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Aspects of Pitch Organization in Schönberg's Variations for Orchestra op. 31

A. Schönbergo Variacijų orkestrui op. 31 garsų aukščių sąrangos aspektai

Abstract

Arnold Schönberg's Variations for Orchestra op. 31 is one of the masterpieces of early twelve-tone composition. The piece comprises an introduction, a theme, nine variations, and a finale. It features an innovative use of twelve-tone rows. Developing a process found in places in earlier compositions, the row is not only used as a melodic/harmonic element, but is also decomposed, or "liquidated," into motivic fragments. Each variation has a particular partitioning scheme that gives it an individual characteristic. The process reaches its apex in the fifth variation in which the row is decomposed into six semitonal dyads. In the fifth variation the theme acts as a *cantus firmus*, progressing through the four combinatorial forms P_{10}, RI_7, RP_{10}, and I_7. The corresponding retrograde-related row forms in the cantus firms are seemingly intended to have the same vertical rows at the corresponding pitch classes, in a principle that acts as a unifying structure. The clarity of this plan, however, is shadowed by the discrepancies found in the score: the dyads do not always suggest exactly those row forms outlined in the plan. Hence a more refined approach is needed. The pitch-class organization in the fifth variation is a result of the interplay of several competing and complementing strategies. I identify six such strategies: *cantus firmus*, alternating prime and inversion forms, isomorphic partitioning, linear voice leading, "odd" and "even" partitions of the aggregate, and four-note motives.

Tracking the row forms and deviations provides insight into Schönberg's musical thinking: the motivic factors and continuity on the musical surface that forced him to go beyond the possibilities offered by the row. They force the listener or analyst to compare the advantages of a strategy based on the row, or one based on a liquidation of the row, to the most generic quality of the aggregate.

Keywords: Schönberg, twelve-tone music, music analysis, semitone dyads, partition, mosaic.

Anotacija

Arnoldo Schönbergo Variacijos orkestrui op. 31 yra vienas iš ankstyvųjų dvylikatonių kompozicijų šedevrų. Kūrinį sudaro įžanga, tema, devynios variacijos ir finalas. Kūrinyje pateikiamas inovacinis 12 garsų serijų panaudojimas. Plėtojant ankstesnėse kompozicijose pastebėtus panašius procesus, garsaeilis ne tik naudojamas kaip melodinis-harmoninis elementas, bet ir išskaidomas (arba likviduojamas) į motyvų fragmentus. Kiekviena variacija pasižymi konkrečia dalijančia schema, kuri suteikia variacijai individualumo. Aukščiausią tašką procesas pasiekia penktojoje variacijoje, kurioje garsaeilis išskaidomas į šešias pustonių diadas. Penktojoje variacijoje tema veikia kaip *cantus firmus*, progresuodama per keturias kombinatorines formas P_{10}, RI_7, RP_{10} *ir* I_7. Atitinkamos *cantus firmus* retrogradinės serijų formos, matyt, turėtų turėti tokias pat vertikales atitinkamose garsų aukščių klasėse, kad būtų sukurtas unifikuotos struktūros principas. Tačiau šio plano aiškumą temdo partitūroje randami neatitikimai: diados ne visada asocijuojasi būtent su tomis garsaeilių formomis, kurios nurodytos plane. Taigi reikia gilesnio žvilgsnio. Garsų aukščių grupių organizavimas penktojoje variacijoje yra kelių tarpusavyje besivaržančių ir viena kitą papildančių strategijų sąveikos rezultatas. Aš nustačiau šešias tokias strategijas: *cantus firmus*, pirminių ir inversijų formų kaitaliojimas, izomorfinis atidalijimas, linijinis balso vedimas, „nelyginis" ir „lyginis" visumos dalijimas ir keturių natų motyvai.

Sekdami garsaeilių formas ir nukrypimus, galime įžvelgti Schönbergo muzikinės mąstysenos ypatumus – motyvų plėtotės veiksnius ir tęstinumą muzikos paviršiuje, verčiančius kompozitorių peržengti garsaeilio siūlomų galimybių ribas. Taigi klausytojas ar analitikas garsaeiliu arba jo likvidavimu pagrįstos strategijos privalumus verčiamas lyginti su labiausiai charakteringa visumos kokybe.

Reikšminiai žodžiai: Schönbergas, dylikatonė muzika, muzikos analizė, pustoninės diados, dalijimas, mozaika.

Introduction

Arnold Schönberg's *Variations for Orchestra* op. 31 is one of the masterpieces of early twelve-tone composition. The piece comprises an introduction, a theme, nine variations, and a finale. The theme is Schönberg's typical arrangement of a set of four hexachordally combinatorial[1] row forms: prime form P_{10}, retrograde inversion RI_7, retrograde P_{10}, and inversion I_7, as shown in Figure 1.[2] The four rows act both melodically (as the theme) and harmonically. In several variations, including the fifth, the theme acts as a *cantus firmus*, progressing through the four combinatorial row forms.

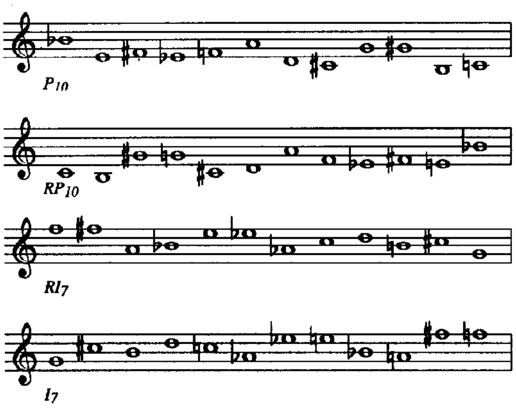

Figure 1. The four rows of the theme

The piece features innovative use of twelve-tone rows. Developing a process found in places in earlier compositions, the row is not only used as a melodic/harmonic element, but is also decomposed, or "liquidated", into motivic fragments. Each variation has a particular partitioning scheme that gives it an individual characteristic. Hence, the piece can be considered a variation on partitions.

The process of decomposing the row into motivic fragments reaches its apex in the fifth variation in which the row is decomposed into six semitone dyads (an event that is already anticipated by the similar partition in measures 24–25 of the introduction). For instance, the first row of the fifth variation, I_{10} = *A4253B671098* is divided into six semitone dyads *98*, *10*, *23*, *45*, *67*, and *AB* as shown in Figure 2. Consequently, in the analysis of this movement we need to consider the partitions of the aggregate in addition to the conventional analytical methods for twelve-tone composition.

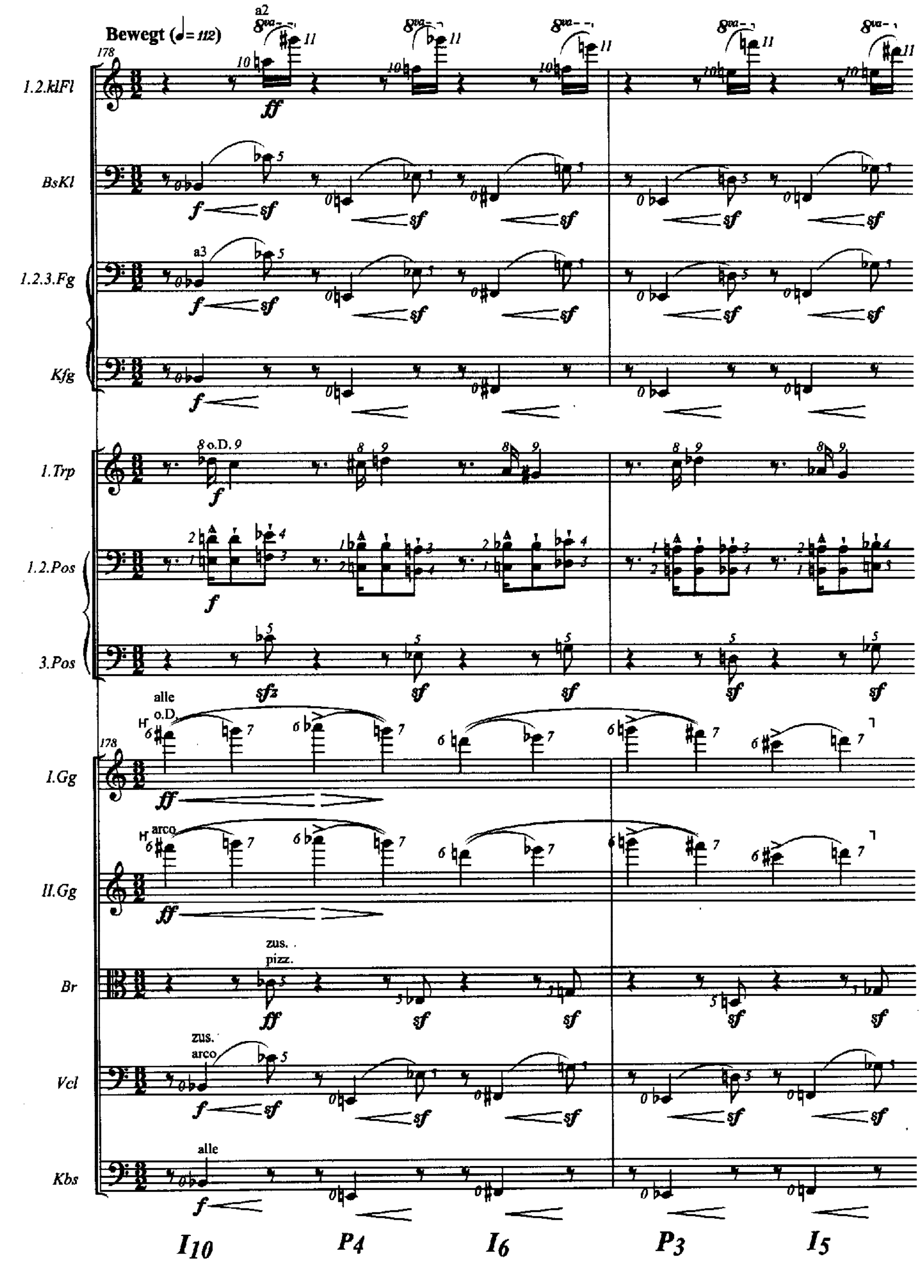

Figure 2. The beginning of the fifth variation. The vertical row forms are enumerated below the score. The numbers beside the notes are order numbers.

I will show in detail in Section 3 that partitioning a row into semitone dyads results in a fundamental ambiguity: the row forms cannot be unequivocally deciphered. Hence, there is a tension between the rows and the properties of the aggregate. I believe that this tension has not been fully addressed in the analyses published so far. On the one hand, the row has a global structural function since it provides a *cantus firmus* that determines, to some degree, the row forms used in this movement. On the other hand, on local detail level, slicing the row into dyads results in the rows losing their identity.

The pitch-class organization of the fifth variation is not only derived from partition schemes, but also from voice exchanges and other schemes. There are two issues to be addressed here. First, what is the basis of the structure, the row or an aggregate formation? Second, what determines the choice of rows and how could the several disparities in an apparently systematic methodology be explained? Why these row forms? How are they related to the musical surface on the one hand and the overall form on the other hand?

Even if we know that this piece is a twelve-tone piece, the case for rows is further weakened since, as I will demonstrate, not all combinations of semitone dyads used in the piece can be directly derived from the rows. Of course, a composer has the freedom to re-order pitch classes in the rows at will. Using twelve-tone rows does not mean that the pitch classes must always appear in precisely the order defined by the row forms. Nevertheless, in this variation we attain the level in which the explanatory power of rows is relatively weak – where the identity of a row is diminished to a minimum. Indeed, it is symptomatic that the analysts do not agree on the row forms in the fifth variation. In this study I hope to clarify some details of the pitch-class organization in this movement and will also suggest some re-interpretations of the row structure based on a careful examination of the dyads and their relations.

The rest of this paper is structured as follows. In Section 2, I will provide the necessary background for the discussion by outlining the structure of the fifth variation. Since the movement is based on semitone dyads, I will analyze the pertinent properties of semitone partitions in Section 3. The main body of this work is in Section 4 in which I will discuss Schönberg's strategies of pitch-class organization. Finally, I will draw some conclusions in Section 5.

1. The structure of the fifth variation

The predominant pattern in the fifth variation is that the rows are sliced into six semitone dyads that are stacked vertically (see Figure 2). Throughout the variation, the vertical rows occur every half-note duration, which results in three vertical rows per measure. In addition, like in some other variations, four row forms P_{10}, RI_7, RP_{10}, and I_7 are used as a *cantus firmus* – one *cantus firmus* note per beat – that runs as a thread through the variation.

The *cantus firmus* holds some pauses, however. Figure 3 shows how the notes of the four cantus firmus rows are distributed over the course of the variation (a black spot denotes a beat that has a *cantus firmus* note and a white spot denotes one that does not). Each of the four *cantus firmus* rows features a unique grouping scheme (naturally, it is precisely the pauses that impose this grouping structure on the *cantus firmus* rows). The first row P_{10} is grouped 5 + 4 + 3, the second row RI_7 is grouped 3 + 2 + 2 + 5 (almost a retrograde of the first one), the third row RP_{10} is grouped 6 + 2 + 2 + 2, and the fourth row I_7 is grouped 5 + 2 + 2 + 3. Furthermore, there is no pause between the last two *cantus firmus* rows RP_{10} and I_7. Thus, the segments with *cantus firmus* notes are relatively short, two to six beats, followed by even shorter interludes.[3]

The texture is usually relatively consistent within the short *cantus firmus* segments and isomorphic partitioning is often employed.[4] There are always textural changes between passages with and without *cantus firmus* notes. For instance, each of the five first beats of the variation (in measures 178–179) has a *cantus firmus* note and the texture is uniform throughout this passage. The sixth beat (last beat of measure 179) does not have a *cantus firmus* note and it has a contrasting texture. In measure 180 both *cantus firmus* notes and the opening texture reappear.

The corresponding retrograde-related row forms of the *cantus firmus* (rows P_{10} and RP_{10} and rows RI_7 and I_7) are seemingly intended to have the same vertical rows at the corresponding pitch classes, in a principle that acts as a unifying structure. Indeed, all cantus firmus beats have the same vertical rows in the analysis of John Covach (2000); Tiina Koivisto (1996) presents only the non-retrograded forms, thus suggesting that the row forms are the same in the retrograded *cantus firmus* rows. The clarity of this plan, however, is shadowed by the discrepancies found in the score. Indeed, a fair amount of goodwill is needed to see this plan worked out because the dyads do not always suggest exactly those row forms outlined in the plan.

Figure 4 shows my interpretation of the row forms at the *cantus firmus* beats. The corresponding vertical row forms are aligned. The corresponding row forms are identical in most cases but not always, for instance, the bottom left corner shows that row P_0 in measure 183.3 is paired with row P_{11} in measure 201.3.

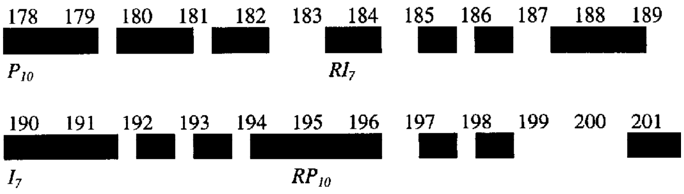

Figure 3. The distribution of the *cantus firmus* notes

measure	178.1	178.2	178.3	179.1	179.2	180.1	180.2	180.3	181.1	181.3	182.1	182.2
	I_{10}	P_4	I_6	P_3	I_5	RI_{11}	RP_0	RI_3	RP_5	RP_9	HRI_{10}	RP_1
CF op	**0**	**0**	**0**	**0**	**0**	**11**	**11**	**11**	**11**	**5**	**5**	**5**
P10 → / RP10 ←	10	4	6	3	5	9	2	1	7	8	11	0
CF op	**0**	**0**	**0**	**0**	**0**	**11**	**11**	**11**	**11**	**5**	**5**	**5**
	I_{10}	P_4	I_6	P_3	I_5	RI_{11}	RP_0	RI_3	RP_5	RP_9	RI_{10}	RP\
measure	194.3	194.2	193.3	193.2	192.3	192.2	191.3	191.2	191.1	190.3	190.2	190.1

measure	183.3	184.1	184.2	185.2	185.3	186.2	186.3	187.3	188.1	188.2	188.3	189.1
	P_0	I_0	I_6	I_2	HP_6*	I_9	P_2	P_8	$P_1=RI_0$	$I_8=RP_9$	I_1	HP_1
CF op	**3**	**1**	**8**	**6**	**9**	**1**	**1**	**6**	**10**	**8**	**0**	**1**
RI7 → / I7 ←	5	6	9	10	4	3	8	0	2	11	1	7
CF op	**1**	**1**	**8**	**6**	**9**	**1**	**1**	**6**	**9**	**11**	**0**	**1**
	P_{11}	I_0*	I_6	I_2	HP_6	I_9	P_2	P_8	RI_0	HP_9	I_1	P_1
measure	201.3	201.2	201.1	198.3	198.2	197.3	197.2	196.2	196.1	195.3	195.2	195.1

Figure 4. The vertical row forms at the *cantus firmus* notes. *Cantus firmus* rows P_{10} and I_7 are read from left to right, and the retrograded rows RP_{10} and RI_7 are read from right to left. Vertical lines separate the *cantus firmus* segments. Asterisk denotes a tweaked row form.

ŅevenÓ partition: {{0, 1}, {2, 3}, {4, 5}, {6, 7}, {8, 9}, {10, 11}}
ŅoddÓ partition: {{1, 2}, {3, 4}, {5, 6}, {7, 8}, {9, 10}, {11, 0}}

Figure 5. Even and odd partitions of the aggregate

Tiina Koivisto (1995, 1996) and John Covach (2000) emphasize the structural plan by interpreting some dyads as reversed and thus tweaking the row forms to fit the plan. I made an effort to be more faithful to the musical surface, embracing the discrepancies, leaving a less polished picture, and treating these tiny irregularities as windows to the pitch-class organization of this piece.

The semitone dyads are very labile: reversing a single dyad can mean that the musical surface results in suggesting a different row. Hence a more refined approach is needed. The discrepancies call attention to how the surface has been constructed. Why are the chosen rows used? Why are there these discrepancies? Why are the individual voices set as they are? Before addressing these issues I will examine in the next section some fundamentals of twelve-tone rows and semitone partitions.

2. The ambiguity of the dyads

Semitone dyads play a crucial role in the fifth variation. Consequently, an interpretation of its musical surface benefits from a theoretical consideration of the partitions of rows into semitone dyads.[5]

The aggregate can be sliced into unordered semitone dyads in two ways, as illustrated in Figure 5.

I will refer to these two as "even" and "odd" partitions. Any row can correspondingly be sliced into either one of these six unordered semitone dyads, using an appropriate *partition scheme* or *order-number mosaic*.[6] The row of opus 31 is no different in this respect, even if its structure might suggest one very natural division: the order-number mosaic A = {{**0**, **5**}, {**1**, **3**}, {**2**, **4**}, {**6**, **7**}, {**8**, **9**}, {**10**, **11**}} in Figure 6.[7] In this partition scheme

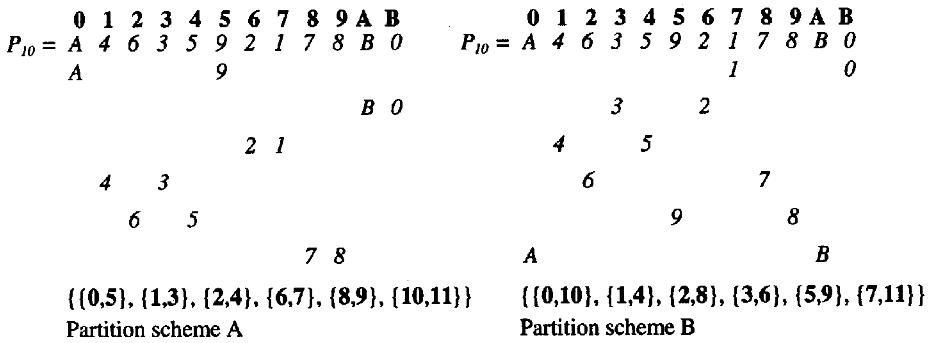

Figure 6. Partition schemes A and B (with the dyads interpreted as unordered dyads) result in six unordered semitone dyads when they are applied to row P_{10} = *A463592178B0.*

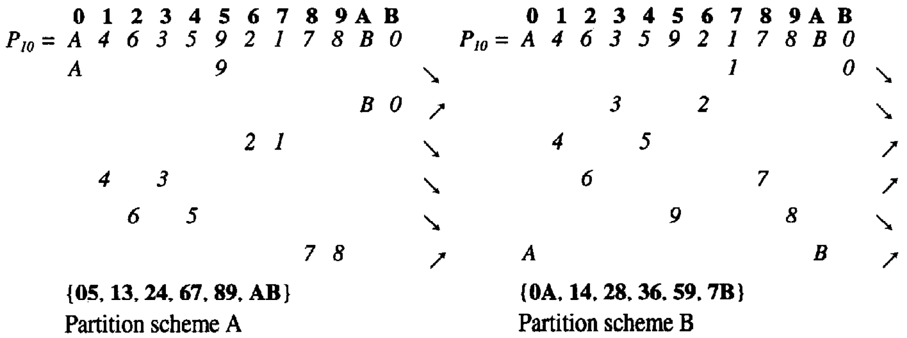

Figure 7. Partition schemes A and B (with the dyads interpreted as ordered dyads) result in six ordered semitone dyads when they are applied to row P_{10} = *A463592178B0.*

the dyads in the second hexachord are contiguous whereas those in the first hexachord are not.[8] By applying this order-number mosaic to row P_{10} = *A463592178B0* we obtain the set of unordered semitone dyads {{*10, 9*}, {*4, 3*}, {*5, 6*}, {*2, 1*}, {*7, 8*}, {*11, 0*}}. Similarly, by the order-number mosaic B = {{**0**, **10**}, {**1**, **4**}, {**2**, **8**}, {**3**, **6**}, {**5**, **9**}, {7, **11**}} to row P_{10} we obtain the set of unordered semitone dyads {{*10, 11*}, {*4, 5*}, {*6, 7*}, {*3, 2*}, {*1, 0*}, {*7, 8*}}. These two order-number mosaics are the only ones that produce a set of six (disjoint) semitone dyads.

Each dyad can be ordered in two ways, which I will term colloquially *up* and *down.* For instance, dyad *01* is up and dyad *10* is down. Correspondingly, dyad *B0* is up and dyad *0B* is down.[9] Using the *rule of product* – a well-known result in combinatorics – we can conclude that, since each dyad can be ordered in two ways, there are $2^6 + 2^6 = 64 + 64 = 128$ ways of ordering these two sets of dyads.

A twelve-tone row constrains the set of ordered semitone dyads that can be derived from it. To create a set of ordered semitone dyads, we may use a partition scheme for unordered semitone dyads as the starting point and take the order numbers in their natural order. Thus, in the prime and inversions forms the order numbers are in ascending order, and in the retrograde and retrograde inversion forms they are in descending order (see also footnote 7). For instance, Figure 7 shows the order-number mosaics that derive the two possible sets of unordered semitone dyads from row P_{10}. By taking the order numbers in those mosaics in their natural order, we obtain the order-number mosaics that yield ordered semitone dyads when applied to row P_{10}. By applying the order-number mosaic[10] {**05**, **13**, **24**, **67**, **89**, **AB**} to row P_{10}, we obtain the set of ordered dyads {*A9*, *43*, *65*, *21*, 78, *B0*}, and correspondingly by applying the order-number mosaic {**0A**, **14**, **28**, **36**, **59**, **7B**} we obtain the set of ordered dyads {*AB*, *45*, *67*, *32*, *10*, *78*}. No other sets of six distinct ordered semitone dyads can be obtained from row P_{10}.

In principle, the 48 row forms in a row class, each with two different order-number mosaics could yield 96 different sets of ordered dyads. In practice, however, no row class yields more than 48 sets of ordered dyads.[11] Some of the 128 sets of dyads cannot be obtained. The 48 distinct row forms of op. 31 yield 48, which is rather typical since about one third of row classes have the same property. Hence, the same set of ordered semitone dyads can always be drawn from at least two row forms (which, in case of symmetrical rows, can be identical in content).

As a result of the above observations, when the row is partitioned into semitone dyads, there, by definition, is not enough information with which to decide the row form. To illustrate this, Figure 8 shows two candidate rows for the first row of the variation.[12] These two rows have exactly the same semitone dyads. We can argue for selecting row form I_{10} in this case, for example, because the two last sixteenth notes of the first beat in the piccolo are order positions **10** and **11** of row I_{10} and hence more plausible than order positions **9** and **8** of row R_{11}.

I_{10} = A4253B671098	**05**	**67**	**13**	**24**	**89**	**AB**
RP_{11} = 109823A6475B	**50**	**42**	**31**	**76**	**BA**	**98**
ordered dyads	*AB*	*67*	*45*	*23*	*10*	*98*

Figure 8. Two row forms with the same six distinct ordered semitone dyads

Adopting a more formal approach, we can consider the row as defining 66 order relations between the pitch classes. The first pitch class precedes the remaining 11 pitch classes, the second pitch class precedes 10 pitch classes, etc. If we consider only the lines containing dyads, only 6 of those relations are left. If we also consider the order relations between voices, for example, the first measure begins with a pitch class at order position **6** – resulting in 6 order violations (since the pitch class at order position **6** precedes the pitch classes at order positions **0**, **1**, **2**, **3**, **4**, and **5**). If we label the first row as I_{10}, there are 16 order violations, and if we label this row as R_{11}, there are 24 order violations. This is a difference in degree, but not in quality.

The order violations provide a tangible means to help the otherwise slippery decision of which of the two candidates better fits the musical surface.[13] There is, however, no ubiquitous rule for deciding the row form. For example, two detailed analyses of the variation, by Koivisto and Covach, do not always agree on the row forms. Nevertheless, they tend to prefer the choice with less order violations, but there are other factors as well.

We can gain further insight by considering distributions of the ups and downs of the dyads as shown in Figure 9. The two partition schemes have unique patterns of ups and downs. Inversion and retrograde exchange up and down in the pattern, but do not alter the pattern otherwise. Therefore, using the first partition scheme, all rows will have four ups and two downs or two ups and four downs, and the pattern is up-up-up-down-up-down or down-down-down-up-down-up. Similarly, using the second partition, all rows will have three ups and three downs.

unordered dyads	*{0,1}*	*{2,3}*	*{4,5}*	*{6,7}*	*{8,9}*	*{10,11}*	
Partition scheme A	↗	↘	↘	↘	↗	↘	***P_{11}***
Partition scheme B	↗	↘	↘	↗	↗	↘	***P_0***

Figure 9. Up dyads and down dyads of partition schemes A and B

As illustrated in Figure 9, these two patterns of ups and downs only differ at one point. Reversing one dyad transforms a B-type partition scheme into an A-type partition scheme and vice versa. The published analyses do not seem to utilize the partition scheme B in Figure 6 at all – not even when the music presents us with exactly this pattern of dyads. For instance, the last beat of measure 183 presents the ordered dyads *67*, *89*, *32*, *BA*, *54*, and *01*. These dyads suggest row forms T_0 = *06857B439A12* or I_{11} = *B536407821A9*. Nevertheless, John Covach (2000, 328) prefers to interpret dyad *67* in this passage as a reversed dyad *76* and labels this row as RI_{10} = *890176B3524A*.

In sum, partitioning rows into dyads results in a fundamental ambiguity regarding the row forms. In the following section I will provide means to tackle this ambiguity by discussing strategies for pitch-class organization which can be used as arguments for row choices.

3. Strategies for dyad organization

Dividing a row into six dyads could lead to a fragmental musical surface. However, Schönberg takes measures to guarantee continuity on a local level and unity on the level of the whole variation. In the following section I will discuss the musical surface of the fifth variation in more detail.

The pitch-class organization in the fifth variation is a result of the interplay of several competing and complementing strategies. I will outline six such strategies below: *cantus firmus*, prime and inversions forms, order-number mosaics, local continuity, the parity of the semitone dyads, and four-note motives. The first three are general strategies, whereas the latter three are more local ones that provide some possible explanations for the discrepancies found in the score – these deviations provide an excellent viewpoint on the piece. The pertinent question is: what is obtained by going beyond the partitions offered by the row forms?

3.1. *Cantus firmus*

In several cases, the initial pitch class of the vertical row is derived from the *cantus firmus*. For instance, the first pitch class of the first *cantus firmus* row is *Bb* and the first row of the fifth variation is I_{10}, which begins with pitch class *Bb*. Naturally, this strategy is only applicable when the vertical row is based on a *cantus firmus* note. Figure 4 enumerates the vertical rows associated with each note of the *cantus firmus*. An examination of the row forms reveals that the two row pairs of retrograde related *cantus firmus* rows – rows P_{10} and RP_{10} versus rows RI_7 and I_7 – have quite different characteristics with regard to the *cantus firmus* note. In the vertical rows associated with the *cantus firmus* rows P_{10} and RP_{10}, the *cantus firmus* note appears in a fixed order position (**0**, **11** or **5**).[14] The vertical rows associated with the *cantus firmus* rows I_7 and RI_7 allow no such logic. Thus, the prime and retrograde *cantus firmus* rows determine the vertical rows, not so with the inversion and retrograde inversion *cantus firmus* rows.

3.2. Prime and inversion forms

The *cantus firmus* determines the pertinent vertical row forms only to a certain degree and hence another principle is needed: alternation of prime and inversion forms (or, correspondingly, retrograde and retrograde inversion forms). While this alternation is not an all-pervasive rule, it is far too frequent to be merely coincidental. Furthermore, the alternation of prime and inversion forms is already established in the beginning of the fifth variation.

The first five row forms of the fifth variation employ the *cantus firmus* notes *Bb–E–F#–Eb–F*. Since the first row form is I_{10} and prime forms and inversions alternate, the first five vertical row forms are I_{10}, P_4, I_6, P_3, and I_5. The partition scheme A is employed here: *cantus firmus* notes are pitch classes at order position **0** and they are paired with pitch classes at order position **5**; according to partition scheme A, pitch classes at these two order positions form a semitone. As the prime and inversion forms alternate, the semitone is either up (realized in the pitch-space as a minor ninth up) or down (realized as a major seventh up).

In principle, the combination of the two strategies for row choice – the *cantus firmus* note and the alternation of prime and inversion forms – could determine all vertical row forms (as long as they are based on the *cantus firmus*). In practice, in some places Schönberg allows other strategies to override these two. Nevertheless, even when a different strategy is prevalent, prime and inversion forms (or retrograde and retrograde inversions forms) tend to alternate, even beyond changes in texture. Mixing non-retrograded row forms with retrograded ones is considerably less frequent.

The combination of these two strategies is surely a good way to begin a variation. However, it would not be typical of Schönberg to continue in this manner for an extended period of time. In general, Schönberg opts for variety in this variation. While short passages are unified using homogeneous texture, variety is preferred for longer spans.

The alternation of prime and inversion forms brings up one source of differences in the row labels. For example, in the first two beats of measure 188 there are really no compelling reasons to choose between the possible row forms. On the first beat of measure 188 the dyads *10, 54, 76, 98, AB,* and *23* suggest row forms P_1 and RI_0. Correspondingly, on the second beat the dyads *89, 23, 45, 76, 01,* and *BA* suggest row forms I_8 and RP_9. Selecting the retrograded forms would give the same forms as in the corresponding measures. However, the principle of not mixing retrograde related row forms would here suggest non-retrograded forms. Similarly, the decision of the row form in the third beat of measure 182 can be explained as avoidance of mixing retrograde and non-retrograde forms.

3.3. Isomorphic partitionings

Let us next consider how the dyads are distributed among the individual voices. The most straightforward strategy of distributing a row's dyads would be to keep the same order positions in each voice in consecutive statements of the row; in other words, the use of isomorphic partitioning.[15] Indeed, many passages in the variation could serve as textbook examples of isomorphic partitionings, for example, the first five row forms. All instruments play pitch classes at the same order positions in each vertical row form – except the trombones: I will analyze this exception later.

Combining the fixed order positions with the alternation of successive prime and inversion forms results in a compromise: all dyads in each voice are related by transposition or inversion. Of course, in a case where the partitions always involve just six semitones (the argument would be trivial as all semitones are, of course, transpositionally or inversionally related). However, the same strategy can also be applied when the partition involves a wider array of interval-classes. For example, in measure 180 the rows are partitioned using the order-number mosaic {**05**, **13**, **24**, **68**, **7B**, **9A**} and, as a result, the dyads belong to interval classes *1, 3,* and *5*.

If only transpositionally related row forms were used in a combination of isomorphic partitioning, the surface would become very redundant – a transposed repetition of a block of dyads. The interval between the dyads would be the same in every voice. Now, as the row forms alternate between prime and inversion forms, the intervals between the dyads of individual lines vary. For example, the interval between the two first *cantus firmus* notes is a tritone, but all other voices have smaller intervals.

3.4. Local continuity: stepwise voice leading, mirrors and repeated dyads

The alternation of prime and inversion forms does not guarantee linear aggregate formation. The pitch-class organization in this movement is not based on combinatoriality.[16] On the contrary, repetition of the same pitch classes in a single voice is certainly accepted and often intentional. We only need to look at the four first pitches of the *Haupstimme* of the first violin: *F#–G–Ab–G*. This brings us to the issue of local continuity. It seems that local continuity is either behind several compositional choices in the piece, or is a direct result of them.

Local continuity can be accomplished in several manners. In the following I will discuss three strategies employed in the fifth variation: stepwise voice leading, mirrors, and repeated dyads. The mirrors, in particular, can be considered as forms of Schönberg's technique of developing variation, since they introduce change while retaining connection to the previous material.[17] The borderline between mirrors and repeated dyads is blurry, in particular when only some voices are mirrored and other voices repeat dyads.

3.4.1. Linear voice leading

Voice leading in the fifth variation can be analyzed using the conventional model of melody and accompaniment, whereby the *cantus firmus* and the *Haupstimme* serve as melodies and the remaining voices form the accompaniment.

Traditional stepwise or nearly stepwise voice leading is preferred within groups of few row forms for the sake of continuity. Sometimes the combination of fixed order positions and the alternation of successive prime and inversion forms result in relatively linear voice leading – at least in some voices. At other times some tweaking has been made to ensure linearity.

Let us examine at the opening of the fifth variation. The order-number mosaic {**05**, **13**, **24**, **67**, **89**, **AB**} is applied here consistently to the five first vertical row forms associated with a *cantus firmus* note. According to this scheme, the flute plays semitone dyads which are derived from pitch classes at order positions **10** and **11**. These dyads are realized in the pitch space as an ascending minor ninth for ascending semitone dyads and an ascending major seventh for descending semitone dyads. Due to the structure of the row, these dyads always have the opposite direction to those formed by pitch classes at order positions **0** and **5**; hence an up dyad realized as an ascending minor ninth in the bass is complemented by a down dyad realized as an ascending major seventh in flute and vice versa. For the first pitch classes of the flute dyads, the alternation of successive prime and inversion forms here result in very smooth linear voice leading.

The issue of linear voice leading really comes to the fore in the trombone parts. These two parts are the only ones not using the same set of order positions in all five dyads: the two trombone parts alternate between order positions **1/3** and **2/4**: trombone I plays pitch classes at order positions **2/4**–**1/3**–**2/4**–**1/3**–**2/4** and trombone II plays pitch classes at order positions **1/3**–**2/4**–**1/3**–**2/4**–**1/3**. While there is a leap after the first dyad, the rest of the passage is very linear, with trombone I playing *Bb–A–Bb–Cb–A–Ab–A–Bb* and trombone II playing *C–B–C–Db–B–Bb–B–C*. In particular, without the exchange of order positions, the second trombone line would be *E–F–Bb–A–C–Db–A–Ab–B–C,* which is clearly more "bumpy" than the present line.

Another passage featuring exemplary linear voice leading is found in the oboe and viola in measures 187–188. Figure 10 reproduces the viola part with the pertinent row forms and order positions. Two beats of measure 188 employ order positions **1/3** and **6/7**. Here linearity and parallel motion is obtained by exchanging order positions between two voices. In the row form P_8, at the end of measure 187, different order positions (**1/3** and **2/4**) are used rather neatly: first, the parallel motion between the voices is retained (and also realized in the pitch space as parallel minor sevenths), and second, the order positions **6/7** could not have been used anyway, since the pitch classes at those order positions are needed for the *cantus firmus* dyad *C–B* in the cello part.

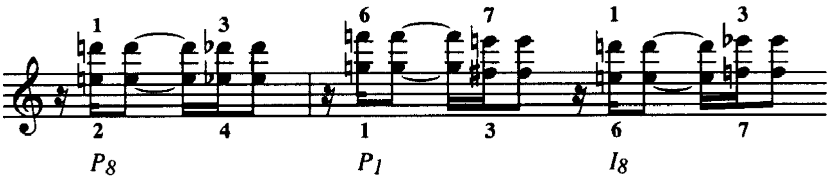

Figure 10. Viola part of the third beat of measure 187 and the first two beats of measure 188

3.4.2. Mirrors

Mirrors – statements of dyads followed by a retrograde of same – provide a method to enhance local continuity. Usually mirrors do not appear in all voices but only in some prominent ones.

Let us consider the ordered dyads at both sides of the bar line between measures 181 and 182, shown in Figure 11. These dyads present a mirror and also the first instance of discrepancy in this variation: namely, no row form satisfies the set of ordered dyads {*10*, *32*, *54*, *67*, *98*, *BA*} found in the first half note of measure 182 (since it contains five down dyads and a single up dyad; as shown in Figure 6, using partition schemes A and B, the distribution of up dyads and down dyads in all row forms is either 2/4 or 3/3).

181.3	182.1
01	*10*
23	*32*
45	*54*
76	*67*
89	*98*
BA	*BA*

Figure 11. The dyads at both sides of the bar line between measures 181 and 182

At least two interpretations can be given to the first beat of measure 182. The mirror motivates the first one. All dyads at both sides of the bar line between measures 181 and 182 are reversed, except the dyad *B–Bb* (played by the double bass). In three voices – those played by the trombones and violins – the mirror is explicit (these are within a box in Figure 11). Hence, we could say that the two pertinent rows are retrograde related: the row in the last beat of 181 is RP_9 (with no discrepancies) and the row in the next beat is its retrograde $RRP_9 = P_9$ with the one reversed dyad. Pitch classes *Bb* and *B* cause the discrepancy: their order has to be reversed because here *B* is a *cantus firmus* note, and the established pattern is that a *cantus firmus* note is presented first and followed by a leap up (either a major seventh or a minor ninth). Schönberg apparently wanted to retain the same pattern in the bass with which the *cantus firmus* notes have been used since the beginning of the variation.

The second interpretation utilizes a "hexachord trick" as shown in Figure 12: the notation HRI_{10} denotes a row form where the order of the pitch classes of only one of the hexachords has been retrograded in the first beat of measure 182.[18] As a result, a new distribution of ups and downs is obtained: one to five (dyads *98*, *10*, *32*, *54*, *BA* are down, and one dyad, *67*, is up). Other

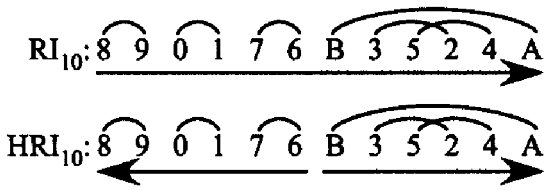

Figure 12. The interpretation of the notation HRI_{10}

movements in the piece support this somewhat unconventional interpretation: there are passages in which one hexachord is one segment and the other, retrograded hexachord is the second segment.

In the case of dyads, we again have no evidence to decide whether this is a prime form, or a retrograde form with the reversed dyads in the second hexachord; thus the identity of a row is further diminished.

Another example of a mirror is the third beat of measure 182 and, curiously enough, it also involves a discrepancy. Figure 13 shows the dyads and row forms from the second beat of measure 182 to the first beat of measure 183. No row form satisfies the set of ordered dyads {*01*, *32*, *45*, *76*, *89*, *BA*} from the last beat of measure 182. The pattern is up-down-up-down-up-down and it cannot be obtained by using the hexachord trick, since the hexachord trick always gives a pattern of five ups and one down, or vice versa.

182.2	182.3	183.1
45	*45*	*54*
BA	*BA*	*AB*
67	*76*	*76*
89	*89*	*98*
32	*32*	*23*
01	*01*	*10*
$I_0=RP_1$	*???*	$RI_0=P_1$

Figure 13. The dyads in the second and third beats of measure 182 and the dyads from the first beat of measure 183

However, as shown in Figure 13, the dyads in the last beat of measure 182 are nearly the same as those of the previous beat and they almost form a mirror with the next beat. Furthermore, the dyads on the second beat of measure 182 and the dyads on the first beat of measure 183 create a mirror. The only difference between the dyads of the second and third beats of measure 182 is the dyad *67*. Thus, the vertical row form in the last beat of measure 182 could be interpreted as a deranged version of the row in the second beat of measure 182.

Two mirrors were discussed above: a proper mirror between the dyads of the second beat of measure 182 and the dyads of the first beat of measure 183, and a "deranged" mirror between the dyads of the last beat of measure 182 and the dyads of the first beat of measure 183. However, this time the musical surface does not support the mirror argument as strongly as in the previous case. The instrumentation and texture change considerably between the dyads of the real mirror row pair. The texture remains relatively similar in the dyads of the deranged mirror row pair, but even in this case the mirrored dyads appear in different instruments thereby making the perception of the mirror more difficult.

Giving a row label to the last beat of measure 182 is practically arbitrary. It is not a *cantus firmus* row, so we cannot seek help from a corresponding measure. The hexachord trick does not work, we must arbitrarily decide which of the dyads must be reversed: reversing any of its six dyads would give two candidate rows. Consequently, there are twelve equally plausible row labels to choose from.

Two further cases of mirrors deserve to be mentioned. First, in the first and second beats of measure 187 row forms I_{10} and RI_{10} are presented. Here the musical surface again strongly supports the mirror. Several inverted dyads appear in the same voice or the same instrument group: *F#–G/G–F#* in the English horn and bass clarinet and *D–Eb/Eb–D* in the "high" clarinets (this mirror is also in pitch). In addition, the four-note successions *Bb–Cb–Db–C/Db–C–B–Bb* in the harp and bassoon present a deranged mirror (reversing dyad *Db–C* in the latter results in a proper mirror). Again, no row form is compatible with the actual set of dyads on the second beat of measure 187; hence a reinterpretation is needed. In order to "complete" the mirror, the ordered dyad *A–G#* of the violin is assigned order positions **10** and **11** (which are in the wrong order on the surface), and similarly the ordered dyad *Db–C* of the harp is assigned order positions **8** and **9** (again in wrong order).

The second case is the row forms RP_0 and P_0 in the last half note of measure 191 and the first half note of measure 192. This is a rare case of presenting a row and its retrograde consecutively with no discrepancy whatsoever involved. In principle all dyads are reversed here. However, in practice the reversal is not easily audible, since the texture and partition scheme change between the two row forms.

Sometimes just a few dyads are mirrored. For example, in the last two half notes of measure 186 the flute dyads *C–B/B–C* and the horn dyads *A–Bb/Bb–A* create mirrors, and in the last two half notes of measure 190 the harp dyads *Eb–D/D–Eb* and *F–E/E–F* create mirrors. These local mirrors provide a handy means to enhance local continuity by association.

In sum, the mirrors are a prominent and easily recognizable element of the fifth variation. It is hardly a coincidence that the mirrors and discrepancies tend to appear together: it seems that Schönberg was willing to sacrifice the consistency of the row forms in order to create these mirrors.

3.4.3. Dyads with repeated pitch classes

Dyads with repeated pitch classes in a prominent voice provide yet another way to enhance local continuity by association. Two cases are possible: either the two consecutive dyads begin with the same pitch class or end with the same pitch class. Both create an association between the dyads.

The first four measures are full of dyad pairs with repeated pitch classes. The *Haupstimme* in the violins in the first four measures provides a particularly good example. The dyads are first at order positions **6/7** and then at order positions **5/0**; the row forms are determined by the *cantus firmus* and the principle of alternating prime and inversion forms. Nevertheless, the melody in the *Haupstimme* does not sound like a "by-product". It is actually smoother than the *cantus firmus* line. In addition, if we look at the row forms at/in measures 180–181, the lines with semitone dyads have order positions **5/0**. The resulting sequence of dyads is *C–B B–C E–D# E–F*, which contains several repeated pitch classes (including a mirror) and is considerably smoother than the line *G#–A Eb–E C–B Ab–G*, which the dyads at order positions **7/6** would have produced. In addition, this is a persuasive explanation of why it is the hexachord with order number **012345** that is partitioned into semitone dyads and not the other.

In conclusion, at the very beginning of the variation Schönberg announces an important pitch-organization strategy that is used in several places in the variation. I would suggest that this possibility of creating smooth lines with carefully selected order positions supports the idea of using alternating prime and inversion forms.

3.5. Odd and even dyads

Let us now consider the unordered dyad partitions in more detail. As discussed in Section 3, the aggregate can be divided into six even or six odd dyads. If two (different) consecutive vertical row forms are both divided into even dyads (or into odd dyads), then they both have the same unordered dyads, but not the same ordered dyads. The combination of the row form and the partition scheme decide both the even/odd aspect and the number of ascending/descending dyads. For example, if the partition scheme A (see Figure 6) is

182			183			184			185	
P_9	I_0	P_{11}	RI_0	P_8	P_0	I_0	I_6	I_8	RP_1	I_2
e	e	e	e	o	e	e	e	e	e	e

end of cantus firmus row P_{10} **new cantus firmus row RI_7**

Figure 14. Distribution of even and odd dyads in measures 182–185. *Cantus firmus* beats are within boxes.

used, all prime and retrograde inversion forms have two ascending and four descending dyads, and all inversion and retrograde forms have four ascending and two descending dyads. Furthermore, all odd prime and retrogression forms (like P_3 and RP_3) have even dyads (and even prime and retrogression forms have odd dyads), and all odd inversion and retrograde inversion forms (like I_7 and RI_7) have odd dyads (and even inversion and retrograde inversion forms have even dyads). We are lead to ask: is there some system in how the even and odd dyads are used?

The fifth variation contains long stretches of rows that are partitioned into sets of dyads of the same parity. A human would certainly like to see a pattern therein. However, probability theory tells us that even a relatively long stretch does not require the intention of a composer *per se*, since random processes do provide similar results.

The longest stretch of dyads of the same parity appears from the end of measure 181 to the middle of measure 185 (see Figure 14). Within this passage we find a stretch of even dyads with a single exception, which occurs just before the new *cantus firmus* in measure 183. Since the exception falls on a structurally important point in this variation, it is improbable that this is a mere coincidence. This variation can be divided into four sections based on the *cantus firmus* row. The other two section changes involve a tempo change, but this one is indicated by the parity of the dyads.

3.6. Four-note motives

In the introduction of the piece, a *B–A–C–H* motive (using the German spelling) is dramatically introduced. Using isomorphic partitioning the dyad *B–A* is drawn from one vertical row form and the dyad *C–H* is drawn from the following one; both dyads are at order positions **0** and **5**. The *B–A–C–H* motive does not appear in the fifth variation, but the manner of using four-note motives is similar in making the connection clear.

Let us consider the trombones at measure 185. The four-note motive *D–Eb–Gb–F* in the *Haupstimme* is clearly emphasized in the texture. The pitch classes are from two consecutive row forms and in both rows the pertinent order positions are **0** and **5**. Similarly in the corresponding measure 198 we have the very same dyads in the second violin; pitch classes are again drawn from two consecutive row forms and in both rows the pertinent order positions are **0** and **5**. In both measures 185 and 198 the hexachord trick is used and in measure 185 with an additional discrepancy.

In conclusion etc., the four-note motive in the fifth variation is associated to the *B–A–C–H* motive in the Introduction paving way to an abundant use of the motive in the Finale. In the two passages just discussed, the motive is introduced even at the cost of going beyond the dyad organization provided by the 48 row forms.

3.7. Discrepancies

Finally, let us try to sum up the discrepancies and how they correspond to the musical surface. Many of the discrepancies in the *cantus firmus* can be explained using the corresponding *cantus firmus* beat. But when we do not have a *cantus firmus* row we cannot discern between hexachord tricks and discrepancies: we do have measures with hexachords and we do have genuine discrepancies. Which should we choose?

184.1	201.2
01	01
32	32
45	45
67	67
89	89
BA	AB
I_0	$I_0^* = HI_6$

Figure 15. The dyads in the first beat of measure 184 and in the second beat of measure 201

In the second beat of measure 201 we have five ups and one down, as illustrated in Figure 15. An H means that the dyads of one of the hexachords have been reversed. An asterisk means that some extra tweaking has been done. We must choose between row form I_6 with the hexachord trick or row form I_0 with a discrepancy. Because the row in the corresponding measure 184 is I_0, it is plausible to consider this as a genuine discrepancy.

Let us consider the second beat of measure 200. The interpretation is more difficult here, since this is not a *cantus firmus* row form. The set of segments *F#–G* in flute, *Bb–Cb* in clarinet, *C–Db* in bass clarinet, *E–F–Eb–D* violin, and *A–Ab* in cello is not compatible with any row form. If we keep the four-note segment, reversing any of the remaining dyads does not help. Partitioning the segments to dyads does not help either: no row form is compatible with this set of dyads {*67*, *AB*, *01*, *45*, *32*, *98*}. If we want to interpret the segments we need either to reverse two dyads or split the four-note segment into two dyads and reverse either *67*, *AB*, *01,* or *45*. But then it is hard to tell which one of the dyads we should reverse. Perhaps the original reason for this problem is due to the dyads *AB* and *01* of the clarinet and bass clarinet, which are retained from the previous row form. Perhaps this is also a case where Schönberg sacrificed the strict serial principle in order to enhance local continuity (and texture) by retaining two dyads.

4. Conclusions

I have shown that a set of semitone dyads does not unequivocally define a row form. In addition, while the rows are, in principle, split into dyads in the fifth variation, there are some discrepancies: changing the order of one dyad may result in an unexpected row form, and sometimes no row form satisfies the set of dyads. The identity of a row is shallow indeed. Hence we can pose the question: is the variation based on rows or is it based on dyads? The components are the surface arrangement, row information, and the dyads. Both rows and the aggregate formation provide explanatory power: in most of the cases, the overall scheme and the pertinent row form define the dyads (even if there are usually two row forms satisfying the set of dyads), but the dyads seem to have a will of their own.

Some of these discrepancies have an explanation, others have not and they remain as discrepancies. In any case, I do not consider the discrepancies as "mistakes" – at least in most cases. Instead, they provide us with spots where Schönberg deemed it necessary to deviate from the overall plan: the local details were more important than a strict adherence to serial principles.

The four *cantus firmus* rows do carry a structural role. However, on the surface the aggregate formation and the properties of the semitone dyads seem to have more explanatory power. For the creation of the musical surface with the local continuities, the possibilities provided by the 48 row forms were not quite enough: a set of ordered dyads not satisfied by any row form was required.

Tracking the row forms and deviations provides insight into Schönberg's musical thinking: the motivic factors and continuity on the musical surface that forced him to go beyond the possibilities offered by the row. They force the listener or analyst to compare the advantages of a strategy based on the row, or one based on a liquidation of the row, to the most generic quality of the aggregate.

The complexity of the forces behind the musical surface of the fifth variation is astonishing. Our analysis of these forces demonstrates that twelve-tone composition is far from a mechanical adherence to a strict compositional system – an offense of which twelve-tone composition is sometimes accused. On the contrary, local continuity, association, and developing variation are compositional strategies that are familiar from the earlier styles and, as the fifth variation vividly corroborate, they have found life and meaning in the skillful hands of Schönberg.

Notes

[1] Schönberg (1975) describes his technique of using inversionally related ("combinatorial") row forms in his essay "Composition with twelve tones". Since Schönberg, due to the work of Donald Martino (1961), Milton Babbitt (1974), Daniel Starr and Robert Morris (1977, 1978), and many others, combinatoriality is one of the most thoroughly studied aspects of twelve-tone rows.

[2] Throughout this article, I will use a flavor of numeric notation known as *fixed-zero notation*. Hence, *0* denotes *C*, *1* denotes *C#*, etc. When required by the clarity of spacing, *A* and *B* stand for pitch classes 10 and 11, respectively. Row P_{10} denotes the prime form that begins with pitch class *10*, row I_7 denotes the inversion form that begins with pitch class *7*, and RP_{10} and RI_7 denote corresponding retrograde forms. Hence, using this notation the four *cantus firmus* rows are P_{10} = *A463592178B0*, I_7 = *71B20834A965*, RP_{10} = *0B871295364A*, and RI_7 = *569A43802B17*.

[3] On the average, segments based on the *cantus firmus* span 3.4 beats and the other segments span only 1.8 beats.

[4] See Haimo and Johnson (1984) for a discussion on isomorphic partitioning.

[5] Naturally, a corresponding theory could be developed for dyads in which the interval is larger than a semitone.

[6] Donald Martino (1960) introduced the term "mosaic". Andrew Mead (1988) provides an extensive study on mosaics.

[7] I adopt Andrew Mead's practice of using bold type for order positions and order numbers. In addition, the order positions of retrogrades and retrograde inversions run "backwards", that is, the first order position of a retrograde or a retrograde inversion is **11** and the last order position is **0**.

[8] It is surely not a coincidence that Schönberg, who favored hexachordal combinatoriality, should favor a partition scheme in which the dyads are within the hexachords.

[9] I use here the words up, down, ascending, and descending only to differentiate between the two ordered dyads; they do not refer to pitch space.

[10] Note that the dyads here are written as ordered dyads.

[11] The proof of this claim is straightforward and involves the pigeonhole principle. However, as the proof is relatively lengthy, I omit it here.

[12] The two candidate rows in the partition scheme A are always related by retrograde inversion.
[13] We could also consider only order violations within the hexachords.
[14] Here order positions **0** and **11** denote the first pitch class of the row form, since when the *cantus firmus* notes are at order position **11** the respective vertical row forms are (always?) retrogrades.
[15] Sometimes the choice between two possible row forms can be made on the basis of continuing an isomorphic partitioning.
[16] Just for the record, dyad combinatoriality using this or any other row would be perfectly possible, even if alternating prime and inversions forms are required. It is a property of the aggregate, not of any particular row. The combination of dyad combinatoriality and *cantus firmus* would require a row specifically constructed for that purpose.
[17] For a discussion on developing variation in Schönberg's serial music, see Haimo (1997).
[18] The order numbers are reordered as **5432106789AB**. Hence, we can think of this ordering of pitch classes as a combination of retrograde (order positions **543210**) and prime form (order positions **6789AB**).

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Santrauka

Arnoldo Schönbergo Variacijos orkestrui op. 31 yra vienas iš ankstyvųjų dvylikatonių kompozicijų šedevrų. Kūrinį sudaro įžanga, tema, devynios variacijos ir finalas. Kūrinyje pateikiamas inovacinis 12 garsų serijų panaudojimas. Plėtojant ankstesnėse kompozicijose pastebėtus panašius procesus, garsaeilis ne tik naudojamas kaip melodinis-harmoninis elementas, bet ir išskaidomas (arba likviduojamas) į motyvų fragmentus. Kiekviena variacija pasižymi konkrečia dalijančia schema, kuri suteikia variacijai individualumo. Aukščiausią tašką procesas pasiekia penktojoje variacijoje, kurioje garsaeilis išskaidomas į šešias pustonių diadas.

Penktojoje variacijoje (kaip ir kai kuriose kitose variacijose) tema veikia kaip *cantus firmus*, progresuodama per keturias kombinatorines formas P_{10}, RI_7, RP_{10} ir I_7. Atitinkamos *cantus firmus* retrogradinės serijų formos, matyt, turėtų turėti tokias pat vertikales atitinkamose garsų aukščių grupėse, kad būtų sukurtas unifikuotos struktūros principas. Tačiau šio plano aiškumą temdo partitūroje randami neatitikimai: diados ne visada asocijuojasi būtent su tomis garsaeilių formomis, kurios nurodytos plane. Kombinatorinių procesų pateikiamas argumentas gali būti panaudotas kaip priemonė parodyti, jog garsaeilius dalijant į pustonių diadas išgaunamas fundamentalus garsaeilių formų daugiaprasmiškumas: pustonių diadų kompozicija garsaeilio formos vienareikšmiškai neapibrėžia. Taigi penktojoje variacijoje vyrauja įtampa tarp garsaeilių ir visumos savybių. Viena vertus, garsaeiliui būdinga globalinė struktūrinė funkcija, kadangi jis suteikia *cantus firmus*, kuris iš dalies nustato šioje variacijoje naudojamas garsaeilių formas. Be to, vertinant lokaliniu-detaliuoju lygmeniu, į diadas susmulkinti garsaeiliai praranda savo tapatumą.

Straipsnyje aš nurodau, kad garsų aukščių grupių sąranga penktojoje variacijoje yra kelių tarpusavyje besivaržančių ir viena kitą papildančių strategijų sąveikos rezultatas. Aš nustačiau šešias tokias strategijas. Pirma, *cantus firmus* nutiesia giją, kuri driekiasi per visą kūrinio dalį. Ji suformuoja bendrą planą ir yra reikšmingiausias veiksnys, nulemiantis garsaeilius. Tačiau dvi retrogradinių *cantus firmus* garsaeilių poros – garsaeiliai P_{10} *ir* RP_{10} bei garsaeiliai RI_7 ir I_7 – pasižymi gana skirtingomis *cantus firmus* savybėmis. Vertikaliose eilėse, susijusiose su *cantus firmus* garsaeiliais P_{10} ir RP_{10}, *cantus firmus* kartojasi fiksuotoje padėtyje (**0, 11** arba **5**). Vertikaliose eilėse, susijusiose su *cantus firmus* garsaeiliais RI_7 ir I_7, tokios logikos nėra. *Cantus firmus* išlaiko tokias pat pauzes, tačiau *cantus firmus* segmentai yra santykinai trumpi, nuo dviejų iki šešių taktų, o juos lydi dar trumpesnės interliudijos. Taigi *cantus firmus* yra ne visose garsaeilių formose.

Antra, pirminių ir inversinių formų (ir atitinkamai – retrogrado ir retrogrado inversijų formų) kaitaliojimas. Nors šis kaitaliojimas nėra visa apimanti taisyklė, bet jis kartojasi taip dažnai, kad laikyti tik sutapimu negalima. *Cantus firmus* nulemia atitinkamas vertikalių garsaeilių formas tik iš dalies; *cantus firmus* ir pirminių bei inversinių formų kaitaliojimas kartu gali sąlygoti visas garsaeilių formas, kuriose yra *cantus firmus*.

Trečia, izomorfinis dalijimas naudojamas visoje variacijoje: daugelis variacijos pasažų gali būti chrestomatiniu izomorfinio dalijimo modeliu, pavyzdžiui, pirmosios penkios garsaeilių formos.

Pirmosios trys strategijos gali egzistuoti kartu, nesukeldamos neatitikimų. Tačiau ketvirtoji strategija – lokalinis tęstinumas – yra neatitikimų šaltinis. Aš matau tris būdus, kuriais išgaunamas lokalinis tęstinumas. Tai balso vedimas etapais, veidrodžiai ir pasikartojančios diados. Norėdamas užtikrinti lokalinį tęstinumą, Schönbergas manė, kad reikia keisti bendro plano apibrėžtą garsaeilio formos siūlomą diadų kompoziciją.

Penkta, yra tik du visumos padalijimo į šešias pustonines diadas būdai: {{0, 1}, {2, 3}, {4, 5}, {6, 7}, {8, 9}, {10, 11}} ir {{1, 2}, {3, 4}, {5, 6}, {7, 8}, {9, 10}, {11, 0}}. Pirmąjį aš vadinu „lyginiu" padalijimu, o antrąjį – „nelyginiu". Ilgiausia analogiškų diadų tąsa yra nuo 181 takto pabaigos iki 185 takto vidurio. Šiame pasaže yra lyginių diadų tąsa, išskyrus vienintelę išimtį prieš pat naują *cantus firmus* 183 takte. Kadangi ši išimtis yra struktūriškai svarbiame šios variacijos taške, neįtikėtina, kad tai būtų tik sutapimas.

Šešta, Schönbergas naudoja keturių natų motyvus, kurie siejasi su *B-A-C-H* motyvu pirmoje kūrinio dalyje, nutiesdami kelią gausiam motyvų panaudojimui finale.

Apibendrindamas aš parodau, kad pustonių diadų kompozicija garsaeilio formos vienareikšmiškai neapibrėžia. Be to, nors garsaeiliai iš principo yra suskaldyti į diadas penktojoje variacijoje, galima pastebėti tam tikrų neatitikimų: pakeitus vienos diados formą, galima išgauti netikėtą garsaeilio formą, ir kartais nė viena garsaeilio forma neatitinka diadų kompozicijos. Garsaeilio identitetas iš tiesų yra paviršutiniškas. Taigi galima kelti klausimą: kuo variacija pagrįsta – garsaeiliais ar diadomis? Sudedamuosius elementus sudaro paviršiaus komponavimas, garsaeilių informacija ir diados. Tiek garsaeiliai, tiek visumos derinys atlieka aiškinamąją funkciją: daugeliu atvejų bendra schema ir tam tikra garsaeilių forma sąlygoja diadas (net jeigu paprastai yra tik dvi garsaeilių formos, atitinkančios diadų kompoziciją), tačiau diados tarsi turi savo atskirą valią. Kai kuriuos neatitikimus galima paaiškinti, o kai kurių – ne. Jie taip ir lieka neatitikimais. Šiaip ar taip, nemanau, kad neatitikimai yra „klaidos" – bent jau didžiuma atvejų. Greičiau jie nurodo mums tas vietas, kur Schönbergas manė esant būtina nukrypti nuo bendro plano: lokalinės detalės buvo svarbesnės nei griežtas serijų principų laikymasis.

Ketvirtasis *cantus firmus* iš tiesų atlieka struktūrinį vaidmenį. Tačiau panašu, kad paviršiuje visumos darinys ir pustoninių diadų savybės turi didesnės aiškinamosios galios. Lokaliai nenutrūkstamam muzikos paviršiui sukurti 48 garsaeilių formų teikiamų galimybių neužteko: reikėjo sutvarkytos diadų serijos, kurios neatitiktų nė viena garsaeilio forma.

Sekdami garsaeilių formas ir nukrypimus, galime įžvelgti Schönbergo muzikinės mąstysenos ypatumus: motyvų plėtotės veiksnius ir tęstinumą muzikos paviršiuje, kas verčia jį išeiti už garsaeilio siūlomų galimybių ribų. Taigi klausytojas ar analitikas yra verčiamas palyginti garsaeiliu ar jo „likvidavimu" pagrįstos strategijos privalumus su labiausiai charakteringa visumos kokybe.

Už penktosios variacijos muzikinio paviršiaus slypinčių jėgų sudėtingumas stebinantis. Šių jėgų analizė rodo, kad dvylikatonei kompozicijai tikrai nebūdingas mechaniškas griežtos kompozicinės sistemos laikymasis, t. y. nusižengimas, kuriuo dvylikagarsė serija kartais yra kaltinama. Priešingai, lokalus tęstinumas, asociacijos ir plėtotė yra kompozicinės variacijos strategijos, žinomos iš ankstesnių stilių ir – tai gyvai patvirtina penktoji variacija – atgijusios bei įgavusios prasmę meistriškose Schönbergo rankose.