Expanding a redundancy:
Manipulating row forms through augmentation
in Webern's *Symphony* Op.21

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Essay #2
11.15.10

In *Symphony* Op. 21, Webern constructs intricate, detailed, and crystalline structures using the inherent features of the tone row. Beyond the row being combinatorial, the ordering of intervals which assembles the row create opportunities for intense symmetrical variation, hence the form is theme and variation. In wading through layers upon layers one finds that Webern creates the proverbial onion in which each deeper layer is more interesting and rigorously structured than the previous. Such is the case with the variations. In a direct comparison of the theme with variation IV (henceforth V.4) comes augmentation of identical structure through row expansion.

The tone row used by Webern is inversionally combinatorial which limits how many available permutations exist. Instead of the typical forty-eight there are half as many, twenty-four. This is significant as the retrograde versions can be eliminated because simply transposing the prime or inverted row a tritone reveals its retrograde. See example 1.

Example 1: Prime and inversion permutations have same retrograde row form
which when applied to matrix produces 24 permutations.

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        ┌─────────────────────────────►
P-5 | 5 8 7 6 T 9 3 4 0 1 2 E | R-5
I-E | E 2 1 0 4 3 9 T 6 7 8 5 | RI-E
        ◄─────────────────────────────┘
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There are two opposing views on why or why not to include designations of the retrograde row form. First, is to keep the retrograde as an analytical tool because there are many palindromes and symmetrical structures which are easier to see when labeling a row as its prime and retrograde versions. Many times in this piece occurs a prime form followed by its retrograde. Using this method makes it more apparent on the surface to what is going on.

Second, it is redundant to use retrograde forms when there are perfectly good prime and inversion forms lying about. Viewing retrograde forms in this manner actually brings out more of the processes in this piece as well as the genius of Webern. It would be easy to simply write a row form followed by a retrograde version of itself, but to be able to weave intricate fabrics through the inherent symmetrical properties of the row requires more rigor from the composer and a more structured technique of composition, both compositional characteristics of Webern.

The row is symmetrical due to the interval order being reflected around an axis between order numbers six and seven. Either moving from the axis or the outside in reveals the same interval structure. See example 2.

Example 2: Symmetrical intervals in tone row. Going from the axis out or
the outside in produces the same interval order.

5 8 7 6 T 9 3 4 0 1 2 E
  3   1   1   4   1   6   1   4   1   1   3
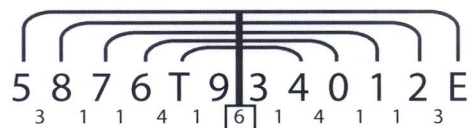
The row is primarily derived from small intervals, mostly semi-tones. The first and last interval, the minor third, plays an important dual role in importance as it is aurally easy to hear (which lends it to surface importance) as well as can be overlapped with a complementary row that contains the same minor third. The other distinguishing feature is expanding from <9 3> in order numbers 6 and 7 out are all the same interval, the tritone. This is an important feature as the tritone is also the transposition level at which rows become combinatorial.

Variation IV employs four rows simultaneously two times. The first four rows (P_1, I_{10}, I_0, P_{11}) come before the mirror point in m. 50 and the last four (P_3, I_8, P_1, I_{10}) after. Rows P_1 and I_{10} get used twice which brings the actual total row usage to six. In example 3, the first four rows only make it through row order 8 (except P_1 which makes it through 10) while the last four begin on order 5 (except P_1 which begins on 3). This means that the last four (or two), or first four (or two) order numbers are missing from each side. See example 3[1]:

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[1] See Appendix 1 for a full page of this example.

Example 3: Anton Webern, *Symphony Op. 21* mm. 45-56.
Row permutations in V.4. The first four rows, P₁, I₁₀, I₀, P₁₁ 1 2 3 4 5 6 7 8 (9 10)
and last four, P₃, I₈, P₁, I₁₀ (3 4) 5 6 7 8 9 10 11 are missing the last and first
four (two) order numbers.

Each row from the first half has a complimentary row in the second, which is
designated in this example by the same colored boxes. The rows are paired
according to the overlap of order numbers 11 and 12 in the first with order
numbers 1 and 2 in the second. Combination of two rows forms a meta-row. See
example 4.

Example 4: Combination of overlapping rows to form a meta-row for row P₁ and I₁₀.

When mirroring out from the overlapping point (mirror point) which contains <T
7>, notice the pattern of same (or similar) dyads moving out. Dyads <8 9>, <3 2>, <1

4>, and the center <T 7> are symmetrical by pair, not by discreet pitch. This is important when comparing V.4 to the theme; Webern uses dyads here in the same way he uses pitches in the theme. Order numbers 5 6 and 7 8 in P_1 and I_{10} swap places symmetrically by dyad and by order number by pitch from 6 5 E 0 to 5 6 0 E. Even though it looks like only the order numbers switched, when moving out symmetrically from the middle the two dyads are swapped.

Webern treats the meta-row in the same way as a normal row and thus treats dyads as pitches. In V.4 the dyad is the smallest unit for manipulation. With this in mind the movement can be re-analyzed according to ordering dyads instead of pitches. See example 5[2].

Example 5: Anton Webern, *Symphony Op. 21* mm. 45-56.
Meta-row order numbers by dyads.

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[2] See Appendix 2 for a full page of this example.

Order numbers 5 6 7 8 are contained in measure 50. 5 8 are labeled orange to designate difference from the rest of the meta-rows by using five order numbers on the outside of the mirror point. Notice that the rhythm within each meta-row is consistent, then reversed after the axis. The only parameter that changes after the midpoint is the orchestration[3] while the rhythm stays the same. The expansion of the tone row into the meta-row is a variation of a typical row manipulation, but on a larger scale.

Completion of the row aggregates occurs in m. 50, which is the mirror point for the movement. This measure is drastically different than the rest of the movement in color, tempo, and rhythm. See example 6.

Example 6: Anton Webern, *Symphony Op. 21* m. 50.
Parts are not transposed.

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[3] While examining the meta-row, it will be noticed that order numbers <3 4> and <9 10> are not a palindrome. This is due to the double swap inherent to the tone row construction. The meta-row order number is switched as well as the tone row order.

This dramatic (albeit understated) climax breaks the continuity of the rest of the movement that is rigidly rhythmic and pointillistic. This measure is also a repository for the missing pitches. Each row is missing four pitches with the exception of P_1 which is missing two. P_1 is missing order numbers 11 12 with the second P_1 missing numbers 1 2; the other rows are missing order numbers 9 10 11 12 and 1 2 3 4. Example 7 shows how Webern meticulously crafted this measure to contain all missing pitches.

Example 7: Distribution pitches according to meta-rows in the mirror point, m. 50.
Order numbers 9 10 11 12 belong to rows P_1, I_{10}, I_0, P_E while order numbers
1 2 3 4 belong to I_{10}, P_1, P_3, I_8.

Orange: T7 / T7
Rows: P-1, I-10

Green: 3214 / 1432
Rows: I-10, P-1

Red: 5436 / 3654
Rows: I-0, P-3

Blue: 6785/ 8567
Rows: P-E, I-8

The top four measures display the termination or genesis of each row. Webern is strict in regarding the "moving forward" rule of number ordering; the numbers never go backward but occasionally align vertically. The orange rows have the only repeated order number in the whole variation, B-flat is repeated as order number 11 which then allows the G to be written as number 12. All four rows contain some type of symmetry, with green and blue being the most pronounced. The bottom measure shows by color matching which pitches are contained in which rows. Every pitch is accounted for.

The structure that is common to the theme and V.4 (as well as other variations) is the idea of inserting twelve elements in the place of eleven. Both numbers (as well as any number) can be split symmetrically; in even numbers the axis is between two numbers while in odds the axis is the median number. This means that twelve would be split between six and seven while eleven would mirror around six. There is only one solution for transforming twelve symmetrical elements into eleven, overlap elements six and seven into one value. See example 8.

Example 8: Symmetrical transformation of twelve elements on to eleven.

11 elements	1	2	3	4	5	6	7	8	9	10	11	
12 elements	1	2	3	4	5	6						
							7	8	9	10	11	12
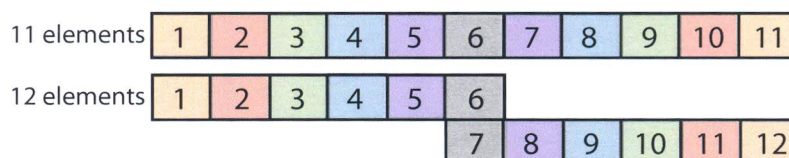
The color coding shows which elements are mapped over the axis. This transformational idea manifests itself in two ways in the theme and V.4. First, the

theme maps P5 on to eleven measures at a pacing of one order number per measure,

except at the mirror point which has order numbers 6 7. See example 9.

Example 9: P5 mapped out over first eleven measures in the theme.
Order numbers 6 7 overlap in measure 6.

This transformation is at a one-to-one level, each element directly maps onto another element. This is the foundation for the second transformation in V.4 which changes the mapping ratio from one-to-one to two-to-one. This is the heart of the variation of the theme. Instead of mapping twelve values onto eleven, Webern doubles it to two rows or twenty-four discreet pitches. As shown previously, the pitches are paired into dyads to form meta-rows that then transform to the one-to-one mapping of elements to measures in the theme. See example 10.

Example 10: Hierarchal structure of transformations of twelve row orderings onto eleven measures. Theme to measure is one-to-one. Variation IV to theme is two-to-one which then maps to eleven measures.

Measures		1	2	3	4	5	6	7	8	9	10	11
Theme	Meta-Row	1	2	3	4	5	6/7	8	9	10	11	12
Variation IV	Row	1 2	3 4	5 6	7 8	9 10	11 12 / 1 2	3 4	5 6	7 8	9 10	11 12

The transformation from twenty-four pitches to eleven measures happens through the same ordering distribution as the theme. This pitch expansion is the main variant between the theme and V.4.

This expansion is also mapped rhythmically. The theme (Example 9) is a rhythmic palindrome around the center axis. Since only one row is being utilized, the pitches are not symmetrical, but the rhythmic structure is. Variation IV is the same in that the pitches are not an exact palindrome, but the rhythm is. It can be broken down into rhythmic cells that each meta-row strictly adheres to as seen in example 11.

Example 11: Rhythmic cells used by each dyad in the same meta-row. Colored numbers designate meta-rows.
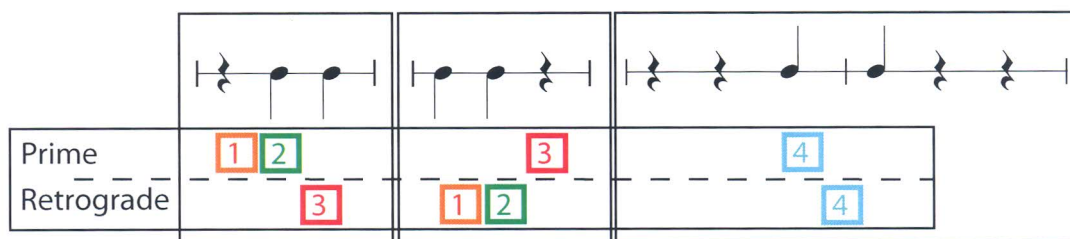

These three rhythmic cells cover the possible range of rhythms given a quantization of three; the first note of each dyad either begins on beat one, two, or three. Looking at the score may tell a different story as to the strictness of the palindrome; but, as stated earlier, the only parameter that changes is the orchestration not the rhythmic symmetry.

The final comparison between the theme variation IV is in how the different rows interact. The theme has a quality of melody and accompaniment. This is achieved partially through orchestration as the clarinet is the continuous melody

while the harp and horns supply the background. More importantly though is the

use of the row in determining this relationship. The clarinet uses one complete row

form P_5 while I_{11} (the retrograde) is split between three instruments. It is this row

stratification that delineates the foreground and background. Variation IV is more

subtle than this. The texture is more homogenous than the theme but is not without

row stratification. Meta-rows 1 and 2 (or rows P_1-I_{10} and I_{10}-P_1) are of more interest

and importance than meta-rows 3 and 4 in that they are derived from only two

rows. See Example 12.

Example 12: Common row usage between meta-row 1 and 2.
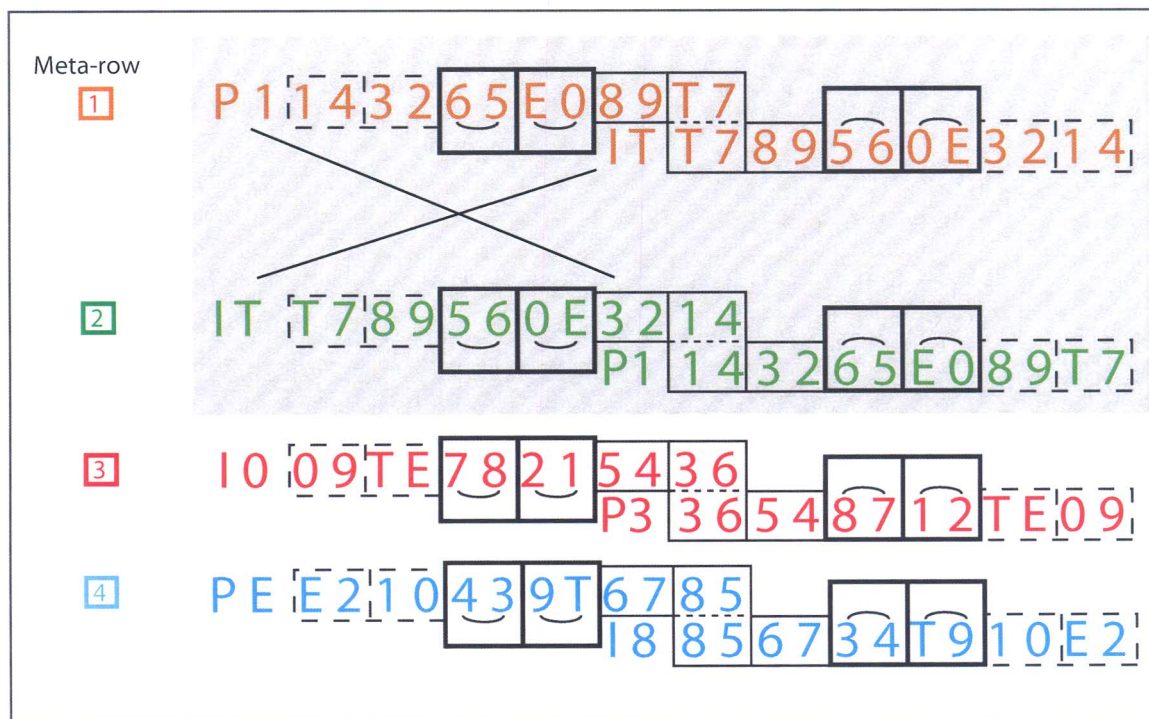
This gives them more significance due to the repeated material whereas 3 and 4 are derived from separate row forms. Furthermore meta-row 1 is more important in that it begins and ends the variation as well has two more order numberings outside the mirror point. Meta-row 1 contains tone row numbers 1-10 while the rest contain 1-8. This continuation gives the meta-row dominance over other rows structurally creating a hierarchal order of importance, which can be equated to a melody-accompaniment relationship.

The idea of a theme and variations traditionally is one of mostly aural conception. A successful theme and variations will, now matter how varied, allow the theme to seep through in the variations. It is this aural relationship that challenges composers to push the limit of how varied to construct each variation. Webern added to this form not more aural relationships[4] in the variations but varying the use of the row and its inherent symmetrical properties. The success of this movement lies not in hearing the theme but for the theme to produce stratification of commonality and variance of how the row is being used. In this case between the theme and variation IV, Webern uses row augmentation into the creation of a meta-row that achieves identical structure of twelve ordered elements mapped onto eleven measures. This is but one way in which variance occurs in this movement.

The way Webern manipulates rows in less apparent on the surface than a theme and variations written two hundred years ago, but is no less interesting to hear and to understand. The rigorous structure derived from the row in

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[4] Although through the row construction aural relationships can be heard, particularly with the minor third.

conjunction with symmetry in all forms creates a complex, layered, and stratified movement that only becomes more amazing as each successive layer is peeled off. Webern can be seen as the Godfather of modernism and the 'future' of music of the twentieth century, which can easily be seen in the abstraction of this traditional form. It seems that Webern took an old, well used form and retrograded it into the future.

APPENDIX 1: Full page of example 3.

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APPENDIX 2: Full page of example 5.