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## Unlocking the Secrets of William O. Smith's Five Pieces for Clarinet Alone: Analyzing 12-tone Music

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William O. Smith is a popular composer of clarinet repertoire, and much of his music is atonal. While it is possible to perform music without awareness of underlying structures, performers who take the time to study the basic construction of the pieces they play will find such analysis brings greater intelligence and richness to their performance. Unfortunately, atonal music often seems intimidating and confusing, although with the proper tools it can be analyzed as readily as tonal pieces. It is the intention of this paper to provide the fundamental skills that will allow performers to detect the basic structure of atonal pieces.

I have selected "Rhythmic," the third movement of Five Pieces for Clarinet Alone by William O. Smith, as an example to analyze because it is fairly uncomplicated and yet illustrates Smith's extremely creative use of 12-tone rows. Much of the theoretical information used here is outlined by Allen Forte in *The Structure of Atonal Music* (Yale University Press, 1973).

### 12-tone Rows

The two basic compositional structures found in atonal music are 12-tone rows and sets. A 12-tone row is a pattern containing all 12 notes of the chromatic scale, and is used as the foundation for both melody and harmony. During the compositional process the original row, called the prime row, may undergo various changes, including transposition, inversion (upside down), retrograde (backwards), and retrograde inversion (backwards and upside down).

It is interesting to note that when manipulating 12-tone rows, some composers always follow the order of the prime row exactly, without skipping or repeating notes, until all 12 pitches have been used. Other composers, like Smith, tend to be more liberal in this regard, often repeating notes of the row, or combining rows and sets in the same piece.

### Sets

Sets are a little more complicated than rows. A set is a group of notes in which the intervallic relationship between pitches is more important than the order of those pitches. For example, sets 0 1 3, 1 0 3, and 3 0 1 are all forms of the same independent set because they share the same pitches and intervals. Independent sets such as these are usually unordered, while sets that are portions of a 12-tone row usually keep their original order. Although Forte defines sets as having 3-8 notes, I believe Smith at times uses sets containing only two notes.

Like rows, sets can be varied through transposition, inversion, etc. In addition, a pitch can belong to two interlocking sets at the same time. For example, pitch 7 belongs to both sets 027 and 792. Although Smith makes extensive use of sets in this piece, they are more challenging to analyze; in this paper, therefore, I will concentrate primarily on his use of 12-tone rows.

### Tools for Analysis

*Step 1: the Key.* Creating a key provides the basis for all further analysis.

- On staff paper, notate an ascending chromatic scale beginning on the first note of the piece. (Note the non-standard chromatic scale notation, reflecting the actual pitches used in this piece).
- Number the notes of the scale from 0 to 11. (Contrary to traditional theory, the first note will be 0, not 1.)



*Step 2: Coding*

Using the key, place the appropriate number above each note of the piece, like solving a coded message. The note number will be the same regardless of the octave. Measures 1-6



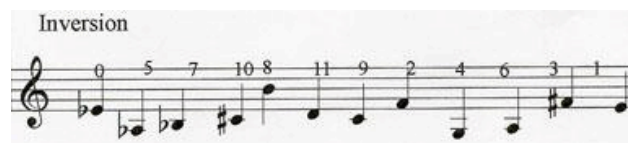
*Step 3: Identifying the Prime Row (Original Row)*

Locate the 12-tone row in the music and notate it on the staff. In Smith's music, the row is always the first 12 different notes of the piece; in music by other composers, however, it may be necessary to resort to a guess-and-check method in order to find the row.



*Step 4: Creating the Inverted Form of the Row*

Create the inversion by subtracting each number of the prime row from 12. For example, the first number of the prime row is 0;  $12 - 0 = 12$ . In this number system, however, we substitute the numeral 0 for 12, since the pitches are the same, so the first note of the inversion is 0. The second number of the prime row is 7;  $12 - 7 = 5$ , so the second note of the inversion is 5.



*Step 5: Creating a Row Matrix*

- Make a 12 by 12 grid. This row matrix will show all four forms of the prime row and will yield all possible transpositions.
- Place the *prime row* pitch numbers into the first *row* at the top of the chart, from left to right.
- Place the *inverted row* pitch numbers into the first *column* at the left of the chart, from top to bottom. Note that 0 is in the first square of both row forms.

0	7	5	2	4	1	3	10	8	6	9	11
5											
7											
10											
8											
11											
9											
2											
4											
6											
3											
1											

- Place the *inverted row* pitch numbers into the first *column* at the left of the chart, from top to bottom. Note that 0 is in the first square of both row forms.

#### Step 6: Creating Transpositions

To construct transpositions, take a number from the first column and add that number to each number of the prime row. For example, to transpose the second row (which begins with 5), add 5 to each note number of the prime row, placing the answers in the squares to the right of the numeral 5. When transposing the 8th note of the prime row, the answer ( $10 + 5 = 15$ ) must be reduced in order to represent one of the 12 pitches. To do so, just subtract 12 from 15, and enter the numeral 3 into that square.

- Continue until all rows are filled in. The completed row matrix will yield all possible transpositions of the four row forms.

Prime												
	0	7	5	2	4	1	3	10	8	6	9	11
Inversion	5	0	10	7	9	6	8	3	1	11	2	4
7	2	0	9	11	8	10	5	3	1	4	6	
10	5	3	0	2	11	1	8	6	4	7	9	
8	3	1	10	0	9	11	6	4	2	5	7	
11	6	4	1	3	0	2	9	7	5	8	10	
9	4	2	11	1	10	0	7	5	3	6	8	
2	9	7	4	6	3	5	0	10	8	11	1	
4	11	9	6	8	5	7	2	0	10	1	3	
6	1	11	8	10	7	9	4	2	0	3	5	
3	10	8	5	7	4	6	1	11	9	0	2	
1	8	6	3	5	2	4	11	9	7	10	0	
	Retrograde											

Retrograde Inversion

- Prime rows are read left to right, inverted rows are read from top to bottom, retrograde rows are read from right to left, and retrograde inversion rows are read from bottom to top.
- Before proceeding further, check to see that each row has 12 different numbers and that the numeral 0 forms a diagonal from top left to bottom right.

#### Analysis Using the Matrix

When the row matrix is complete, we can begin to analyze the piece, looking for additional row statements in order to determine the underlying structure. Refer to the row matrix as the analysis progresses. The example below shows the first appearance of the prime row in "Rhythmic", occurring at the beginning of the movement. The pitch numbers correspond with the prime row numbers entered into the top row of the matrix.

#### Measures 1-4

Music

The last two pitches in measure 4 appear to form one of the 2-note sets mentioned earlier. When this piece is fully analyzed, it can be seen that these two notes function like a cadence, and can be seen at the end of row statements throughout the movement.

As the piece continues, we need to look for additional occurrences of the row. In the example below, however, the notes do not seem to correspond to any of the row forms in the matrix. (Please note that in this movement Smith uses only the prime row and its transpositions.)

Measures 5-10

In situations like this, it becomes necessary to think creatively, looking for clues that could help identify the row. In this piece, Smith makes extensive use of accents and dynamic changes. In addition, rhythm can be another clue, so it is worthwhile to study the rhythm of the prime row.

If we re-examine this section using the accents and dynamics as guides, it becomes apparent that they are outlining a statement of the row P 9 (9 4 2 11 1 10 0 7 5 3 6 8), highlighted in yellow in the example below. The in-between notes should be evaluated to see if they fit into a row form; in this case they do not, but further analysis will show us that they do indeed form another melody.

Measures 5-10

In the next example, we must once again look for hints such as accents, dynamics, and rhythm in order to find the row. Using these clues, we can find a statement of the row P 5. (5 0 10 7 9 6 8 3 1 11 2 4).

Measures 11-15

Measures 16-20 are similar to the two examples we have just explored, so let us now skip to the final section of this movement, which begins with a statement of row P 11.

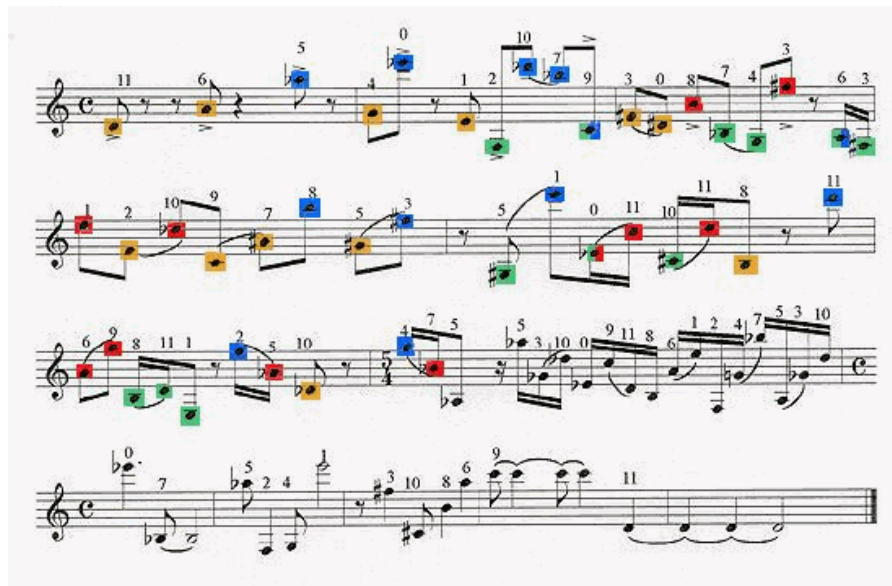
*Measures 22-33*

As before, the in-between notes should be examined. In this case, these notes form another statement of the row, beginning before the first statement is complete. As a matter of fact, this passage contains four overlapping statements of the row! In the example below, each entrance is shown highlighted in a different color. (I use highlighted notes in my performance score when I play this movement.)

- The first voice to enter is row *P 11*, shown here in yellow. Notice that the range corresponds to the tenor voice part in a four-part choir.
- Row *P 5*, shown here in blue, enters before row *P 11* is finished. The range of this voice roughly corresponds to the soprano part.
- Row *P 2*, highlighted in green, corresponds to the bass part.
- Row *P 8*, shown in red, corresponds to the alto part.

*Measures 22-33*





At this point it becomes clear that Smith has cleverly incorporated a traditional formal technique into his atonal music: *this movement is actually a four-voice fugue, and the section we just examined is a stretto!*

The movement concludes with a final statement of the prime row (measures 29-33), altered slightly by large octave displacements and subtle changes in note values, although the underlying rhythmic pattern is the same.

#### Implications for Performance

As we have seen, in the early passages of this movement Smith clearly indicates the rows through the use of dynamic level and accents. Performers who carefully follow these markings will naturally emphasize the row statements. During the stretto, however, the entire section is marked *molto* with no changes. Because of this, I do not believe that in the stretto Smith intended for clarinetists to try to differentiate each row during performance, although each entrance is marked by accents on the first two notes.

When possible, it can be very helpful to communicate with composers about their music. For example, in corresponding with Smith, I have learned that in writing *Five Pieces*, his intent was to explore the possibilities of the solo clarinet playing more than one voice at a time. In addition, I have noticed many similarities between Smith's *Five Pieces* and Stravinsky's *Three Pieces*; Smith confirmed that he greatly admires the way in which Stravinsky wrote for the clarinet. If the composer is no longer living, it can be beneficial to look up program notes or letters from the composer, or to read analyses of the pieces by others.

#### Conclusion

With practice, the basic tools outlined in this paper can be used to analyze all types of atonal music. Such analysis, while perhaps a little time-consuming, is not difficult, and the rewards are tremendous. I believe that incorporating the analysis of atonal music into performance preparation will result in deeper understanding of the music, more intelligent phrasing and styling, and a more meaningful performance for any clarinetist.