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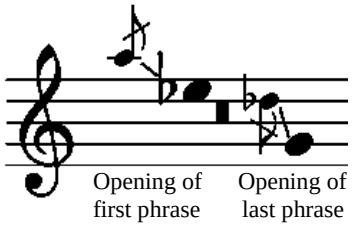
Analysis of *Caprice No. 42*

Throughout George Rochberg's *Caprice No. 42,* I hear a kind of palindrome and inverse effect, both in the structure of the piece as a whole as well as in individual pitch class sets. The way Rochberg weaves all of the material together in this way assists the performer in knowing which sections to connect. In addition, when the music deviates from the palindrome and inverse effect, this informs the performer to give special attention to these differences. I will explain this palindrome structure first by taking a broad view of the piece, then comparing individual pitch class sets in normal and prime forms, and then finally mention some of the ways Rochberg tampers with the palindrome structure.

As would be expected with a palindrome, the first and last phrases of *Caprice No. 42* are incredibly similar; see Example 1:

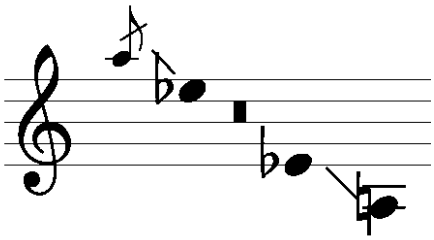
Example 1: cross-reference of A-natural / E-flat and D-flat / G-natural in Rochberg, *Caprice No. 42*



The " ▮ " in Example 1, and in following examples, represents all of the notes not notated, allowing me to show the similarities between the two phrases. Both begin with a grace note and then a gliss down. Although the pitch classes of the two phrases are not the same, the

opening of the first phrase, pitch classes 9 and 3, relate at T_4 to create the opening of the last phrase, pitch classes 1 and 7. Perhaps even more interesting, however, is that the piece's first two pitch classes, 9 and 3, are the inverse of the last two pitch classes, 3 and 9; see Example 2:

Example 2: cross-reference of A-natural / E-flat and E-flat / A-natural in Rochberg, *Caprice No. 42*



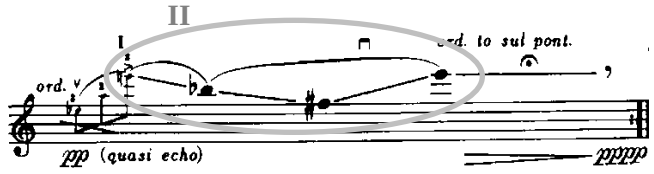
Opening of first phrase

Ending of last phrase

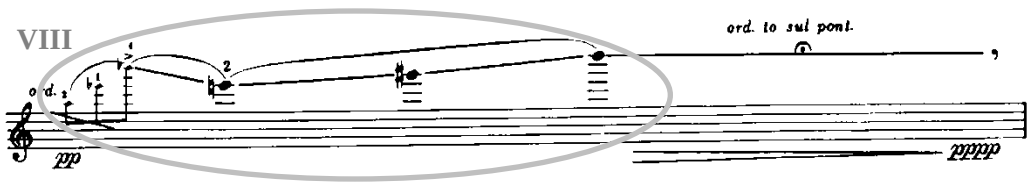
This connection between the opening and ending notes depicted in Example 2 might be hard to make if one just listened, since the opening two notes are connected by a grace note and then a gliss, while the last two notes are simply connected by a gliss. In addition, it is important to note that while the opening and concluding two notes are the same pitch classes—9 and 3 and then 3 and 9—they are not the same pitches; the conclusion of the piece is played an octave lower than the opening.

The next layers of the palindrome are the phrases found in the first half of line 2 and the entirety of line 5; see Example 3:

Example 3: cross-reference of lines 2 and 5, and pitch class sets II and VIII, in Rochberg, *Caprice No. 42*



Opening of line 2 and pitch class set II

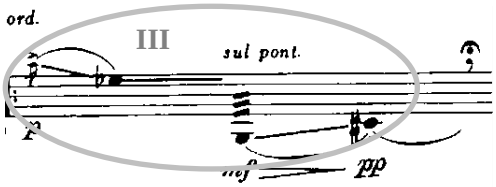


Entirety of line 5, pitch class set VIII

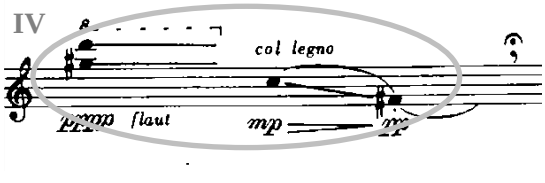
In Example 3 both lines open with a run of three grace notes. These pitch class sets are not identical, but the first two notes of each line are transpositions of each other. The first two pitch classes of line 2—3 and 9—are related at T_6 to create the first two pitch classes of line 5—9 and 3. Thus, in a way the opening of line 5 is the inverse of the first two pitch classes of line 1.

The middle section of the caprice, the beginning of the B section, clarifies the palindrome structure of the piece even further; see Example 4:

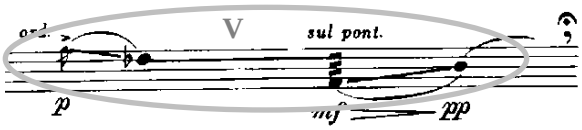
Example 4: cross-reference of lines 2-4 and pitch class sets III-VI in Rochberg, *Caprice No. 42*



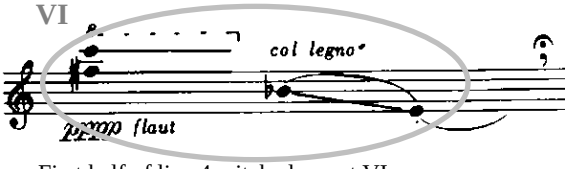
Second half of line 2, pitch class set III



First half of line 3, pitch class set IV



Second half of line 3, pitch class set V



First half of line 4, pitch class set VI

In Example 4 I have arranged each of the pitch class sets found in lines 2 through 4 in such a way as to highlight their connections. I hear the second half of line 2 and first half of line 3 as a kind of phrase, and then the second half of line 3 and first half of line 4 as another phrase. These two phrases are the middle of the caprice's palindrome structure and look incredibly similar. The beginning of each phrase begins with a gliss down from a grace note and then a gliss going up. The second half of each phrase begins with a double-stop and concludes with a gliss going down.

To further confirm that the phrases found in the middle of the palindrome are connected, Rochberg simply relates pitch class sets III and IV to pitch class sets V and VI at T_{10}. In other

words, pitch class set III, <9371>, is related at T_{10} to pitch class set V, <715E>, and pitch class set IV, <2806>, is also related at T_{10} to pitch class set VI, <06T4>. In addition, pitch class set III relates at T_5 to pitch class set IV, which relates at T_5 to pitch class set V, which in turn relates at T_5 to pitch class set VI. This results in a steady descent in the actual pitch space.

Despite the B section's clear palindrome structure, the final phrase found at the end of line 4 presents an issue; see Example 5:

Example 5: cross-reference of line 4 and pitch class VII in Rochberg, *Caprice No. 42*

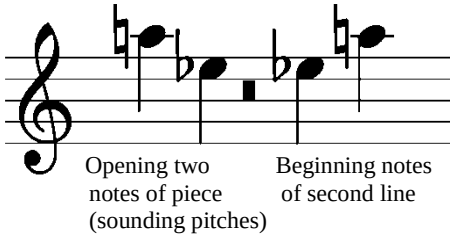
Last half of line 4, pitch class set VII

Due to the palindrome structure of the caprice, every phrase has a "duplicate" phrase; the only exception is the phrase depicted in Example 5. Though I will discuss the significance of this later, when I explore the ways Rochberg defies expectations, I think it is important to mention here that despite pitch class set VII's puzzling placement, it is still connected to the preceding pitch class sets. Like pitch class sets III and V, pitch class set VII begins with a gliss down. Furthermore, the first two pitches of pitch class set V, 7 and 1, relate at T_{10} to create the first two pitches of pitch class set VII, 5 and E. This is identical to the way pitch class set III transposes to create pitch class set V.

I found even more inverse relationships in this caprice when I analyzed each pitch class set at an even deeper level. I have already mentioned that the pitch class set that opens the piece is transposed to begin line 6, and its inverse concludes the piece (see Examples 1 and 2). However, this particular pitch class set is found throughout the caprice. To begin with, I hear an

inverse echo of the A-natural / E-flat idea that introduces the first line in the beginning of the second line; see Example 6:

Example 6: cross-reference of A-natural / E-flat in Rochberg, *Caprice No. 42*

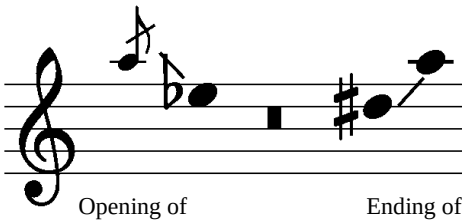


I have made all the note values the same in Example 6, to better highlight the echo that I hear. The echo includes the same pitch classes, 9 and 3, as well as specific pitches. Furthermore, the pitches in both ideas are written in the same octave. In other words, the exact same notes played at the opening of the piece are repeated at the beginning of the second line. The techniques used to play these pitches in the two lines are not the same however, which obscures this inverse relationship; the opening of the piece is played as a gliss, while the beginning of line 2 is played as grace notes.

This same pitch class set and inverse relationship is also found at the beginning of the B section, the second half of line 2 (see Example 4). Like the opening of the A section, the A-natural and E-flat are connected by a gliss. Because these two section openings are so similar, it is likely that Rochberg wrote the opening of the B section essentially the same as the A section in order to indicate that it is the start of the new section.

Next, the inverse of these pitch classes, 9 and 3, is found at the end of line 4, where the notes go from D-sharp to A-natural; see Example 7:

Example 7: cross-reference of A-natural / E-flat and D-sharp / A-natural in Rochberg, *Caprice No. 42*

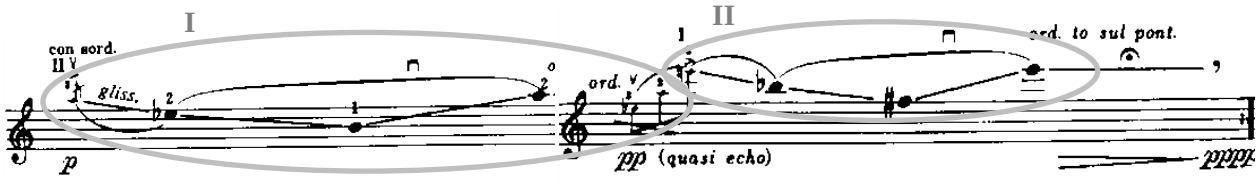


Opening of line 1 | Ending of line 4

While it is obvious that the two groups of notes in Example 7 are not made up of the same pitches, they are the same pitch classes, 9 and 3. Interestingly the latter set of pitch classes from the ending of line 4 is neither played as grace notes nor as a grace note followed by a gliss. Instead it is played much like the end of the piece, as a straight gliss. Therefore, the pitch classes that end line 4 can be heard as the direct inverse of the end of line 6.

Up to this point I have not discussed the normal form or prime form of any of the pitch class sets. However, they are incredibly interesting to analyze because many of them are themselves types of palindromes or connected by voice-leading; see Example 8:

Example 8: cross-reference of lines 1-2 and pitch class sets I and II in Rochberg, *Caprice No. 42*



Pitch class set I from line 1 | Pitch class set II from line 2

In Example 8 I have appended the first line of the piece and the beginning of the second line, the A section of the caprice, in order to make it easier to mark pitch class sets I and II. Although I initially heard the first two grace notes in line 2 as part of the entire phrase in line 2, including them in pitch class set I allows me to analyze the two pitch class sets as trichords. Pitch

class set I's normal form [9E3] relates to pitch class set II's normal form [46T] at T_7. Furthermore, not only do these two trichords have the same prime form (026), but they are also connected by voice leading because they are both made up of the same ordered pitch class intervals.

I find the prime form and voice leading in the middle of the caprice to be particularly interesting. Pitch class sets III, IV, V, VI, VII, and VIII are all tetrachords and have the same prime form (0268). Typically prime form is determined by which side of the normal form has the fewest semitones separating the pitch classes. However, with each of the pitch class sets in the middle of the caprice, the first two pitch classes in the normal form are separated by the same number of semitones as the last two pitch classes; see Example 9:

Example 9: pitch class sets III-VIII's normal forms and their semitones in Rochberg, *Caprice No. 42*

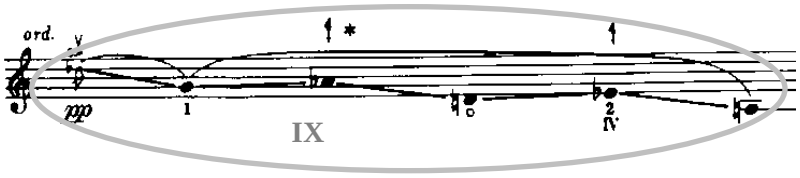
Pitch class set	**Normal form**	**Number of semitones between each pitch class**
III	[7913]	2 4 2
IV	[0268]	2 4 2
V	[57E1]	2 4 2
VI	[T046]	2 4 2
VII	[9E35]	2 4 2
VIII	[8T24]	2 4 2

In Example 9 we see clearly how each pitch class set's normal form not only has the same number of semitones between each pitch class, the semitone sets are palindromes, 2 to 4 to 2. This means that when determining the prime form, we can start at either the left or the right end of the normal form and still get the same result: (0268). Furthermore, this prime form has the same number of semitones between each pitch class as the normal forms and can also be considered a kind of palindrome.

Pitch class sets I and II, which have the prime form (026), can be viewed as subsets of pitch class sets III, IV, V, VI, VII, and VIII, which have the prime form (0268). In particular this means that pitch class set II's "duplicate," pitch class set VIII, is its superset. This further strengthens the two phrases' connection and informs the performer to not only notice which pitch classes that the two phrases have in common, but to also think about, and possibly bring out, the dissimilarities as well.

One final connection in the prime form of the caprice is between the pitch class sets in the middle of the caprice and pitch class set IX; see Example 10:

Example 10: cross-reference of line 6 and pitch class set IX in Rochberg, *Caprice No. 42*



Line 6, pitch class set IX

Pitch class set IX, shown in Example 10, is a hexachord and has the normal form [123789] and prime form (012678). This means that its normal and prime forms are types of palindromes because the number of semitones between each pitch class is 1 to 1 to 4 to 1 to 1. More importantly, however, is the way that pitch class sets III, IV, V, VI, VII, and VIII, each with prime form (0268), can fit into pitch class set IX's prime form (012678). Although the prime form (0268) is not a typical subset of pitch class set IX, (0268) does fit into set IX's prime form in an obvious, inverse pattern: (0 1 2 6 7 8). This therefore relates the middle section of the caprice to the final line, making pitch class set IX even more of a resolution to the piece.

Despite the many ways Rochberg follows a palindrome structure in this caprice, there are some exceptions. As I mentioned previously, pitch class set VII does not have a "duplicate" in the palindrome structure. Indeed, while pitch class sets III, IV, V, and VI are each related at T_5, set VII, while it does have the same prime form (0268) as the previous pitch class sets, is related to pitch class set VI at T_{11}, not T_5. Furthermore, although pitch class set VII does begin with a gliss down like pitch class sets III and V, it immediately begins ascending again, first by four semitones, then by six. Because each of the pitch class sets in the B section have been steadily descending in actual pitch space, I believe Rochberg uses pitch class set VII as a way to transition back up to pitch class set VIII, which is related to pitch class set VII at T_{11}. The two pitch class sets are also related by voice leading because their ordered pitch class intervals are the same.

One of the most apparent ways Rochberg defies expectations is with the proportional notation. I find it curious that, when viewing the piece as a palindrome, the first half of line 2, which can be viewed as the "duplicate" of line 5, is to be played much more compactly than the phrase in line 5 (see Example 3). In this way it seems as though the caprice begins slowly, picks up the pace in lines 2-4, and then stretches out more and more in lines 5 and 6.

Another interesting way Rochberg disregards the patterns he has created is that he adds or subtracts the number of pitches included in corresponding lines. For example, though line 1 can be viewed as the "duplicate" of line 6, line 6 includes six pitches while the phrase in line 1 only has four. Furthermore, line 1 only has three pitch classes while line 6 has six pitch classes. The only pitch classes in common between the two lines are 9 and 3. Therefore, when preparing to perform this piece it would be wise to look at these pitch classes and consciously connect the two that are the same.

One final way that Rochberg toys with conventions is the markings he has put into the music. Beyond the different sound effect techniques that he incorporates, such as *sul ponticello* and *col legno*, I think the places he marks accents are significant. For instance, the first grace note played on line 2 is to be accented, but its "duplicate" in line 5 is not marked with an accent. I also find it unusual that Rochberg includes two quarter tones but only introduces them in the final phrase of the piece. I believe this must be significant in some way, perhaps because the quarter tones each muddy the tritones that follow them. Regardless of the quarter tones' purpose, the fact that Rochberg waited until the very end of the piece to introduce this new element indicates that they are certainly important and ought to be given special attention.

In conclusion, when preparing to perform this caprice I believe it is important to study the palindrome structure of the piece and pay close attention to the times that this structure is modified or completely changed. At first glance the palindrome pattern appears to be very straightforward and apparent. Only when I inspected the piece at a deeper level did I find that, while the similarities between the pitch class sets and their normal and prime forms certainly seem to solidify the palindrome thesis, their occasional differences still make me wonder at its validity. Regardless, it will be helpful to use this analysis as a method of learning and performing the caprice because the palindrome structure assists the performer in knowing which phrases to connect and which notes to emphasize. The fact that the similarities between phrases are not always clear reveals that Rochberg's *Caprice No. 42* is a very rich piece that makes for an interesting, in-depth study, where the possible connections appear to be countless.