A Look at the Pitch Content and Structure within Part I of Milton Babbitt's *Around the Horn*

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Milton Babbitt, who passed away in January of 2011, has spent his whole life writing music adhering to the constraints of one specific compositional technique. His music is wholly twelve-tone, although his approach is unique when compared to that of the Second Viennese School and other serialist composers. He has been able to take the framework that Schönberg laid down and make it his own. This resulting extension of serialism is often termed either total serialism or integral serialism, and is characterized by the serialization of not only the pitch content, but also the rhythm, dynamics, register, articulation, and row forms within a piece.[1]

Babbitt's music is highly structured, but he has still found ways to give it life even within such restrictive parameters. To this end, his compositional style and technique has evolved throughout his career in order to create flexibility and allow for a greater number of possible permutations of different aspects of a piece. This article will serve to give a glimpse of Babbitt's later compositional processes in relation to pitch content and register. An in-depth analysis of the pitch content found within Part I of Babbitt's *Around the Horn* will serve this purpose. Pertinent background information regarding this piece will precede the analysis, but this essay will begin with a brief overview of Babbitt's compositional periods and the different compositional tools that he has developed throughout his career.

Andrew Mead, in his book *An Introduction to the Music of Milton Babbitt*, groups Babbitt's compositions into three distinct periods: First Period, 1947-1963; Second Period, 1964-1980; and Third Period, 1981-2011. Each period marks a change in style or at least the appearance of new compositional techniques. Babbitt's first period could be described as his basic style, meaning that it sets the foundation for later works. Compositions from this period share the following concepts and practices: maximal diversity, hexachordal combinatoriality, trichordal arrays, and subsets and partitions.[2]

Babbitt's concept of maximal diversity is important to understanding his compositional style, but not especially vital to my analysis of *Around the Horn*. It is enough to know that Babbitt utilizes a number of techniques, which give him the freedom to explore the many different ways of constructing aggregates. He does not stop here, however, taking his ideal of maximal diversity to other areas, such as articulation, dynamics, register, and rhythm. His other concepts and processes, however, are more important to this discussion.

A way that Babbitt is able to explore the numerous permutations of aggregates is through the use of combinatorial hexachords, a practice which was also quite prevalent in the music of Schönberg. More specifically, Babbitt limits himself to the use of five out of the six all-combinatorial hexachords. He does not use the sixth, because of its whole-tone properties.[4] The all-combinatorial hexachords are six hexachords that are capable of forming an aggregate with any of its transposed forms: prime, retrograde, inversion, and retrograde inversion. Each hexachord also contains at least one axis that spans a tritone. An all-combinatorial hexachord may contain more than one tritone axis, so each hexachord is classified according to its number of axes. This number of axes also alters the number of transpositional levels at which a hexachord is combinatorial with its transformations.[5] These hexachords are ultimately the source of Babbitt's ability to construct a pitch structure that is so meticulously intertwined.

This intertwined pitch structure typically takes the form of an array in Babbitt's music. An array is basically a horizontal presentation of a pair or group of aggregates that unfolds over time. The horizontal presentation of an aggregate is called a lyne, and each of these lynes generally unfolds in a specific registral area.[6] Babbitt's arrays mostly consist of four lynes, and due to his use of all-combinatorial hexachords, each hexachord from a lyne will be combinatorial with a hexachord from another lyne. He even goes further by breaking down each lyne into a grouping of four trichords, with each vertical column within an array forming an aggregate. Many of these trichords will also share similar set class relationships with trichords from other lynes.

Babbitt takes his pitch structure to an even deeper level through subsets and partitions that cross over lyne boundaries. This basically refers to pitch classes that can be grouped together by articulation and dynamics, without regard to register. Many analysts classify these groupings as associative harmony. This associative harmony usually consists of trichords that share the same set classes as those related to the specific all-combinatorial hexachord used to construct a piece.

Much of what has been discussed is characteristic of all of Babbitt's compositional periods, but the technique that is most often associated with his second period is his use of all-partition arrays. Babbitt still utilizes all-combinatorial hexachords as the basis for his rows, but aggregates are now partitioned in different ways. Instead of unfolding an aggregate in each lyne, one aggregate is partitioned throughout all four lynes. Each block, or complete aggregate, of this array is partitioned in different ways, so that all possible partitions of an aggregate are observed.[7] Mead writes that "an all-partition array will contain as many aggregates as there are different ways of slicing the number twelve into the number of parts present, or fewer."[8] This means that for a four-part array, there will be a total of thirty-four aggregates.

These all-partition arrays are difficult to construct, which is why Babbitt is known to use the same arrays for multiple compositions.[9] The pitch content is of course altered in some way, but the partitions remain the same. Babbitt continues to use all-partition arrays well into his third period of composition. This later period serves more as a synthesis of all his previous compositional techniques. One new device that is characteristic of this period is the superarray. This technique is not pertinent to our discussion, so it is enough to know that this device is used to allow for multiple arrays to be assembled together to form a contrapuntal network.[10] Even though *Around the Horn* falls under Babbitt's third period, it is constructed from an all-partition array that first appears during his second period.

Around the Horn, written in 1993, is a piece that was specifically composed for horn player William Purvis. Purvis, who currently teaches horn at Yale University and The Juilliard School, performed the premiere of this work and released a compact disc recording of it in 2006. This piece is dedicated to Marjorie Schuller, the late wife of Gunther Schuller. The latter is most well-known as a composer, but was also an accomplished horn player earlier in his career.

Around the Horn is an interesting piece not only because of its dedications and musical language, but also because of its obvious pun in relation to one of America's favorite past-times.[13] The term "around the horn" is used to describe one of the most difficult plays in baseball, the 5-4-3 double play. This is when the ball is hit to the third baseman and he must throw it to the second baseman, who in turn throws it to the first baseman in order to record the two outs. Aside from the double play, this term is also often used to generally describe the action of throwing the ball around the bases. This is a typical warm-up routine between innings and it is also done after a strikeout. The catcher will throw the ball to the third baseman, who continues to throw the ball around the base paths.

Just as this term refers to a difficult play in baseball, this piece is very demanding for the horn. It requires a high degree of technical facility, accuracy, especially in the high register (the flexibility to accurately shift between extreme registers, a strong rhythmic pulse, and an immaculate attention to detail). Purvis performs this piece extremely well and is meticulous in his interpretation of dynamics and rhythm. There can be up to four different contrasting dynamics within each measure, and these must be achieved while performing complex rhythms and drastically shifting between different registers of the instrument. The range, which spans from f#-b", is daunting, especially when taking the quick register shifts into consideration, but this almost pales in comparison to the rhythmic integrity required to perform this piece.

Analyzing a piece of music written by Babbitt is never an easy task, and this particular work does not disappoint. Upon first inspection, Part I consists of thirty-two full aggregates that seem to be separated into two distinct registral areas, high and low. These two distinct registers are difficult to distinguish at times, which is why it is helpful to determine the registral boundary. It seems logical to choose written a' as the focal pitch and the lowest note of the high register, because this pitch is exactly the middle point of the register used within this piece. With this in mind, one can begin to search for aggregates within each register and construct a preliminary array sketch of the pitch content. The following examples show the preliminary aggregate and array sketches.

Example 1: Preliminary Full Aggregate Sketch, mm. 1-117

mm 1-6: 1,t,9,6,4,e,5,0,8,7,3,2	mm 60-65: 2,t,1,5,4,8,3,e,0,7,9,6
mm 6-8: 0,4,e,5,3,8,7,6,1,9,2,t	mm 66-70: t,9,2,e,7,6,3,0,8,1,5,4
mm 9-12: 5,t,0,7,4,1,8,e,3,2,6,9	mm 70-74: 9,1,t,5,6,2,4,e,8,7,3,0
mm 12-17: t,3,e,6,4,9,1,0,7,8,5,2	mm 74-77: 5,9,8,0,t,3,1,2,4,7,e,6
mm 17-23: 9,2,1,4,7,e,0,3,8,6,t,5	mm 78-80: 0,5,1,t,3,2,6,e,8,7,9,4
mm 23-27: 9,1,8,7,5,6,t,3,0,e,4,2	mm 80-83: 8,7,e,3,5,2,1,4,7,9,0,t
mm 27-30: 7,2,6,1,8,t,5,4,0,e,3,9	mm 84-87: 1,6,e,7,2,3,t,9,0,4,8,5
mm 30-35: 2,6,9,1,t,5,7,3,8,0,e,4	mm 87-89: 4,2,7,9,5,1,8,0,t,e,3,6
mm 36-37: 6,4,2,7,0,e,8,3,5,1,t,9	mm 89-92: 9,0,4,5,3,8,6,1,t,7,e,2
mm 38-41: 9,t,6,3,1,5,8,0,e,2,4,7	mm 92-96: e,2,6,0,3,8,t,9,5,7,4,1
mm 41-43: 6,5,9,2,4,7,e,0,3,8,t,1	mm 96-100: 4,8,e,0,2,t,9,6,3,5,1,7
mm 44-48: 3,8,4,6,1,t,9,5,e,2,7,0	mm 100-105: 8,0,3,t,1,5,6,e,9,4,2,7
mm 48-51: 7,t,3,1,4,8,0,2,e,6,5,9	mm 105-107: t,e,7,2,3,0,1,5,8,6,4,9
mm 51-54: 9,5,6,7,4,3,t,8,1,2,0,e	mm 107-110: 3,2,e,6,t,5,4,0,8,7,1,9
mm 54-57: 0,7,e,6,3,4,5,8,9,2,1,t	mm 111-114: e,6,8,3,1,2,t,0,7,9,5,4
mm 57-60: 4,7,0,e,9,8,t,3,2,5,1,6	mm 114-117: 5,7,t,2,1,4,9,0,6,e,8,3

Example 2: Preliminary Array Sketch, mm. 1-117

mm 1-8: High: 1,6,4,e,5,0,8‖3,7,9,t,2	mm 60-70: t,1,5,4,8,3,e,0,7,9,2,6
mm 1-8: Low: t,9,7,3,2‖0,4,e,5,8,6,1	mm 60-70: 2‖e,7,6,3,t,0,8,9,1,5,4
mm 9-17: 5,t,0,7,4,1,2,6,9‖3,e,8	mm 70-77: 9,1,t,6,2,4,e,8,7,3,0‖5
mm 9-17: 8,e,3‖t,6,4,9,1,0,7,5,2	mm 70-77: 5,9‖8,0,t,3,1,4,7,e,6,X
mm 17-27: 9,4,7,e,0,3,8,6,t,5‖1,2	mm 78-83: 0,5,1,t,8‖6,e,3,2,4,7,9
mm 17-27: 2,1‖8,9,7,5,6,t,3,0,e,4	mm 78-83: 3,2,6,e,7,9,4‖1,XXXX
mm 27-35: 6‖2,9,1,t,5,7,3,8,0,e,4	mm 84-89: e,7‖2,9,XXXXXXXXX

mm 27-35: 7,2,1,8,t,5,4,0,e,3,9‖6
mm 36-41: 4,2,7,0,e,9‖t,6,3,1,5,8
mm 36-41: 6,8,3,5,1,t‖0,e,2,9,4,7
mm 41-48: 3,8‖4,6,1,8,t,9,5,e,2,7
mm 41-48: 6,5,9,2,4,7,e,0,t,1‖XX
mm 48-54: 7,4,2,5,9‖XXXXXXX
mm 48-54: t,3,1,8,0,e,6‖5,7,4,9,2
mm 54-60: 7,4‖0,e,9,8,t,3,5,1,6,X
mm 54-60: 0,e,6,3,5,8,9,2,1,t‖4,7

mm 84-89: 1,6,2,3,t,9,0,e,4,8,5‖X
mm 89-96: 9,0,4,5,3,8,6,1,t‖XXX
mm 89-96: 7,e,2‖6,0,9,5,7,4,1,XX
mm 97-105: 4,e,0,2,9,6,5,1,7‖8,3,t
mm 97-105: 8,t,3‖1,5,0,6,e,9,4,2,7
mm 105-110: t,e,1,5,8,6,4,9‖3,2,0,7
mm 105-110: 7,2,3,0‖e,6,t,5,4,8,1,9
mm 111-117: 0,9,5,4‖t,2,1,6,e,7,8,3
mm 111-117: e,6,8,3,1,2,t,7‖4,5,9,0

Within this preliminary array sketch, each registral aggregate unfolds at half the rate of the full aggregates. This means that for every two full aggregates, a single aggregate should unfold in each register. Also, since the registral aggregates unfold at half the speed, they can be divided, or partitioned, in relation to the full aggregates. The double lines in Example 2 are used to denote partitions, which represent the points at which a new full aggregate begins. If fluent in Babbitt's earlier practices, one would expect the partitions to be symmetrical, and for each hexachord and trichord to share similar set classes and be combinatorial and complementary with one another. This, however, is not the case. Here, partitions are seemingly random, yet each partition is still combinatorial and complementary in relation to its registral counterparts.

Mead, in his article “Still Being an American Composer: Milton Babbitt at Eighty,” constructs a similar array, but he goes no further than m. 17.[14] This work is helpful in checking the first two array blocks, but does nothing to help explain the seemingly chaotic registral partitions that ensue during the middle section of Part I. The array is nice and neat until m. 41, where notes suddenly begin to disappear. These missing notes are marked as an “X” in Example 2. This trend continues until m. 97, and even though notes are missing, the complete partitions within this section still remain combinatorial and complementary between the registers. At m. 97, both registral aggregates return to normal for the last three blocks of the array.

At this point, there are already red flags and questions concerning the array sketch. The fact that so many notes are missing from the registral aggregates in the middle of the piece means that this is probably not the most effective technique for analysis. Even shifting the registral boundaries does not aid in uncovering these missing notes. Also, information gleaned from Joseph Dubiel's article, “What's the Use of the Twelve-Tone System?,” sheds even more doubt upon this preliminary analysis. Reading through his analysis reveals that there is a wrong note in m. 61. According to Dubiel, the F in this measure should be an F#, which alters the previous examples drastically.[15] The wrong note can be seen in Example 3.

Example 3: Wrong Note in m. 61

Now, instead of thirty-two full aggregates, there are thirty-three. Example 4 shows how this alters the previous full aggregate in mm. 60-5 by dividing it in two. This odd number of aggregates also disrupts the symmetry of the previous array sketch. With this information in hand, one begins to desperately search for a way to deal with the oddities of this piece. After acquiring a deeper understanding of Babbitt's later compositional techniques, one can begin to determine that this piece does not utilize a hexachordal or trichordal array. The odd partitions found in the preliminary array sketch can lead one to assume that this piece could be employing an all-partition array. This assumption is made even more concrete after further exploration of Mead's work pertaining to this piece.

Example 4: New Full Aggregate
mm 60-65: 2,t,1,5,4,8,3,e,0,7,9,6 *Wrong note f-f# - mm. 60-63: 2,t,1,6,4,8,3,e,0,7,9,5
*mm 63-65: 2,0,5,7,8,4,e,3,t,1,6,9

Another look at Mead's brief array shows that he is partitioning each full aggregate throughout four lynes instead of two.[16] Also, Dubiel mentions in his article that this piece shares the same four-part all-partition array that is used to construct *My Complements to Roger* (1978), as well as *Beaten Paths* (1988), *My Ends Are My Beginnings* (1978), *Canonical Form* (1983), *Whirled Series* (1987), and *Tutte le corde* (1994).[17] The pitch structure of this particular array is based on a Type-E hexachord, which can be seen in Example 5. This means that even though each of these pieces contain the same partitions, Babbitt either transposes or alters the pitch content in a certain way.[18]

My Complements to Roger serves as the prime form of the array, and this specific array can be found in Mead's article, "Detail and the Array in Milton Babbitt's *My Complements to Roger*."[19] According to Mead, the pitch content of *Beaten Paths* is a transposed retrograde of the original array.[20] The remaining four pieces mentioned are circle of fifths transformations of the prime form.[21] After more research, it was discovered that there is yet another piece that utilizes this same array, *String Quartet No. 5* (1982). The array for this piece is a transposition of the prime form.[22] With all of this information, especially the original array and Mead's array for the beginning of *Around the Horn*, one can deduce that Part I consists of a transposed inverted form of the original array. It also becomes possible to construct a complete array for this portion of the piece, which is shown in Example 6.

Example 5: Type-E Hexachord

C# F# F A D B^{b} C G E D# B G#

Example 6: Partition Array for *Around the Horn*, Part I

	1 $(4^{2}31)$	**2** (532^{2})	**3** (6321)	**4** (63^{2})	**5** (921)	**6** (651)
High:	1,6,5	9,2,t	0,7,4	3,e,8	9	
	4,e,0,8	3,7	5,t,1,2,6,9		4,7,e,0,3,8,6,t,5	1
Low:	t,7,3,2	e,6	8	4,9,1,0,5,2	2,1	7,6,t,3,e
	9	0,4,5,8,1	e,3	t,6,7		8,9,5,0,4,2

7 (641^{2})	**8** $(t1^{2})$	**9** (3^{4})	**10** $(43^{2}2)$	**11** $(5^{2}1^{2})$	**12** (84)	**13** (543)
6	2,1,t,5,7,3,8,0,e,4	4,2,9	t,6,1,5	3	3,8,e,0	4,7,2,5,9
2	9	7,0,e	3,8	8	4,6,1,t,9,5,2,7	
1,8,5,4,0,9		3,6,t	e,2,7	5,9,4,0,1		1,8,e,6
7,t,e,3	6	8,5,1	0,9,4	6,2,7,e,t		t,3,0

14 (6^{2})	**15** $(5^{2}2)$	**16** $(72^{2}1)$	**17** (93)	**18** $(t2)$
		9,t	1,6,4,8,3,e,0,7,5	5,t
	7,4	0,e,8,3,5,1,6	t,9,2	2,0,7,8,4,e,3,1,6,9
6,7,3,t,2,0	0,5,8,9,1	4,2		
5,4,8,1,9,e	e,6,3,2,t	7		

19 $(e1)$	**20** (91^{3})	**21** (82^{2})	**22** (732)	**23** (741)
0	1,6,2,4,e,8,7,3,0		0,1,t	6,5,2,9
	t	2,5	5,8	8,e,3,4,7,0,t
2,e,7,6,3,t,0,8,1,5,4	9	e,6	3,2,6,e,7,9,4	1
	5	1,9,8,5,0,2,t,3		

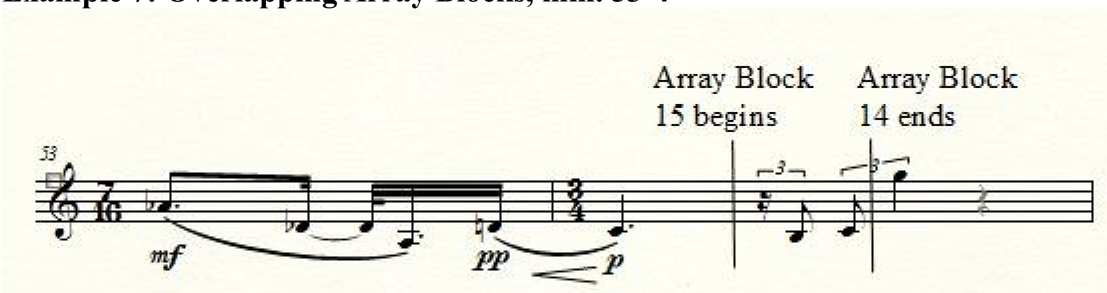
24 (642)	**25** (821^{2})	**26** (5421)	**27** (731^{2})	***28** (831)	**29** (12)
e,7	7	0,4,3,8,t	t		5,6,2,9,1,e,4,7,8,0,3,t
	2,9	9,5,6,1	3,8,7	e,4,0,2,9,6,5,1	
1,0,8,5	e	2	6	7,t,3	
6,2,3,t,9,4	4,5,1,8,0,t,3,6	7,e	e,2,0,9,5,4,1	8	

30 (75)	**31** $(4^{2}2^{2})$	**32** $(53^{2}1)$	**33** (62^{3})	**34** (4^{3})
	1,5,6,9	2	0,4	e,7,8,3
	t,e,8,4	3,0,7	9,5	t,2,1,6
1,5,0,8,9,4,7	2,3	e,6,t	8,1	4,5,9,0
t,6,e,3,2	7,0	5,4,8,1,9	e,6,3,2,t,7	

As can be seen in the previous example, there are thirty-four aggregates that are divided into partitioned array blocks. These blocks are partitioned between four lynes, which are grouped by register. The top two lynes represent the upper register, while the bottom two lynes represent the lower register. The registral boundary discussed earlier still applies to this array, meaning that a written a' still serves as the focal pitch. The division of pitches between the two lynes within each register is assigned according to articulation. This implies that two separately attacked notes in the same register will be assigned to different lynes. Also, two consecutive notes in the same register that are slurred will be assigned to the same lyne. There are also other factors that affect this division, such as stopped vs. open notes, dynamics, and pitch doubling.

Pitch doubling, which is not a common feature of Babbitt's music, occurs quite frequently throughout this piece. Within each aggregate, doubling is limited to a select few pitch classes. This device is at times used to separate pitches between the different lynes, but it also serves another more important purpose. Many of the array blocks overlap due to pitch doubling. This is most apparent in the music between array blocks 14 and 15. As can be seen in Example 6, the bottom two lynes of array block 14 end with a 0 and e, while the same lynes of array block 15 begin with these same pitch classes. This can be seen most clearly in Example 7, which shows how these two array blocks overlap. This feature occurs often during the middle section of this piece, although at times it is not as easy to pinpoint within the music. This is especially apparent when lyne overlapping occurs between lynes that are displaced by three array blocks, as with pitch class 9, which connects blocks 13 and 16.

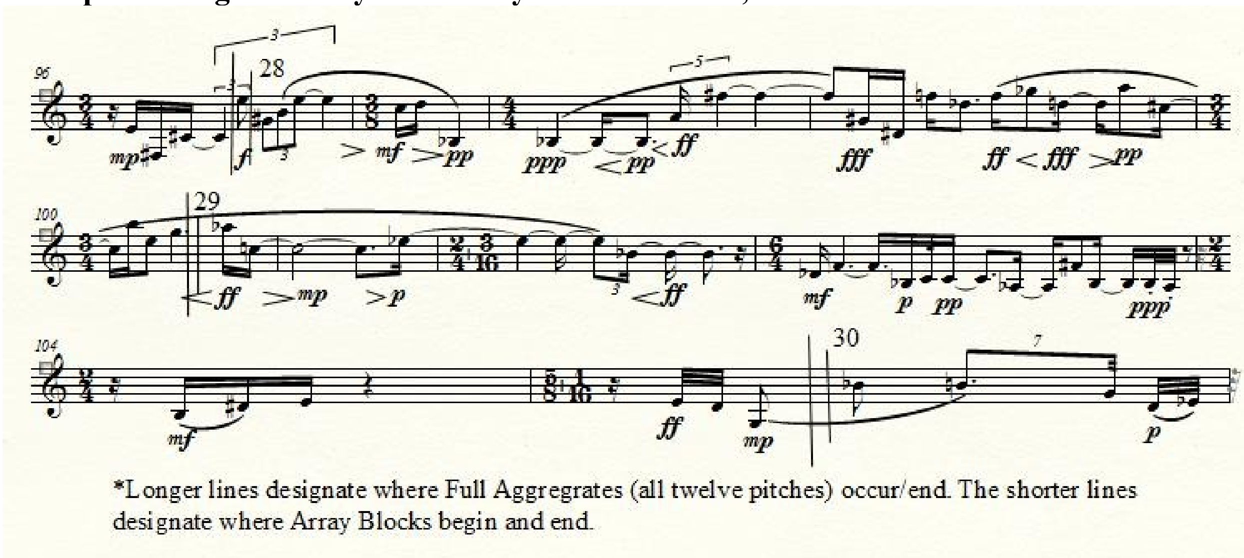
Example 7: Overlapping Array Blocks, mm. 53-4



Unfortunately, there is still a glaring problem that has yet to be addressed, which concerns the number of aggregates within the all-partition array. As was discovered in the preliminary analysis, there are only thirty-three full aggregates in this piece. This means that something is missing or that there might be another wrong note, which points one's attention to the array blocks 28 and 29.

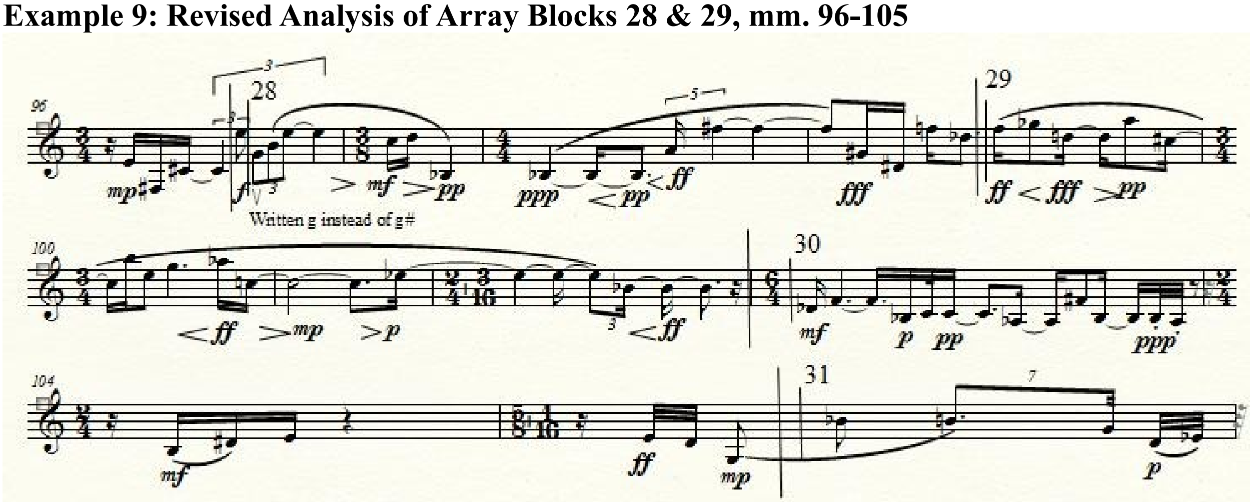
As it stands, array block 28 starts in the middle of m. 96 and does not unfold the full aggregate until near the end of m. 100. One problem with this is the fact that the aggregate in array block 29 unfolds entirely in the top register. If block 29 begins in m. 100, then there is a register shift in m. 103 that should not exist. Also, the written g'' that should end the aggregate for array block 28 in m. 100 is in the wrong register. According to the array, this note should be in the bottom register, which does not occur until m. 105. This leads one to believe that there is a wrong note in this section of the piece. The original configuration of these aggregates and arrays can be seen in Example 8.

Example 8: Original Analysis of Array Blocks 28 & 29, mm. 96-105



The missing note in array block 28 is a written g in the lower register of the horn. Another look at the aggregate for this block, reveals that a written g#' occurs twice between mm. 96-9. If one of these notes were replaced by a written g', then the aggregate for array block 28 would end in the middle of m. 99. This also means that array block 29 would shift over and completely unfold in the top register of the horn. The revised analysis of this section can be seen in Example 9. Also within this configuration, the array block 30 completely unfolds in the bottom register of the horn, which strictly corresponds with Babbitt's partitions under this revision. It did not quite fit before the change. This corrected note would even create a new aggregate, which would increase the total number of aggregates to thirty-four. With all of this in mind, it is definitely logical to assume that there is a wrong note somewhere in mm. 96-9. This assumption will of course require further exploration.

Example 9: Revised Analysis of Array Blocks 28 & 29, mm. 96-105



Since this piece utilizes an all-partition array, the pitch content is not structured in neat hexachords and trichords that share similar set classes. After a set class analysis of certain pitch class groupings within the array, it becomes apparent that one must delve into the associative harmony to find significant set class relationships. Analyzing the associative harmony of a piece is normally done without regard to register. It is also wise to begin with an analysis of trichordal relationships, because Babbitt often constructs his arrays using the trichordal set classes found within the Basic Set of a given piece. The Basic Set of this piece is given in Example 5, and its trichordal set classes are as follows: [0,1,4], [0,1,5], [0,2,4], [0,2,5], and [0,3,7].

Much of this piece can be divided into trichords in relation to many different factors, including articulation, dynamics, rhythmic configurations, and stopped notes. All of the trichord sets found correspond with the five set classes of the Basic Set. The most prominent trichords found are the [0,1,4], [0,1,5], and [0,3,7] sets. The [0,3,7] set class is an interesting choice, because it appears as a major/minor triad within the music. Of course, these triads are often spelled enharmonically or displaced by an octave, which makes it difficult to recognize these diatonic references. Another diatonic reference is the frequent use of the [0,2,4] set. When placed in best normal order, these pitch classes form the first three pitches of a major scale. To disguise this relationship, Babbitt again frequently displaces these pitch classes by an octave and employs enharmonic spellings. This is especially intriguing, because Babbitt rarely includes diatonic references in his music.

There are no significant relationships regarding tetrachords or hexachords in the associative harmony, but the dyadic content offers even more diatonic references. Almost all of the slurred notes within Part I of this piece are dyads, and they fall under the same recurring set classes: [0,1], [0,2], [0,3], [0,4], and [0,5]. This means that a majority of the pitch content in this piece is built upon the following diatonic intervals: m2, M2, m3, M3, P4/P5. As with the trichord sets, many of these dyads are displaced by register or spelled enharmonically to disguise any recognizable relationships.

The last aspect to discuss pertaining to Babbitt's compositional process is his use of rhythm. Unlike Schönberg, employed certain traditional rhythmic practices in his music, Babbitt is known for constructing his rhythmic patterns with as much detail as his arrays. Mead writes that "Babbitt sought ways to create rhythmic structures that stemmed directly from twelve-tone pitch relations rather than simply adapt practices from earlier music for his particular ends."[23] In order to accomplish this, he employed many different techniques in his own music. After studying Babbitt's numerous rhythmic techniques, it becomes quite obvious that analyzing the rhythmic structure of one of his works is tedious and takes a great deal of time and effort. Unfortunately, so much time has been spent on the pitch content of Part I to *Around the Horn* that an analysis of its rhythmic structure is beyond the scope of this article.

The pitch analysis of Part I of *Around the Horn* presented in this paper is thorough, yet there are obviously questions and areas that need to be explored further. It would even be interesting to discover the pitch structure of Part II and analyze the similarities and differences between the two halves. Even so, this analysis has given the author a deeper understanding of Babbitt's wide spectrum of compositional processes and a great sense of respect for those brave enough to analyze his music. Babbitt's music is complicated, yet it is important to know how a piece like this is constructed, especially when attempting to perform it. *Around the Horn* is quite challenging and many of the diatonic relationships discovered through the associative harmony analysis would prove beneficial to anyone attempting to perform this work.

Notes

1. Stefan Kostka, *Materials and Techniques of Twentieth Century Music*, 3rd ed. (Upper Saddle River, NJ: Pearson Prentice Hall, 2006), 265.

2. Andrew Mead, *An Introduction to the Music of Milton Babbitt* (Princeton, NJ: Princeton University Press, 1994), 19-30.

3. Ibid., 19-20.

4. Ibid., 22.

5. Jody Nagel, “All-Combinatorial Hexachords,” *Writings of Jody Nagel*, JOMAR Press, http://www.jomarpress.com/nagel/writings.html.

6. Andrew Mead, *An Introduction to the Music of Milton Babbitt*, 20.

7. Ibid., 31.

8. Ibid., 32.

9. Ibid., 33.

10. Ibid., 37.

11. “William Purvis,” *Yale School of Music*, Yale University, http://music.yale.edu/faculty/purvis.html.

12. Norbert Carnovale and Richard Dyer, “Schuller, Gunther,” In *Grove Music Online* (Oxford University Press, 2011).

13. Cait Miller, “My Dinner with Milton,” *In The Muse*, Library of Congress, http://blogs.loc.gov/music/2011/02/my-dinner-with-milton/.

14. Andrew Mead, “Still Being an American Composer: Milton Babbitt at Eighty,” *Perspectives of New Music* 35, no. 2 (Summer 1997): 111.

15. Joseph Dubiel, “What's the Use of the Twelve-Tone System?,” *Perspectives of New Music* 35, no. 2 (Summer 1997): 39.

16. Andrew Mead, “Still Being an American Composer: Milton Babbitt at Eighty,” 111.

17. Joseph Dubiel, “What's the Use of the Twelve-Tone System?,” 45.

18. Ibid., 45.

19. Andrew Mead, "Detail and the Array in Milton Babbitt's *My Complements to Roger*," *Music Theory Spectrum* 5 (Spring 1983): 94.

20. Andrew Mead, *An Introduction to the Music of Milton Babbitt*, 246.

21. Joseph Dubiel, "What's the Use of the Twelve-Tone System?," 45.

22. William Lake, "The Architecture of a Superarray Composition: Milton Babbitt's String Quartet No. 5," *Perspectives of New Music* 24, no. 2 (Spring-Summer, 1986): 90.

23. Andrew Mead, *An Introduction to the Music of Milton Babbitt*, 38.

24. Ibid., 39.

25. Ibid., 39.

26. Ibid., 45.

27. Ibid., 45.

28. Ibid., 51.

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