At the beginning of Analyzing Atonal Music, Michiel Schuijer recounts an argument about pitch-class set theory between North American and European participants at a music-analysis conference in Rotterdam in 1999. In short, the Europeans would have nothing of it! Schuijer recounts how one participant from France noted: “We do not talk about pitch-class sets because we do not hear them.”\(^1\) American pc set theory, a musical application of mathematical set theory, developed out of the analysis of twelve-tone composition to become a method for approaching the pre-serial works of (especially) Arnold Schoenberg, Anton Webern, and Alban Berg. At the beginning of his book, Schuijer goes to great length to underscore just how inappropriate American pc set theory seemed—perhaps because of its mathematical underpinnings—to the Europeans, who believed that it would “force most music onto a Procrustean bed of preconceived relations.”\(^2\)

Although Schuijer highlights pc set theory’s American provenance and the relevant work done therewith, there is actually a solid and often-overlooked list of Europeans who did similar work in the 1950s and 1960s with respect to the music of Anton Webern. The Germans Erhard Karkoschka (1959), Heinz-Klaus Metzger (1955), and Karlheinz Stockhausen (1963); the

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Austrian Walter Kolneder (1961); and the Belgian Henri Pousseur (1955) all considered Webern’s music in a way that identified important two-, three-, and four-note groups—often by featuring pitch-class, interval-class, and set-class equivalences—along with similar groups of notes containing semitones and instances of linear motion by semitone.\(^3\) To one extent or another, they categorized these set classes and, by segmenting sets belonging to them, analyzed several works by Webern.

Of course, at the same time, many developments were underway in the United States with respect to pc set theory. Milton Babbitt, who began his studies as an undergraduate in mathematics at the University of Pennsylvania in 1931 and only later changed to composition and theory, issued three pioneering articles in 1955, 1960, and 1961, and paved the way for many other American authors to work with this theory.\(^4\) Also seminal was a 1964 article by Allen Forte,\(^5\) who, along with Babbitt, is considered a founder of American pc set theory. Forte was also instrumental in introducing the computer to this type of analysis. Schuijer observes that “few people realize that PC set theory was actually devised for computer-aided analysis—today, this fact is ignored in most analytical textbooks.”\(^6\) In fact, there were many currents in computer-aided music analysis in the 1960s in the United States, and Forte was at the forefront of this trend. In a slew of publications in the mid-late 1960s, he tried to show how the computer could

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help to analyze atonal music. In so doing, Forte essentially gave us many of pc set theory’s basic notions: ‘PC set,’ ‘normal’ or ‘prime form,’ and ‘interval vector’ have become household concepts for many music theorists, but in the mid-1960s they met a very specific need: the need for definitions of musical relations that a computer program could recognize.”

Naturally there were many other authors, in the United States and elsewhere, who contributed to the development of pc set theory in the twentieth century. While Schuijer’s superb account of American pc set theory traces these developments historically, Jonathan Bernard’s essay on “Chord, Collection, and Set in Twentieth-Century Theory” goes through the developments of the concept of a “group of notes” that makes up this theory. Bernard gives a rigorous account of the history of chords, collections, and sets, and the quest to quantify the possibilities of grouping notes in a twelve-note system. He is primarily concerned with writings of the early through mid twentieth century, when foggy formations of how composers grouped notes became more and more reified. This period, of course, overlaps with the musical one often called “free atonality” in the United States (i.e., roughly 1908 to 1922).

It is worth noting that neither Bernard nor Schuijer discusses the work of the European authors I mentioned above with respect to Webern studies or with respect to pc set theory. Nor does either author mention the important work of brother and sister Yuri Kholopov and Valentina Kholopova, of the Moscow Conservatory. In an important parallel development in Russia in the late 1960s, when American pc set analysis was still in its infancy, the Kholopovs created their own system of pc set analysis for the music of Webern, which they called “Hemi-
tonicism” (Russian: гемитоника), and which they later used to analyze the music of other composers as well.\(^\text{10}\) They did so with knowledge of European developments in the field of Webern studies (mentioned above), but without knowledge of the major American developments in pc set theory.\(^\text{11}\)

In this essay my primary goal is to explain the Kholopovs’ system of analysis. Although simpler than its American cousin, I believe that hemitonicism is important for several reasons. First, the Kholopovs came to many of the same conclusions as Babbitt and Forte, and contrived a subsystem of pc set theory without using computers or mathematical formulas but by simply making observations about Webern’s music. That the Kholopovs did so without any knowledge of American developments is also notable: their ideas grew out of the work of certain European analysts and, one might argue, a certain European music-analytical tradition that emphasized practicality over theory. In so doing, they created a musical method for using ideas from pc set theory that may be more appealing to people who have problems with American pc set theory.\(^\text{12}\) That is, even for those who believe that one cannot “hear” pc sets, hemitonicism provides a valuable approach to understanding intervallic, harmonic, and motivic relationships that are part and parcel of the post-tonal repertoire of the early twentieth century. Lastly, their approach features

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\(^\text{10}\) All translations from Russian to English are my own. I have used the transliteration system of the Library of Congress, which can be found in the *Chicago Manual of Style* (16th ed.), Table 11.3 (p. 568). (Though non-Russian and typical Anglicized names and appellations—Webern and Schoenberg, or Moscow, for example—appear throughout.) Also, I refer to hemitonicism as a system of pc set “analysis” and not “theory,” as I do not believe that theirs is a theory, strictly speaking.

\(^\text{11}\) The only American author cited in the Kholopovs’ work on hemitonicism is Leland Smith, “Composition and Precomposition in the Music of Webern,” in *Anton von Webern Perspectives*, ed. Hans Moldenhauer and Demar Irvine (Seattle: Univ. of Washington Press, 1966). Valentina Kholopova confirmed to me in one of our conversations that they had no knowledge of the seminal American developments in pc set theory as they worked in the 1960s.

\(^\text{12}\) I do not wish to suggest here that American pc set theory is somehow “unmusical.” However, unlike the work of Babbitt or Forte (among other American authors), whose early work in the field often included the working out of mathematical formulas and proofs in order to define rigorously the objects with which they worked—a necessary and valuable task to be sure—hemitonicism features no such formulas or proofs, which may make the ideas of pc set analysis more accessible to a wider audience.
several interesting nuances in dealing with Webern’s music, nuances that will likely interest not only practitioners of pc set theory but also those who study the history of music theory in the twentieth century.

HEMITONICISM

The Kholopovs’ forays into the analysis of Webern’s music were prompted by a visit to Moscow by Pierre Boulez in 1965, when he conducted Webern’s Six Pieces for Large Orchestra (Op. 6), which was one of the first live performances of Webern ever heard there.13 Awestruck, the Kholopovs began studying the composer: from 1965 to 1970 they wrote two books thereon, *Anton Vebern* (Anton Webern) and *Muzyka Veberna* (The Music of Webern), which were finally published in 1984 and 1999, respectively.14 Kholopova first presented their findings to the Union of Composers of the USSR in the early 1970s, and then published a follow-up article in 1973.15 In the article she first discusses hemitonicism, although not under that name. In the book from 1999 there is an entire chapter on hemitonicism.16

Although both the 1973 article and the 1999 book deal extensively with hemitonicism, I more often cite work from the latter in this essay, as it is more thorough. Toward the end of his life, Yuri Kholopov began to use the term hemitonicism to include a vast array of twentieth-

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13 Kholopova related this information to me in one of our conversations. She also spoke of her very first encounter with the music of Webern. In 1957, Glenn Gould came to Moscow and, in an impromptu performance at the Moscow Conservatory, played some solo piano pieces by Webern. She said that many in the audience, herself included, were hearing Webern for the first time.

14 Valentina Kholopova and Yuri Kholopov, *Антон Веберн: жизнь и творчество* (Anton Webern: Life and Work) (Moscow: Kompozitor, 1984); and *Музыка Веберна* (The Music of Webern) (Moscow: Kompozitor, 1999). The reason that the Kholopovs had to wait fifteen and thirty years to see publication of their books on Webern is simple: there was no support for such research in the Soviet Union at the time they completed it.


16 I have included, as an Appendix to this essay, my translation into English of that self-contained chapter.
century techniques, beyond that which I outline in this essay. The third volume of his *Garmonicheskii analiz* (Harmonic Analysis, 2009) is titled, simply, “Hemitonicism.” He goes on to list sixteen different analytical categories, each with a model composer and composition, all of which fall under this hemitonic rubric, including “Twelve-tone Rows” (Shostakovich, Thirteenth String Quartet), “Synthetic Chords” (Roslavets, Three Compositions for Voice and Piano), “Neotonality” (Berg, *Wozzeck*), and Sonoricism and Coloristic Effects (Ligeti, *Atmospheres*). Although it became something much larger, in this essay I will focus on the more restricted meaning of hemitonicism, as a system of pc set analysis.  

It is not surprising that the hemitonic system took root in Russia, as there is a strong precedent for an analytical method based on (1) octave and enharmonic equivalence, (2) intervals expressed in terms of semitonal content, and (3) twelve tones of equal weight and importance—which are all hallmarks of American pitch-class set theory, as well. The Russian theorist who contrived this analytical method, the “Theory of Modal Rhythm,” was Boleslav Yavorsky (1877–1942). In 1904, in a letter to his friend, the music theorist Nadezhda Bruisova, Yavorsky wrote: “You ought to write a music-theory fundamentals textbook that is void of everything that results from the confusion of naming one note with three names (e.g., B♯, C, and D♭) or one audible interval with different designations.” Further, in what is certainly one of the first theoretical formulations of the semitonal content of intervals located in pc space, Yavorsky laid bare what he sees as the basis of new music; see Figure 1.

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17 I am indebted to Zachary Cairns for making available to me a copy of Yuri Kholopov, Гармонический анализ: в 3-х частях (Harmonic Analysis: In Three Parts), Part III (Moscow: Moscow Conservatory, 2009).

18 I. S. Rabinovich (editor), Б. Яворский: статьи, воспоминания, переписка (B. Yavorsky: Articles, Remembrances, Correspondence) (Moscow: Kompozitor, 1972), vol. 1, 253.

19 Boleslav Yavorsky, Строение музыкальной речи (The Construction of Musical Speech) (Moscow, 1908), Chapter 3, 11. What is shown in Figure 1 would later become, of course, the ordered pc interval in American pc set analysis. Yavorsky gives no method for calculating such intervals using modulo-12 arithmetic. For an even earlier
It is little surprise, then, that the Kholopovs used an identical formulation in explicating their hemitonic system. Their description of this new intervallic system is telling, insofar as it lays out the new thinking about intervals that has become part and parcel of American pc set theory. The Kholopovs write:

The use of the semitone as the foundation for hemitonicism as a system necessitates a reinterpretation of intervallic properties and a renaming of intervals. The traditional method of naming intervals comes from diatonicism and from major/minor tonality and, as is well known, treats intervals of the same size—such as major and minor seconds, major and minor thirds, perfect and diminished fifths, and so on—as equal. Conversely, this method differentiates between an augmented fourth and diminished fifth, a major seventh and diminished octave, and so forth. For hemitonicism, on the contrary, there are utterly fundamental differences between the semitone and the whole tone, between the perfect fifth and the tritone, as well as with other similar pairs of intervals. And, conversely, the difference between the augmented fourth and diminished fifth or between the minor second and the augmented unison, and so on, is entirely unimportant.

In her 1973 article, Kholopova gives brief hemitonic analyses of Brahms, Franck, Shostakovich, Stravinsky, Liszt, and Bartók, among others. Obviously, then, she felt this system could be applied to composers other than Webern, although she did not believe hemitonicism applied

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20 Kholopova and Kholopov, Музыка Веберна (The Music of Webern), 13; see also Appendix, paragraph 7.
21 Kholopova and Kholopov, Музыка Веберна (The Music of Webern), 12.
to functional tonality in a larger sense. In a correspondence with Kholopova, she told me what she discovered while analyzing Webern’s Five Movements for String Quartet, Op. 5:

I found out that clear-cut groups of notes were taking shape, and that these groups consisted of one semitone and any other interval. This happened at different symmetries as well, so that a group could consist of two semitones at the extremities with another interval in the middle. Having made certain that all of op. 5 was put together in this fashion, I began to look at different opuses, which it turned out were the same! I was incredibly pleased that Webern’s system had so clearly revealed itself.22

Yuri Kholopov, having noticed the impact of the semitone in Webern’s music, named the emerging analytical system “hemitonicism,” which he likely did as an antonym to the preexisting Russian term “anhemitonicism” (ангемитоника).

The Kholopovs cite Webern himself for revealing this mode of thought in his music: one not simply of twelve tones but, rather, of movement by semitone. As they quote him: “[I]t was soon clear that hidden laws were there, bound up with the twelve notes; the ear found it very satisfying when the course of the melody went from semitone to semitone, or by intervals connected with chromatic progression.”23 Although the Kholopovs stop their citation with this, the passage from Webern’s lecture continues: “That’s to say, on the basis of chromaticism, not of the seven-note scale. The chromatic scale came to dominate more and more: twelve notes instead of seven.”24 What Webern had done in his famous lectures of 1932–33 was to trace a historical

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22 Kholopova, personal email correspondence with the author, 2011 (quoted by permission). The original Russian reads: “Тут обнаружила, что складываются четкие группки нот, состоящие из полутона и любого др. интервала, а при разных симметриях—из двух полутона по краям и др. интервала в середине. Убедившись, что весь оп. 5—такой, взялся за др. опусы—там оказалось то же самое! Страшно обрадовалась, что система Веберна так четко раскрылась.”

23 Cited in Kholopova and Kholopov, Музыка Веберна (The Music of Webern), 12; emphasis original. Rather than translate into English the Russian, which was in fact translated from German, I have selected the relevant quote from an English translation of the German (Anton Webern, The Path to the New Music, translated by Leo Black [Bryn Mawr, PA: Theodore Presser, 1963]), and used it for this quotation. The lecture by Webern from which this quote is drawn was given in Vienna on 10 April 1933.

24 Webern, The Path to the New Music, 39.
path for the development of European music, all of which lead to his well-known formulation of “New Music.” He ended with what he simply called “chromaticism,” which he often equated with “movement by semitone.” For example, Webern also said, “Here already is a piece [a Bach chorale] wholly based on what we call chromaticism, on progression by semitones.”25 And, when speaking about the dawning of a new era, he said: “The chromatic path, that’s to say the path where one moves by semitones, had begun.”26 What the Kholopovs did, by focusing on the above quotation on twelve-tone music, was to find the relevant section with respect to Webern’s view on the importance of the semitone and relate it to their new analytical system.

In the Kholopovs’ system, there are two main types of hemitonicism: hemitonic “fields” and hemitonic “groups.” A field is defined as the continuous filling in, by semitones, of some portion of the chromatic scale along the vertical, horizontal, or diagonal dimensions. Such a field is shown in Figure 2, from Webern’s Five Songs, Op. 4/3. The Kholopovs give several such examples, which are melodic segments that carve out a piece of the chromatic scale—thus, they are horizontal manifestations of hemitonic fields. Further, these fields range from three to twelve notes. Quantitatively, the fields vary; but qualitatively, they are constant, that is, the field will always be filled in by semitones. Another way of thinking of hemitonic fields is as chromatic clusters that could be represented by prime forms (012), (0123), (01234), and so on, for three-, four-, and five-note fields, respectively. Finally, the Kholopovs observe that “the hemitonic field quite frequently coincides with the phrasing in the melody and, in songs, also with the caesuras in the poetry.”27 This proves to be common in Webern’s music: a phrase, melody, or a break often delineates a certain hemitonic field.

25 Webern, The Path to the New Music, 29.
26 Webern, The Path to the New Music, 47.
27 Kholopova and Kholopov, Музыка Веберна (The Music of Webern), 14
With respect to hemitonic groups (see Figure 3), the Kholopovs explain that they are groups of three and four notes that are formed by connecting any interval with one or two semitones. Each group is laid out in its most compact arrangement. Therefore the intervals that are connected to the semitone do not exceed five semitones since their inversions will yield the same groups in the same compact arrangement.\(^{28}\)

So here we see the ten hemitonic groups in their canonic, most-compact form. The distinguishing factor of the groups is the semitonal content, noted below the groups in the figure as 1H, 2H, etc. (where “H” stands for half-step). The five tetrachordal hemitonic groups, distinguished as letter-

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\(^{28}\) Kholopova and Kholopov, Музыка Веберна (The Music of Webern), 16.
“b” as opposed to letter-“a” groups, are based on the trichordal groups, in that each four-note version contains two versions of the accompanying trichords. So, for example, the trichord 2a, shown by (C, C#, D#) in Figure 3 as a “prime form,” is contained twice in tetrachord 2b: once as (C, C#, D#) and once again as (C#, D#, E); this is why they are both numbered with the Arabic numeral “2.” In other words, with the ten hemitonic groups, both transpositional and inversive equivalence are at play. These groups represent a subsystem of pc set theory. With respect to their formation, the situation with the hemitonic trichords is unproblematic: these are all of the trichords that contain at least one semitone. The situation with the hemitonic tetrachords is somewhat more nuanced, as not all of the tetrachords that contain a semitone are listed in Figure 3. (I will show below how the Kholopovs dealt with other tetrachords that contained at least one semitone.) Notably, the five hemitonic tetrachords feature inversive symmetry, which the Kholopovs mention (see paragraph 24 in the Appendix). The four tetrachordal groups are really just a function of the trichordal groups. As Kholopova writes in her 1973 article: “The systematization of the chromatic intervalllic groups . . . shows that each four-note group, structured symmetrically, includes two three-note groups that have the same collection of intervals.”29 She goes on to discuss how group 2b, for instance, is essentially made up of (013) and (023) trichords, stressing the succession of semitones for each subset (i.e., 1–2 and 2–1). This is why she stopped at five tetrachordal hemitonic groups, as she conceived of them as dependent on the trichordal groups.

Figure 4 shows the Kholopovs’ hemitonic group analysis of the vocal line from Webern’s Five Canons, Op. 16/1. They mention that not one note of the vocal line is left out, and all ten hemitonic groups are used. (Although they had to take a note from the bass clarinet in m. 10 in

order to analyze all the notes of the vocal line; otherwise, they would not have been able to do so.) This figure also shows Webern’s predilection for group “3,” based on set class (014), which happens eight times in all, out of twenty-five segmented sets. The Kholopovs say that this group highlights the “intonational sharpness of the minor second with the singing softness of the minor third.”

In fact, they call this group the “Webern Hemitonic Group.” They further justify Webern’s use of this particular group: “Structurally, group 3a is the only group—containing two different intervals—that does not exist in diatonicism and is used only in chromaticism.” Thus they feel that Webern is able to distance himself further from diatonicism by means of group 3a (and, by extension, group 3b).

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30 Kholopova and Kholopov, Музыка Веберна (The Music of Webern), 18.
31 Kholopova and Kholopov, Музыка Веберна (The Music of Webern), 18.
32 Kholopova and Kholopov, Музыка Веберна (The Music of Webern), 18; emphasis original.
The Kholopovs also label vertical sonorities with hemitonic groups; see Figure 5. In this analysis we once again see the prominence of group 3, accounting for all but two chords. Observe in the second chord the combination of two instances of group 3a, the trichordal version. In other words, instead of coming up with a new classification for a new type of tetra-chord—in this case, (0347) or Forte number 4-17—the Kholopovs view the sonority as the combination of two trichordal hemitonic groups.

By taking into account hemitonic trichordal combinations, it is possible to represent all tetrachordal set classes that contain at least one semitone as one, two, or three of the trichordal hemitonic groups. Figure 6 expands the Kholopovs’ hemitonic groups to include all trichords and tetrachords that contain at least one semitone. I have shown the original ten hemitonic groups in bold-faced type. The Kholopovs claim that hemitonicism is the one constant in Webern’s music, from Op. 3 (the Five Songs of 1908–09) to his final compositions, and argue that this system connects Webern’s nonserial and serial works. They add that “The five hemitonic groups, along with their derivatives, give a complete classification of combinations of a given semitone with all...
**FIGURE 6.** Prime forms of trichordal and tetrachordal set classes containing at least one semitone, expressed as hemitonic groups

(Kholopovs’ original groups in bold type; hemitonic duplicates bracketed; there are five trichordal and eighteen tetrachordal hemitonic groups)

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<thead>
<tr>
<th>Trichords</th>
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<tr>
<td>(012) = 1a</td>
<td>(0123) = 1b</td>
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<tr>
<td>(013) = 2a</td>
<td>(0124) = 1a + 2a + 3a</td>
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<tr>
<td>(014) = 3a</td>
<td>(0125) = 1a + 3a + 4a</td>
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<tr>
<td>(015) = 4a</td>
<td>(0126) = 1a + 4a + 5a</td>
</tr>
<tr>
<td>(016) = 5a</td>
<td>(0127) = 1a + 5a + 5a</td>
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<tr>
<td>(0134) = 2b</td>
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<td>(0135) = 2a + 4a</td>
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<td>(0136) = 2a + 5a</td>
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<tr>
<td>(0137) = 2a + 5a</td>
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<tr>
<td>(0145) = 3b</td>
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<td>(0146) = 3a + 5a</td>
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<td>(0147) = 3a + 5a</td>
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<td>(0148) = 3a + 4a</td>
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<td>(0156) = 4b</td>
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<td>(0235) = 2a + 2a</td>
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<td>(0347) = 3a + 3a</td>
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intervals of the chromatic system.” The Kholopovs also connect the use of hemitonic groups with compositional procedure, mentioning that Webern elevated semitonal voice leading from an intuitive choice into conscious compositional (and precompositional) decisions:

Hemitonic groups in Webern’s work underwent a clear-cut evolution: from an intuitive auditory choice to conscious compositional and precompositional application. “Pre-compositional” (Leland Smith’s term) means originating before the process of actually composing as, for example, Mozart’s choice of form or a twelve-tone composer’s choice of series.

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33 Kholopova and Kholopov, Музыка Веберна (The Music of Webern), 17.

34 Kholopova and Kholopov, Музыка Веберна (The Music of Webern), 20–21; emphasis original.
ANALYSIS OF Op. 11\textsuperscript{35}

I will now turn to Webern’s Three Little Pieces for Cello and Piano, Op. 11, and offer an analysis of nos. 1 and 3, using hemitonic fields and groups. The inspiration for hemitonic fields can be found in Webern’s own words. As is well known, regarding his Six Bagatelles for String Quartet, Op. 9, he stated that he had the feeling that “when all twelve notes have gone by, the piece is over.”\textsuperscript{36} This is also the piece for which he wrote out the chromatic scale and crossed off pitches as he composed, which the Kholopovs mention in their writings.

Figure 7 shows my hemitonic-field analysis of the first movement. Of course, at the final level, any hemitonic field is the twelve-tone aggregate, which the Kholopovs call “total hemitonicism.” This type of hemitonicism is a direct result of Webern’s own idea: “In short, a rule of law emerged; until all twelve notes have occurred, none of them may occur again. The most important thing is that each ‘run’ of twelve notes marked a division within the piece, idea or theme.”\textsuperscript{37} It is indeed interesting to see how Webern marks divisions of a piece using a “run” of the twelve tones, especially in his pre-serial works.

In the example, I have marked off the three instances of total hemitonicism with vertical dotted lines. As mentioned earlier, the Kholopovs connect the field to phrases, noting that “the hemitonic field quite frequently coincides with the phrasing.” This is important because it strengthens the musical associations of hemitonic-field analysis. In other words, the three fields I have marked off in Figure 7 should be thought of as musical units, or as complete musical gestures; the completion of the field is also the completion of the musical gesture.


\textsuperscript{36} Webern, The Path to the New Music, 51.

\textsuperscript{37} Webern, The Path to the New Music, 51.
The first hemitonic field is sixteen notes in total and finishes with the B♭3 in the cello in m. 3. The second, which begins with F♯4 (F♯ being the same pc that began the piece), is also sixteen notes long and ends with the E♭4 in the cello in m. 4. The third, which also ends with F♯, written as G♭2 in m. 6, is significant in that it has no repetition. The Kholopovs say that Webern’s intention to use total hemitonicism is obvious when all twelve notes occur without repetition. For the performer, emphasizing these field completions is important, and represents a basic way of interpreting this music. Notice how Webern emphasizes each note that completes the field: the B♭3 in the cello in m. 3 is highlighted by a diminuendo to ppp, a ritardando to a tempo, and a rest afterward; the E♭4 in the cello in m. 4 is highlighted by pizzicato, a f dynamic,
and an accelerando; while the G♭2 in the cello in m. 6 is highlighted least of all, only by a tenuto mark. However, that G♭ gains significance from its place in the hemitonic field, which is something the performer should bring out.

Figures 8a and 8b show mm. 5–6 of the same piece, which offers the third instance of total hemitonicism. In m. 5, the piano opens a hemitonic field from G up to D. In m. 6, the cello’s E–F motive expands the field down to F and up to E. At this point, the piano completes the field by filling in the final two whole tones that were opened up by the cello E–F. This linking of hemitonic fields with musical phrases or gestures could be thought of as one of the most interesting elements of hemitonic analysis.
Figure 9 shows the third piece from Op. 11. A hemitonic field from B♭₂ to F₃ is established in the first two and a half measures of the piece. If we look at the hemitonic field established in these measures, we quickly see two statements of an (014) trichord (which I will soon identify as a hemitonic group in the group analysis): one (014) trichord occurs as the first three notes of the cello line, and the other is expressed as a piano chord; they overlap to form a six-note chromatic segment (see Figures 10a and 10b). At the end of this segment, the cello adds two more notes to the hemitonic field: B and B♭. Significantly, the next note in the piano is F♯, which further expands the hemitonic field. An almost identical hemitonic field is established in the cello line itself, without the piano part, as shown in Figure 10c. This is emblematic of

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38 The F♯₂ of the cello trill is also part of this field.
Figure 10. Webern, Op. 11/3

(a) first 2.5 measures, score

Äußerst ruhig (♩= ca 50)
con sord.
am Steg

(b) first 2.5 measures, analysis

(014), cello opening

(014), piano chord

(c) hemitonic field of entire cello line

Opening notes, mm. 1-2
Apex, mm. 5-6

Ending notes (filling in), mm. 8-10
hemitonic fields; in this case, the cello carves out a specific chromatic segment, a hemitonic field, which in turns works with the surrounding notes. The field has one additional note, A♯, which completes the twelve-tone total hemitonic field in m. 8. This, of course, is of great musical significance, especially for a piece that is only ten measures long and is comprised of only twenty-one notes. Also, the field that makes up the cello line lacks an F♯, G, and G♯, which is the hemitonic group played alone by the piano in mm. 3–5. Lastly, the first notes to be repeated in the entire piece are E and E♯ (piano, m. 5); they form the same semitone that began the piece in the cello trill.

Figures 11a and 11b show hemitonic group analyses of Op. 11, nos. 1 and 3. I have boxed all hemitonic groups, and not one note is left out. Also, within each group I have slurred the relevant semitone(s) using dotted slurs. The segmentation I have used is simple, and along the horizontal, vertical, or diagonal dimension, as the Kholopovs say.\textsuperscript{39} Once again the prominence of group 3, the “Webern hemitonic group,” is shown: fourteen out of thirty-one groups in Op. 11/1, and five out of fifteen groups in Op. 11/3. Of course, none of this is particularly earth shattering today. I offer these simple analyses as an example of work the Kholopovs did with respect to Webern’s music in the late 1960s, without any knowledge of American developments, working strictly from the scores and using the ideas of a few European authors who had worked with Webern before. Given what they knew and when they knew it—and where they were working for that matter—the hemitonic system of analysis was a remarkable invention for its time.

\textsuperscript{39} The “diagonal” dimension would be something like an arpeggio, or the initial notes of imitative entrances—in other words, something that occurs diagonally across the page. The Kholopovs use this term often with the horizontal (melodic) and vertical (chordal) dimensions.
FIGURE 11. Hemitonic group analyses
(a) Webern, Op. 11/1
CONCLUSION

Today, hemitonicism seems quaint. There is nothing revolutionary in finding chromatic “fields” in Webern’s music, nor in identifying certain canonic three- and four-note groups. What one must bear in mind, however, is that the Kholopovs began their work in 1965, when they knew next to nothing about Webern and his music. They studied the writings of a few Europeans, some writings of Webern, and his scores. In light of these circumstances, hemitonicism gains new meaning. The Kholopovs contrived a subsystem of pc set theory that paralleled the groundbreaking work of Babbitt and Forte, as well as other American authors, in the 1950s and
1960s.\textsuperscript{40} That they had little support to do so is not in doubt. Not only was Webern’s music far afield for the Russian ear at that time, the ashes from World War II had hardly settled, and to hold a composer from Austria in such high regard would have been doubly difficult. Clearly, mathematical underpinnings or computer-aided analysis were not part of the Kholopovs’ research. They simply wrote down what they heard and saw, knowing nothing of the developments going on in the United States.

I believe that hemitonicism provides a valuable approach to understanding intervallic, harmonic, and motivic relationships that are part and parcel of the post-tonal repertoire of the early twentieth century. The fact that the Kholopovs link musical phrasing and gesture so closely to hemitonic fields and groups is also noteworthy; it provides a useful method for understanding the structure of Webern’s music. For all of these reasons, hemitonicism also provides a firm rebuttal to those who may think that we cannot “hear” pc sets.

Notably, the most basic tenets of American pc set analysis are operative in hemitonicism. The Kholopovs write:

Notes and structures in [Webern’s] pitch system are equivalent and void of hierarchy . . . . In the hemitonic groups . . . there is no fundamental tone, which means that any one group has one and the same structural meaning, whether reading it: in prograde, retrograde, inversional, or retrograde inversional form . . . ; in its most compact-fundamental or wide-derived spacing; or vertically, linearly, or diagonally.\textsuperscript{41}

From this quotation we can glean that—as with the “set class” of American pc set analysis—the


\textsuperscript{41} Kholopova and Kholopov, Музыка Веберна (The Music of Webern), 18.
hemitonic groups (1) feature transpositional and inversional equivalence, (2) operate in pc space and not pitch space, and (3) occur in melodic or harmonic form. Of course, these are building blocks of pc set analysis as practiced in the United States. However, unlike the set class, the Kholopovs did not try to expand hemitonicism to include sets of a larger cardinality. They felt that “Further growth in the number of notes in the group gives either a quantitative increase, that is, doubled groups, or goes beyond the limits of hemitonicism.”

Although the Kholopovs’ system is certainly not meant to be as comprehensive as the American version of pc set analysis, they do suggest that it has application beyond the music of Webern:

Webern’s hemitonicism is an independent pitch system, as pure, confined, and self-contained as, for example, seven-note diatonicism. Its elements, more or less, are present in all of the most important musical styles of the first half of the twentieth century. Prokofiev, Stravinsky, Bartók, Shostakovich, Hindemith, Schoenberg, Berg, and many others, all used it, yet in a mixed form with other pitch systems. Only with Webern is hemitonicism concentrated and isolated from different systems and proves to be hemitonicism of a strict style.43

The Kholopovs were aware of the tendency to use the term “atonality” with respect to Webern’s music. This they categorically avoided: “Hemitonicism is the positive name that is implied by the so-called ‘atonality’ of Webern and that, perhaps, replaces that negative designation, which satisfied neither Schoenberg nor Webern, nor any composers or theorists of that time.”44 Still, that they contrived a system that bears many resemblances to American pc set theory, and did so in the Soviet Union in the 1960s, is remarkable.

42 Kholopova and Kholopov, Музыка Веберна (The Music of Webern), 17.
43 Kholopova and Kholopov, Музыка Веберна (The Music of Webern), 28; emphasis original.
44 Kholopova and Kholopov, Музыка Веберна (The Music of Webern), 32.
APPENDIX

This Appendix contains a complete translation of the chapter on hemitonicism in Valentina Kholopova and Yuri Kholopov, Музыка Веберна (The Music of Webern) (Moscow: Kompozitor, 1999), pp. 11–32. I have interpolated minimal editorial commentary, and such commentary is placed in square brackets followed by my initials, “PE.” The translation is formatted as it is in the Russian edition, with the same headings and paragraph breaks. Footnotes appear with asterisks preceding them to distinguish the numbering from that of the preceding essay; the sources cited in footnotes are not contained in my “Works Cited” list. Examples and Figures have been labeled with an “A” prefix, likewise to distinguish them from the preceding. Lastly, I have added paragraph numbers so that readers can compare versions, if the Russian edition is available to them.

Hemitonicism

[1] Hemitonicism (from the Greek ημιτονιον, or “semitone”) is a pitch system defined by the semitone and a variety of chromaticism.1 Pitch organization in Webern’s music is essentially represented by hemitonicism. The strict consistency of this system is one of the most important conditions of the wonderful purity of Webern’s musical style. We do not equate hemitonicism with chromaticism insofar as chromaticism is not always characterized solely by the motion of semitones. For example, in tonicizations there are notes that are foreign to the main scale.

---

One of the most important features of hemitonicism as a musical system is its completeness. If major/minor tonality contains—apart from pure diatonicism—pentatonicism, particular diatonic modes, and chromatic intervallic progressions and scales (including whole-tone and octatonic), then hemitonicism’s isolation from different pitch systems is a condition of its vitality. A disastrous incompatibility appears with respect to hemitonicism in the event of a breach of this isolation. Of the “trinity” of Second Viennese School composers, only Webern wrote in the system of pure hemitonicism, which captures Webern’s works from Op. 3 to his final, Op. 31. Op. 1, the Passacaglia, was written in the expanded tonality of D minor, while his Op. 2, the choral work “Entflieht auf leichten Kähnen,” with the exception of the final G-major triad, is persistently in a chromatic “atonal” system with the defining interval of a major third. Webern’s style, then, is as consistently hemitonic as, for example, Palestrina’s style is diatonic.

That Webern, having found the hemitonic system, did not once deviate from it, completely ensured unity in his musical style, despite the evolution of technique from the so-called “free atonality” to serialism. Though the complete isolation of hemitonicism from other systems was crucial to Webern in particular, the demand of completeness and isolation from tonality was also, theoretically, clear to Schoenberg. When speaking of the avoidance of octave doublings, Schoenberg explained this by saying “even a slight hint at a former tonal harmony is capable of misleading, since it evokes a false expectation of corresponding consequences and continuations.”

Webern thought that completeness was necessary also for tonality: “What is a cadence? An attempt to delimit tonality from everything that could obfuscate it.”

---


*3 Anton Webern, Lektsii o muzyke, pis’ma (Moscow: Muzyka, 1975), 64.
Webern was convinced that at the heart of his music lie strict laws, which he tried very hard to learn. However, his ideas about pitch laws in his own music amounted to nothing more than what he knew from Schoenberg about contemporary chromaticism and the historical paths to it. (In his lectures Webern speaks of the assimilation of the intermediate notes between the seven diatonic steps, of the use of the twelve notes of the chromatic scale of Bach, of the divergence of a system of applied dominants, of the intensification of the role of the leading tone, of the complementation of notes spaced at the distance of a semitone, of doubled scale degrees and, finally, of the chromatic scale as the only scale in contemporary music.)

One must be attentive to understand Webern’s individual system while reading his discussions on chromaticism and dodecaphony. The system is not of twelve tones, but of movement by semitone. Here is the most definitive statement by the composer: “But it was soon clear that hidden laws were there, bound up with the twelve notes; the ear found it very satisfying when the course of the melody went from semitone to semitone, or by intervals connected with chromatic progression.”*⁴ Webern did not use the term “hemitonicism”; rather, like Schoenberg, he used the term “chromaticism.”

The use of the semitone as the foundation for hemitonicism as a system necessitates a reinterpretation of intervallic properties and a renaming of intervals. The traditional method of naming intervals comes from diatonicism and from major/minor tonality and, as is well known, treats intervals of the same size—such as major and minor seconds, major and minor thirds, perfect and diminished fifths, and so on—as equal. Conversely, this method differentiates between an augmented fourth and diminished fifth, a major seventh and diminished octave, and so forth. For hemitonicism, on the contrary, there are utterly fundamental differences between

the semitone and the whole tone, between the perfect fifth and the tritone, as well as with other similar pairs of intervals. And, conversely, the difference between the augmented fourth and diminished fifth or between the minor second and the augmented unison, and so on, is entirely unimportant.

[7] The method of computing intervals that corresponds to the essence of hemitonicism is the expression of the interval as a number of semitones, taking the semitone itself as “1.” The following table of intervals compares the traditional computations with the new hemitonic computations thereof:

<table>
<thead>
<tr>
<th>Interval</th>
<th>Traditional</th>
<th>Hemitonic</th>
</tr>
</thead>
<tbody>
<tr>
<td>Perfect</td>
<td>Per. 1 = 0</td>
<td>Aug. 4 (dim. 5) = 6</td>
</tr>
<tr>
<td>Minor</td>
<td>Min. 2 = 1</td>
<td>Per. 5 = 7</td>
</tr>
<tr>
<td>Major</td>
<td>Maj. 2 = 2</td>
<td>Min. 6 = 8</td>
</tr>
<tr>
<td>Minor</td>
<td>Min. 3 = 3</td>
<td>Maj. 6 = 9</td>
</tr>
<tr>
<td>Major</td>
<td>Maj. 3 = 4</td>
<td>Min. 7 = 10</td>
</tr>
<tr>
<td>Perfect</td>
<td>Per. 4 = 5</td>
<td>Maj. 7 = 11</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Per. 8 = 12</td>
</tr>
</tbody>
</table>

[8] In order to set apart a number designating an interval from other abstract numbers, we will use the following designations: 1 H. (1 semitone), 2 H. (2 semitones), etc.

[9] In hemitonicism enharmonic notes and intervals are equivalent according to their roles in the system, insofar as the intervals emanate from an equal twelve-tone temperament. So, there is always the equivalency C♯ = D♭, D♯ = E♭, etc. (we will no longer discuss this equivalency). The distinction in vocal and string-instrument tuning of C♯ as a higher pitch and D♭ as a lower pitch is natural in tonal music, while in hemitonicism this distinction is neutralized. The tuning of pitches for vocalists and string instrumentalists in Webern’s music should be maximally close to equal temperament. The composer himself, never writing key signatures (except for Opp. 1 and 2), inasmuch as it was possible in his system, adhered to a “tonal” coloration in his selection of
markings, that is, among flats he would usually put D♭ and not C♯, and among sharps, he would put C♯ and not D♭.

[10] Webern’s hemitonicism has two basic forms: hemitonic fields and hemitonic groups. These forms are analogous to the two most important manifestations of mode: the scale and the characteristic intervallic groups (for example, in folk music’s anhemitonic pentatonicism the scale is the pentachord and the intervallic groups are the trichords).

[11] The theory of hemitonicism (however, without that title) with a suggestion to that which we call “fields” and “groups,” was developed in the 1950s through the early 1960s by an entire group of composers and theorists. For instance, Stockhausen derived several trichordal hemitonic groups by Webern.⁵ Pousseur calls hemitonic fields that sound simultaneously “synchronen Felder” (German) and “campi sincroni” (Italian), and those that sound successively “diachronen Felder” and “campi diacronici,” while he calls hemitonic groups “campi frequenziali.”⁶ Metzger includes Webern’s hemitonic groups in his system of all other trichordal groups of an equal-tempered tuning system.⁷ Karkoschka uses the concept of “groups of three notes,” “groups of four notes,” etc., which coincide with our concept of a “hemitonic field,” with the caveat that Karkoschka’s groups exclude the repetition of notes. Karkoschka assigns special significance to “chromatic filling in” (by semitone) in Webern’s music.⁸ Kolneder lays out a theory of hemitonic groups most comprehensively, calling them “fields” (for instance, a group of nine notes is a

“Neuntonfeld”). And he calls a semitone filling in of the complete chromatic “panchromaticism.”

Hemitonic Fields

A hemitonic field is the continuous filling in, by semitones, of some portion of the chromatic scale along the vertical, horizontal, and diagonal dimensions. In hemitonicism movement within the chromatic scale is exhausted by this semitone filling in. The number of notes in the hemitonic field arbitrarily changes from three to twelve notes, and the pitch range varies accordingly from two semitones to twelve. In this fashion, the quantitative factor in the hemitonic fields, namely, the size of the pitch-class set, is variable, while the qualitative factor, the filling in by semitones, is constant. [I translated “звукоряд” as “pitch-class set” in this sentence and elsewhere. —PE.] Hemitonicism that exhausts the system, that is, that fills in a complete octave by semitones, we shall call “total hemitonicism.”

Hemitonic fields of all ranges, from two to twelve semitones, are constant already in Webern’s non-serial opuses, nos. 3-16. Notably, the hemitonic field quite frequently coincides with the phrasing in the melody and, in songs, also with the caesuras in the poetry. Here are some examples of hemitonic fields stated linearly, with a gradual increase in the number of non-repeated notes, from three to nine.

Example A1

Repetitions of notes are not excluded here.

---


*10* Repetitions of notes are not excluded here.
EXAMPLE A1 (continued)

D) op. 6, no. 2

E) op. 4, no. 3

F) op. 4, no. 5


[15] The hemitonic field fulfills an organizational role connecting notes into a unified system during the transfer of notes into different octaves with Webern’s characteristic large melodic leaps. Thus, at the beginning of the song “Die Sonne,” Op. 14, no. 1, the hemitonic field is filled in with eleven notes (only B♭ is missing):

EXAMPLE A2

[16] Gradually, the constructed and conscious “movement by semitones” naturally led Webern to the thought of using all twelve tones of the chromatic scale sequentially. By the principle of semitone filling in, such a small number of notes can exhaust itself quite quickly. For example, in mm. 1–2 of Webern’s Op. 5, no. 1, all twelve tones are used up, and in mm. 3–4 they
are used again, but in a different order. Further, there are many non-adjacent repeated notes. The intention of the composer to use “total hemitonicism” is clear when twelve tones are taken without repetition. The first example of this appears in Webern’s Bagatelles, Op. 9, no. 1 (mm. 1–3). Webern himself wrote that, precisely when writing the Bagatelles, he took the chromatic scale and crossed off each separate note. It is possible that the composer used this method even beyond Op. 9. So, in the middle of the second of the Three Little Pieces for cello and piano, Op. 11, no. 2, as in the first Bagatelle, the notes begin to be repeated only after they have all been used up by the cello and piano. And the song “Gleich und Gleich,” Op. 12, no. 4, opens with a piano phrase, in gracefully spread-out notes, in which “total hemitonicism” appears:

![Example A3](image)

When Webern began writing serial music, the composition of his series conformed to the principle of hemitonicism. It is possible to call each of his series a “total hemitonic” field, which was one of the merits of serialism for Webern. There is no necessity to specially demonstrate these fields. As the series intersects with its variants (P, R, I, RI) the pitch material in Webern’s music appears in its typical two forms: hemitonic fields and hemitonic groups (which will be discussed shortly).

[17] We will recall that these characters designate Prime, Retrograde, Inversion, and Retrograde Inversion. [This may sound simplistic but, in fact, they use these four Latin symbols—P, I, R, and RI—to designate the four forms of a twelve-tone row in Russia, and not Cyrillic characters. So, it looks strange in a Russian text, and that is why they are clarifying this in a footnote here. —PE]
Up until now we have seen examples of hemitonic fields spread out over the horizontal, vertical, and diagonal dimensions, strictly limited by the confines of small construction. This limitation serves as a very important criterion, since in any sufficiently developed composition of tonal music all twelve tones of the chromatic scale can be used, which does not give sufficient reason to call it a hemitonic field (for example, in the first movement of Beethoven’s Third Symphony all twelve tones are used by m. 25). With the small compositions it was clear that Webern’s hemitonicism (fields and groups) took the place of the diatonic scales, triads, and seventh chords of classical tonality. Larger constructions in Webern’s works, from the point of view of pitch material, can be thought of as combinations of several fields whose pitch-class sets complement one another (sometimes to the “total hemitonic”) or, variously, whose pitch-class sets fill themselves out by semitones, and also alternate from time to time with hemitonic groups.

**Hemitonic Groups**

Hemitonic groups are groups of three and four notes that are formed by connecting any interval with one or two semitones. Each group is laid out in its most compact arrangement. Therefore the intervals that are connected to the semitone do not exceed five semitones since their inversions will yield the same groups in the same compact arrangement.

In all there are five trichordal hemitonic groups, constructed as 1+1, 1+2, 1+3, 1+4, and 1+5 semitones:

---

**Example A4**

\[
\begin{align*}
1a & : 1H \\
2a & : 1H 2H \\
3a & : 1H 3H \\
4a & : 1H 4H \\
5a & : 1H 5H
\end{align*}
\]
[21] The connections of one semitone with 6, 7, 8, 9, or 10 semitones are derivatives of the first five, as a result of intervalllic inversion.

[22] The five hemitonic groups, along with their derivatives, give a complete classification of combinations of a given semitone with all intervals of an equally tempered tuning system.

[23] There are also five tetrachordal hemitonic groups, also arranged in a most compact fashion, formed by placing a semitone with any other interval. They are built on the principle of a semitone at the extremes and 1, 2, 3, 4, or 5 semitones in the middle and, as such, they are symmetrical pitch-class sets.¹²

Example A5

![Example A5](image)

[24] The tetrachordal groups possess a new quality when compared with the trichordal groups—inversional symmetry. Further growth in the number of notes in the group gives either a quantitative increase, that is, doubled groups, or goes beyond the limits of hemitonicism.

[25] The selection of three- and four-note hemitonic groups answers the logic of musical thought established over centuries. This logic manifests itself in ancient Greek tetrachords, in the trichords of pentatonicism, and the triads and seventh chords of major/minor tonality.

---

¹² Karkoschka calls the various forms of our tetrachordal hemitonic groups with two semitones “chromatic ranges” (Umgreifung), which can be horizontal or vertical. For example, he gives the following figure, corresponding to Webern’s Op. 5/5, mm. 17–18 (our group “4b”; see Karkoschka, Studien zur Entwicklung der Kompositionstechnik im Frühwerk Anton Webers, 69).

Figure A1:

![Figure A1](image)
Hemitonic groups in their tetrachordal and, partially, their trichordal versions exclude diatonic intervallic formations. The groups capable of being considered diatonic are constructed accordingly to the hemitonic principle and, among the other groups, perform exactly the same role.

Above all, the hemitonic groups are distinguished from tonal triads and seventh chords in their intervallic structure. Significantly, there is another difference. In a tonal chord there is a fundamental tone to which all other tones are subordinate. A fundamental sonority and its inversion are, in turn, also not equivalent. The principle of strict hierarchical subordination, intrinsic to tonality, carries over to three- and four-note chords, giving rise to a functional dependence of the structures of chords and notes within the chord.

Inherent in Webern’s hemitonicism is a refusal of tonal subordination. Notes and structures in his pitch system are equivalent and void of hierarchy (in Webern’s style, differences and dependence are created through different elements of his musical language). In the hemitonic groups, defined by the connection of any interval with a semitone, there is no fundamental tone, which means that any one group has one and the same structural meaning, whether reading it: in prograde, retrograde, inversional, or retrograde inversional form (the four forms of the series—P, R, I, and RI); in its most compact-fundamental or wide-derived spacing; or vertically, linearly, or diagonally. Rearrangement of notes is also possible within the groups (which is “rotation” according to the terminology of serial theory), which Webern’s hemitonic groups have in common with the hemitonic fields.

Though the five groups are part of a unified self-contained hemitonic system, Webern does differentiate among them. One of Webern’s particularly favorite groups is group 3 in its trichordal version (1 H. + 3 H.). It is possible to explain this structurally and semantically.
Structurally, group 3a is the only group—containing *two different* intervals—that does not exist in diatonicism and is used only in chromaticism. Semantically, it connects the intonational sharpness of the minor second, inverted into a major seventh, with the singing softness of the minor third, inverted into a major sixth. Webern understood the significance of these intervals that had taken hold in tonal music over the centuries. In fact, group 3a is so typical in Webern’s compositions that it can rightly be called the “Webern group.” Group 1b, in its schematic form (three semitones in succession) is avoided, particularly in melodic phrases, since it coincides with a segment of the chromatic scale.

[30] Compared with tonal triads, seventh, and ninth chords, hemitonic groups are small in their interval range. In tonal sonorities the fifth represents the smallest interval range necessary for a sonority, yet in the hemitonic groups it is the largest such interval range (as seen in group 5b) while the smallest is the whole tone (as seen in group 1a).

[31] The ranges for the hemitonic groups, then, are on average twice as small as the ranges for tonal sonorities. Accordingly to Alfred Schnittke (in conversation with the authors of the present work), “chromaticism is diatonicism spit out.” Accordingly, the interval that regulates the range of the pitch-class sets in one or another system changed. In classical tonality the *octave* limited the growth of chords, and the ninth chord—the only exception—arose at first as a suspension to the octave. In Webern’s hemitonicism *half of the octave*, the tritone (6 H.), limits the growth of the hemitonic groups, representing a boundary between inversionally related intervals, and group 5b with a range of 7 semitones (the fifth) is the only exception (in Webern’s work the fifth most often inverts to the fourth, 5 H.). Webern himself spoke of the huge significance played by the tritone, the diminished fifth, in new music.\(^{13}\)

\(^{13}\) Webern, *Lektsii o muzyke, pis’ma*, 79.
Hemitonic groups are active in melodic voices, chords, Webern’s distinctive complementary multi-voiced textures, imitative counterpoint, and sonorous complexes—in short, they are active in all aspects of Webern’s technique.

From the point of view of pitch material, Webern’s melodies are characteristically a continuous linking of hemitonic groups (the segments of the melody are taken in their most compact arrangement). The groups sometimes coincide with phrases (if the phrases are short), but frequently they are independent of phrasings and include the “dead intervals” that occur over breaks in the music as well. As an example of such a melody we cite the vocal part of Webern’s “Christus factus,” Op. 16, no. 1, in its entirety. The square brackets with the group numbers show just how closely situated the hemitonic groups are in the melody and that not one note is left unaccounted for:

**Example A6**

Rasch (\(\dot{d} = \text{ca 88}\))

\[\text{Voice}\]

\[\text{Christus Factus, op. 16, no. 1}\]
We can find one characteristic example of the hemitonic structure of chords in the song Op. 6, no. 4. Its first chord (m. 8) is revealing. In its makeup we can see two minor thirds offset by 11 semitones. Particularly revealing is the role of the “Webern group” (1 H. + 3 H.)—it forms all chords except the first and third:

Hemitonic groups in Webern’s work underwent a clear-cut evolution: from an intuitive auditory choice to conscious compositional and precompositional application. “Precompositional” (Leland Smith’s term) means originating before the process of actually composing as, for example, Mozart’s choice of form or a twelve-tone composer’s choice of series.

Already in 1905 in the String Quartet, with a philosophical epigraph from Jacob Böhme, Webern triumphantly declared one of the hemitonic groups, namely: the “Webern group,” no. 3a. At the beginning of the quartet the motive C♯–C–E is given as a significant idea-formula related to Beethoven’s famous “muss es sein?” from the Introduction to the Finale of his Op. 135 quartet (notably, Beethoven’s aphoristic theme is built on the same group, 3a). The same group took

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hold in the strict theme of Webern’s Passacaglia, Op. 1, and in the lyrical song “Ascension,” from Five Songs on Words by Dehmel (without opus).

[37] Webern’s first years of working with the twelve-tone technique, from Op. 17 to Op. 21 (1924–28) became a period of realizing the hemitonic groups, though the realization was incomplete (judging by Webern’s works, he never came to a complete understanding of pitch relationships in his music). In Op. 17 Webern developed the series as a twelve-tone aggregate, yet in Op. 21 he also used the technique of hemitonic groups as parts of the series. *And the three- and four-note parts of the series in Op. 21 precisely coincide with the hemitonic groups.*

[38] Hemitonicism is that general system that connected Webern’s non-serial and serial works. Webern composed the series of the song “Armer Sünder, du,” Op. 17, no. 1—a series not yet divided into groups from which the series could be built—by the same pitch principles by which he composed the melodies of the songs from the “atonal” opuses. The series from Op. 17, no. 1, is as tightly “woven” from three- and four-note hemitonic groups (see Example A8a) as the melody from Op. 15, no. 4. The unique features of Webern’s pitch principles, expressed also in his series, are clearly evident when comparing a series by Webern (from Op. 17, no. 1; 1924) with a series by Schoenberg (from the Wind Quintet, Op. 26; 1923-24) and also one from Berg of the same vintage (from the Lyric Suite for string quartet; 1925-26).

[39] In contrast to the dense construction of hemitonic groups in Webern’s series, not leaving a single note outside of the system, in the series by Schoenberg and Berg the hemitonic groups are only episodic and exist side by side with whole-tone (in the Schoenberg quintet) and diatonic (in the first movement of Berg’s suite) configurations:
In the second movement (Theme and Variations) of Webern’s Symphony, Op. 21, he uses different segmentations of groups from the series as a means of contrasting development. So, in the third variation, groups are segmented by three notes, while in the fifth they are segmented by four. Insofar as the Op. 21 series is divided into four trichordal and three tetrachordal hemitonic groups, the segmented groups in the variations turn out to be hemitonic as well.

After the milestone of the Symphony, Op. 21, in Webern’s output, the technique of hemitonic groups continued to be used with success and underwent further development. In the creation of the Concerto for Nine Instruments, Op. 24, this technique had one of its most effective applications. Webern constructed the series for this concerto as four versions of group 3a—P, RI, R, and I. To the opening trichordal group he assigned the significance of a classical “primary” motive, which was subject to different transformations (see Example A9a). Webern’s understanding of the rules of his musical thought and the increased interest in the possibilities of
a well-defined structural organization affected even his vocal melodies, which he always distin-
guished as freer. So, in the melody of the Canon, Op. 31, no. 6, short separate phrases are
divided up by rests. Each of these phrases is a hemitonic group, which is a part of the series (see
Example A9b). In the cantata “Das Augenlicht,” Op. 26, take note of the harsh intense four-voice
chords of the choir. The cohesion of each four-voice verticality is not based on the series (four
versions of the series are stated horizontally here); rather, prompted by the ear, it is held together
by the hemitonic groups 4b, 3b, and 2b, from which group 4b is not found in the series (see
Example A9c). The new structural quality in so clearly divided hemitonic groups shows through
in the general principle of construction for all of them: the duplication of one or another initial
harmonic interval of 11 semitones into different intervals. In the Piano Variations, Op. 27,
Webern returned to the hemitonic-group technique of a former instrumental composition, the Op.
24 concerto. In the first movement of the variations each of the hemitonic groups of the series
became an integral structural unit (see Example A9d).

In the Cantata, Op. 29, at the beginning of the piece, the author gave the first and last
groups of the series (3a) as clearly and separately as the C♯–C–E in the youthful string quartet,
yet simultaneously in four voices (see Example A9e):

Example A9

[next page]
A MUSIC-THEORETICAL MATRIX: ESSAYS IN HONOR OF ALLEN FORTE (PART IV)

EXAMPLE A9
A

Webern Series, op. 24

[continued]
All of Webern’s series are constructed on the basis of the hemitonic groups, which are tightly linked with each other from the first to the twelfth note of the series (the only time that Webern relaxes the hemitonic principle can be found in the series from Op. 23 in which notes 4–7 constitute a whole-tone set. However, in all the songs of the opus, Webern divides notes 4–7 with rests and connects them with hemitonic successions). Serial composition significantly helped Webern realize the principles of pitch organization in his music and, in particular, helped him to intentionally use the hemitonic groups as structural units.

**Forms of the Melodic Line in Hemitonicism**

Hemitonicism, as with other pitch systems, is accompanied by well-defined corresponding forms of the melodic line. If scalar motion is consistently associated with diatonicism and major/minor tonality, then hemitonicism is marked by a rejection of scalar lines. The forms of
melodic lines in Webern’s hemitonicism are the wave, the circle, and the spiral.

[45] Ultimately, in several purely instrumental compositions, Webern’s melodic line completely disappeared, and the “horizontal dimension” in his music was replaced with a distinct Webernian “deep dimension.” In connection with the latter, a spiral—as if indicative of the very process of discontinuing the line and departing into the “depths”—stands out as the most specific form of Webern’s line. With ingenious accuracy Stravinsky expressed the three-dimensional temporal essence of Webern’s music by symbolically depicting Webern’s style as a rolled-up spiral.*15

![Figure A2](image)

[46] Ernő Lendvai also noticed the circularity of lines in chromaticism by using Bartók’s music as an example:*16

![Example A10](image)

[47] The wave form and the waviness of the line in Webern’s hemitonicism is distinct from the waviness in any melody from romanticism, classicism, sixteenth-century polyphony, Russian

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Znamennyï chant, Gregorian chant, and folk songs, in that a smooth and gradual motion of the line is avoided. A hemitonic wave-formed line is predominantly a line of leaps and, to be more precise, of ascents and descents from one note to another, since a straight line in hemitonicism, naturally, cannot be diatonic, and *the chromatic scale is avoided in it*.

That which has just been said applies to Webern’s fully formed style, beginning with Op. 3. In Op. 2 the scale successions, which are repeated several times in the middle of the form, create an alien textural density for Webern’s style, which gives a certain air of immaturity to this piece.

Webern brilliantly made plain his treatment of wavy and straight chromatic lines in his orchestration of Bach’s Ricercare. In Bach’s theme there is an opening thematic nucleus in wave form and generalized continuation in the form of a straight chromatic line. In the orchestration Webern represents the thematic nucleus with the single timbre of the trombone, and he divides the scalar continuation into two- to three-note segments so that a bold structure arose, the so-called “timbral melody” of the French horn, trumpet, and trombone, in place of the neutral “general forms of motion”:

![Example A11](image)

Webern and Schoenberg fundamentally differed, in the period between 1907 and 1909, in their treatment of the chromatic scale and scalar lines (with the establishment of Webern’s style in his Opp. 3–4). For example, in the fifteen songs from the *Book of the Hanging Gardens*, Op. 15 (1908–09), Schoenberg, along with hemitonic progressions, used scale formations entirely

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systematically. So, in the second song there is a segment from a B♭-major diatonic scale, in the tenth song the bass is founded on scalar motion, and in the eighth song there is a segment of the chromatic scale in a hidden two-voice texture.

[51] There is nothing similar between Webern’s songs of Opp. 3–4 and his subsequent compositions. Up to 1908, Webern’s musical language, with its entire collection of tools, formed a new language and, moreover, a language newer than Schoenberg’s.

[52] The sensation of the new expressiveness of wavelike chromatic melodicism was “in the air” in the twentieth century. In particular, it was to a large extent characteristic of Bartók (as Lendvai pointed out). In his best compositions, written in the 1930s, such as the “Music for Strings, Percussion, and Celeste” and the Sonata for Two Pianos and Percussion, Bartók used hemitonicism with wavelike and spiral lines. Having heard Bartók’s “Music for Strings . . . ,” Webern found in it confirmation of the rules of his own method.

[53] The forms of hemitonic lines in the first half of the twentieth century were generalized also in theory. And none other than Schoenberg’s twelve-tone series became its theoretical formula. Already in his first completed dodecaphonic piece, the Waltz, Op. 23, No. 5, Schoenberg constructed the series exactly as a wavelike and not a scalar line: C♯–A–B–G–Ab–Gb–B♭–D–E–E♭–C–F (in contrast to Webern’s series, Schoenberg’s is not completely hemitonic). The avoidance of the chromatic scale in the series was a completely conscious decision by Schoenberg at the beginning of his work on the twelve-tone technique. “The series must never coincide with the chromatic scale,” he wrote later on in the article “Composition with Twelve Tones.”*

*17 At the same time—and here the contrast with Webern is clear—Schoenberg made an analogy between the scale and the series, finding a linear similarity between them. The series

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*Schoenberg, “Komposition mit zwölf Tönen,” 30.*
“should never be called a scale, though it was developed to replace several unifying and form-generating advantages ("Vorteile") of the scale in tonality. The scale is the source of many figurations, parts of the melody (and even the melody itself), ascending and descending passages, and even broken chords. Roughly speaking, in analogous fashion the tones of the established series produce similar elements.”¹⁸ The wavelike series, from which only Berg departed in the first half of the twentieth century, lingered on in compositional practice up to the middle of the century, until Messiaen (in 1950) and, after him, Nono, made use of new forms with two divergent chromatic lines. The melodic spiral—which we already discussed as we cited Stravinsky’s symbolic illustration—is entirely indicative of Webern’s style. For Webern the spiral represents an expanding or contracting illustration with movement by semitones or by various other intervals at the extremes:

![Example A12](image)

Finally, we will show how the spiral is formed no longer in the “horizontal” but in the “deep dimension.” Measure 8 from the Bagatelles, Op. 9, No. 5, can serve as an example. E–Eb–F constitute the smallest spiral formation, where Eb and F adjoin the initial E symmetrically, above and below, by semitone, forming hemitonic group 1a. Such a spiral lies outside of the limits of the melodic line, which dissolves here into a multi-voiced texture.

¹⁸ Schoenberg, “Komposition mit zwölf Tönen,” 31 (italics added).
**Hemitonicism—Tonality—Modality**

[55]  Webern’s hemitonicism is an independent pitch system, as pure, confined, and self-contained as, for example, seven-note diatonicism. Its elements, more or less, are present in all of the most important musical styles of the first half of the twentieth century. Prokofiev, Stravinsky, Bartók, Shostakovich, Hindemith, Schoenberg, Berg, and many others, all used it, yet in a mixed form with other pitch systems. Only with Webern is hemitonicism concentrated and isolated from different systems and proves to be hemitonicism of a strict style. As with any independent system, hemitonicism has its internal rules and prohibitions. So, analogous to scalar movement in diatonicism and to the triadic vertical structure in major/minor tonality, the essential principle of hemitonicism consists of “movement by semitone” (as Webern himself indicated). Like the prohibition of parallel fifths and octaves in modality and major/minor tonality, and also like the absence of movement by thirds in the diatonicism of the fifteenth and sixteenth centuries and the absence of quartal harmonies in the major/minor tonality of the seventeenth to the nineteenth centuries, hemitonicism has its own set of rules and prohibitions. In hemitonicism the use of octaves or fifths, diatonic or chromatic scalar motion, or sonorities of a triadic structure are “contraindicative.” Also prohibited are any equivalent intervallic successions within the limits of the octave (not only motion by 1 H. but also chains of 2, 3, 4, or 6 H.), since from the point of view of linearity they represent a *straight line*, that is, they are the same as a scale and, for the point of view of the vertical line, they are an inert *filling in of the octave*.

[56]  In his early period Webern used certain resemblances of scales (Opp. 5 and 7), except only at formal boundaries, five to seven notes in one direction. They are remarkable for their varied intervallic structure:
Ultimately the fundamental qualities of hemitonicism are determined by the idea of Webern’s form that we define as a *contemplation of coming into existence*, in contrast to the establishment of existence as the ideas of classical form from a pre-Webern epoch. Webern’s forms produced devices that were distinguished much less by energy, determination, and tension, than the devices of dynamic classical form; on the contrary, his devices were more balanced, stable, and evenly divided. Among them stands his historically innovative *hierarchical pitch system*, or *his system of equivalent pitches*.

The equivalency of notes in a pitch system (declared by Schoenberg in the rules of dodecaphony but accomplished entirely by Webern), beginning with Webern’s Op. 3, was provided by the abovementioned rules of hemitonicism.

Melodic motion by octave quite effectively creates the sensation of a fundamental tone and, with that, the sensation of tonality. In Webern’s hemitonicism there is not one instance of melodic motion by octave.

In some of Webern’s most dense compositions octave doublings appear, both in the bass and in the soprano, in order to tighten up the sonorities (Op. 3, No. 2, m. 9 and No. 5, mm. 8–9 and 13; Op. 4, No. 1, mm. 1, 2, 11, and 14; and Op. 5, No. 1, m. 1, and No. 2, m. 5; among others).

The fifth, as a harmonically strong interval, also creates the sensation of a fundamental tone. In his melodies Webern sometimes includes the fifth in a group of other intervals in quick
succession, but in his harmonies he either uses it in a brief moment (Op. 13, No. 3, m. 13) or he mixes it with other notes (Op. 18, No. 1, mm. 8–9, parallel twelfths in the harp). As for the rest Webern replaces the fifth with the fourth and intentionally places the fourth in the bass (e.g., in Op. 5: No. 1, mm. 31–36; No. 3, m. 9; No. 4, mm. 7–9 and 12; and No. 5, mm. 1 and 10–11). However, in one of the early songs, Op. 4, No. 1, Webern adds both an octave doubling and a fifth in the bass in the final chord, and this combination unambiguously brings to mind the tonality of E major, elaborate and chromaticized, in the spirit of Schoenberg’s “atonality” of the same vintage. And this shows that Webern, at that stage of development, was still making the transition to pure hemitonicism.

If tonal harmonies somehow gravitate toward fundamental tones, situated in the bass, like an earthly attraction, then hemitonic groups and fields are deprived of this influence and, as it were, hover in a sense of weightlessness. The rounded forms of the wave or spiral of the hemitonic line satisfy the same condition. The peculiarity of Webern’s “deep dimension” lies in the fact that the foreground is balanced in authority with the background and does not have priority over it. As Ligeti said, Webern’s sonorities are based on themselves alone and also shift as if in a self-contained circle.¹⁹

The elimination of the contrast between consonance and dissonance fulfilled the objective of a nonhierarchical pitch structure. In order to achieve this Webern fundamentally eliminated consonance from hemitonic trichords. Only as an exception, for a brief moment in the movement of the voices, a minor ⁶₄ chord emerges, for example, in the culmination of the first movement of his Symphony, Op. 21 (m. 53). Webern placed consonance and dissonance under

such conditions that the boundary between them faded. “There is no fundamental difference between dissonance and consonance,” said Webern, varying Schoenberg’s thought as laid out in his *Theory of Harmony.*

For Webern’s pitch material, rotations within the self-contained and delineated hemitonic system are continuous and, in this sense, any harmony “functionally” gravitates to the pitch structures of harmonies of the same type. But in Webern’s harmonic system there are no dynamically directed gravitations of a tonal type: correlations between notes and hemitonic groups are uniform and balanced, the structures of sonorities come from the consistent principle of the relation with the semitone, and dissonances are in equilibrium with consonances, right up to the formation of “sounds.” The undirected design of the wave, spiral, and circle are also associated with this uniformity and equilibrium of pitches.

With this system of equivalent notes Webern found that natural form of organization that created order without a functional hierarchy of notes in the system and without the tonal forces of gravitation—symmetry (for more on symmetry see the section under that heading). Symmetry in hemitonicism acquires the same rank as functional organization does in the tonal system.

Additional resources of functionality in hemitonic pitch material are created thanks to the functional structure of its melodic form, with its contrast of “tightness” and “looseness.” The comparative contrasting effect of stability and instability is injected into the system of equivalent hemitonic notes for the sake of contrast, for example, between exposition and contrasting middle section, or between retransition and recapitulation, among other similar moments. Devices for strengthening and releasing the notes within an octave, as well as for ostinato repeatability and for the varied nonrepeatability of tones, among others, are used in this music. A perfect land-
scape of form, with all of its functional colors, is shaped by an entire complex of musical means in which melodic line, rhythm, texture, timbre, and all other elements carefully worked out by the composer play a part.

Hemitonicism, which is to a large extent the antithesis of tonality along the spiral of the dialectical development of history, partially touches on modality with its principles. The form of modal music in the choral polyphony of the Netherlanders, such as Josquin or Palestrina, is monolithic and, when compared to classical music, is much more static and contemplative, and its elements are not endowed with the same energy and determination as the elements of dialectical classical form. Therefore, in contrast to tonality, at the heart of modality lies not the opposition of stability and instability, nor the correlation of all tones to a tonic but, rather, the preservation of the unity of, and the smooth gradual sliding along, the diatonic scale. Under gradual motion, separate tones are only locally differentiated in terms of function, there is no stable hierarchy among them, and they are rather equivalent to one another in the longer sections of form (with the exception of the cadence).  

If we look at hemitonicism from a historical perspective, we see that its elements have existed for several centuries in European professional music, at least since the fifteenth century. One of the earliest manifestations of hemitonicism was group 1a as a double neighbor. As E. Lovinsky shows, the chromatic clausula—in which the melodic progressions B–A–G♯–A; E–D–C♯–D are transformed by the Netherlanders as B♭–A–G♯–A; E♭–D–C♯–D—relates to the

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*21 R. Stephan establishes a relationship between Webern's compositions and Gregorian melodies, despite the huge difference: clearly defined progressions, an antipathy toward repetition, a striving for greatness (not in quantity but in quality), internal relationships calibrated on the finest scales, an inclination for concentrated perfection, and a quasi-transient capability to transform an interlude into a small masterpiece (R. Stephan, “Über einige geistliche Kompositionen Anton von Weberns,” in Musik und Kirche 4 [1954], 272).

*22 Though virtually no ancient Greek music has survived, it is known that they had a chromatic tetrachord: A–F♯–F–E.
style of *musica ficta.*\(^{23}\) Along with the Netherlanders’ group 1a, group 2b was also used as a double neighbor: B–C–B–A–G♯–A. We turn your attention here to the wavelike form of the melodic line and to the splitting off of chromatic progressions as three- and four-note groups. Here the hemitonic elements serve to strengthen the tonality, breaking the confinement of the modal diatonicism into cadences.

[69] With the triumph of major/minor tonality and with the introduction of equal temperament, the hemitonic groups and fields became the media of an alternating dynamic. Melodicism partially retained its wavelike form (especially in the hemitonic groups), but it also acquired a straight-lined scale-formed appearance.

[70] In the course of the nineteenth century and in certain twentieth-century styles, hemitonicism continued to remain subordinate to tonality while radiating an alternating dynamic. During this period the hemitonic groups became “nomadic” and “erratic” formulas in different styles and, ultimately, all groups, save for the diatonic group 4, acquired their “own names”: group 1b is BACH (from the time of J. S. Bach to the music of today); group 2b is DEsCH (Shostakovich’s monogram was used, aside from Shostakovich himself, by Denisov and other composers); group 3a is the Webernian AsCH from Schumann’s *Carnaval,* and also the “question motive,” including the formerly mentioned “muss es sein?” of Beethoven; and group 5b is the “Javanese mode” with respect to the music of Bartók.

[71] Webern’s pioneering work in the sphere of pitch organization resides in the formation of hemitonicism as an independent autonomous system, having its own internal laws of pitch structure. This system was capable of realizing the harmonic organization of entire forms and, even, the composer’s entire output. Hemitonicism is the positive name that is implied by the so-

called “atonality” of Webern and that, perhaps, replaces that negative designation, which satisfied neither Schoenberg nor Webern, nor any composers or theorists of that time.
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ABSTRACT

Prompted by a live performance of Webern’s Op. 6 in Moscow, in 1965, brother and sister Yuri Kholopov and Valentina Kholopova began to analyze the music of Webern; from 1965 to 1970 they wrote two books thereon. Working from scores and a few writings by Europeans (i.e., Stockhausen, Pousseur, Metzger, Kolneder, and Karkoschka), Valentina Kholopova devised a system of pc set analysis, which Yuri later named “hemitonicism.” She first presented her findings to the Soviet “Union of Composers” in the early 1970s, and then published a follow-up article in 1973. In the present essay, the author explicates this important development in Russian music theory. In hemitonicism, octave, enharmonic, transpositional, and inversional equivalence are all operative. There are two types of hemitonicism: fields (the continuous filling in, by semitone, of some portion of the chromatic scale), and groups (five three-note and five four-note archetypal pc sets that feature at least one semitone—thus, there are ten total archetypal sets in the hemitonic system). By looking at some of the Kholopovs’ analyses, and providing some new analyses, the author shows that their system bears many resemblances to American pc set analysis, while also having many interesting and significant differences.

In an appendix, the author provides a complete translation into English of the chapter on “hemitonicism,” from Valentina Kholopova’s and Yuri Kholopov’s Russian-language book, The Music of Webern (1999).

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ABOUT THE AUTHOR

Philip Ewell received a B.A. in music from Stanford University, an M.A. in cello performance from Queens College (New York), and a certificate in cello performance from the St. Petersburg Conservatory of Music in Russia, before embarking on doctoral studies at Yale University in music theory. His dissertation, advised by Allen Forte, focused on the music of Alexander Scriabin and included archival work in Moscow, and studies at the Moscow Conservatory with Yuri Kholopov. Philip’s specialties include Russian music and music theory, twentieth-century music, twentieth-century modal theory, and rap and hip-hop music. He has writings published in *Music Theory Online, Journal of Schenkerian Studies*, and *Popular Music*, among other journals. Philip began an appointment as Assistant Professor of Music Theory at Hunter College CUNY in the fall of 2009, and in the spring of 2010 he began a joint appointment with the CUNY Graduate Center.