

REVIEW OF THREE TWENTIETH-CENTURY TEXTS

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Stefan Kostka. *Materials and Techniques of Twentieth-Century Music*. Englewood Cliffs: Prentice Hall, 1990.

Joel Lester. *Analytic Approaches to Twentieth-Century Music*. New York and London: W. W. Norton, 1989.

Joseph Straus. *Introduction to Post Tonal Theory*. Englewood Cliffs: Prentice Hall, 1990.

The three books discussed in this review, all theoretical in nature, are designed to meet the needs of undergraduate music majors who take a class that introduces them to twentieth-century music. Two of their authors, Lester and Straus, take a more restricted approach to the subject to achieve greater depth, while Kostka explores a wide range of basic materials in what must be, of necessity, a more superficial manner. Human nature being what it is, it seems safe to say that some of my remarks will seem inevitable: I would like to see the more focused discussions broadened and the survey approach more focused.

All three of the texts deal with aspects of set theory to a greater or lesser degree, confirming the tendency by many to present this material at the undergraduate level. Because these new textbooks are consolidating material that once had to be gathered from a number of sources, some teachers may see less need to draw from additional sources such as the introductions to Forte's *The Harmonic Organization of the Rite of Spring*¹ and Schmalfeldt's *Berg's Wozzeck*², or to develop their own course handouts.

I believe strongly that every effort should be made to ensure that a textbook's material is organized and presented in a manner that is of maximum benefit to the student. Therefore, when examining each book in turn, I will first summarize its contents and organizational aspects, and then discuss its physical attributes. I will conclude my remarks by focusing on some of the features that distinguish the content of each book. In addition,

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I will interject several asides that relate to pedagogical considerations as they arise.

KOSTKA

Stefan Kostka's book is by far the most general text of the three examined in this review. His book is comprised of fifteen chapters loosely organized by compositional technique. Each chapter contains a number of subtopics that can be easily located by examining the table of contents. At the conclusion of each chapter there is a summary, bibliographic notes, and a series of exercises that cover fundamentals, analysis, and composition using the materials discussed in that chapter. Important terms are italicized in the body of the chapter. There are numerous musical examples from a variety of composers.

The book's physical design and layout is beautiful. The text is large and easily readable. There is plenty of margin for annotations and, believe me, you will want to write things in these margins. A great many examples of all kinds are very attractively presented; the musical examples, in particular, are reproduced as clearly as any I have ever seen.

Kostka's chapter titled "Classical Serialism" is perhaps the best chapter in the book. The basic material is presented with clarity and simplicity, though not without error. Kostka states "the matrix or 'magic square' allows you to see all 48 versions after writing out only 12 [sic] of them" (p. 209). Teachers will find that the materials in some of the other chapters, such as the chapters on rhythm and acoustical timbre and texture, to also be very useful. Throughout the book there are numerous widely used terms that are defined and illustrated with short musical examples from a variety of sources. Moreover, the book is the only one of the three to discuss, rather than simply mention, some important topics such as electroacoustic music.

Despite such merits, however, my impression of the book is colored by a perception that in many places the approach is simplistic and dated. This impression is compounded by the author's tendency to present the information in a manner that may be characterized as imprecise or misleading.

Consider the following: "The actual spelling of the octatonic scale is optional . . ." (p. 34). "If it [the octatonic scale] has a weakness, it is its symmetrical construction, a characteristic it shares with the whole-tone scale, which can make establishment of a tonal center more difficult" (p. 35). "Bass notes usually want to be roots of a chord, if they can . . ." (p. 52). "The analysis of atonal music has largely become a process of identifying and labeling . . . important pitch sets . . ." (p. 186). "Minimalism opposes the atonal ideals of the incessant recycling of pitch material . . ." (p. 322). No

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doubt these and other statements throughout the book are the result of a commendable effort to communicate more meaningfully to students, but their unintentional effect is to reinforce the weakness of expression that is already found in the writing of most students.

The first quarter of the book is disappointing. When discussing chords and scales the author himself does not seem to grasp the fundamental differences in the way composers have dealt with pitch materials in this century. We find ourselves grappling with ways in which to seek traditional patterns, such as triads, in contexts that may no longer warrant such observations. In this realm Kostka discusses items such as chords with "split members," that is, notes added a minor second away from triad or seventh chord members (p. 55). Referring to Henze's *Elegy for Young Lovers*, Kostka determines a chord to be comprised of the notes A, C-sharp, E, F, C, E-flat, B-flat and G-sharp. He reads this chord as an A-major triad with "split roots," "split third" and "split fifths." Alternate readings, I suppose, would have to include an F dominant 7th with split 3rds, split 5th, and split 7th and a B-flat half-diminished 7th with split 3rd, split 5ths, and split 7th! Aside from the question of musical relevance, the degree of subjectivity inherent in this system would surely be a source of consternation and frustration to both student and teacher.

Kostka discusses another construct, the "open-5th chord," which he defines as a "triad without a third" (p. 58). I experienced some difficulty distinguishing this "chord" from an interval. He goes on to say that the "sound of open 5ths rapidly becomes tiresome, so extended passages on this chord are rare." "Typically they [open 5th chords] are used to create an impression of the Orient or of the distant past" (p. 58). Can remarks such as these offer real insight to students who struggle to understand twentieth-century music?

Later Kostka spends several pages pondering a means of representing quartal and quintal harmonies. He settles on a system that can be illustrated by his example of a "3X4 on B" (p. 59), meaning a three-note quartal harmony built above the lowest pitch of B. Are these quartal harmonies comprised of only perfect fourths, or can they contain diminished or augmented fourths as well? Kostka admits that "the use of diminished 4ths and augmented 5ths in quartal and quintal chords can lead to perplexing questions, since the intervals sound like 3rds and 6ths." [The perplexing question raised in my mind was: why does the author wait another 120 pages before introducing a theory that removes any doubt as to what to call a sonority?] Kostka goes on to cite two examples of Scriabin's "Mystic Chord," labeling them both as "altered 6X4 chords" because they contain diminished fourths, but allows that "other voicings might lead to other

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analyses" (p. 62). From the student's perspective this presentation is certainly more confusing than enlightening.

Kostka spends an inordinate amount of time merely attempting to label a sound because he considers its mutable traits, like spacing or spelling, to be distinguishing features. Anyone familiar with the basics of set theory would have no trouble labeling either version of the "Mystic" chord with the *same* name, 6-34 (013579), and would do so in short order. After all, the name is perhaps the least "mystical" feature of Scriabin's chord.

Given the developments in music theory in recent decades, it seems unfortunate that Kostka devotes such a large proportion of his text to techniques that perpetuate the tortuous ambiguities that plagued previous generations of music theorists. When Kostka finally does offer an introduction to set theory halfway through the book, he does so without the benefit of integers, to which he adds the burden of traditional interval names and the implication that students will be able to locate the definition of "pitch-class" in a footnote to chapter one. This timing, coupled with the cumbersome approach, diminishes the potential usefulness of the ideas.

Part of my frustration with this text arises because I believe the more general approach to the material adopted by Kostka is precisely the approach that would likely meet the needs of the greatest audience. However, until such time as his book is carefully revised, I would have difficulty recommending that students read anything but selected portions.

LESTER

Joel Lester's book is comprised of some 300 pages divided into four units: 1) introductory materials, 2) set theory, 3) twelve-tone theory, and 4) music since World War II. Each of the sixteen chapters is divided into several subtopics that are listed in the table of contents. These subtopics appear as highlighted text when found in the body of the chapter. When chapter subtopics are themselves divided, the smaller topics are found as boldfaced inserts to the beginning of the paragraph in the body of the text. The author includes one Appendix on the topic of Combinatorial Hexachords and a glossary of foreign terms used in pieces studied in the text.

At the beginning of each chapter Lester has a list of important terms or concepts covered in that chapter. In the body of the chapter terms or important concepts are italicized and often followed by their definitions, which are listed in parentheses. Each chapter has a "Suggestions for Further Study" section as well as "Exercises" and "Points for Review." The exercises deal with fundamental concepts, musical analysis, and composi-

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tion projects. To his credit Lester begins many of his exercises with the word "listen," a word that appears frequently in the body of text as well. Many examples in the book use pitches (or pitches and integers) rather than integers alone; students will surely find this practice to be helpful. The "Suggestions for Further Study" are very nicely done and offer students many opportunities to explore other pieces in ways that are both appropriate and realistic at the undergraduate level.

The book's physical appearance suggests a text destined to be a classic, though, like many Norton texts, I find the paper's yellow tint, when combined with the size of the text, to produce some eyestrain after awhile. The musical examples are plentiful and readable, but not as crisp as those printed in the Prentice-Hall books.

Lester's aim is to introduce the material with as "little jargon as possible" and he chooses to include topics "of the greatest relevance to a student beginning work in this field." Lester brings a sensitivity to his discussion that is almost poetic at times. His genuine fondness for this music, while acknowledging its complexities, is evident throughout the book and instills a sense of appreciation in the reader. The following passage in which Lester is discussing Webern's Op. 28 *String Quartet* is typical:

The resulting musical continuities, however, are anything but abstract—an intense and dazzling array of notes and small groupings of notes, timbre, registers, rhythm and articulations that follow one another in unique ways.

The first unit of Lester's book is a general introduction to the elements of twentieth-century music. The author compares the use of pitch, rhythm and meter, texture and timbre, and form in tonal music with that of twentieth-century music. The first chapter, *Pitch in Tonal and Nontonal Music*, is a particularly good transition into the subject. This chapter includes a "no-nonsense" rationale for using pitch-class sets when examining twentieth-century music. He also takes care to define tonality so that the differences between common-practice music and twentieth-century music are apparent. Lester's chapters on rhythm and meter and timbre are also very good. Discussions of this type are often overwhelmed by what may be viewed as a preoccupation with pitch in the discussion of music. The chapter on form is a bit perfunctory, but defines form in a way that is very useful when viewing much of the literature of the last century.

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The second unit of the book concentrates primarily on pitch-class sets in a way that emphasizes practical application over abstraction. Though appreciative of his attempt to keep the focus on the music, I believe that at times a more rigorous approach would be desirable. Lester follows the convention of naming a set by using the format $[0,1,4]$ which he calls "lowest ordering." He does not use or refer to Forte's³ set-class numbers. Lester uses both moveable-zero (any pitch-class may be designated zero) and fixed-zero (all Cs are 0, C-sharps are 1, and so on) integer notation of pitch classes in his discussions, preferring moveable-zero for most examples. When he turns to twelve-tone music in the third unit, he uses a third system, that of fixed-*do* pitch-class names, for the elements of the row instead of integers. Lester glides easily from system to system, but it seems likely that students will be uncertain as to when to use which system and will incur a number of errors in their own work due to confusion between these systems. There is no list of sets in the book so students have no way of checking their work unless they do as Lester suggests and consult either Forte or Rahn⁴ (p. 107). His suggestion seems unnecessarily cumbersome; students would clearly benefit if the book included an appendix like Straus' Simplified Set List.

In discussing intervals Lester forsakes a degree of clarity with the informality of his approach. In the course of his exposition there emerge three methods for calculating intervals, though students would have to read very carefully to make this determination. What appears to the student to be the definitive means for calculating intervals (pp. 68-69), actually turns out to be the means for calculating *harmonic* intervals only. Unfortunately, students do not discover this important distinction until they encounter it in the "Points for Review" at the end of the chapter (p. 76). Because he does not adequately distinguish one interval type from another in his discussion of examples, Lester sometimes leaves the student guessing as to which type of interval he refers.

Analyzing an excerpt from Schoenberg's Serenade, Op. 24, the author states that "all intervals are indicated below the melody." Are these intervals "melodic intervals between pitches" or "melodic intervals between pitch-classes?" In one place he mentions "skips of interval 4 (both rising and falling)" (p. 74). In this case "interval" means *melodic interval between pitches*. Later in the analysis he says that "interval 4 is also the interval between the lowest and highest pitches," D3 and F-sharp4. This time "interval" must be interpreted to mean *melodic interval between pitch-classes*.

One cannot help but draw a comparison between Lester's exposition of pitches, pitch classes, and intervals and that of Rahn. Rahn's presentation⁵, which is limited to the same number of pages as Lester's, is more

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comprehensive and ultimately more comprehensible. If Rahn's presentation seems too "technical," why not summarize its common-sense observations? Intervals can be figured between either pitches or pitch-classes. Those intervals can either be ordered or unordered. Each of these four possibilities has potential for aiding the analyst. In that light this information of Lester's chapter seems quite obvious, but it is important to bear in mind that it is unlikely that students will have had the benefit of reading Rahn prior to reading Lester.

Once people grasp an idea it is difficult, if not impossible, to imagine what the initial exposure to the topic was like. Yet both teacher and author must continually make every attempt to recreate that first experience in order to explain an idea with a maximum of clarity and efficiency. When we lose sight of this perspective, as is inevitable, it is easy to make slight omissions which, in turn, may puzzle the student.

For example, when Lester describes the Fibonacci series (p. 143), explaining that the ratio of two adjacent numbers in the series approaches .618, he fails to include an explanation as to why this proportion has any significance in music. In a more important presentation, when Lester demonstrates the steps necessary to determine a set's "lowest ordering" (pp. 85-87), he again does so more from the perspective of one who knows than one who needs to know. An experienced teacher would probably glance over Lester's steps and think that his procedure seems well-defined because the procedure is, after all, quite simple. However, from the point of view of the completely inexperienced student, Lester's steps can seem confusing. Let us see why. Lester says that "you can figure out the lowest ordering of any pitch-class set by following the three steps given here" (pp. 85-86):

Step 1: Notate all the pitch classes in ascending order within an octave. You can start on any pitch-class . . .

Step 2: Find the largest interval between consecutive pitches. (Remember to consider the interval from the last note up to the first note in the next octave . . .) Reorder the pitches, beginning with the upper pitch of the largest interval. Number from 0. this gives you the lowest number between the first and last pitch-classes . . .

Step 3: If the last interval in your step 2 result is larger than the first interval, then you already have the lowest ordering. But, if the last interval in step 2 is the same

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size or smaller than the first interval, rewrite the pitches from right to left, write the complement of each number, and transpose to begin on 0. Compare this new result to that of step 2 to find the lowest ordering.

It is likely that students will falsely perceive a disparity between the number of steps and the number of instructions required to complete their task. Ostensibly there are three steps, but up to nine instructions may have to be performed prior to obtaining the answer. Lester's procedure would certainly be more comprehensible to the novice if the goals of steps two and three were clearly stated. I am sure that students would not find it immediately apparent that the goal of step two is to compact the set and the goal of step three is to determine which result is most packed to the left. If these goals were stated explicitly, the instructions contained within steps two and three would be viewed more obviously as the means to accomplish these goals. Implicit is the understanding that students will memorize this procedure and apply it to music hereafter. Consideration must therefore be given to the format of the presentation.

Would not the instructions be more easily assimilated if given in the form of an outline—a format preferred by students—rather than as prose? Lester does follow this format elsewhere (see p. 109) no doubt to the delight of the student reader. It is important that the reader understand at this point that these examples are the exception in Lester's work, not the rule, and have been chosen merely to indulge this reviewer in picking some pedagogical nits. I hope that these examples remind us all of the enormous difficulties and challenges we encounter when attempting to convey ideas to one another.

The unit on twelve-tone music provides a good introduction to the topic. It is within this section that Lester seems most at home. The author wisely chooses to gradually unfold the various techniques associated with this literature and continues to give preference to the musical element over the technical, and that which is literally expressed in the music over that which has the potential to be expressed. Lester projects an attitude of exploration which I believe students will find most engaging.

Perhaps the most enjoyable chapter in this regard is titled "Common Elements." Lester begins by advising students that "labeling series in a score and trying to hear those series in the music (were that possible) is a rather poor way to try to learn about this music" (p. 189). Many earlier presentations of twelve-tone music falter once it is assumed that students can label the rows. It is from this point on, however, that Lester makes his

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greatest impact. All of the illustrative analyses that follow, such as the openings of Schoenberg's 4th Quartet and of the second movement of Webern's *Variations for Piano*, are eminently accessible introductions to the works. Though teachers may wish for more detail in these analyses, it is probably better that Lester chooses not to overwhelm his audience.

The last unit is comprised of a single, brief chapter that deals with music composed after World War II. Though terms like aleatoric music, minimalism, and electronic music are mentioned in passing, Lester disappoints the reader with what comes across as an afterthought rather than an integrated part of the text. Lester provides no analysis exercises for this chapter "since it is hard to predict the availability of scores and recordings of recent music in any given music library." This excuse seems weak given the fact that he has reproduced scores for the analysis sections in other chapters. However, the chapter is by no means without merit. Its high point is an analysis of aspects of Peter Maxwell Davies' *Ave Maria Stella*. In a future edition of the book I hope Lester will devote more attention to recent music, particularly if his presentation reflects the insight and sensitivity that characterizes much of the book.

STRAUS

Straus' book is divided into six chapters—a chapter that introduces the basic materials, two chapters that deal with pitch-class sets, a chapter that discusses tonality and referential pitch collections, and two chapters that explore twelve-tone music. Each chapter has several subtopics that are listed in the table of contents and set apart in the body of text with capital letters. Each chapter concludes with exercises that reinforce basic concepts and analyses that examine portions of two pieces in light of the recent discussion. The analyses at the end of each chapter are written at a level very much appropriate to the undergraduate student's ability. The bibliography at the end of each chapter reflects more recent developments in the field and provides many important references to the development of contemporary theoretical ideas as well as excellent points of departure for the more advanced student.

The Appendices in Straus are very useful aids to the analysis techniques on which he concentrates. There is a List of Set Classes, a Simplified Set List and a List of Index Vectors. The list of set classes is like Forte's list but also includes indications for transpositional and inversional symmetry of the sets. The Simplified Set List is one of the handiest features of the book. By simply putting a set's members into ascending order, students can discover the set's normal order, prime form, and set-class name without

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performing any computations. Though lists like this have circulated for years, it is desirable for students to have a copy that they are unlikely to misplace given the cost of textbooks these days.

The appendices could have been more easily used if their layout had received just a little more attention. With the exception of the tetrachords, the lists of set classes are each split across two pages. This inconvenience could have been avoided by placing the trichords and tetrachords on one page, the pentachords on a second page, and the hexachords on a third page. Students would benefit from labels at the top of each column of information in all the appendices, particularly in the Simplified Set List. The text of the Simplified Set List is clear, if microscopic, but there is no means to assist the eye in reading across the page; it would be easy to make a reading error if one did not use a straightedge when using this table. In removing many tiny obstacles such as these, students are less likely to get bogged down by the mechanics of the process and are more likely to think about the meaning of musical relationships.

A few additional features in the physical layout of Straus' book want some attention from the publisher. The text and figures, though beautiful and crisp, seem small. The ratio of black to white on the page is high; I am told by a learning specialist that this makes a text seem intimidating to the student. The margins are very small so it is difficult to make any annotations on the page. It is interesting to note that Kostka's book, also from the same publisher, is much larger, uses a much larger type, has larger margins and will be perceived by students, purely on visual terms, as an easier book to use. Greater sensitivity to these admittedly picky, yet important details can only benefit those students who will use these books.

It is difficult to imagine a simpler presentation of the basic materials of set theory (pp. 1-11). Straus has succeeded in translating Rahn into the vernacular! Though his tone is informal, Straus cuts right to the point in laying the ground for further discussion. In addition to the standard repertoire of "stupid set tricks," such as transposition and inversion, Straus also makes use of the concepts of index number (p. 37) and index vector (p. 63), which, like many aspects of theory, may initially seem arcane to the novice, but prove themselves useful and practical tools, especially to the composer. These concepts are also presented sensibly and enthusiastically and lay a foundation for further study of newer works, such as Morris' *Composition with Pitch-Classes*⁶.

Like Lester, Straus makes use of multiple systems of pitch-class notation. Straus uses the fixed-zero system of integer notation when discussing pitch-class sets and the moveable-zero integer notation when discussing twelve-tone music, yet offers no explanation to the student as to why this change is necessary or desirable. Despite the many logical reasons

for using multiple systems, and with all due respect to Babbitt⁷, Lewin⁸, Wourinen⁹, and others, pedagogues may eventually conclude that using a single pitch system for both set theory and twelve-tone theory may ultimately be of greater benefit to students who are new to the subject.

For a number of years I taught a course in which I switched from the use of fixed-zero when discussing set theory to moveable-zero when studying twelve-tone theory, just as Straus does. It was necessary to dedicate some portion of my class time to reorient the students and this process always produced confusion and a host of careless mistakes in their papers. In recent years I retain fixed-zero throughout the course because the continuity not only preserves some of my instructional time but also improves my students' performance. Though certainly a matter of opinion, I believe that retaining a single system keeps the focus on the musical element as much as possible.

One intriguing, yet controversial, feature of this book is Straus' discussion of non-contiguous pitch classes spanning large distances in organizing the larger structure of a piece. He says that "one of the most potent means of assuring large-scale coherence in post-tonal music involves projecting pitch-class sets over large musical spans" (p. 72). He echoes David Beach¹⁰ when he suggests that "There are many different ways of projecting a pitch-class set . . . all that is necessary is that the notes that make up the set . . . be associated in some musical way" (pp. 72-73).

His first example of such a span (p. 73) is found in the opening bars of Schoenberg's Op. 11, No. 1, a piece to which Straus refers throughout the book. Having established the significance of set 3-3 (014) in prior musical examples, the author illustrates a linear span of set 3-3 (014) in both the highest and lowest voices of the passage. Pitches B, G, and G-sharp, of which the upper span is comprised, are distinguished by the fact that they are the highest pitches in their respective phrase segments. For the lower span Straus selects three of the four pitches in the lowest voice of the first 11 measures, G-flat, B-flat, and G, and associates them because they share a common register and articulation. Some might argue that, despite the contrast in the music, the G-sharp that intervenes between the G-flat and B-flat for some 5 measures also shares the same register and articulation as the other notes and clouds Straus' interpretation.

Straus goes on to discuss another example, Stravinsky's *Oedipus Rex*, in which the composing out of set 3-3 (014) occurs over the entire duration of the work. Each statement of Stravinsky's so-called "Fate motive" begins with a different element of the great 3-3 (014) itself. In such a brief exposition Straus' examples may not convince the reader of the merit of this idea, but I believe that the idea is both tantalizing and ripe with potential, perhaps more for composers than theorists. Some contemporary composers do

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exactly as Straus proposes and weave their pitch material into larger spans in their compositions. It seems entirely possible that earlier composers may have sometimes followed this practice themselves. Because this premise does seem to have the potential for shedding new light on some pieces, I hope it will be explored with greater depth and clarity in a future edition of the book.

Straus presents a useful distinction between *tonal* music (music characterized by traditional voice leading and functional harmony) and *centric* music (music that focuses on referential centers). He states that "all tonal music is centric, focused on specific pitch-classes or triads, but not all centric music is tonal" (pp. 89-90). "When twentieth-century composers create a tonal sound, they usually do so by using nontonal means" (p. 89). A thorough understanding of this concept would no doubt improve many of the well-meaning, yet misguided, analyses of the twentieth-century's "tonal" music.

Straus is successful in communicating to undergraduates in a way that is both concise and precise yet without diluting the material or seeming to condescend. Because his book focuses primarily on set theory and twelve-tone theory, and his examples are limited to the music of Schoenberg, Webern, Bartok, Stravinsky, Berg and, to a small degree, Babbitt and Boulez, Straus' approach may be too constrained to meet the needs of classroom teachers who must cover a broader range of topics. Though he "makes no pretense to comprehensiveness," I found myself wishing that Straus had discussed a wider range of topics in twentieth-century music with the same lucidity and enthusiasm given the material that is covered in his book.

It is encouraging to see that there are now several new, theoretically-oriented texts from which to choose when teaching a twentieth-century course, but because of the limitations of each text, some instructors may still choose to teach without a text, preferring to send their students to the myriad books and articles that constitute the primary sources in this field. Still others may choose to select one book from this list as well as a separate text that deals more with the aspects of history and literature, like Morgan's *Twentieth-Century Music*.¹¹ (Given the fact that many teachers require the purchase of scores or Wennerstrom's *Anthology*¹² for such a course, the latter may be not possible due to the financial burden placed upon the student. Furthermore, this much information would be overwhelming unless the course were a year-long endeavor.)

I suspect that many instructors may choose instead to make one of these books the central source of their course material and simply reduce the number of outside readings required of their students. Whatever the case, students will likely benefit from the efforts of these authors, either directly

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or indirectly, for it is in considering the ideas of others that we teachers each improve our own perspective.

NOTES

¹Allen Forte, *The Harmonic Organization of The Rite of Spring* (New Haven and London: Yale University Press, 1978), 1-12.

²Janet Schmalfeldt, *Berg's Wozzeck: Harmonic Language and Dramatic Design* (New Haven and London: Yale University Press, 1983), 1-24.

³Allen Forte, *The Structure of Atonal Music* (New Haven and London: Yale University Press, 1973).

⁴John Rahn, *Basic Atonal Theory* (New York and London: Longman, 1980).

⁵Rahn, pp. 20-21.

⁶Robert Morris, *Composition with Pitch Classes* (New Haven and London: Yale University Press, 1987).

⁷Milton Babbitt, "Twelve-Tone Invariants as Compositional Determinants," *Musical Quarterly* 46/2: 246-59. Reprinted in *Problems of Modern Music*, edited by Paul Henry Lang (New York: W. W. Norton & Co., 1962), 108-121.

⁸David Lewin, "A Label-Free Development for Twelve-Pitch-Class Systems," *Journal of Music Theory* 21/1: 29-48.

⁹Charles Wourinen, *Simple Composition* (New York and London: Longman, 1979), 82.

¹⁰David Beach, "Pitch Structure and the Analytic Process in Atonal Music: An Interpretation of the Theory of Sets," *Music Theory Spectrum* 1 (1979): 15.

¹¹Robert Morgan, *Twentieth-Century Music* (New York and London: W. W. Norton, 1991).

¹²Mary Wennerstrom. *Anthology of Twentieth-Century Music, 2nd edition* (Englewood Cliffs: Prentice-Hall, 1988).