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Volume 16

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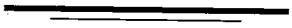

The Gail Boyd de Stwolinski Prize for Lifetime Achievement in Music Theory Pedagogy and Scholarship

The second biennial Gail Boyd de Stwolinski Prize for Lifetime Achievement in Music Theory Pedagogy and Scholarship was awarded to Robert Gauldin at the College Music Society Annual Meeting, September 22, 2002, in Kansas City. The $10,000 prize is permanently endowed through the Gail Boyd de Stwolinski Center for Music Theory Pedagogy on the campus of the University of Oklahoma.

Robert Gauldin, Professor Emeritus at the Eastman School of Music in Rochester, NY, has a long and distinguished career as a teacher and scholar in the field of music theory. He served as Professor of Music Theory at Eastman from 1963-1997 and chaired the Department of Music Theory from 1970-1980. Among his professional activities are the following: President of the Society for Music Theory (1991-1993), Board of Directors of the Music Theory Society of New York State, Review Board of the *Journal of Music Theory Pedagogy* , and invited speaker at numerous professional workshops and conferences.

Dr. Gauldin is the author of three well-known textbooks: *A Practical Approach to 18th Century Counterpoint, A Practical Approach to 16th Century Counterpoint,* and *Harmonic Practice in Tonal Music.* Additionally, he has published articles in *GAMUT, Journal of Music Theory Pedagogy, Theory and Practice, Indiana Theory Review,* CMS *Symposium,* and *Spectrum.*.

From a prize nomination letter submitted by his colleagues, these comments accurately describe Gauldin's approach to teaching. "As a teacher, Bob Gauldin is inspiring. Not only does he draw upon an almost encyclopedia knowledge of diverse musical repertoires (from Palestrina, to Bach, to Wagner, to the Beatles) to demonstrate musical structure and ideas, but he also has an impressive facility in the area of musical skills (from keyboard realizations of counterpoint in multiple clefs at sight, to rapid composition of fugal subjects and answers to illustrate a point, to harmonization of popular melodies from "pop symbols".) All this he accomplishes with a wry sense of humor; it is clear that he thoroughly enjoys what he is doing. In the classroom, students are actively involved—whether standing around the piano singing counterpoint assignments before hearing a critique of their stylistic accuracy, or practicing effective classroom ear-training drills, or discussing the implications of Leonard Meyer's theories. His time is spent most often engaging students in active participation, rather than in passively lecturing. "

The Gail Boyd de Stwolinski Center for Music Theory Pedagogy was established in 1985 to provide a clearing house for the collection and dissemination of information concerning the teaching and learning of music theory at the college and university level. The first major project of the Center was the publication of the *Journal of Music Theory Pedagogy*. Launched in 1987, *JMTP* has earned an international reputation for outstanding articles in music theory pedagogy and maintains an impressive subscription list including most major libraries of the world as well as a substantial list of distinguished individual subscribers. The current editor of *JMTP* is Dr. J. Kent Williams of the University of North Carolina at Greensboro.

Both the de Stwolinski Center and the de Stwolinski Prize are named for the late Gail Boyd de Stwolinski, long-time David Ross Boyd Professor of Music Theory and Chair of the Department of Music Theory at the University of Oklahoma. It was one of Dr. de Stwolinski's fondest dreams to elevate the role of the classroom music theory teacher—the person who devotes a career to the many- times unsung role somewhere between guru and drill sergeant. Established of the de Stwolinski Prize is but one step toward fulfillment of that dream.

More information regarding the Gail Boyd de Stwolinski Center for Music Theory Pedagogy is available by writing to:

Gail Boyd de Stwolinski Center for Music Theory Pedagogy
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Norman OK 73019

On Teaching "Tonal Mirror Counterpoint": A Guide to Concepts and Practice

David Carson Berry

Contemporary tonal-counterpoint textbooks tend to focus on the most common procedures, such as thematic imitation and stretto; rhythmic augmentation and diminution; the construction of double and triple counterpoint (perhaps with passing references to quadruple and quintuple counterpoint); and the coordination of these and other techniques within the contexts of inventions, canons, and fugues (if not also passacaglias, chaconnes, and chorale preludes).[1] Other topics may be introduced, such as thematic contrary motion (as in fugues, and canons in which the *comes* is the inversion of the *dux*), or even thematic retrograde (as in *cancrizans* [crab] canons). But compositional contrivances considered arcane—e.g., canons of the perpetual (infinite), puzzle (enigma/riddle), and spiral (modulating) types—are described only briefly, if at all.

A focus on the commonplace certainly seems proper. Given the limited time allotted counterpoint in many music curricula, and the difficulties in becoming merely competent in (let alone mastering) the usual topics, one would be hard-pressed to justify the appropriation of time for more esoteric exercises. Consider Angelo Berardi's treatise,

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[1]For a sampling of tonal counterpoint textbooks, see Thomas Benjamin, *Counterpoint in the Style of J.S. Bach* (New York: Schirmer, 1986); Robert Gauldin, *A Practical Approach to Eighteenth-Century Counterpoint* (Englewood Cliffs, NJ: Prentice-Hall, 1988; reprinted Prospect Heights, IL: Waveland Press, 1995); Kent Kennan, *Counterpoint*, 4th ed. (Upper Saddle River, NJ: Prentice-Hall, 1999); Richard S. Parks, *Eighteenth-Century Counterpoint and Tonal Structure* (Englewood Cliffs, NJ: Prentice-Hall, 1984); Walter Piston, *Counterpoint* (New York: Norton, 1947); and H. Gilbert Trythall, *Eighteenth Century Counterpoint* (Dubuque, IA: Wm. C. Brown, 1993). For a textbook with a different focus and coverage of topics, see Felix Salzer and Carl Schachter, *Counterpoint in Composition: The Study of Voice Leading* (New York: McGraw-Hill, 1969; reprinted New York: Columbia Univ. Press, 1989).

Documenti armonici (1687), which presented a three-voice composition by Marco Scacchi, constructed so that it worked well whether its rests—scattered variously among the voices—remained as originally written (forming a fifteen-measure piece) or were removed (compressing the piece into twelve measures).[2] Scacchi's is an ingenious artifice—one of many offered by Berardi as an illustration of *obbligo*, a popular practice in the sixteenth and early seventeenth centuries, in which an arbitrary restriction was imposed on a composition in order to demonstrate contrapuntal skill.[3] No student interested in the *history* of counterpoint should be deprived of such examples, which paint a more complete picture of the art and craft than that suggested by some textbooks. However, students expected to learn the practical *application* of counterpoint rarely have time for such beguilements.

The prior observation not withstanding, I believe that there is one seemingly esoteric technique, generally ignored, that could be incorporated into either a tonal counterpoint or harmony-and-voice-leading course, and that could generate many practical benefits for the student: the writing of simultaneous outer-voice inversion, i.e., a form of note-against-note counterpoint in which the lowest voice descends by as many (generally diatonic) steps as the topmost voice ascends, and vice-versa; inner voices are then added to complete tonal harmonic progressions.[4] Although the practice may be called by various names, I will refer to it as "tonal mirror counterpoint." Terms—especially those used in teaching—should be selected judiciously, and there are reasons that the preceding is to be preferred

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[2]See Angelo Berardi, *Documenti armonici* (Bologna: Giacomo Monti, 1687; facsimile published Bologna: Forni Editore, 1970); trans. in Arved M. Larsen, III, *Angelo Berardi (1636–1694) as Theorist: A Seventeenth-Century View of Counterpoint* (Ph.D. diss., Catholic Univ. of America, 1979): 4–178. The Scacchi piece is included in the "30th Document" of Berardi's treatise.

[3]For a systematic guide to composing such a piece, see ch. 24 ("Counterpoint with and without Rests") in Serge Ivanovitch Taneiev, *Convertible Counterpoint in the Strict Style*, trans. G. Ackley Brower (Boston: Bruce Humphries, 1962).

[4]As for the technique being "generally ignored," I should mention that, of the sources cited in n.1, only Piston's book devotes a brief passage (pp. 222–23) to its general description, although it provides no constructional guidelines.

over, e.g., "simultaneous inversion." For one thing, the alternative term "inversion" is commonly used in three *different* ways in musical discourse. Regarding the spatial arrangement of chord members, it refers to that which is in the lowest position (e.g., "second inversion"). It also refers to two contrapuntal procedures: the registral exchange of melodic lines (i.e., "invertible counterpoint"), and the precise reversal of contour between two voices (i.e., "melodic inversion"). On the other hand, the preferred term "mirror" connotes a visual reflection of notes about an axis; and in conjunction with the term "counterpoint" it can only mean the simultaneous, vertical reflection of contours. Furthermore, whereas the alternative term "inversion" is often associated with intervalic exactness (as in serial works), such precision is generally not found in tonal music, in which mirroring operates primarily within diatonic space. Accordingly, the metaphor of visual reflection evoked by the term "melodic mirroring" seems more appropriate, given that an ascending interval of x steps will be reflected into a descending interval of x steps, without regard for an exact correspondence in interval size, and thus without the addition of new visual symbols (i.e., note accidentals). Of course, the mirrored voices may at times exceed an established diatonic collection, as tonal music encompasses functional chromaticism; consequently "*tonal* mirror counterpoint" is the most apt designation.[5]

Students may well be aware of *successive* inversion in tonal music, as in fugues with inversions of the subject, or canons that employ contrary motion in the *comes*. However, many will not associate mirror counterpoint with tonal practice, except on smaller scales. For example, some students may have studied chord-expansion techniques, and may be familiar with forms of concurrent, stepwise-linear inversions that prolong a single harmony (frequently the dominant). A primarily diatonic form of the device—deviating only with the use of a secondary leading tone—became a cliché of turn-of-the-twentieth-century marches, as illustrated in Figure 1a. There, departure

[5]In this article, I may refer to the operation with similar terms, such as "mirror writing," "contrapuntal reflection," etc. The alternative term "simultaneous inversion" may occasionally be used in a literal fashion, as when contrasting it with successive inversion, but "tonal mirror counterpoint" and its synonyms will remain the preferred usage.

from and arrival on C ($\hat{5}$), in contrary motion, serves to introduce an F-major march by John Philip Sousa. In Figure 1b is a Mozart excerpt, in which the highest and lowest notes diverge to fill D/A♭, the tritone constituents of the V^7 chord in E♭. In the Schumann excerpt of Figure 1c, we find a chromatic form of the device: chromatic passing tones fill the third F/A, of the V^7 chord in B♭. Chromatic forms analogous to this final one are sufficiently common to have earned their own monicker, "omnibus progressions."[6]

Though frequent, such scalar voice-exchange passages are conceptually removed from the juxtaposition of two inversionally-related "melodic" voices—i.e., those with more variegated contour profiles, and which span entire harmonic progressions. When considering the latter, students familiar with twentieth-century music may associate the operation with serialism, and imagine "atonal" passages as per the excerpt of Figure 2, from Anton Webern's Cantata, op. 29 (1938–39). In this choral excerpt, the melodies of the soprano and bass are inversions (reflections) of one another, as are those of the tenor and alto; the voice pairs are inverted around the axis C♯/D.[7] However, just as forms of *successive* melodic retrograde, inversion, and even retrograde-inversion were used a half-millennium before the advent of twentieth-century serialism,[8] so does *simultaneous*

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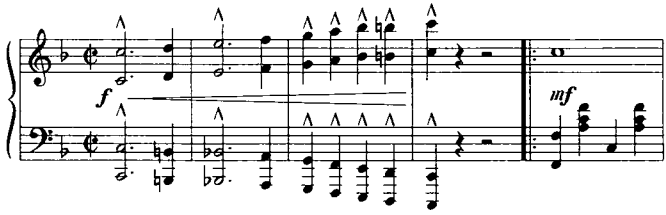
[6]See, e.g., Victor Fell Yellin, *The Omnibus Idea* (Warren, MI: Harmonie Park Press, 1998). The term originated two decades earlier in Yellin, "The Omnibus Idea," paper read at the annual meeting of the American Musicological Society, November 1972 (Dallas, TX).

[7]Having made reference specifically to serial inversion, I should point out that Webern constructed his twelve-tone row (prime form: A-F-A♭-G-B-B♭-D♭-C-E-D♯-F♯-D) so that the retrograde of the last six notes is the same as an inverted (and transposed) form of the first six notes. I mention this because, accordingly, one can interpret two of the voices of Figure 2 as having segments of prime forms, and two as having segments of retrograded prime forms (specifically, from the top down, segments of P6, R0, P4, and R10). Thus, one *could* dispense with reference to inversion when describing the passage, even though inversion is clearly a defining attribute of the excerpt (as it is of many vocal passages in the movement).

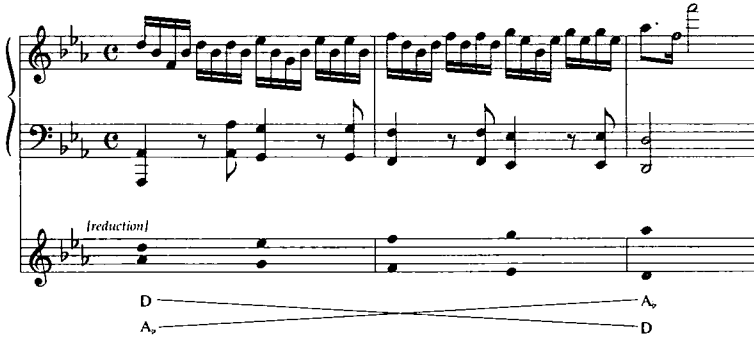
[8]See, for example, the three-voice isorhythmic motet by John Dunstable (ca. 1390–1453), *Veni sancte spiritus*, in Carl Parrish, compiler and editor, *A Treasury of Early Music* (New York: W. W. Norton, 1958): 87-93. It provides a verbal directive (or "canon") indicating that the tenor is to be performed first as written, then (diatonically) inverted, and finally in retrograde-inversion a fifth lower.

Figure 1. Stepwise-filled voice exchanges.

(a) J. P. Sousa, *The Thunderer* (1889): beginnning.



(b) W. A. Mozart, Piano Concerto K. 271 (1777): later cadenza, mm. 10-12.



(c) R. Schumann, Symphony No. 3, Op. 97 (1850): mvmt. I, mm. 542-47.

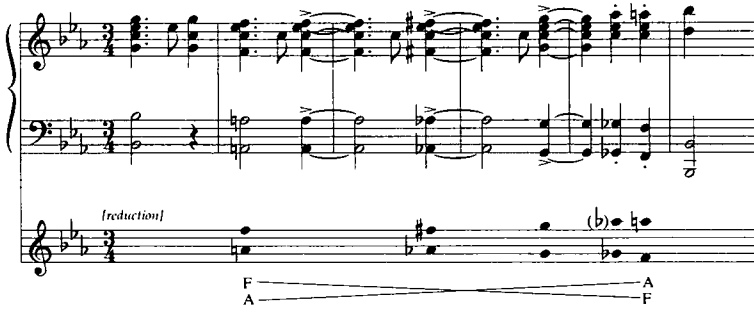
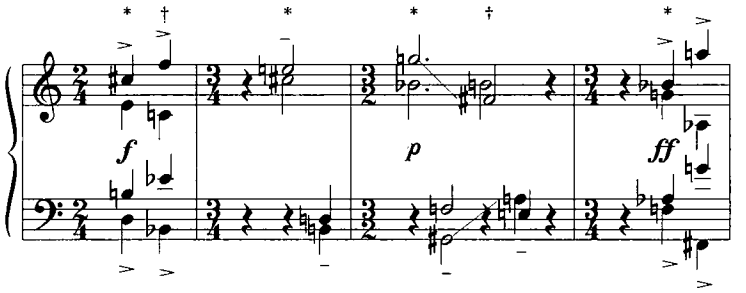


Figure 2. A. Webern, Cantata, Op. 29 (1938—39): mvmt. I, mm. 26—29 (SATB). (Note also linear symmetrical arrangement of set classes: * = 4-10 [0235], † = 4-23 [0257].)



inversion have a lengthy history, stretching back through the tonal and into the modal periods. One certainly does not have to turn to serial or even "atonal" music to find it.

Within the corpus of Western "art music," the perseverance of mirror counterpoint is a valuable fact to stress to students. It is important for them to become familiar with the endurance of it and other compositional procedures, lest they believe that certain undertakings (such as the topical one) are merely quixotic "theory exercises" unrelated to "real music." Accordingly, in the first section of this article, I provide an overview of the historical development and various applications of mirror counterpoint. Then, in the second section, I commence the investigation of the operation's musical attributes and compositional utilization. Brief analyses of three mirror compositions follow; these allow us to confirm, and explore further, certain previous observations in the contexts of extant compositions. In the concluding section, I summarize the benefits a student may obtain through the practice and application of the technique. All sections were written with both teacher and student in mind; the frequent use of the plural "we" is intended to denote this cooperative

community. Suggestions for approaching the material are offered, as are evaluations of problematic aspects and sample exercises and analyses. Indeed, the essay may serve as a model class lecture, and as such can be applied to the needs of teacher and student alike.

An Outline History of Mirror Counterpoint

Mirror counterpoint can trace its compositional roots to the opposition of voices by contrary motion, which has been advocated in counterpoint for centuries. For example, Johannes Affligemensis (a.k.a. John Cotton or Johannes Cotto) advised ca. 1100 that "[t]he simplest method for [constructing organum] is when the various melodic progressions are borne carefully in mind, so that whenever there is an ascent in the original melody, there is at that point a descent in the organal part and vice-versa."[9] By the fifteenth century the advice had become a general directive: in 1482 Bartolomeo Ramis offered six rules of counterpoint, the last being "[i]f the tenor ascends let the counterpoint be careful to descend,"[10] and Franchinus Gafurius echoed the sentiment in his eight rules of 1496, stating that "the parts of a song—tenor, cantus, and contratenor—ought to be in contrary motion to each other."[11]

These prescriptions were for the use of general contrary motion when juxtaposing parts, not strict mirror counterpoint. However, examples of the latter did emerge from comparable types of compositional thinking. The benefit of studying such examples is to increase awareness not only of the historical persistence of the technique, but of its various compositional applications and its stylistic evolution. Regarding matters of style and syntax, much can be learned by comparing tonal specimens, from the eighteenth and nineteenth

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[9]Johannes Affligemensis, *On Music (De Musica)* (ca. 1100), trans. by Warren Babb in *Hucbald, Guido, and John on Music: Three Medieval Treatises* (New Haven: Yale Univ. Press, 1978): 160.

[10]Bartolomeo Ramis (or Ramos), *Musica Practica* (1482), trans. with commentary by Clement A. Miller (s.l.: American Institute of Musicology, 1993): 119.

[11]Franchinus Gafurius, *Practica musicae* (1496), trans. and ed. by Irwin Young as *The Practica musicae of Franchinus Gafurius* (Madison: Univ. of Wisconsin Press, 1969): 135.

centuries, with earlier (i.e., modal) and later (e.g., "pandiatonic") works; and also by analyzing forms of mirroring among the Baroque, Classical, and Romantic eras, in order to assess the diverging practices that have been grouped under the rubric "tonal." To this end, in the following I will cite and briefly comment upon a handful of mirror passages, from the fifteenth through the twentieth centuries, that incorporate the technique in a variety of ways. (Of course, if using these or similar examples in an instructional environment, teachers and students should focus on issues of musical language to an extent not feasible here.) The survey will also permit us to broach, for the first time, some of the vicissitudes of specifically *tonal* mirroring, which is the principal focus of this article.

Two instances of "pre-tonal" mirroring will be mentioned. The first is from the English "Fountains Fragment," which probably dates from early in the fifteenth century.[12] In the third Gloria of this anonymous work, there is an isorhythmic tenor of six-notes (the piece ends during its ninth statement). A verbal directive or "canon" indicates that the contratenor, to be performed concurrently, is to be a (diatonic) inversion of the tenor at the fifth below. Together these voices are given, ostinato-like, underneath two more rapid voices. As may be seen in Figure 3, both lower voices move stepwise and are inverted about F (the note upon which they converge); together filling in the fifth D–A, they reinforce the Dorian modality of the piece.

For the second example, we turn to a publication by Giovanni Battista Martini, an esteemed musical authority of the eighteenth century, and a highly sought-after teacher with many famous pupils (including J.C. Bach and, allegedly, W.A. Mozart).[13] Despite its

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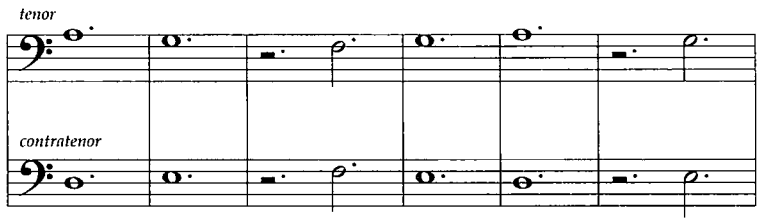
[12]For more, see Manfred F. Bukofzer, "The Fountains Fragment," ch. 3 in his *Studies in Medieval and Renaissance Music* (New York: Norton, 1950): 86–112; see also the editor's "Introduction" in *The Fountains Fragments: Late-Fourteenth-Century Polyphony for the Mass from a Fountains Abbey Memorial Book*, transcribed and ed. by Edward Kershaw (Devon, England: Antico Edition, 1989). Despite the subtitle of the last-named work, both authors hold that the music probably dates from the early fifteenth century—perhaps from, or around, its second decade.

[13]The nature of Mozart's often-cited studies with Martini is a matter of debate. Investigation of documents from the period, especially the cor-

late date, Martini's tract, *Esemplare o sia saggio fondamentale prattico di contrappunto fugato* (1774–75), is actually a monument to the *stile antico* of the sixteenth and seventeenth centuries.[14] Rather than a counterpoint treatise in the usual sense, it is a two-volume collection of annotated musical scores, mostly from the cited centuries. References to and examples of contrary-motion imitation are scattered throughout,[15] and at one point Martini illustrates mirror counterpoint in the forms transcribed in Figure 4.[16] The Mixolydian, imitative passage at *(a)* includes a cantus firmus (voice-1) and its inversion at

Figure 3. "Fountains Fragment" (English, ca. early 15th century): tenor and contratenor ostinato from third Gloria.



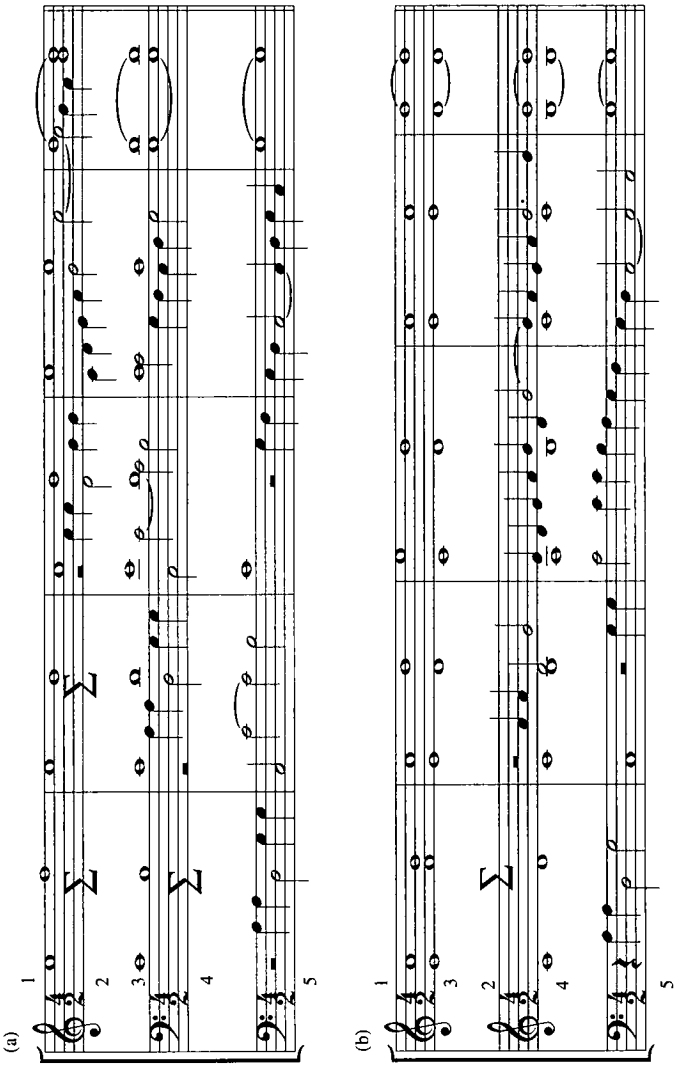
respondence of Mozart's father, suggests that the studies were very brief, if not anecdotal (see Frédéric Gonin, "Mozart et le Padre Martini: Histoire d'une légende?," *Revue de Musicologie* 85/2 [1999]: 277–95).

[14]Giovanni Battista Martini, *Esemplare o sia saggio fondamentale prattico di contrappunto fugato*, 2 vols. (Bologna: Lelio dalla Volpe, 1774–75; facsimile published Ridgewood, NJ: Gregg Press Inc., 1965); some portions are translated in Alfred Mann, *The Study of Fugue* (Mineola, NY: Dover, 1987): 263–314.

[15]See, e.g., vol. 1: 84–85.

[16]From vol. 1: 210. This is a more convenient and accurate transcription than what Martini provided; I have reduced the 5-staff system to 3; placed voices in either treble or bass clefs (eliminating C clefs); replaced the indicated ¢ time signature with the more accurate $\frac{4}{2}$; and corrected the final nine notes of version *(a)*, fifth voice, which were notated a third too low in the source.

Figure 4. G. B. Martini, *Esemplare...*: simultaneous inversion.
(NB: voices numbered as per original ordering, top to bottom, in orig. 5-stave source)



the tenth below (voice-3); the axis of inversion is D, upon which the two voices converge at the ending plagal cadence. The version at *(b)* demonstrates register-invertible counterpoint (i.e., "double counterpoint") by placing voice-1 an octave lower and voice-3 an octave higher; a new voice-4 is in parallel thirds below the repositioned cantus firmus.

Proceeding now into the tonal period, we find problems with the application of mirror counterpoint that would not have been experienced earlier. These arise due to the difficulties of incorporating its symmetrical prescriptions into a musical language in which scale degrees and harmonies are disproportionately weighted—i.e., one with an asymmetrical syntax. Indeed, it can be difficult enough to coordinate matching leaps and steps between voices, even if the reflected intervals do *not* have to be of the same (general) size. This fact was illustrated by an eighteenth-century tract that briefly considered the technique: Joseph Haydn's *Elementarbuch* (1789), which was recorded in manuscript by his student, F.C. Magnus.[17] The text is essentially an abstract of Fux's *Gradus ad Parnassum* (1725), on different species of counterpoint, although its musical examples are usually *not* taken from Fux and some of its techniques are unique.

One such novel specimen arises when Haydn addresses the different kinds of motions in two-voice writing, including contrary motion (*Motus contrarius*). As shown in Figure 5 (which should be read as a single phrase, despite the double bar), he illustrates how contrary motion may be either by step, as in the first two measures; or by skip, as in the last two measures. In brackets above the passage, I have added ordinal numbers which will be keyed to subsequent comments. Underneath, I have provided an interpretation of the harmonic potential of the passage, should one expand the range between the lines and add inner parts; thus we find what is, in the

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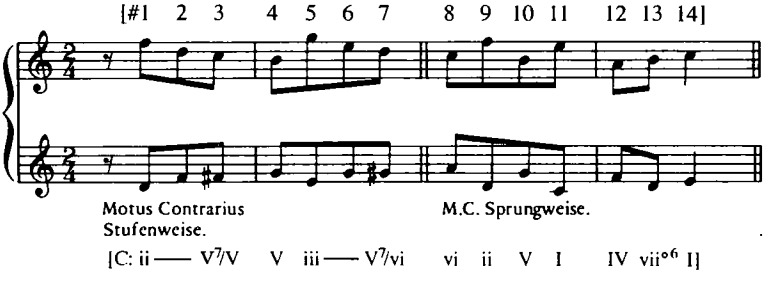
[17]The *Elementarbuch* subheading reads: "condensed from the larger works of Kapellmeister Fux by Joseph Haydn" (*"aus den grösseren Wercken des Kappm. Fux, von Joesph Hayden zusammengezogen"*). See a diplomatic transcription with parallel translation in Alfred Mann, "Haydn's *Elementarbuch*: A Document of Classic Counterpoint Instruction," *Music Forum* 3 (1973): 197–237. Mann states that it was "possibly taken down from Haydn's dictations, but more likely transcribed from a rough copy prepared by Haydn himself" (p. 200).

Figure 5. J. Haydn, *Elementarbuch* (1789): 2-voice *Motus contrarius*.



main, a reasonable tonal passage. Still, consider the "tweaking" of the voices that had to be made just in the "stepwise" portion: between events #2–4, the top voice descends a *third* while the bottom voice chromatically fills a *second*; the leap between #4–5 is a *sixth* above but a *third* below; and between #6–8 there is another *third* against a filled-in *second*. In the "skips" section, at *no* time does the interval traversed above match that below (*fourths* are placed against *fifths*, etc.). Yet, even with all of these freedoms, notice the unusual features that still persist: e.g., there is a leap away from the leading tone between #10–11, where the implicit V–I takes place; and in the final measure (between #12–13), a *step* has to counter a *skip* in order to create a more conventional cadential gesture.

If irregularities are difficult to overcome even when contour inversion is applied less strictly, one can imagine the challenge of using precise mirror counterpoint and attempting to harmonize appropriately all reflected intervals—of integrating them into reasonable tonal progressions. This is especially true of the secundal mapping that necessarily results (i.e., no matter the diatonic axis, two notes adjacent in the scale will always be amount those that map onto one another). Moreover, one has to consider the octave or

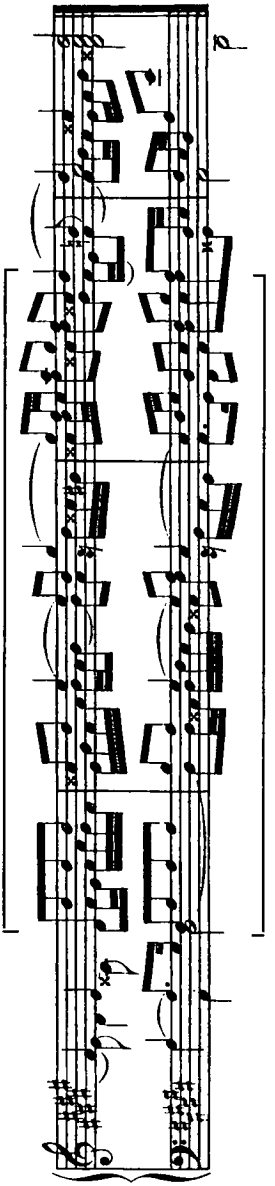
unison convergences upon the axis tone, which may give it undue emphasis (especially if the axis is not a conventionally-stressed scale degree). Accordingly, when tonal mirror counterpoint is found, passages are usually relatively brief. A few such examples will be cited below; as before, in an actual teaching environment, these should be compared and examined more thoroughly.

Given J.S. Bach's contrapuntal mastery, and the fact that various types of *successive* mirror inversions can be found in his music, it may come as little surprise that *simultaneous* inversion also exists within his works. As an example, Figure 6 presents the final four measures of Fugue 8, in D♯-minor, from *The Well-Tempered Clavier*, Book II (1738–42). The two-bar fugue subject, placed in the top voice, is simultaneously mirrored by the tenor-range voice; F♯ ($\hat{3}$) is the axis. In this particular work, the subject's inversion had not appeared previously; however, one can find examples by Bach in which a mirror-counterpoint section suggests an apotheosis due to prior applications of inversion. For example, consider the gigue of his Suite in A Minor, BWV 818 (see also the alternate version, BWV 818a): the original form of the theme is introduced at the beginning; the second strain begins with its inversion (as is often the case); and then, at the end, both forms are combined in mirror counterpoint.[18] Perhaps more striking is Contrapunctus 5, from *The Art of Fugue*, in which fugal entries are first discrete, then overlapped (in *stretto*), and finally combined—conceptually representing the ultimate temporal compression between entries: statements after the duration *zero*.

Muzio Clementi and Johannes Brahms exemplify composers from different halves of the nineteenth century whose interests in counterpoint prompted mirror writing. Clementi offered such a passage in *Gradus ad Parnassum*, vol. 1 (1817); and Brahms featured mirroring within different piano variations, including *Variations on a Theme by Robert Schumann*, op. 9 (1854), and *Variations and Fugue on a Theme*

[18]A Gigue that proceeds in a similar fashion, but whose two sections are more extensively related by inversion, is the one in D Minor from Bach's English Suite No. 6 (BWV 811). In it, the second strain is mostly constructed as the inverse of the first strain (i.e., the melodic contours are inverted *and* the registral order of voices is reversed); however, the axes of inversion are not constant and there are several deviations.

Figure 6. J. S. Bach, *Well-Tempered Clavier* II, Fugue 8 in D♯m (final 4 mm).

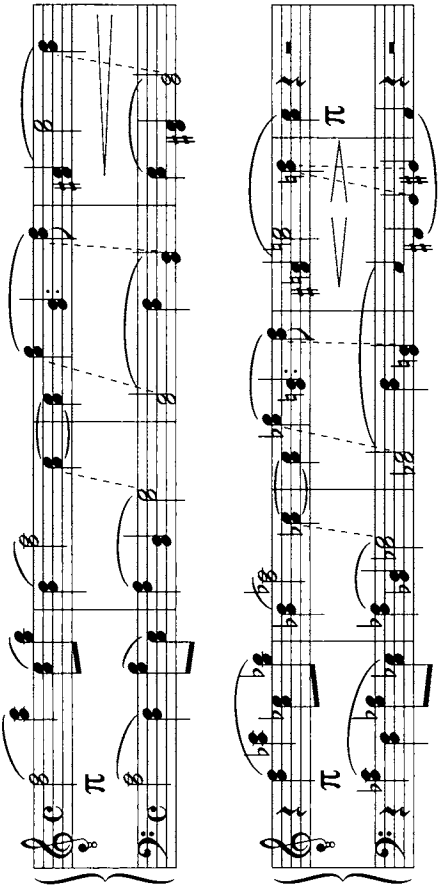


by Handel, op. 24 (1861). We will examine these compositions in detail later, after exploring general aspects of mirror counterpoint, so further comments will not be added here (the musical excerpts can be found as Figures 20–22). However, in passing, it should be noted that Brahms may well be the exemplar of a post-Bach tonal composer who was devoted to the technique of mirror writing. He returned to it several times. In addition to his two variations excerpted herein, see, e.g., his *Variations on a Theme of Haydn*, a.k.a. the "St. Anthony" variations (1873). In variation 8, mm. 350–53 are in tonal mirror counterpoint and are bounded by further, more general contrary motion. One can also find numerous examples of *inexact* mirroring in Brahms's piano music; e.g., see any of several variations in his two sets of *Variations on a Theme of Paganini* (1866).

Lastly, moving into the twentieth century, we note that mirror writing may be found in works that are still somewhat tonal. Edward Elgar's *Falstaff*, op. 68 (1913), provides one such example. There are various pockets of mirroring within this "symphonic study in C-minor," one of which is excerpted in Figure 7. However, here we do not find tonal progressions *per se*; instead, the various, leaping, mirrored thirds form a series of parallel seventh chords, first descending within the C-major collection, and then within the C-minor collection. Although the mirror technique may be found in such predominantly tertian, diatonically oriented passages, it most flourished in the twentieth century *after* adherence to tonality further weakened, and contrapuntal/harmonic possibilities began to expand. With a greater variety of permitted intervallic configurations came an increased potential for simultaneous inversion. Accordingly, it is among the century's "post-tonal" composers that the technique is most prominent. Many of these are known for their use of contrapuntal symmetries (e.g., Bartók and Webern), but in closing this survey, one should be mentioned who is perhaps not as widely recognized: Vincent Persichetti. He went through a period of intense mirror composition, between 1978 and 1980, that yielded forty-eight *Reflective Keyboard Studies*, op. 138; the five-movement *Little Mirror Book*, op. 139; seven *Mirror Etudes*, op. 143; and the "Mirror Sonata" (i.e., the Twelfth Piano Sonata), op. 145.

Techniques of mirror counterpoint in the "pre-" and "post-tonal" eras are no less worthy of study than those of the tonal period. How-

Figure 7. E. Elgar, *Falstaff* (marker [103]), violas and cellos.



ever, for the remainder of the article, we will focus only on the latter, so as to clarify the kinds of compositional approaches that were (and can be) used, the special considerations demanded by tonal mirroring, and ways in which these approaches and demands can well complement what is typically taught in undergraduate music-theory classes. A student can learn much by trying to compose aesthetically pleasing, tonally functional mirror counterpoint, as this article will make manifest. To be as concise as possible in a rather extensive undertaking, only major-key writing will be addressed here. Once its techniques have been mastered, application within minor should not be too difficult. The chief distinction will be that, although $\hat{6}$ and $\hat{7}$ will be considered generally when calculating scale-degree reflections, in application they will need to be transformed into appropriately "natural" or "raised" versions, depending upon local voice-leading requirements.

Axis Notation and Tonic-Triad Emphasis

As we begin to focus on compositional aspects of mirror counterpoint, a logical point of departure will be the determination of appropriate axes for inversion. A composition most strongly asserts its tonality when a tonic triad is present and confirmed, especially at points of musical departure and arrival. Accordingly, we will start with the proposition that an appropriate axis will be one that maps two members of the tonic triad onto one another; such an operation will permit the tonal center to be reinforced at defining moments. In order to form a tonic triad, it is not necessary for either outer voice to have $\hat{1}$; an inner voice could assume it instead. However, if one of the inversionally-related outer voices does contain $\hat{1}$, then closure—or at least a stronger arrival—will be especially facilitated. Before exploring how this premise affects axis determination, we must address how our axis systems will be indicated and modeled.

In the following, a diatonic inversion (dI) operator will be symbolized dI^{x}_{y}, which indicates that scale-degree x is mapped onto y, and vice-versa. When x and y are identical, these entries represent the actual scale-degree axis; when they differ, the axis is the scale degree "in between" the two (e.g., for $\mathrm{dI}^{!}_{5}$ the axis is $\hat{3}$). Thus, those inversions that map members of the tonic triad onto one another may

be symbolized: dI^1_1, dI^1_3, dI^1_5, dI^3_3 (which has the same axis as dI^1_5), dI^3_5, and dI^5_5 An advantage of this system is that the inversional analogue to any scale degree (i.e., the scale degree an equal step-distance on the "other side" of the axis) may be calculated easily, by simple addition or subtraction: treating scale degrees as integers, any whose sum is $x+y$ (mod. 7) are inversionally related. That is, if one wants to find the inversional analogue to $\hat{5}$ under dI^1_3, then: $5+\underline{6}=4$ (mod. 7), and so $\hat{6}$ is the corresponding inverted scale degree.[19]

There are different ways to represent notationally the mappings that result from the cited operations, and the strengths and weakness of each should be discussed, by teacher and student, before advocating one to follow. For example, dI^1_1 could be represented in conventional musical notation, with aligned ascending and descending scales, as shown in Figure 8. Here, C-major is used to represent the diatonic scale, and the notation indicates that if C↔C (C maps onto itself), then D↔B (D and B map onto one another), E↔A, etc. In between the staves is indicated the diatonic intervals between voices. This method of notation may seem direct, but in fact it is *too* specific: one is forced to select a particular scale, when one is really interested in the general relationships between scale degrees; and one must represent the notes of that scale in a fixed register (as the notation requires), although other registers may be employed.

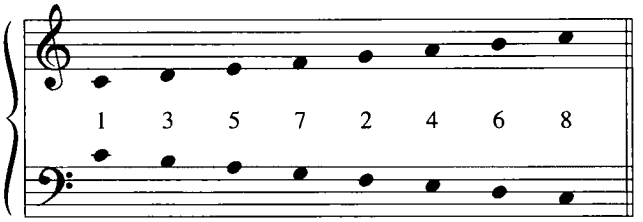
A modified cyclic notation, using scale degrees, provides a more general format in which the results of dI^1_1 could be represented:

$$(\hat{1})_{1/8}\,(\hat{2}\text{-}\hat{7})_{3/6}\,(\hat{3}\text{-}\hat{6})_{4/5}\,(\hat{4}\text{-}\hat{5})_{2/7}$$

Here, parentheses enclose outer-voice mappings, and so the notation indicates that $\hat{1}$ maps onto itself, $\hat{2}$ maps onto $\hat{7}$ (and vice-versa), and so forth. The subscripted numbers to the right of each parentheses-set

[19]For students unaccustomed to modular arithmetic, all one has to remember is that 8=1. That is, when counting, 7 is always followed by 1 (just as when thinking of scale degrees). So, when adding as per the cited example, think: what number added to 5 will equal 4? Then count the steps it takes to arrive at 4: ...6, 7, 1, 2, 3, 4 (= 6 steps). (Some mathematically aware readers may object to the use of mod. 7 arithmetic without the existence of 0, i.e, counting from 1 through 8 [=1] rather than from 0 through 7 [=0]. This is done only to preserve the usual interval numbers [prime, second, etc.].)

Figure 8. Diatonic mappings for axs $\hat{1}$, as represented by C-major scale.



denote the two diatonic intervals that can be formed by the given mapping, depending on which scale degree is placed in the bass. This more abstract notation eliminates the problems cited above, with Figure 8, but it eliminates also one of the benefits of conventional notation: the unambiguous indication of note adjacencies, of which notes are melodically nearest to which other notes—something of great importance when contemplating voice leading.

We will use a compromise notation, as shown in Figure 9a. There, dI^1_1 is represented by two concentric rings containing four scale degrees each. The aligned dyads indicate the scale-degree mappings, and (to facilitate voice leading) each scale degree is also visually adjacent to the next higher or lower degree, either by reading clockwise or counter-clockwise within a single ring (e.g., $\hat{3}$-$\hat{4}$), or by moving from one ring to another at the "break" (e.g., $\hat{4}$-$\hat{5}$). The motion in both rings must be read in the same direction; e.g., as $\hat{1}$ moves to $\hat{2}$ (outer ring) in one voice, concurrently $\hat{1}$ moves to $\hat{7}$ (inner ring) in the other voice. Following the break—i.e., after one "crosses" the rings—one must continue tracing both voices in the same direction. That is, if one is tracing a voice from $\hat{4}$ to $\hat{5}$ (across the rings) and then to $\hat{6}$ (continuing *counterclockwise* in the inner ring), one would trace the mirrored voice from $\hat{5}$ to $\hat{4}$ (across the rings) and then to $\hat{3}$ (continuing *counterclockwise* in the outer ring). Around the perimeter

of the rings are the intervals formed, depending on which dyadic scale degree is assigned to the lower register. Figures 9b–e provide similar displays for the other cited dI operators.

After examining the scale-degree correspondences within each axis system, and considering the chord possibilities for each note-pair, we observe that two systems can be dismissed due to tonally undesirable mappings: dI_5^3 (axis $\hat{4}$) is discarded due to $\hat{1}\leftrightarrow\hat{7}$, and dI_5^5 (axis $\hat{5}$) is treated likewise due to $\hat{1}\leftrightarrow\hat{2}$. In each case, the tonic pitch would be combined with a scale degree a step away, and thus neither axis could produce an unadorned tonic triad with which to conclude a composition. Accordingly, we are left with three alternatives, each viable in terms of mapping $\hat{1}$ onto a tonic-triad member, and thus each permitting a root-position tonic chord: dI_1^1 (axis $\hat{1}$), dI_5^1/dI_3^3 (both with axis $\hat{3}$), and dI_3^1 (axis $\hat{2}$).

The Species Approach

The diagrams of the three remaining axis systems reveal why mirror writing is *not* especially suitable for conventional two-voice, species-counterpoint exercises. Given the simultaneous reflections under discussion, exercises would have to be in note-against-note counterpoint, eliminating all species except the one traditionally ordered as "first." However, as the diagrams indicate, there are only a few scale-degree pairs that would produce the consonances required of note-against-note writing; these are summarized in Table 1. (Given that a unison or octave with $\hat{1}$ can be formed only under a single axis, namely $\hat{1}$, we must relax the common restriction that first-species exercises should end with that combination. In the following, "note-against-note counterpoint" will mean that which employs only consonant intervals between voices: the perfect unison, fifth, and octave; and major and minor thirds and sixths.) As a first step into the practice and problems of mirror writing, the student should compose some brief exercises in note-against-note counterpoint, under each axis; examples are provided in Figure 10. Due to the melodic limitations of each voice, longer exercises will likely be found to be tedious for both composer and listener. Such is the case especially with axis $\hat{2}$, which provides only three scale-degree possibilities. Figure 10b makes the most of the circumstance, in that its upper voice employs

Figure 9. Axis systems in graphic ("rings") notation.
(NB: systems shown are only those that permit members of the tonic triad to map onto one another.)

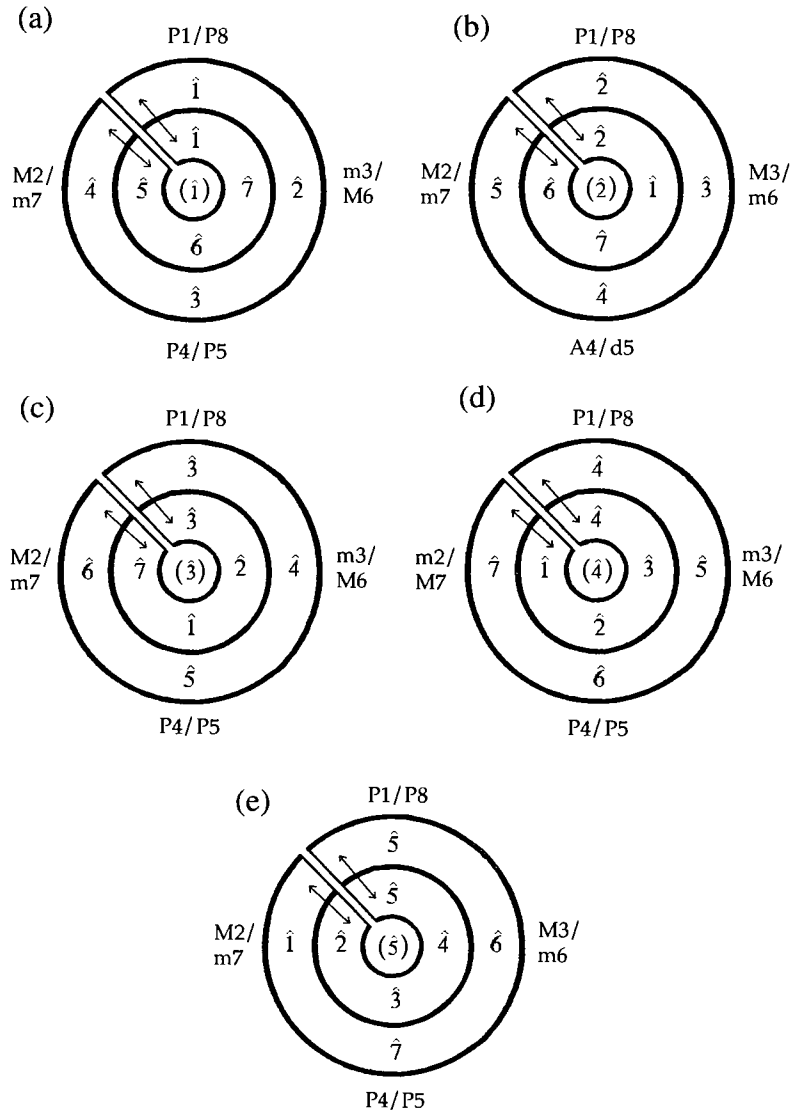


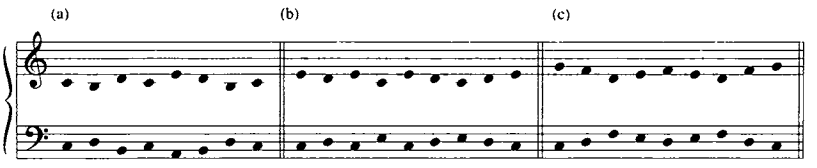
Table 1. Available consonances for note-against-note counterpoint.

axis	scale-degrees that can be used in either voice	scale-degrees that must be used in a specific voice
$\hat{1}$	$\hat{7}$, $\hat{1}$, $\hat{2}$	$\hat{3}$ (top), $\hat{6}$ (bottom)
$\hat{3}$	$\hat{2}$, $\hat{3}$, $\hat{4}$	$\hat{5}$ (top), $\hat{1}$ (bottom)
$\hat{2}$	$\hat{1}$, $\hat{2}$, $\hat{3}$	

all six unique scale-degree successions ($\hat{1}$-$\hat{2}$, $\hat{2}$-$\hat{1}$, $\hat{1}$-$\hat{3}$, $\hat{3}$-$\hat{1}$, $\hat{2}$-$\hat{3}$, $\hat{3}$-$\hat{2}$), and so provides maximum melodic/intervallic variety.

If one wanted to explore two-voice writing further, it would be advantageous to become progressively—and systematically—more liberal in the allowance of dissonances. One could posit different mirror-counterpoint species, each gradually expanding the palette of (controlled) dissonances, as in the five conventional species. For example, after the all-consonances model previously embraced, a "second (mirror) species" might then allow passing and neighboring dissonances on relative weak beats. If so, one will find the axes $\hat{1}$ and $\hat{3}$ generally more suitable than axis $\hat{2}$ not only because the former axes provide more consonant scale-degree combinations to begin with, but also because one of the dissonances under axis $\hat{2}$ is the tritone, which has fewer traditional resolution possibilities than certain other dissonances. Nonetheless, this "second species" will increase compositional potentials only slightly. One reason is that actually *no*

Figure 10. Two-voice counterpoint for axes $\hat{1}$, $\hat{2}$, and $\hat{3}$.



dissonant passing tones can be added under the three axes, because there are no single-scale-degree "gaps" between those scale degrees that can form consonances; e.g., under axis $\hat{1}$, $\hat{4}$ cannot be an upper-voice (dissonant) passing tone between $\hat{3}$ and $\hat{5}$ because goal-tone $\hat{5}$ cannot, itself, form a vertical consonance. Some neighboring tones will be possible; e.g., under axis $\hat{1}$: in the top voice, upper-neighbor $\hat{4}$ and lower-neighbor $\hat{6}$; in the bottom voice, upper-neighbor $\hat{3}$ and lower-neighbor $\hat{5}$. But still, the top and bottom voices will each have one scale degree ($\hat{5}$ and $\hat{4}$, respectively) that cannot be used. Figure 11 offers a "second species" exercise in common time, written under axis $\hat{1}$; intervals of the seventh and the fourth (marked with asterisks) appear on relative weak beats.

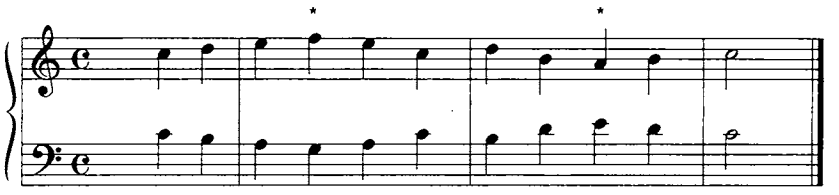
One may contrive other mirror species through the continued incorporation of dissonance types, but at some point too many successive dissonances will likely undermine any real sense of tonality, and exercises will come to sound more like specimens of "pandiatonic" counterpoint, *à la* Stravinsky and certain other twentieth-century composers.[20] Indeed, proceeding from suggestions in the historical-survey section, it could be fruitful to have students continue with the systematic expansion of allowed dissonances, and to debate at what point their exercises ceased to be truly tonal. At any rate, the foregoing observations suggest the reason that tonal composers usually employ mirror counterpoint only when (nonsymmetrical) inner voices are also present: these soften the frequent outer-voice dissonances with added consonances, and complete or suggest tonally-normative chord progressions. Thus, in continuing our evaluation of the three axes, the next issues to consider are the harmonies implied by each mapping, and their immediate voice-leading consequences.

Harmonic Implications

Given the relatively limited set of possible harmonies, can they be incorporated into tonally suitable progressions, considering also exigencies of voice leading (such as resolutions of chord sevenths

[20]See, for example, much of the theme-and-variation movement of Stravinsky's *Sonata for Two Pianos* (1943–44).

Figure 11. "Second (mirror) species," under axis î.



and other dissonant tones)?[21] The entries in Table 2 suggest partial answers to this question. Let us consider the table for axis î. The first column indicates the mappings, i.e., the scale degrees that will be assigned to the outer voices. The second column displays the chords (usually triads) that are most likely to be formed with the outer voices. For example, if î is in both outer voices, then I, vi, and IV are likely harmonies (for consistency, the table does not include figured-bass inversional symbols (e.g., $_3$and $_4$) because the bass tone is not fixed when two *different* scale degrees are in column 1). Finally, the third column lists the most obvious and immediate voice-leading restrictions. In teaching, these should be addressed individually; each implicit chord and its possible resolutions should be illustrated, with special attention paid to the restrictions and potential problems arising therefrom. In practice, the student will learn much about tonal voice leading from taking one of the outer-voice combinations and determining what chords can follow, within the narrow context of a two- to four-element progression. Some of these are detailed below.

[21] A fundamental pedagogical issue is which to teach first, counterpoint or harmony (setting aside, for the moment, the fact that both topics are inextricably intertwined in tonal practice). In my approach to the following discussion, I am assuming prior knowledge of basic harmonic syntax on the part of the student.

Table 2. Possible (common) harmonies, and their voice-leading restrictions.

axis $\hat{1}$ mapping	common chords	common restrictions
$\hat{1}\leftrightarrow\hat{1}^*$	I, vi, IV	—
$\hat{7}\leftrightarrow\hat{2}$	V, vii^o	$\hat{7}$-$\hat{1}$ (necessitates $\hat{2}$-$\hat{1}$)
$\hat{6}\leftrightarrow\hat{3}$	vi	—
$\hat{4}\leftrightarrow\hat{5}$	V^7	$\hat{4}$-$\hat{3}$ (necessitates $\hat{5}$-$\hat{6}$); works well if $\hat{5}$-$\hat{6}$ in bass

axis $\hat{3}$ mapping	common chords	common restrictions
$\hat{3}\leftrightarrow\hat{3}^*$	I, iii, vi	—
$\hat{2}\leftrightarrow\hat{4}$	ii, vii^o, V^7	if V^7 of vii^o, $\hat{4}$-$\hat{3}$ (necessitates $\hat{2}$-$\hat{3}$); if ii, resolution could be problematic
$\hat{1}\leftrightarrow\hat{5}^*$	I	—
$\hat{6}\leftrightarrow\hat{7}$	vii^{o7}	$\hat{6}$-$\hat{5}$ and $\hat{7}$-$\hat{1}$

axis $\hat{2}$ mapping	common chords	common restrictions
$\hat{2}\leftrightarrow\hat{2}$	ii, V, vii^o	—
$\hat{1}\leftrightarrow\hat{3}^*$	I, vi	—
$\hat{7}\leftrightarrow\hat{4}$	vii$^{o(7)}$, V^7	$\hat{7}$-$\hat{1}$ and $\hat{4}$-$\hat{3}$
$\hat{5}\leftrightarrow\hat{6}$	vi^7; later: V^9	$\hat{5}$-$\hat{4}$ (necessitates $\hat{6}$-$\hat{7}$)

** indicates that a tonic triad can be formed*

There are no restrictions for $\hat{1}\leftrightarrow\hat{1}$, as any of the three indicated chords may be used without affecting the immediate voice-leading of the scale degrees in column 1. That is, even if the outer-voice $\hat{1}$s are made to form IV $_4$, it is not the *outer* voices that are always compelled to move, it may be the added *inner* voices: in the case of a "neighboring $_4$" which resolves to $_3$ above the same bass tone, the added $\hat{4}$ and $\hat{6}$ must step down to $\hat{3}$ and $\hat{5}$, but the $\hat{1}$s remain, and

so the resolution does not affect the motion of the symmetrically disposed outer voices (see Figure 12a).

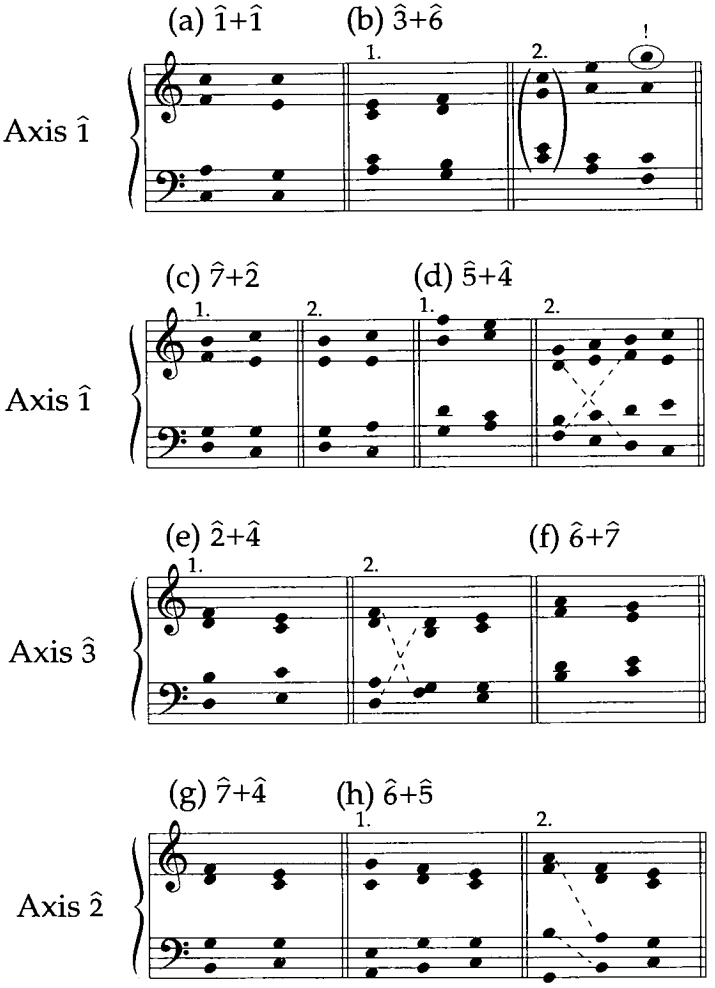
There are also no restrictions for $\hat{6}\leftrightarrow\hat{3}$, which most likely will form vi. True, some progressions will *follow* from vi more logically than others. For example, if vi serves as a prefix to V, then the bass's $\hat{6}$ will step down to $\hat{5}$ as the soprano's $\hat{3}$ steps up to $\hat{4}$, thus forging V^7—a conventional progression (Figure 12b.1). However, the common use of vi as an intermediate chord between I and IV would be problematic, because a bass skipping from $\hat{6}$ to $\hat{4}$ would have to be mirrored by a soprano skipping from $\hat{3}$ to $\hat{5}$, and the latter scale degree is *not* a member of IV (Figure 12b.2). Still, there is nothing about the outer-voice combination of $\hat{6}$ and $\hat{3}$ that *requires* the latter (undesirable) succession; better options (such as the former) do exist.

The same is not true for $\hat{7}\leftrightarrow\hat{2}$, which most likely will fit $vii^{\circ(7)}$ or $V^{(7)}$, thus strengthening harmonically the melodic tension which typically compels the leading tone to ascend to the tonic. The $\hat{7}$-$\hat{1}$ resolution accordingly necessitates a $\hat{2}$-$\hat{1}$ resolution in the mirrored voice (Figure 12c.1). Observe that the same would be true even if $\hat{7}$ and $\hat{2}$ were incorporated into a iii^7 chord: $\hat{7}$ would now be more stable and thus less obliged to resolve upward; but $\hat{2}$, being the chord seventh, would need to resolve downward, meaning that $\hat{7}$ would still be compelled to ascend, as illustrated in Figure 12c.2.

The combination of $\hat{4}$ and $\hat{5}$ likewise suggests V^7 (in either root-position or third inversion), and so $\hat{4}$ (the chord seventh) must step downward to $\hat{3}$; this will cause the mirrored $\hat{5}$ to step to $\hat{6}$, creating a deceptive harmonic resolution. The progression will work especially well if the $\hat{5}$-$\hat{6}$ motion is in the bass, creating a root-position V^7–vi (Figure 12d.1); it will be more problematic if $\hat{4}$-$\hat{3}$ is in the bass, because the "resolution" will be to an unstable vi^{6}_{4} chord. But this too may be reconciled with tonal practice, if the $^{6}_{4}$ behaves normatively (e.g., as a passing chord, as in Figure 12d.2).

Regarding the remaining entries of Table 2, for axes $\hat{3}$ and $\hat{2}$, we will comment only upon the voice-leading restrictions. For axis $\hat{3}$, $\hat{2}\leftrightarrow\hat{4}$ may well be incorporated into a vii° or V^7 chord, which would make $\hat{4}$ an active tone bound to resolve to $\hat{3}$, and thus the mirroring voice would have to progress $\hat{2}$-$\hat{3}$. No matter which registral

Figure 12. Progressions from specified axis-tone combinations, and their harmonic implications.



arrangement is employed, the chord of resolution will be I^6 (Figure 12e.1). The other possible harmonization of $\hat{2}$ and $\hat{4}$ is, of course, ii. However, the motion *from* ii—i.e., considering an appropriate chord to which it could progress—can be problematic; one solution, in which ii leads to V^4_2–I^6, is illustrated in Figure 12e.2. The other voice-leading restrictions for axis $\hat{3}$ occur when $\hat{6}\leftrightarrow\hat{7}$: as the combination suggests vii°^{7}, the leading tone is bound to ascend to $\hat{1}$, and $\hat{6}$ (the chord seventh) must descend (Figure 12f).

Moving to axis $\hat{2}$, we observe that the tritone formed by $\hat{7}$ and $\hat{4}$ requires resolution to $\hat{1}$ and $\hat{3}$. Recall that vii° tends *not* to be used in root position, and occurs only occasionally in second inversion; thus, if $\hat{7}$ is to be in the bass, V^6_5 or vii°^{7} will be most appropriate (Figure 12g). The combination of $\hat{5}$ and $\hat{6}$, when part of vi^7, requires resolution to $\hat{4}$ and $\hat{7}$ (and these, in turn, necessitate resolution to $\hat{3}$ and $\hat{1}$; see Figure 12h.1). Note, however, another possibility for the $\hat{5}$-$\hat{6}$ combination: V^9 (in root position). This option is marked "later" in Table 2—a chronological reference to the fact that such ninth chords were common after the mid-nineteenth century, but are not representative of classical-era music. The V^9 cannot move directly to I, as the ascending fourth in the bass, $\hat{5}$-$\hat{1}$, would have to be answered by a descending fourth in the top voice, $\hat{6}$-$\hat{3}$, which would remove the chord ninth ($\hat{6}$) from an appropriate voice-leading context. A compromise is given in Figure 12h.2, where an arpeggiation from V^9 to vii°^{7} not only lessens the outer-voice gap between V^9 and I, but allows the former chord ninth to be transferred to an inner voice and therefrom resolved properly.

Tonal Progressions

So far, we have tabulated some individual harmonic possibilities and their immediate voice-leading consequences. But what are the implications of longer range, as per coordinating a syntactically appropriate progression, from tonic, through pre-dominant to dominant, and then back to tonic (hereafter abbreviated T–PD–D–T)? In considering such issues, we will utilize non-metered voice-leading

schematics in the form of four-voice, chorale-type settings. This is done only because the student will likely be most familiar with such settings, which make voice leading explicit to a degree not always achieved in, e.g., idiomatic piano arrangements; it is certainly not meant to suggest that composers of mirror counterpoint favored a chorale format.

Under axis $\hat{1}$, there are some significant limitations in terms of coordinating a PD–D progression: given the mandated mappings, there can be no pure ii triad, and IV can only occur as IV^6_4. As previously mentioned, however, vi can also serve as prefix to V^7, thus providing an acceptable PD under the axis. Another limitation is that there cannot be a perfect-authentic cadence, unless one is willing to have the seventh of V^7 resolve in an inner voice, while the top voice (mirroring the bass's descent from $\hat{5}$ to $\hat{1}$) leaps upward by fifth. Figure 13a illustrates how one might achieve a semblance of a conventional I–IV–V–I progression. There, the problematic $\hat{5}$ above $\hat{4}$ is treated as an appoggiatura, which resolves downward as the chord changes from IV to V^7; the subsequent resolution of $\hat{4}$ to $\hat{3}$ occurs in an inner voice, as just described. Despite the limitations of the axis system, longer progressions can be constructed. Figure 13b provides a nine-chord schematic with a conservative outer-voice structure.

Among the obvious problems with axis $\hat{3}$ is that the $\hat{1}\leftrightarrow\hat{5}$ mapping dictates that final cadences must always have $\hat{5}$ in the top voice—a condition undesirable from the standpoint of melodic closure. Root-position $V^{(7)}$ is not possible either, due to the $\hat{1}\leftrightarrow\hat{5}$ mapping. PDs are limited: no pure IV is available, and vi can only occur in second inversion; and, while ii can be constructed in root position or first inversion, one has to be mindful that it can only lead to V^4_3 or V^4_2 (which, in turn, can only lead to I^6) due to the intersection of tonal and axis requirements. Figure 14b shows one means of approaching the dominant: an outer-voice exchange of $\hat{2}$ and $\hat{4}$ (here, F and D) are incorporated into a ii^7–V^4_2 progression. Although no root-position tonic chord can follow an inversion of V^7 or vii°, a useful cadential surrogate does exist in the form of $vii^{\circ 7}$–I. It is found in Figure 14a, which, with only four chords, provides the most compact T–PD–D–T progression possible under the axis system. Figure 14c presents a slightly longer

schematic progression, with two passing six-fours and (as earlier) an appoggiatura resolving as the harmony changes.[22]

Finally, we explore the potential of axis $\hat{2}$. Although one cannot form pure iii or IV triads, there are generally more options here than with the other axes. Axis $\hat{2}$ well facilitates passing between $\hat{1}$ and $\hat{3}$, as illustrated in Figure 15a with an outer-voice exchange on two hierarchic levels. If the harmonic palette is expanded to include V^9, then (as was illustrated earlier) a semblance of a root-position V–I can also be achieved, as shown and interpreted in Figure 15b. The axis can foster a fairly smooth harmonic and melodic progression. Although it is true that melodic (top-voice) closure on $\hat{1}$ will not be as convincing due to the resulting, less-than-conclusive I^6, a more satisfying result can be obtained if the phrase leads melodically to $\hat{1}$ over $\hat{3}$ but then quickly reverses the voices to end with $\hat{1}$ *under* $\hat{3}$. As shown and interpreted in Figure 15a, one may still perceive a definitive melodic descent to $\hat{1}$—albeit one followed by a brief, ancillary return to $\hat{3}$.

Submetrical Embellishments and Unchanging Harmonies

Previously, we considered each outer-voice dyad to contribute to a different harmony—a harmonic enrichment of the "note-against-note" approach. This has enabled us to discern certain limitations of harmonic applicability and chord progression. However, in practice, it is likely that a composer will use two or more melodic notes (and their reflected bass notes) while a single chord is being sounded (or implied). Melodic and bass notes often change more quickly than the underlying chord progression; this is accomplished in a variety of ways, and it is not our intention (nor would it be reasonable) to consider the reflective implications of every conceivable configuration. For example, complete neighboring tones may be used in

[22]In especially Figure 14c, it is important for the student to understand the B (soprano, fourth note) as an appoggiatura. Playing the passage with A substituted for B should clarify the role of B as a melodic displacement of the normative soprano note. If this is not understood, then the student may assume that B–A over A–B forms a secundal voice exchange (which, of course, the exigencies of voice leading would not permit).

Figure 13. Schematic progressions under axis $\hat{1}$.

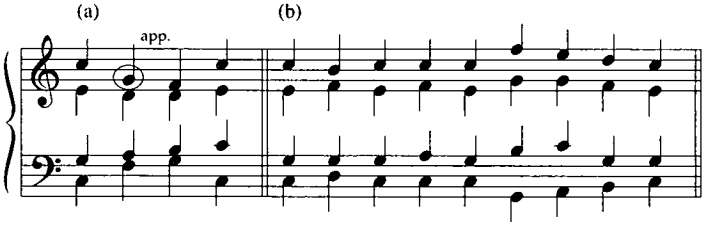


Figure 14. Schematic progressions under axis $\hat{3}$.

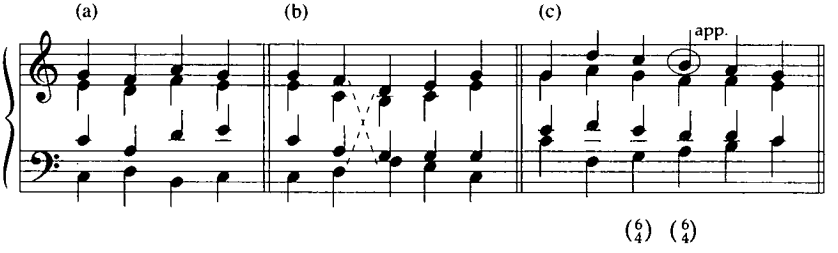
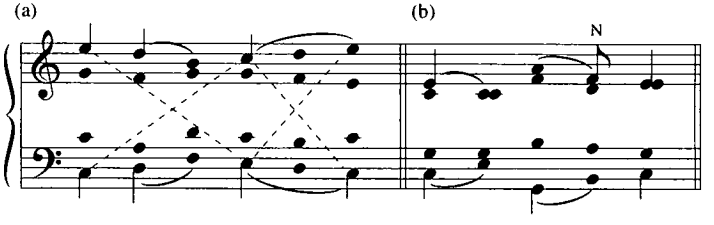


Figure 15. Schematic progressions under axis $\hat{2}$
(with stem-and-slur interpretation).



such contexts; but these present no substantial problems, as the outer harmonic events are identical and the (potential) dissonances arise only in between, perhaps in a relatively brief duration, and in a manner that is easily absolved by the voice leading. Passing tones also present no great problems; e.g., if one has already constructed consonant simultaneities on beats 1 and 2, then adding one or even two passing dissonances in between will likely not offend the ear, due to the clear orientation of the mirrored stepwise lines toward another consonant event. However, a third category of embellishment, submetrical arpeggiations of a chord (i.e., the skip of a third, fourth, fifth, or sixth), can present a special challenge in mirror counterpoint, because the chord suggested by a top-voice arpeggiation may not match the implications of the reflected bass arpeggiation. Accordingly, we will end our survey of the general properties of tonal axes by examining chordal skips (and their reflections), to discover which may be best subsumed under a single harmony.

Table 3 summarizes the possible diatonic chordal skips, and their resulting reflections, under the three axes (the abbreviations "T" and "B" are for top and bottom voices). One may consider these skips to be either ascending or descending, as long as the two voices move in opposite directions and remain in their relative registral positions. (Of course, the student must keep in mind an important stylistic consideration: large leaps, reflected simultaneously in both outer voices, are not common in tonal practice.) As these skips are intended to coincide with the projection of a single harmony, one may wish to think of them as occurring as two eighth notes within a quarter-beat harmony, as a dotted-quarter plus eighth within a half-note harmony, or in any other such configuration in which the second event is of a duration generally no longer than the first.

If the four notes sounded by the reflected dyadic skips can be reconciled in a single harmony (i.e., if one could place the complete set of outer notes against sustained inner chord tones), the Table includes a Roman-numeral representation of that harmony underneath the scale-degree set. In many cases, no such harmony is possible (and thus no chord symbol appears). Consider, for example, under axis $\hat{1}$, the skips $\hat{3}$-$\hat{5}$ above $\hat{6}$-$\hat{4}$. The first vertical dyad naturally suggests vi, and the second V^4_2, and so one can easily align these skips; however, no *single* chord will be suggested by their combination. In contrast,

Table 3. Submetrical chordal skips, and resulting reflections; indication of those that can be reconciled in a single chord.

Axis $\hat{1}$

T	$\hat{1}$-$\hat{3}$	$\hat{2}$-$\hat{4}$	$\hat{3}$-$\hat{5}$	$\hat{4}$-$\hat{6}$	$\hat{5}$-$\hat{7}$	$\hat{6}$-$\hat{1}$	$\hat{7}$-$\hat{2}$	
B	$\hat{1}$-$\hat{6}$	$\hat{7}$-$\hat{5}$	$\hat{6}$-$\hat{4}$	$\hat{5}$-$\hat{3}$	$\hat{4}$-$\hat{2}$	$\hat{3}$-$\hat{1}$	$\hat{2}$-$\hat{7}$	
	vi	V^7			V^7	vi	V^7	
							vii^o	
T	$\hat{1}$-$\hat{4}$	$\hat{2}$-$\hat{5}$	$\hat{3}$-$\hat{6}$	$\hat{4}$-$\hat{7}$	$\hat{5}$-$\hat{1}$	$\hat{6}$-$\hat{2}$	$\hat{7}$-$\hat{3}$	
B	$\hat{1}$-$\hat{5}$	$\hat{7}$-$\hat{4}$	$\hat{6}$-$\hat{3}$	$\hat{5}$-$\hat{2}$	$\hat{4}$-$\hat{1}$	$\hat{3}$-$\hat{7}$	$\hat{2}$-$\hat{6}$	
		V^7	vi	V^7				V^7
T	$\hat{1}$-$\hat{5}$	$\hat{2}$-$\hat{6}$	$\hat{3}$-$\hat{7}$	$\hat{4}$-$\hat{1}$	$\hat{5}$-$\hat{2}$	$\hat{6}$-$\hat{3}$	$\hat{7}$-$\hat{4}$	vi
B	$\hat{1}$-$\hat{4}$	$\hat{7}$-$\hat{3}$	$\hat{6}$-$\hat{2}$	$\hat{5}$-$\hat{1}$	$\hat{4}$-$\hat{7}$	$\hat{3}$-$\hat{6}$	$\hat{2}$-$\hat{5}$	vii^o
					V^7	vi	V^7	
T	$\hat{1}$-$\hat{6}$	$\hat{2}$-$\hat{7}$	$\hat{3}$-$\hat{1}$	$\hat{4}$-$\hat{2}$	$\hat{5}$-$\hat{3}$	$\hat{6}$-$\hat{4}$	$\hat{7}$-$\hat{5}$	
B	$\hat{1}$-$\hat{3}$	$\hat{7}$-$\hat{2}$	$\hat{6}$-$\hat{1}$	$\hat{5}$-$\hat{7}$	$\hat{4}$-$\hat{6}$	$\hat{3}$-$\hat{5}$	$\hat{2}$-$\hat{4}$	
	vi	V^7	vi	V^7			V^7	
		vii^o						

Axis $\hat{2}$

T	$\hat{1}$-$\hat{3}$	$\hat{2}$-$\hat{4}$	$\hat{3}$-$\hat{5}$	$\hat{4}$-$\hat{6}$	$\hat{5}$-$\hat{7}$	$\hat{6}$-$\hat{1}$	$\hat{7}$-$\hat{2}$	
B	$\hat{3}$-$\hat{1}$	$\hat{2}$-$\hat{7}$	$\hat{1}$-$\hat{6}$	$\hat{7}$-$\hat{5}$	$\hat{6}$-$\hat{4}$	$\hat{5}$-$\hat{3}$	$\hat{4}$-$\hat{2}$	
	I	V^7	vi^7	(V^9)	(V^9)	vi^7	V^7	
	vi	vii^o					vii^o	
T	$\hat{1}$-$\hat{4}$	$\hat{2}$-$\hat{5}$	$\hat{3}$-$\hat{6}$	$\hat{4}$-$\hat{7}$	$\hat{5}$-$\hat{1}$	$\hat{6}$-$\hat{2}$	$\hat{7}$-$\hat{3}$	
B	$\hat{3}$-$\hat{7}$	$\hat{2}$-$\hat{6}$	$\hat{1}$-$\hat{5}$	$\hat{7}$-$\hat{4}$	$\hat{6}$-$\hat{3}$	$\hat{5}$-$\hat{2}$	$\hat{4}$-$\hat{1}$	
		(V^9)	vi^7	V^7	vi^7	(V^9)		I
				vii^o				V^7, V^9
T	$\hat{1}$-$\hat{5}$	$\hat{2}$-$\hat{6}$	$\hat{3}$-$\hat{7}$	$\hat{4}$-$\hat{1}$	$\hat{5}$-$\hat{2}$	$\hat{6}$-$\hat{3}$	$\hat{7}$-$\hat{4}$	vi$^{(7)}$
B	$\hat{3}$-$\hat{6}$	$\hat{2}$-$\hat{5}$	$\hat{1}$-$\hat{4}$	$\hat{7}$-$\hat{3}$	$\hat{6}$-$\hat{2}$	$\hat{5}$-$\hat{1}$	$\hat{4}$-$\hat{7}$	vii^o
	vi^7	(V^9)			(V^9)	vi^7	V^7	
							vii^o	
T	$\hat{1}$-$\hat{6}$	$\hat{2}$-$\hat{7}$	$\hat{3}$-$\hat{1}$	$\hat{4}$-$\hat{2}$	$\hat{5}$-$\hat{3}$	$\hat{6}$-$\hat{4}$	$\hat{7}$-$\hat{5}$	
B	$\hat{3}$-$\hat{5}$	$\hat{2}$-$\hat{4}$	$\hat{1}$-$\hat{3}$	$\hat{7}$-$\hat{2}$	$\hat{6}$-$\hat{1}$	$\hat{5}$-$\hat{7}$	$\hat{4}$-$\hat{6}$	
	vi^7	V^7	I	V^7	vi^7	(V^9)	(V^9)	
		vii^o	vi	vii^o				

Table 3. (continued)

Axis $\hat{3}$

T	$\hat{1}$-$\hat{3}$	$\hat{2}$-$\hat{4}$	$\hat{3}$-$\hat{5}$	$\hat{4}$-$\hat{6}$	$\hat{5}$-$\hat{7}$	$\hat{6}$-$\hat{1}$	$\hat{7}$-$\hat{2}$	
B	$\hat{5}$-$\hat{3}$	$\hat{4}$-$\hat{2}$	$\hat{3}$-$\hat{1}$	$\hat{2}$-$\hat{7}$	$\hat{1}$-$\hat{6}$	$\hat{7}$-$\hat{5}$	$\hat{6}$-$\hat{4}$	
	I	ii, V^7 vii^o	I	vii^{o7}			vii^{o7}	
T	$\hat{1}$-$\hat{4}$	$\hat{2}$-$\hat{5}$	$\hat{3}$-$\hat{6}$	$\hat{4}$-$\hat{7}$	$\hat{5}$-$\hat{1}$	$\hat{6}$-$\hat{2}$	$\hat{7}$-$\hat{3}$	I
B	$\hat{5}$-$\hat{2}$	$\hat{4}$-$\hat{1}$	$\hat{3}$-$\hat{7}$	$\hat{2}$-$\hat{6}$	$\hat{1}$-$\hat{5}$	$\hat{7}$-$\hat{4}$	$\hat{6}$-$\hat{3}$	ii
				vii^{o7}	I	vii^{o7}		vi^7
T	$\hat{1}$-$\hat{5}$	$\hat{2}$-$\hat{6}$	$\hat{3}$-$\hat{7}$	$\hat{4}$-$\hat{1}$	$\hat{5}$-$\hat{2}$	$\hat{6}$-$\hat{3}$	$\hat{7}$-$\hat{4}$	vii$^{o(7)}$
B	$\hat{5}$-$\hat{1}$	$\hat{4}$-$\hat{7}$	$\hat{3}$-$\hat{6}$	$\hat{2}$-$\hat{5}$	$\hat{1}$-$\hat{4}$	$\hat{7}$-$\hat{3}$	$\hat{6}$-$\hat{2}$	
	I	vii^{o7}					vii^{o7}	
T	$\hat{1}$-$\hat{6}$	$\hat{2}$-$\hat{7}$	$\hat{3}$-$\hat{1}$	$\hat{4}$-$\hat{2}$	$\hat{5}$-$\hat{3}$	$\hat{6}$-$\hat{4}$	$\hat{7}$-$\hat{5}$	
B	$\hat{5}$-$\hat{7}$	$\hat{4}$-$\hat{6}$	$\hat{3}$-$\hat{5}$	$\hat{2}$-$\hat{4}$	$\hat{1}$-$\hat{3}$	$\hat{7}$-$\hat{2}$	$\hat{6}$-$\hat{1}$	
		vii^{o7}	I	ii, V^7 vii^o	I	vii^{o7}		

when $\hat{2}$-$\hat{4}$ skips above $\hat{7}$-$\hat{5}$, the entire unit suggests some form of V^7. (In the Table, V^7 and other chord symbols are given as general labels of chord types and do not necessarily represent root-position chords.)[23]

Students employing submetrical skips must pay careful attention (as always) to subsequent voice leading, as suggested by the registral distribution of the chord components. For example, if an arpeggiation places an active tone in the bass (as in V^4_2), the resolution of that tone dictates, to a large extent, what chord may follow. Consider, for example, $\hat{5}$-$\hat{7}$ over $\hat{4}$-$\hat{2}$, which suggests an inversion of V^7; if followed by the tonic chord, the latter will likely be in first inversion. Because the bass first sounded $\hat{4}$ (the chord seventh), there is a strong tendency for $\hat{3}$ to appear in the bass for the resolution, and the ten-

[23]The observant reader will note that, because voice-pair entries on one row will always be the inverse of those on another (e.g., one row shows $\hat{5}$-$\hat{7}$ above $\hat{4}$-$\hat{2}$, while another shows $\hat{4}$-$\hat{2}$ above $\hat{5}$-$\hat{7}$), the chord symbols are likewise identical for two voice-pair rows (only rotated).

dency is increased by the fact that the bass skipped *over* $\hat{3}$ to $\hat{2}$ (in outlining V^4_3), thereby leaving a "gap" in need of "filling." Another factor is that the *appropriateness* of a chord inversion must always be considered. For example, one must remember that root-position diminished triads are not commonly used in tonal music, although V^6_5 and root-position vii°[7] are typical. Likewise, V^9presents a special case, since so-called "ninth chords" tend to occur in root position, with the ninth in an upper (often the highest) voice.[24] Accordingly, the V^9 designation (under axis $\hat{2}$) has been placed in parentheses, to indicate that it may be literally possible, but could be executed only in certain spacings. These resolutions, like those considered earlier, must be practiced to facilitate good mirror writing.

One type of harmonic usage requires additional comment. Chords related by descending thirds, such as I–vi or vii°–V^7, are common in tonal music, and can arise with a change in just one—or even zero—sustained inner voices; furthermore, the second chord of such a set often prolongs, or functions similarly to, the first (although it is not always the case, as evidenced by the ii–vii° succession). Thus, although outer-voice skips, which suggest these types of chord successions, do not entirely fit the current topic (as *two different* chords literally result), the effect can be similar in that the skips may be integrated into closely-related chord types with minimal changes to the remaining voices. However, the student should be cautioned that these changes often prove difficult, as one cannot always sustain the inner voices during such outer-voice skips. Consider motion from vii°$^6_5$to V , which would be implied by the skips $\hat{2}$-$\hat{4}$ above $\hat{2}$-$\hat{7}$, under axis $\hat{2}$. In the abstract, it is easy enough to imagine moving from vii° to V^7 in a way that keeps common tones, but once the outer-voice skips are considered, it proves infeasible. Figure 16 illustrates two possibilities for a vii°^{6}–V –I succession, in spacings that result from the cited outer-voice skips. We see that the outer voices of V^6_5 assume the tritone of the inner voices of vii°^{6}; as these active tones should not be doubled, the prior inner voices *must* change to different chord tones. They may do so in the two ways shown. In the tenor of *(a)*,

[24]I will not address here the view that "ninth chords" result from voice leading (that, indeed, "ninths" function as elements of melodic figuration) and are not products of "stacked thirds."

$\hat{7}$ skips to $\hat{2}$ then attains $\hat{1}$ upon resolution to the tonic. The same "circling around the goal tone" technique is employed in the alto of *(b)*, in which $\hat{4}$ skips to $\hat{2}$ before returning to the initially-suggested resolution, $\hat{3}$. If either of these voice-leading types is used in one of the inner voices, then the remaining voice must assume a different pattern, or else the middle chord will not be complete. (I.e., if the tenor of *(a)* and the alto of *(b)* were combined in one progression, then there would be no root for the V^6_5 chord.) The only options for the remaining voice are shown by the alto of *(a)* and the tenor of *(b)*, with the smaller noteheads representing another possibility in each case. (The worst of these options, incidentally, is in *(a)*, should the alto proceed F–G–G; to do so goes against the tendency of F ($\hat{4}$) to resolve downward, even if not immediately.) By now, through the preceding demonstrations and commentary, the student should understand that the best submetrical consonant skips to use are those shown on Table 3, with chord indications underneath. Any others may present more problems in execution than initially imagined, even when they imply the presumedly "simple" descending-third successions.

To the right of Table 3's main entries is a tabulation of the chords available, through submetrical skips, under each axis. To the extent that axis $\hat{3}$ permits a more common PD (ii rather than vi), it may seem especially useful. But remember the limitations already discussed: under axis $\hat{3}$, a ii–V^7–I progression can lead only to I^6, and $\hat{5}$ will always be the ending melodic tone upon an authentic cadence. On the other hand, axis $\hat{2}$ could be considered more desirable by virtue of the voice-exchange which allows a root-position I to be projected ($\hat{1}$-$\hat{3}$ above $\hat{3}$-$\hat{1}$), and the reflected skips which suggest a root-position V^9 ($\hat{4}$-$\hat{6}$ above $\hat{7}$-$\hat{5}$). Axis $\hat{1}$ may be the most impoverished in this regard: it can imply only three chord types, including a root-position V^7 ($\hat{2}$-$\hat{4}$ above $\hat{7}$-$\hat{5}$), but *no* root-position tonic.

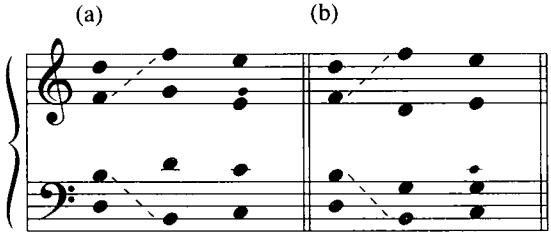
Overall, if the preceding consideration of chordal skips has not provided a criterion by which one axis can be privileged over the others, it does reinforce the positive attributes of axis $\hat{2}$. In certain contexts, axes $\hat{3}$ and especially $\hat{1}$ may have as much utility, but our examinations have shown that axis $\hat{2}$ enjoys an advantage. Perhaps at this point, the teacher and student should consider one other fact about axis $\hat{2}$ that may cause some to favor it: it permits exact

intervallic correspondence between reflected voices. This fact was not cited earlier, as the attribute had nothing to do with our inquiry. Nonetheless, it is true that a major scale is intervallically symmetrical about $\hat{2}$—that the sequence of half steps and whole steps ascending from $\hat{2}$ will be the same as those descending from $\hat{2}$—and accordingly, if that degree of precision is important to a composer, axis $\hat{2}$ may be particularly attractive. Proceeding from this discussion, an instructor might wish to select examples from the literature that employ all three axes, including passages which state reflections successively (as in inversional canons) as well as simultaneously.[25] Following the performance and analysis of such works, aesthetic and perceptual differences can be debated.

On Register and Embellishment

At this stage, a student should compose exercises using the techniques learned so far, with particular attention paid to how register and melodic embellishments can influence the perception of a

Figure 16. Possibilities for moving from vii^{o6} to V^6_5 via outer-voice consonant skips.



[25]For successive (i.e., fugal or canonic) examples of melodic inversion, one might consider J.S. Bach's Canonic Variations on "Vom Himmel hoch, da komm ich her," BWV 769 (1747). The fifth of these is a "canone al rovescio," where $\hat{3}$ is usually the preferred axis, as it allows a subject beginning on $\hat{1}$ to be answered by one on $\hat{5}$.

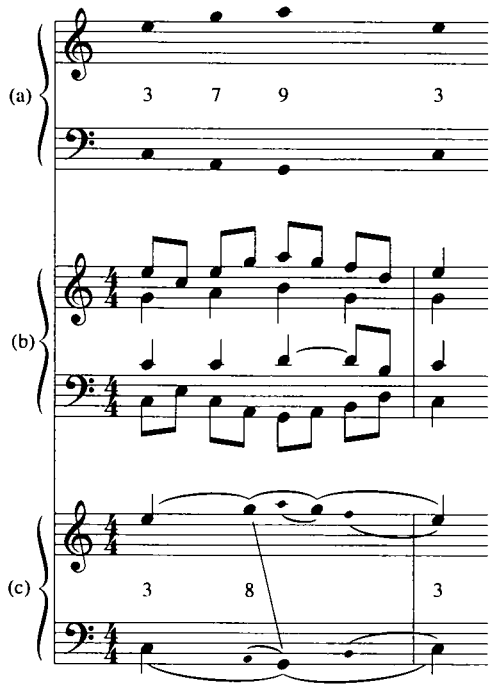
passage—important elements for one to consider, whether or not mirror counterpoint is employed. A profitable manner of doing so would be to compose a conventional structure for one outer voice, but which spawns (as it often will) an unusual structure for the other outer voice; the task will then be to reconcile both voices, within the broader context. A brief example is given in Figure 17a. The bass line is typical: motion from $\hat{1}$ to $\hat{5}$, by way of the latter's upper neighbor, then back to $\hat{1}$. The problem arises when the axis reflections are added. If, for example, one wishes to have $\hat{3}$ in the melody, above $\hat{1}$ (i.e., if one uses axis $\hat{2}$), then a seventh and a ninth will occur above the central bass notes, and neither dissonance will resolve properly. Is there a way to use submetrical skips and other embellishing tones, such that a different structure can be suggested?

One solution is given in Figure 17b, the underlying voice-leading implications of which are indicated in the analysis of Figure 17c. Comparing the two, we should evaluate how the melody suggests its "proper" resolution, despite the literal problematic reflections, outlined above. The melodic A had posed a difficulty, in that it was a dissonance (a ninth) left by leap. Now, the A ($\hat{6}$) occurs as an upper adjacency between two Gs ($\hat{5}$), causing it to sound more like an embellishing tone. This interpretation is suggested by the following factors: First, $\hat{6}$ occurs just as the bass has descended to its lowest note, $\hat{5}$, which coincides with a tonally-strong, root-position dominant chord. Hearing a melodic $\hat{5}$ immediately beforehand, as if in anticipation of V's chord tone, and then again, immediately after $\hat{6}$, while the V chord is still in one's ears, raises $\hat{5}$ to a superordinate level. If the initial melodic $\hat{5}$ sounds like an anticipation, then there is no pressing need to resolve it downward, following the V chord. Still, to the extent that a downward resolution would dissipate any remaining tonal energy, $\hat{5}$ passes through $\hat{4}$ (now itself made a dissonance, above $\hat{7}$) and then to $\hat{3}$, for a consonant repose above the tonic harmony.

Axis Modulation

No matter which axis one finds to have the most general applicability, or to be most suitable for a specific context, its use may become tiresome rather quickly; the static correspondences between

Figure 17. Contextual reconciliation of problematic reflections.



outer voices, and the circulation through the same limited harmonic palette, will eventually exhaust a listener's interest. Accordingly, if students/composers wish to sustain longer exercises/compositions, then they will likely want to employ what we will call *axis modulation*. This is simply the process of changing the axis one or more times after the original axis is established, either to facilitate new outer-voice mappings within the same key (*intrakey* axis modulation), or to effect a temporary change in tonal orientation, as per a tonicization (*interkey* axis modulation). These processes are easy to effect technically, but the selection of new axes does require the consideration of

forthcoming musical goals, with attention focused on both melodic and bass-line events at the same time, so as to achieve an appropriate coordination of the two. In short, axis modulation may require more *compositional* thought than single-axis writing, which can become (once the mappings are internalized) a rather mechanical process. Below, both kinds of axis modulation are discussed and modeled.

In tonal music, phrases are frequently engaged in a melodic descent, and the principal space traversed is often the fifth from $\hat{5}$ to $\hat{1}$. Such a phrase would be difficult to construct using a single axis. If, for example, the initial $\hat{5}$ was to be harmonized with a root-position tonic chord, then axis $\hat{3}$ would be used (wherein $\hat{1}\leftrightarrow\hat{5}$); but, of course, maintaining the axis would cause closure on melodic $\hat{1}$ to occur *above* $\hat{5}$, resulting in an unstable ending on I^{6}_{4}. A better solution would be to change axes, perhaps so that, within the descending melody, all three tonic-triad notes are set against a root-position tonic chord. In composing such passages, it will be beneficial to begin with an underlying voice-leading plan, as per Figure 18a. There, the $\hat{5}$-$\hat{3}$-$\hat{1}$ descent is sketched, and the three different axes are indicated. To fill the space melodically, passing tones have been added, and the bass indicates the two possible supporting tones for these transitional events, depending on whether the preceding or the subsequent axis is employed. (For example, melodic G and E utilize axes $\hat{3}$ and $\hat{2}$, respectively. Thus, the F that connects them could either *continue* using axis $\hat{3}$, and modulate to axis $\hat{2}$ afterward; or *change* to axis $\hat{2}$, and continue with it afterward.)[26] With the tonal plan established, the student should then be able to elaborate it, and produce a fully realized musical phrase.

One such phrase is illustrated in Figure 18b. In addition to having root-position tonic chords accompany all three tonic-triad tones in the melody, $\hat{3}$ over $\hat{1}$ also becomes the goal of a tonicization of vi, thereby adding chromatic interest. In composing such an example, the melody may be considered to be the fixed voice, and the bass may be interpreted as that which shows occasional irregular "seams,"

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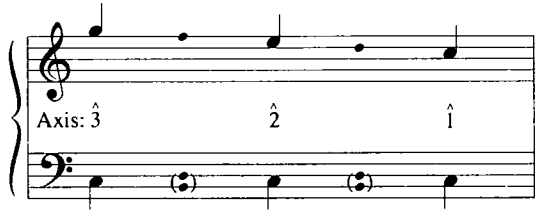
[26]The D-C succession in the bass might seem prohibited, due to the parallel octaves that would result with the melody; but recall that this is only a schematic guide. Through a voice-exchange, or some other type of elaboration, D-C could exist in both voices (just not at the same exact time).

resulting from the changes of axis. In reality, of course, adjustments may be made to both voices as one works, so as to effect the smoothest transition between axes. Here, oblique motion was used to make the transition between axes more fluent—i.e., in the first axis modulation, G was repeated in the melody as the bass skipped from C to A; in the second, C was repeated in the bass as the melody skipped from E to C. Another possibility would have been to maintain contrary motion between bass and melody upon an axis change, even though the precise distance traversed by each voice would be different.

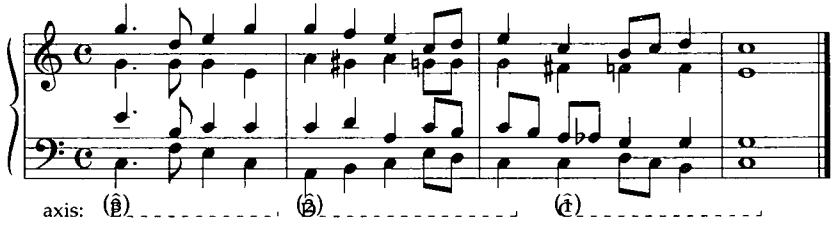
Tonicizations are obviously common in tonal passages, and when they result in outer-voice chromaticism, one does in mirror counterpoint exactly what was done in diatonic axis modulation: one considers outer-voice goals and correspondences, and selects the best axis for the context. The only difference is, one considers the new

Figure 18. Intrakey axis modulation.

(a) initial voice-leading outline.



(b) realization of above.



axis to operate within the diatonic collection of the new (tonicized) key area. One is not constrained to use the same scale-degree axis for the tonicized segment that was being used for the initial (main-key) segment; nor does one have to return to the same scale-degree axis when the original key resumes. The selection depends on the outer-voice correspondences desired at significant moments of arrival, as well as those axes which will foster a musically satisfying line in both outer voices.

Again, the most effective way to construct such a passage is to begin with an underlying voice-leading plan, which will indicate the basic tonicization levels and main outer-voice correspondences. Two of these are illustrated in Figure 19a. In the first, a large-scale melodic descent of $\hat{3}$ to $\hat{1}$ is effected, and both IV and V are tonicized. Root position is desired for each principal chord and, given the melody that has been sketched, the resulting axes are as indicated. In the second schematic, the melody passes from $\hat{3}$ to $\hat{1}$ and back; IV is tonicized in the middle, while the melody is on $\hat{1}$. Given the desired bass and melodic notes, the axes have again been calculated and indicated.

Figure 19b is an elaboration of the second schematic, resulting in a four-bar phrase. For the moments of axis change, similar motion is avoided here as it was earlier. As axis $\hat{2}$/C yields to $\hat{3}$/F, contrary motion is employed; as the latter yields back to $\hat{2}$/C, oblique motion is employed. Of course, other elements of design are incorporated into the actual passage. Most obviously, the melodic contour of m. 1 is replicated in m. 2. And the melodic third, taken from the initial sketch as a basic motive, is applied variously: e.g., immediately, within the first two quarter-beats ($\hat{1}$-$\hat{3}$); filled-in, across the first five quarter-beats ($\hat{1}$...$\hat{2}$-$\hat{3}$); and on different scale degrees, as within m. 1 ($\hat{7}$-$\hat{2}$) and m. 2 ($\hat{1}$...$\hat{6}$-$\hat{1}$). An additional third-skip is assigned to the bass at the point of the first axis modulation. Students should be encouraged to treat such exercises as small compositions, and should endeavor to do more than just "map notes" onto one another about an axis. The initial sketching of the underlying voice-leading patterns will help ensure linear coherence (in addition to facilitating specific axis selections), but it is in the actual elaborations of the patterns that much will be learned.

Mirror Counterpoint by Clementi and Brahms: Analyses of Techniques

When cultivating any musical technique, a study of its application by talented composers can be especially enlightening. Thus, before closing, we will analyze mirror writing in music by Muzio Clementi (1752–1832) and Johannes Brahms (1833–97), so as to solidify certain prior assertions, and to explore further the applications (and ramifications) of mirror counterpoint within an established musical context. It was mentioned earlier that Brahms seems to have been particularly attracted to the technique. This should not be surprising; not only was he intrigued with the study of counterpoint,[27] he also crafted many examples of simultaneous hand mirroring for his *51 Exercises for the Piano* (1893).[28] These exercises, both diatonic and chromatic, indicate

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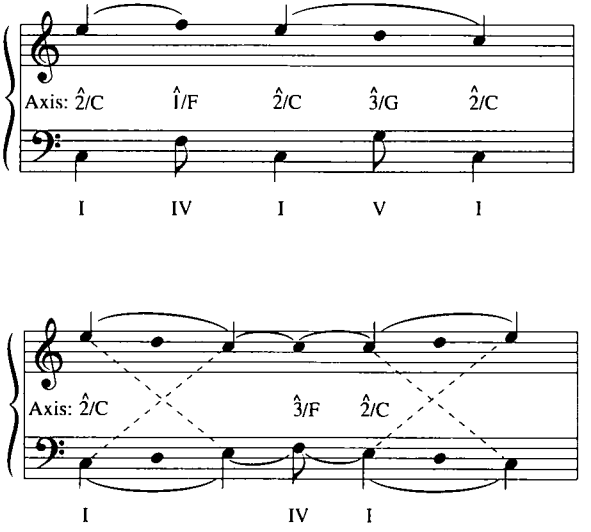
[27]Brahms's keen interest in counterpoint is demonstrated not only by his numerous compositions (including those expressly devoted to contrapuntal artifice, such as his thirteen canons for 3–6 female voices, op. 113), but by the attention he directed toward music-theoretical matters. His personal library contained treatises such as those by Adlung, Forkel, Fux, Gerber, Hiller, Marpurg, Mattheson, and Walther (see, e.g., Karl Geiringer, "Brahms as a Reader and Collector," transl. M. D. Herter Norton, *Musical Quarterly* 19 [1933]: 158–68). He is known too for his personal studies. For example, in the 1850s, he and violinist/composer Joseph Joachim (1831–1907) sent each other their counterpoint exercises for correction in a mutual "correspondence course" of sorts (see, e.g., David L. Brodbeck, "The Brahms-Joachim Counterpoint Exchange, or, Robert, Clara, and 'The Best Harmony Between Jos. and Joh.'," in *Brahms Studies I* [Lincoln: Univ. of Nebraska, 1994]: 30-80; and Isolde Vetter, "Johannes Brahms und Joseph Joachim in der Schule der Alten Musik," in *Alte Musik als asthetische Gegenwart*, vol. I [Kassel: Barenreiter, 1987]: 460–76). He also assembled an annotated collection of around 140 examples of successive octaves and fifths (and other specimens of voice-leading intrigue) he had found in works of various composers; he titled the collection *Octaven u[nd] Quinten u[nd] A[nderes]*. A facsimile of the autograph, with commentary by Heinrich Schenker, has been published (Vienna: Universal, 1933); an edited and translated version by Paul Mast appears as "Brahms's Study, Octaven u. Quinten u. A.," *Music Forum* 5 (1980): 1–196.

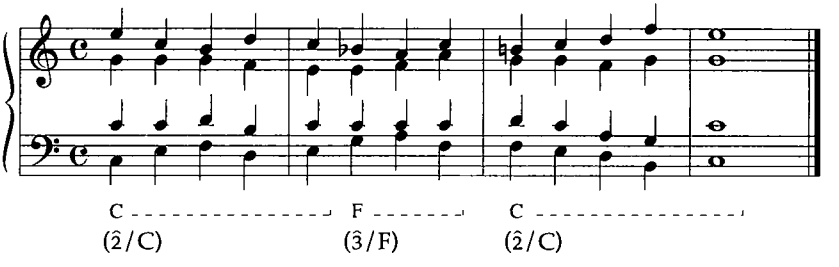
[28]Johannes Brahms, *51 Übungen für Pianoforte*, in *Johannes Brahms: Sämtliche Werke: Ausgabe der Gesellschaft der Musikfreunde in Wien*, ed. Eusebius Mandyczewski (Leipzig: Breitkopf and Härtel); reprinted in Brahms, *Complete Transcriptions, Cadenzas and Exercises for Solo Piano* (New York: Dover, 1971).

Figure 19. Interkey axis modulation.

(a) two voice-leading outlines (flagged notes in bass are tonicized).



(b) realization of no. 2 (above).



exact finger correspondences between reflected hands (a pedagogical benefit), although they do not utilize a consistent scale-degree axis nor result in identical reflected intervals.[29] Nonetheless, they, along with musical passages previously cited, clearly demonstrate his general interest in mirror writing. As for Clementi, those familiar especially with his *Gradus ad Parnassum* (1817–26) will likewise find his use of the technique to be consistent with his compositional inclinations.[30] The *Gradus* includes many specimens of fugue and canon, several of which display ingenious contrapuntal conceits, including forms of inversion-writing other than the simultaneous mirroring under discussion here. E.g., exercise 18 has both inverted entries and stretto by inversion; op. 54 is a double fugue, with inverted entries and a crab canon on one subject; and exercise 10 is a canon by inversion (about axis $\hat{2}$), which exactly preserves reflected intervals even when chromaticism is introduced.[31]

Figure 20a shows a passage from Clementi's *Gradus*, vol. 1 (1817), no. 18; mm. 53–56 feature a melody and bass that are inversions of one another (albeit with octave shifts in the bass on two occasions, so as to keep the outer voices from becoming too close registrally). Except for the two mirrored voices, the only other component of the initial four-bar segment is a line in parallel tenths with the bass (beginning with G above E in m. 53, beat 2, and continuing to C above A in m. 55, beat 2). The excerpt moves through different key areas: it begins in C (which is actually V of the master key, F), moves to F, then implies B♭ (m. 56 is a transposed replica of m. 54) before the subsequent melodic F♯ and E♭ indicate a shift to the relative minor of

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[29]For more on the pedagogical benefits of symmetrical hand exercises for the pianist, see Ronald Rulon Shinn, *The Mirror Inversion Piano Practice Method and the Mirror Music of Vincent Persichetti* (DMA diss., Univ. of Alabama, 1990). Despite the lack of intervallic exactness in Brahms's exercises, those such as nos. 24b and 25c are nonetheless striking. Shinn also cites Brahms's exercises, and notes that if one counts all variations, there are actually 88 examples of which 38 involve some degree of mirroring, no matter how precise (Shinn, p. 41).

[30]Muzio Clementi, *Gradus ad Parnassum*, 3 vols. (1817, 1819, 1826), ed. Nicholas Temperley in *The London Pianoforte School 1766–1860*, vol. 5 (New York: Garland Publishing, 1985).

[31]For example, D♯ is answered by G♮, and G♯ by D♮ (all balanced around B, i.e., $\hat{2}$/A).

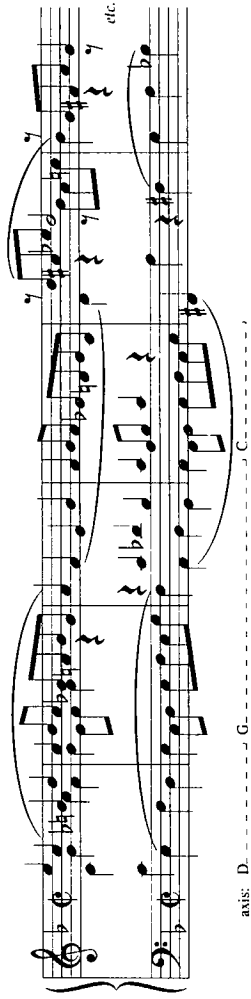
B♭, G-minor (by which point, the mirror writing has ceased). In this case, Clementi has chosen to maintain axis $\hat{2}$ in all three mirrored tonicizations, and thus the axis pitch modulates from D to G to C (i.e., $\hat{2}$/C to $\hat{2}$/F to $\hat{2}$/B♭).

Students of tonal mirror counterpoint should pay particular attention to the placements of the axis shifts, which are rather clever, and show how context can reconcile those sometimes-problematic secundal mappings. The first axis modulation occurs in m. 54, beat 2, just ahead of the melodic B♭, which confirms the change in tonal orientation from C to F. Here D is placed above C (the $\hat{5}\leftrightarrow\hat{6}$ mapping in F); however these notes are *not* fused into an inversion of a seventh chord. Instead, the bass C sounds like the root of a C-major triad—a confirmation of the tonic of m. 53—and the melodic D serves as an upper neighbor between two Cs. (The bass C, as the registral nadir pitch of the measure, also implies a root-position C^7 for beat 3, when literally there is a root-position E-diminished triad, generally impermissible in tonal practice.) As m. 56 is a transposition of m. 54, the same interpretation applies there, with melodic G embellishing an underlying F triad, and the bass F remaining as the active voice until the next measure's F♯. Indeed, the tonal implications of the melody-bass reflections are quite conventional, as demonstrated by the voice-leading graph of Figure 20b. There, one observes a gradual but steady stepwise descent in the melody, and a bass line that suggests the larger-scale motion of C to F, continuing through F♯ to G.

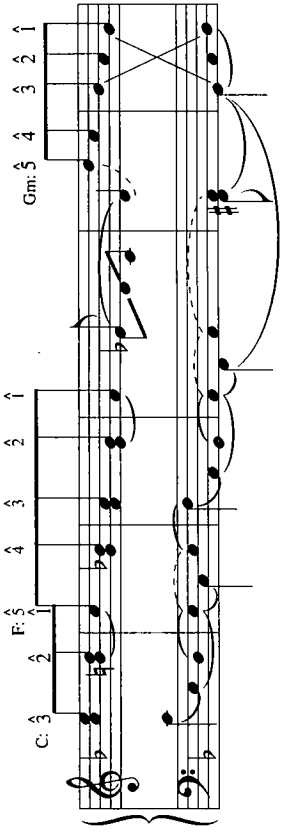
Clementi's success in suggesting the tonally normative structure of Figure 20b is partly due to his choice of axis $\hat{2}$ for each tonal area, which allows the favored $\hat{1}$-$\hat{3}$ voice exchanges. But it is also due, in large part, to his decision as to *where* to place the axis changes—something that can be determined only after a context is established. His choices helped to bring secundal dissonances into compliance with tonal voice-leading and harmonization. However, there is still one problem, inherent to the mirror operation, with which Clementi is not as successful. Octave convergences upon the axis pitch-class can give it undue emphasis; and here the outer-voice octaves (first G, then C) are rather notable, as there is no third voice to ameliorate them harmonically. Still, Clementi admirably avoids most tonal pitfalls that accompany mirror counterpoint, primarily because of his frequent alternation of melodic semitones under axis $\hat{2}$, which result in vii°–I relations.

Figure 20. M. Clementi, *Gradus ad Parnassum*, no. 18 (1817).

(a) score, mm. 53-58.



(b) voice-leading graph of above.



A somewhat more complicated example of mirror composition may be found in Brahms's *Variations on a Theme by Robert Schumann*, op. 9 (1854). Variation 10 consists of four successive (sometimes altered) statements of an eight-bar melody; the setting or accompaniment is varied for each. The first statement (Figure 21a) features a melody and bass exactly inverted about $\hat{2}$ in D-major; inner voices complete harmonies and often include stepwise motion in thirds. The melody is an unusual candidate for inversion, and students should heed the reasons this is so, as well as Brahms's solutions to the problems. First, the melody contains four leaps of a fourth or larger (mm. 1, 3, 5, and 6); when reflected in two voices simultaneously, such leaps are not only unusual in tonal music, but they can be difficult to coordinate harmonically. The leaps occur because the origin of the top voice is not the actual *melody* of Schumann's theme, but the *bass line* of the theme's eight-bar introduction, as shown in Figure 21b. Another unusual facet of Brahms's appropriation is that Schumann's introduction is not in D, but in F♯-minor with a turn to A-major at the very end. Its bass line, however, does *not* contain G♯, the note that would distinguish the diatonic collection of F♯-minor from that of D-major; furthermore, the bass line's first two metric downbeats are F♯ and D (which correspond to $\hat{3}$ and $\hat{1}$ of D). For these reasons, along with its ending tonicization of A (i.e., V/D), Schumann's bassline is able to be transferred to the key of D fairly convincingly.

There are two alterations made by Brahms; these occur in the quarter beats preceding the final measures of each four-bar unit, and the changes are interesting from the dual standpoints of how to adapt a theme written in one key so that it will fit another, and what changes have to be made when adapting a melody for mirror counterpoint, due to the requisite axis mappings. In m. 3, the melody, if adapted exactly, should have had a direct leap from C♯ to F♯ (corresponding to $\hat{5}$-$\hat{1}$ in the original key of F♯-minor). The problem with the leap in the context of D, of course, is that C♯ is the leading tone and needs to ascend by step (not leap downward); and likewise its inverted analogue, the tritone-distant G, needs to descend (not leap upward). Brahms accommodates the problem by altering the ending of the measure so that a C♯/G exchange occurs between outer voices (see Figure 21a), and the resolution to F♯ over D occurs as per the mandates of voice leading. The next change occurs at the end of m.

7, during the tonicization of A. Schumann originally had F♯–E–A, which would have reflected onto D–E–B. The initial two notes (F♯ over D, E over E) could be reconciled with IV–V of A, but the A-over-B combination is untenable for the cadence. Accordingly, Brahms changes the axis here, via an interkey axis modulation: $\hat{2}$/A is now used, and as the top voice ascends to A, the bottom voice descends to C♯. Although the outer voices first diverge from the $\hat{2}$/D axis on m. 7, beat 2, the harmonic move to A-major begins two beats *earlier* (note the inner-voice G♯ on m. 6, beat 2), and mm. 7–8 project the progression ii–V–I of A, as indicated.

Despite Brahms's skillful sculpting of the passage, so that it will sound tonally "normal," some ambiguities can be found (a problem always lurking if the same axis persists for several measures).[32] For example, in m. 2, should the last eighth-note chord be interpreted as IV, with non-chordal $\hat{5}$ in the bass, or does the $\hat{6}$ above $\hat{5}$ suggest V^9? The open seventh in the lower register ($\hat{5}$-$\hat{4}$) would usually suggest a dominant-functioning chord; however, the very next measure clearly sounds another dominant chord, V^4_2. Two factors, common to tonal music, argue for the subdominant interpretation: one would expect a piece to have IV preceding V; and one would probably *not* expect a repetition of the same chord across a barline.[33] For these reasons, one may be inclined to hear the functional harmony as IV, and the bass's A as a non-chord tone—i.e., part of a double-neighbor complex (F♯-A) which leads to G on m. 3, beat 1.

Another issue is the interpretation of the harmonies that end m. 6 and begin m. 7. This is the point at which the internal G♯ indicates a turn to A-major, and so the B–F♯ and A–D of m. 6, beat 2, suggest ii^4_3

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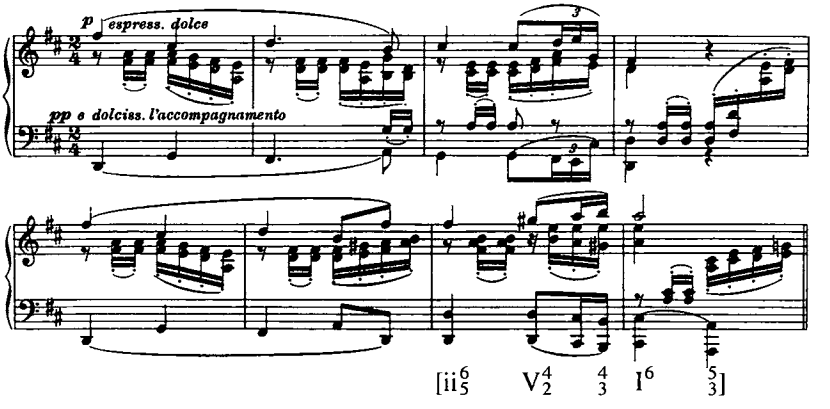
[32]I will set aside, for the moment, the fact that one might well expect—even aesthetically desire—to encounter ambiguities in Brahms's music.

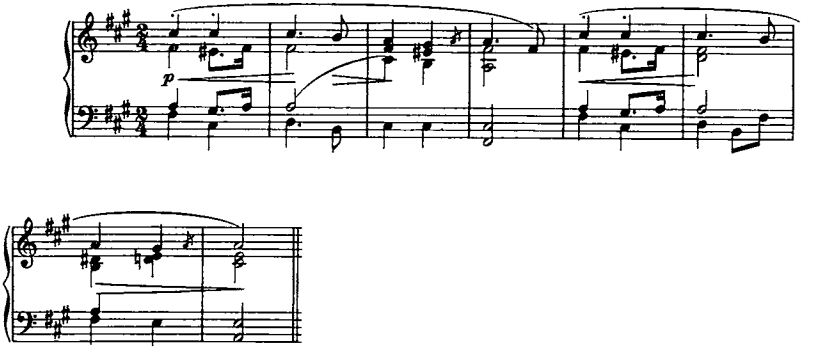
[33]Regarding a listener's not expecting "repetition ... across a barline," I mean simply that, within the established metric grid of a passage, as one moves from a "weaker" event to one that is "stronger," a listener tends to expect a metric accent to be confirmed by various other articulations of change (changes to longer note durations, changes of harmony, etc.). The stronger the metric accent is expected to be (i.e., in $\frac{4}{4}$ time, third beats are not expected to be as strong as first beats; first beats within periodic phrases are not expected to be as strong as first beats which initiate phrases; etc.), the more one expects various other articulations to coincide.

Figure 21. J. Brahms, *Variations on a Theme by Robert Schumann*, Op. 9 (1854).

(a) beginning of var. 10.



(b) theme (the below base line is appropriated for the above variation)



(D is taken as the active bass tone). Indeed, this interpretation seems confirmed by the inner voices, which present the secundal dyad A–B on the last sixteenth-note. But the very next measure keeps the same outer voices (in order to maintain Schumann's model), and the inner voices *once more* complete ii$^4_3$. So here we apparently *do* have a chord sustained across the barline. Should a preconditioning to reject such an occurrence prompt us to reinterpret the function of m. 6, beat 2? If so, how? Should we perhaps try to hear it as a continuation of the previous tonic, D (the measure's boundary notes in the outer voices do suggest I of D: D–F♯ over F♯–D), in which context B would be regarded as an "added sixth"? This would allow us to imagine a root change across the barline, but of course such an interpretation seems fanciful given the strong presence of both D and B throughout both beats. Yet, if one is willing to accept ii/A as continuing across the barline here, why not hear V^7/D as continuing across the barline in the earlier passage? Indeed, such an interpretation of the earlier instance would still confirm the sense of musical "change" one often associates with metric accents, in an important way that the latter instance does not: the *bass* changes between mm. 2 and 3, and so even if one hears both chords as dominant-functioning, the V^4_2 of m. 3, beat 1, is certainly a more "accented" event than the preceding root-position V^9, due to outer-voice intervallic tension.

Observe that both of these interpretively-problematic moments arise when the juxtaposition of $\hat{5}$ and $\hat{6}$ is encountered. We conclude that even in relatively simple, mostly-diatonic settings, outer-voice mirroring often necessitates sonorities and/or chord progressions that "bend" conventional tonal practice.

One final example will be illustrative. A few years after the Schumann variations, Brahms composed another variation set with mirror writing: *Variations and Fugue on a Theme by Handel*, op. 24 (1861). Variation 6 introduces one form of the technique: its first half is a canon at the octave, and its second half a canon in inversion. However, it is in the fugue, which ends the set, that *simultaneous* inversion is presented. As shown in Figure 22a, beginning in m. 75 there are outer-voice reflections, the upper part progressing in parallel sixths and the lower part in parallel thirds. A significant aspect of the passage should be mentioned: it begins 35 measures before the fugue's conclusion (roughly two-thirds of the way through), at a section in

which there is continuous reiteration of the pedal $\hat{5}$ (F in the master key of B♭). In m. 82 (the last measure shown in the excerpt), there is arrival on the complete dominant harmony; but the emphasis of $\hat{5}$ continues afterward, first in the upper voice (as shown by the last three quarter beats of the excerpt), and subsequently again in the bass, each occurrence doubled at the octave and accented. This attribute is described because it is important to realize that the pedal Fs are *independent* of the axis reflections to be discussed. Sometimes an F is added below the bass's true mirror tone (as in m. 77, beat 1, where the lower B♭ is the actual counterpart of the melody's D), but sometimes a bass F fully supplants the mirror tone (as per the fourth sixteenth-beat of m. 78).

If one were to glance casually at the excerpt, it might seem that Brahms was employing only general contrary motion between outer voices, as the axis is not fixed for the entire passage. But, in truth, the passage tonicizes five different scale degrees within the master key ($\hat{1}$ stepwise through $\hat{5}$, of B♭), and so the axis changes five times; yet, it is always positioned as $\hat{2}$ within the tonicized area. These modulations of key area and axis are indicated in the figure. Note that a leading-tone chord—vii°(7)—precedes each change; it is upon the *resolution* of each such chord that the axis changes. This may seem unusual. After all, is not a chief advantage of axis $\hat{2}$ the fact that $\hat{7}\leftrightarrow\hat{4}$ and $\hat{1}\leftrightarrow\hat{3}$ permit vii°–I progressions? So why does Brahms not exploit this potential? Figure 22b illustrates the voice-leading that underpins the passage: a series of ascending (diatonic) tenths, connected by chromatic passing tones. Considering the deeper structure, we can surmise why Brahms changed the axis only upon the arrival of the *tonicized chords*, not before, upon the *leading-tone chords*. As illustrated in Figure 22c, if Brahms had changed the axis to $\hat{2}$/D at the beginning of m. 79, upon the vii°/D chord, then the larger parallel-tenth connection would have taken a different form. But by continuing the prior axis ($\hat{2}$/C) a bit longer—even as chromaticism was introduced in a way that indicated a new tonicization was afoot—he was able to preserve a consistent and thus potentially stronger linear motion: i.e., the chromatic tones now function as passing tones between diatonic steps, and in both outer voices. Thus, regarding axis modulation, once again we find that the only general rule as to *when* one should change the axis tone, is the same one that regulates to *what* scale

Figure 22. J. Brahms, *Variations and Fugue on a Theme by Handel*, Op. 24 (1861).

(a) fugue (mm. 75-82).

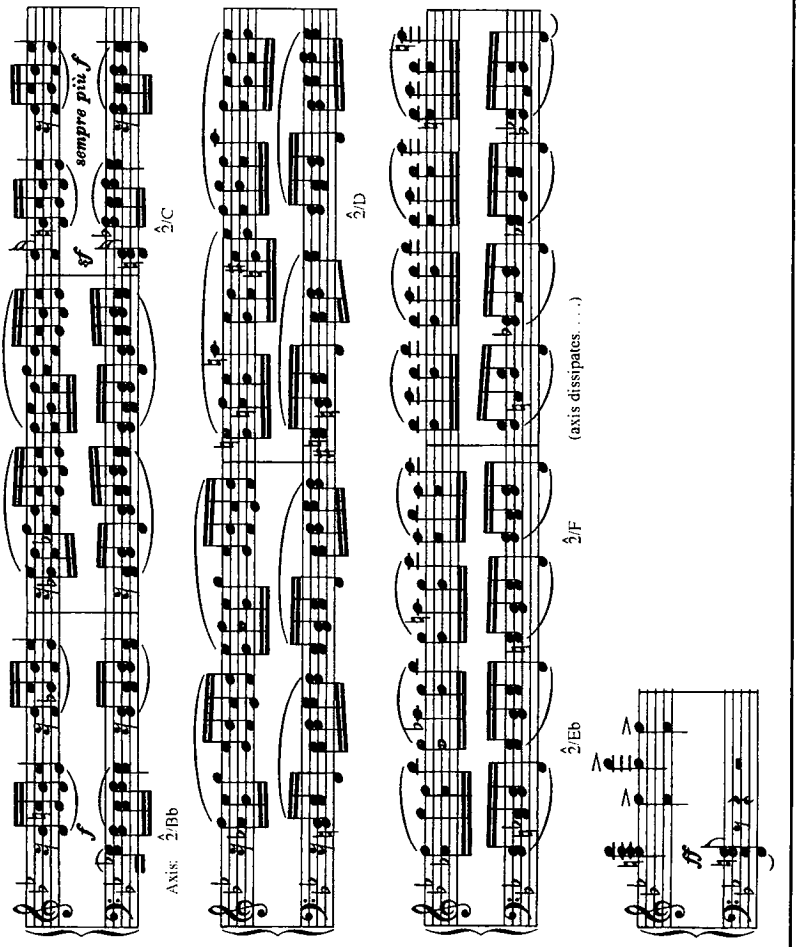
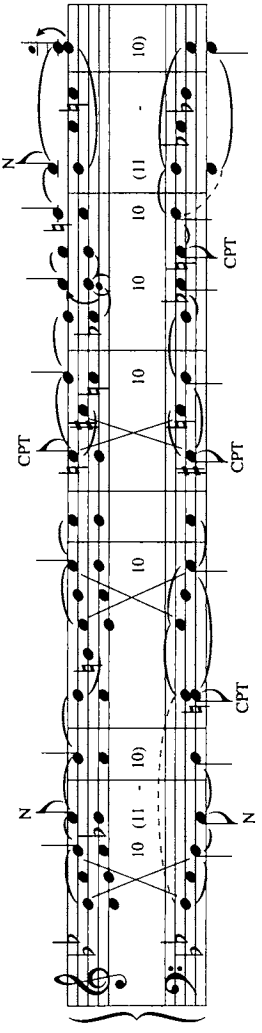
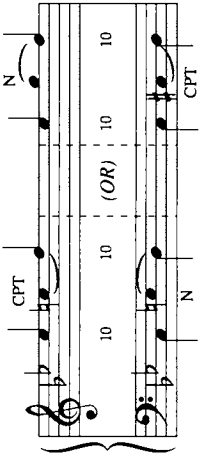


Figure 22. (continued)

(b) voice-leading graph of above.



(c) voice-leading structure, if the axis changed *before* the 10s.



degree one should change it: one should select the axis, and position the change, in the way that best complements the voice leading.

Summary

At the beginning of the article, I mentioned that mirror counterpoint has been virtually ignored in contemporary tonal pedagogical tracts, even though the technique is rich in history and representative composers. Certainly it would be beneficial to introduce it to the student, if only to foster an awareness of an underexplored yet intriguing facet of tonal composition. However, examination of the technique has suggested other benefits—those which relate specifically to the skills and perceptions a student is expected to master during a course on the theory and practice of tonal music. I will close by summarizing some of the most important of these.

Among the efficacies of contrapuntal study in general are that students develop an appreciation for melodic shape, and become sensitive to the numerous voice-leading connotations a single line can embody. Attention must be paid to polylinear aspects (i.e., to registrally-separated voice-leading strands, each suggesting a particular direction of continuation); to notes that may be tonally implicit (though literally absent) and thus impinge upon further developments; and to many other details. These factors are still relevant in mirror counterpoint, but new challenges emerge, with corresponding new benefits. The student must learn to create aesthetically satisfying melodic shapes that, when inverted, can serve well as *either* a melody or a bass. Accordingly, the student must become familiar with the different characteristics of tonal melodies and basses, and find creative ways to compromise them in an effective fusion. In deciding which outer-voice combination to employ at a particular moment, the student must be ever mindful of the melodic and harmonic functions implicit in particular scale degrees. True, these functions must be considered also when one is engaged in melody harmonization or unfigured-bass realizations; but there the outer-voice independence allows a freer coordination, while, with mirror counterpoint, both functions must be considered at once. The contextual, harmonic functions of root-inversions must be evaluated at the same time as the melodic impetus; and this is especially the

case when assessing the degrees of closure suggested by different cadential configurations under different axes.

Finally, it must be acknowledged that one of the more difficult aspects of tonal practice to impart—in that a student must not only understand the concept intellectually, but internalize it and follow it habitually—is that every pitch has both a harmonic and a contrapuntal role; it is this duality of membership, in both chord and line, that gives rise to the art of voice-leading. Mirror writing provides an ideal mechanism for integrating harmonic and contrapuntal principles, for synthesizing the structure of chords and the structure of lines. It demonstrates the fact that music weaves through various patterns at once; the vertical and the horizontal—the immediate and the larger-scale—must all work together. To the extent that mirror counterpoint can lead to an understanding of the rich interplay of musical forces present in tonal music, it is a concept that should not be dismissed lightly from classroom instruction.

"Approach Strong Deliveress!" From George Crumb's Apparition: A Case Study in Analysis and Performance of Post-Tonal Music

Richard Bass

The field of analysis and performance offers theorists the opportunity to make practical contributions to their fellow musicians, and for those of us who teach advanced-level theory courses, it is among the best ways to demonstrate the value of analysis within the larger music-making and learning process. Analysis and performance is also a field, however, in which we inevitably confront some fundamental issues. Our principal problem is that we can never say with absolute assurance exactly *how* what we learn from analysis should be translated into performance. As Wallace Berry writes, " . . . a particular interpretive intent is subject to fulfillment in more ways than one;" and while Jonathan Dunsby notes that a performer can "draw sonic attention to [a] point in the musical architecture by adding an unprecedented expressive edge . . . at a special moment," he stops short of suggesting precisely what kind of expressive effect is called for in a particular situation.[1] Nevertheless, I believe that analysis can serve performers well by focusing their attention on certain important aspects of a piece about which interpretive decisions need to be made. This is especially true in the case of more recent music, for which interpretive traditions have not yet been established.

The vast majority of studies that deal with analysis and performance concentrate on common-practice tonal repertoire, and among the most successful of these are Schenkerian analyses that

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[1]Wallace Berry, *Musical Structure and Performance* (New Haven: Yale University Press, 1989), p. x.; Jonathan Dunsby, "Performance and Analysis of Music," *Music Analysis* 8 (1989), p. 10.

point out large-scale motions and motivic connections or repetitions within various levels of hierarchical tonal structures.[2] Only rarely have theorists approached post-tonal music from a performance perspective, and there is little if anything to be found in the theoretical literature on analysis and performance of repertoire from the post-World War II era.[3] In the present study I will examine in detail a movement from George Crumb's *Apparition* with two objectives in mind. First, I propose to construct an analysis that can be applied to more recent post-tonal music in such a way that the results will be accessible and useful to performers with only a basic knowledge of twentieth-century materials and techniques.[4] Second, I will explore some specific ways this type of analysis can be used in a classroom situation, to generate discussion about how an understanding of structure in post-tonal music might be used to inform and enhance a performer's interpretation as well as to influence the expectations and experience of listeners.

Within the corpus of late twentieth-century music, Crumb's works enjoy extraordinary popularity. In the more than thirty years since he won a Pulitzer prize for his orchestral piece, *Echoes of Time and the River,* Crumb has produced a substantial number of compositions that are widely known and frequently performed.

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[2]See, for example, Charles Burkhart, "Schenker's Theory of Levels and Musical Performance," in *Aspects of Schenkerian Theory*, ed. David Beach (New Haven: Yale University Press, 1983). For an application dealing with a specific, complete piece, see Carl Schachter, "Chopin's Prelude in D Major, Op. 28 No. 5: Analysis and Performance," *Journal of Music Theory Pedagogy* 8 (1994), pp. 27-46.

[3]Exceptional studies that address performance issues in the post-tonal repertoire include Berry, *Musical Structure and Performance* (Berg, Op. 5 No. 3); George Fisher and Judith Lochhead, "Analysis Hearing, and Performance," *Indiana Theory Review* 14 No. 1 (1993), pp. 1-36 (Berg, Op. 5 Nos. 1 and 2); and Christopher Wintle, "Analysis and Performance: Webern's Concerto Op. 24/II," *Music Analysis* 1 No. 1 (1982), pp. 73-100.

[4]The theoretical basis of my approach to pitch structure and form in Crumb's music is explained in Richard Bass, "Sets, Scales and Symmetries: The Pitch-Structural Basis of George Crumb's *Makrokosmos*, Volumes I and II," *Music Theory Spectrum* 13 No. 1 (1991), pp. 1-20. Also see Richard Bass, "Models of Octatonic and Whole-Tone Interaction: George Crumb and His Predecessors," *Journal of Music Theory* 38 No. 2 (1994), pp. 155-86

During the same period of time, there has also been a considerable amount of scholarly work devoted to this repertoire, yet even today, many performances fail to convey the true essence of Crumb's music. Too often performers direct their attention to the novel sounds in these works--the extended performance techniques and the array of "spooky" effects. Managing the unconventional techniques is certainly one of the challenges of performing these compositions, but the unusual timbres are ultimately of little significance with regard to purely musical content. Focusing too narrowly on the special effects can result in interpretations that treat each piece simply as a series of atmospheric episodes, each one independent of the others and repetitive or static within itself--in other words, as a concatenation of minimalist vignettes. It would seem unlikely, however, if it were indeed composed in this way, that Crumb's music could have held its appeal for so long.

Crumb does occasionally use stasis as a musical device, but when he does so it is usually associated with an attempt to portray vastness, or a sense of the infinite, and this is often accomplished through some abstract numerical scheme. Such strictly mechanical procedures are the exception rather than the rule.[5] It is my contention that, for the most part, Crumb's music is far from the kind of static assemblage some people consider it to be--that even though it employs novel timbres and performance techniques, it is usually constructed in ways that follow very closely our Western compositional traditions. This calls for performances that reflect a goal-oriented view of the music as opposed to more static interpretations based on affect. Through the analysis of Crumb's music we can understand its structure as a set of relationships and formal processes that include contrast and restatement, varied repetition and development, long-range composing-out of musical ideas, and underlying motivic connections, all of which cooperate to provide both a sense of unity

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[5]One such remarkable exception is the "Cosmic Canon" that concludes *Makrokosmos* IV, subtitled "Celestial Mechanics," for piano, four hands. This section of the piece combines a three-part isorhythmic structure with a six-part mensuration canon in which all parts are based on the same *talea* proceeding in the proportions 3:5:11:16:27:29.

and a structural contour that is organized around specific points of articulation or musical goals.

Apparition was completed and published in 1979, and subtitled "Elegiac Songs and Vocalises for Soprano and Amplified Piano." It has six movements, with short vocalises inserted before movements II, IV, and V. The vocal text consists of excerpts from Walt Whitman's poem, "When Lilacs Last in the Dooryard Bloom'd," an elegy on the death of Abraham Lincoln. Most of the text fragments are taken from the section of the poem known as the "death carol," which offers different views or perspectives on death. Crumb extracted text segments that present images of death such as "vast and well-veiled," "lovely and soothing," as well as the personifications "dark mother" and "strong deliveress." *Apparition* occupies a special place among Crumb's works because it was his first use of an English text. All his earlier vocal works, including the four books of *Madrigals, Ancient Voices of Children,* and others, are based on texts from the Spanish poet, Federico Garcia Lorca. But the basic constructional procedures in *Apparition* are generally representative of Crumb's compositions. Complete works tend to be made up of relatively short movements, and within individual movements a limited number of small units of material appear in transposed repetitions and in various combinations to comprise larger sections. The form of a movement is typically based either on sectional contrast and restatement, or on some sort of cyclic organization. Symmetrical arrangements of material are common, but Crumb often injects some foreign or disruptive element into cyclic or symmetrical patterns in order to maintain momentum and to provide continuity because, as Stravinsky remarked, "to be perfectly symmetrical is to be perfectly dead."[6]

The fourth movement of *Apparition*—"Approach Strong Deliveress!"—can serve as an excellent case study in analysis and performance, because while it is structurally interesting, it is also relatively simple. The form of the movement is closely tied to the text. Example 1a shows the verse as it appears in the "death carol" portion of Whitman's poem. Crumb's setting, given in Example 1b,

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[6]Igor Stravinsky and Robert Craft, *Conversations with Igor Stravinsky,* Vol. 1 (Garden City, NY: Doubleday, 1959), p. 16.

Example 1. Text for "Approach Strong Deliveress!"

a) Whitman's Original Verse

Approach strong deliveress,!
When it is so, when thou hast taken them
I joyously sing the dead.
Lost in the loving floating ocean of thee,
Laved in the flood of thy bliss O death.

b) Crumb's Arrangement of Text

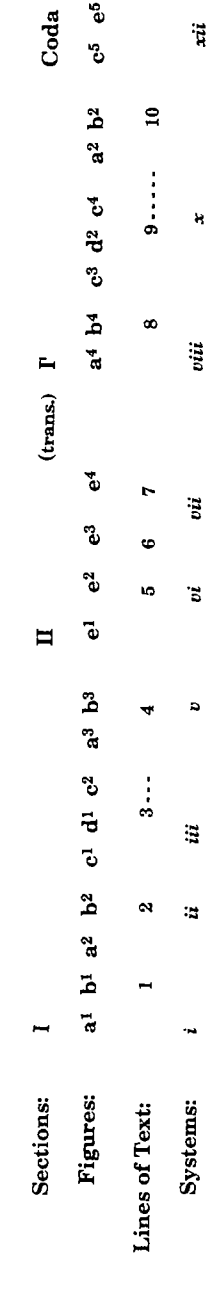
I
1 Approach strong deliveress!
2 Approach strong deliveress!
3 When it is so, when thou hast taken them
I joyously, joyously sing the dead!
4 Approach strong deliveress!

II
5 Lost in the loving floating ocean of thee,
6 lost in the loving floating ocean of thee,
7 Laved in the flood of thy bliss O death.

I'
8 Approach strong deliveress!
9 When it is so when thou hast taken them
I joyously, joyously sing the dead.
10 Approach strong deliveress!

uses repetition and restatement of some lines and words to expand the text to ten lines cast in a ternary arrangement as indicated by the Roman numerals I, II, and I' appearing to the left of the text. Example 2 illustrates the formal structure of the movement in more detail, with subdivisions of sections represented by lower-case letters. Each letter refers to a distinctive type of musical gesture or unit that I call a "figure." The row below the figures shows the locations of the lines of text as they are numbered in Example 1b, and the bottom row indicates approximately where the figures occur in relation to

Example 2. Figures and Formal Divisions



the twelve systems of the score. (This is in lieu of measure numbers, because only portions of the movement are metered.)

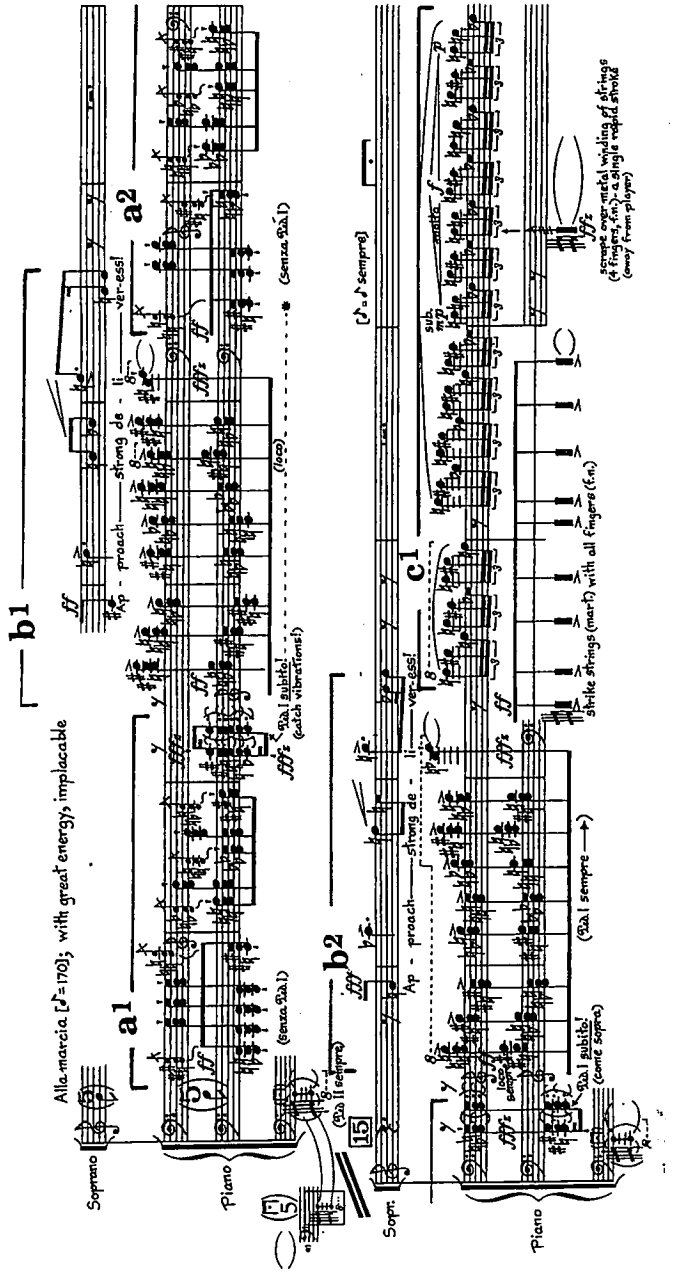
The text also provides the inspiration for the character of the movement. This is an effusive invocation for the advent of death, who is portrayed as a much desired, yet overwhelmingly powerful deliveress. The song exuberantly anticipates her arrival, and her approach is relentless and irresistible. Crumb's setting of the text effectively projects an image of death that is simultaneously wonderful and fearsome.

The beginning of the score is shown in Example 3, with letters and brackets added above the staves to indicate where the individual figures are located. The opening piano chords make up figure a1, and the next series of chords in a higher register, together with the first vocal line, are figure b1. The end of b1 overlaps with a transposed restatement of the opening chords, labeled a2, and this is followed in turn by a transposition of the second figure, b2. The end of b2 overlaps the beginning of a new, contrasting figure, c1, which leads toward the third line of text.

In light of the music's chromatic density, rhythmic drive, and timbral complexity, it is easy to understand why a performer might be inclined to view this movement as essentially repetitive within formal units, with contrast provided by juxtapositions of different units. There are, after all, just two different types of sonorities that dominate the piano part throughout the movement, and each type continues for some time before it is replaced by the other. One way of performing the piece would be to emphasize this intrasectional consistency and intersectional contrast, but such a static interpretation is too simplistic to be musically satisfying. I propose instead that a thoughtful performance of "Approach Strong Deliveress!" should reflect a sensitivity to musical process and direction within similar figures, connections among contrasting figures and sections, and the overall coherence and continuity of the piece, which can be revealed through analysis.

As is obvious from the score excerpt in Example 3, the a and b figures use similar pitch constructions. Whereas the constructions themselves remain consistent, this is just Crumb's way of achieving clarity and aural accessibility within such dense textures. Musical structure derives from the progression of these constructions through

Example 3. Apparition, Mvmt. IV ("Approach Strong Deliveress!"), systems i and ii. (© 1980 by C.F. Peters Corporation. Used by permission. All rights reserved)



various levels of transposition. As the progressions unfold, the notes that receive emphasis tend to be those in the highest line (here, the uppermost notes of the piano, since all the voices move in parallel), those that initiate and terminate lines of pitches (in this case, those of the voice part in particular), and also the notes that occur as the highest pitches of individual figures or sections. By tracking the progression of pitches highlighted in these ways, we can see how larger pitch structures evolve, and we can use these structures to identify long-range goals of the progressions as well as underlying musical processes that give the piece a sense of direction and unity.

Example 4 accounts for the principal aspects of pitch structure in the first four figures of the movement: a1, b1, a2 and b2. The piano part consists principally of a sonority based on the combination of two [0,3,7] pitch-class sets, or what we can describe less formally as two first-inversion minor triads, one in each hand, separated by thirteen half-steps or a "minor ninth." The transpositional progression of this sonority in figure a1 unfolds a linear series of pitches that express the set [0,1,3,6,7,9] or 6-30, an important octatonic subset also known as the "Petroushka chord" set. The example shows only the pitches of the highest line, which belong to the Oct-III collection.[7] Figure b1 begins in the piano, using the same type of construction as a1, and also introduces the first vocal line. Already we can see some connections between figures a1 and b1. The first six chords in the piano part of b1 have the same pitch-class content as those in a1, but they are reordered. The vocal line is related to the highest line of the piano through its use of pitch classes from the Oct-III collection. It is also connected to the vertical construction of the piano part in that it begins and ends with a thirteen half-step, or minor-ninth leap--the same interval that separates the two triads in each piano chord.

The remainder of the piano part in figure b1 moves away from the Oct-III collection, unfolding a [0,1,3,6,7,9] subset of Oct-I in the highest line of the last six chords. The shift is gradual, however,

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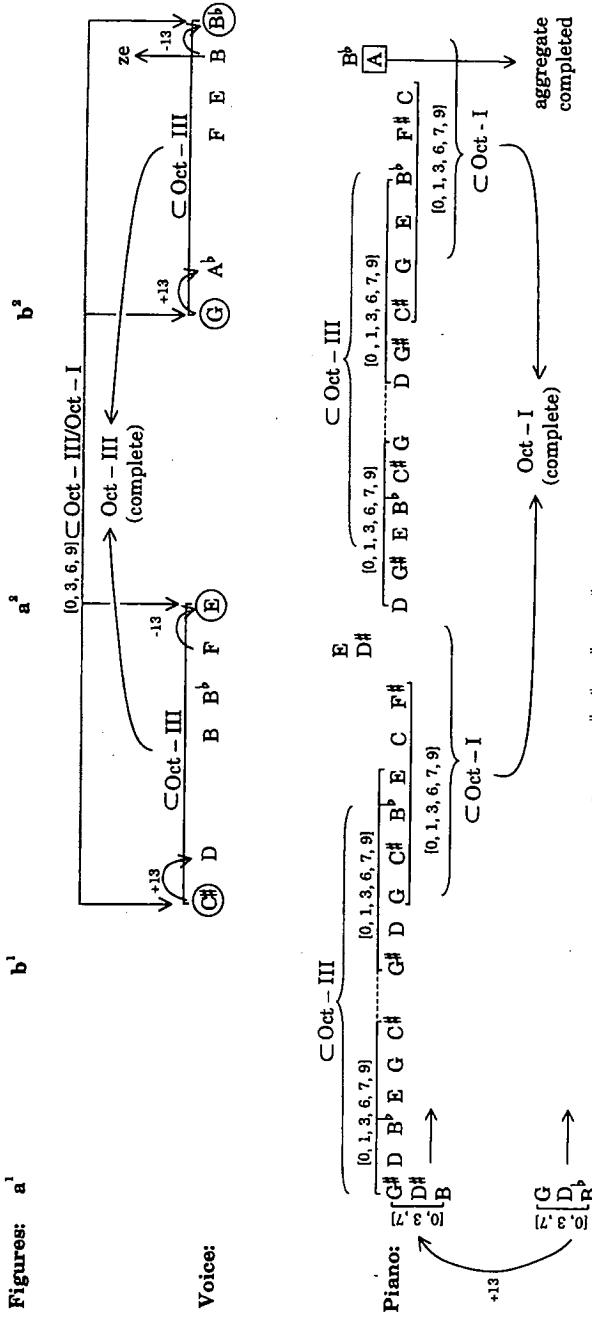
[7]In this study, forms of the octatonic collection are numbered according to the lowest-numbered pitch classes they contain. Therefore Oct-I refers to the octatonic set that contains C and C♯ (pcs 0 and 1), Oct-II is the collection with C and D (0 and 2), and Oct-III has C♯ and D (pcs 1 and 2).

Example 4: Pitch Structure, Section I: Figures a^1 - b^2



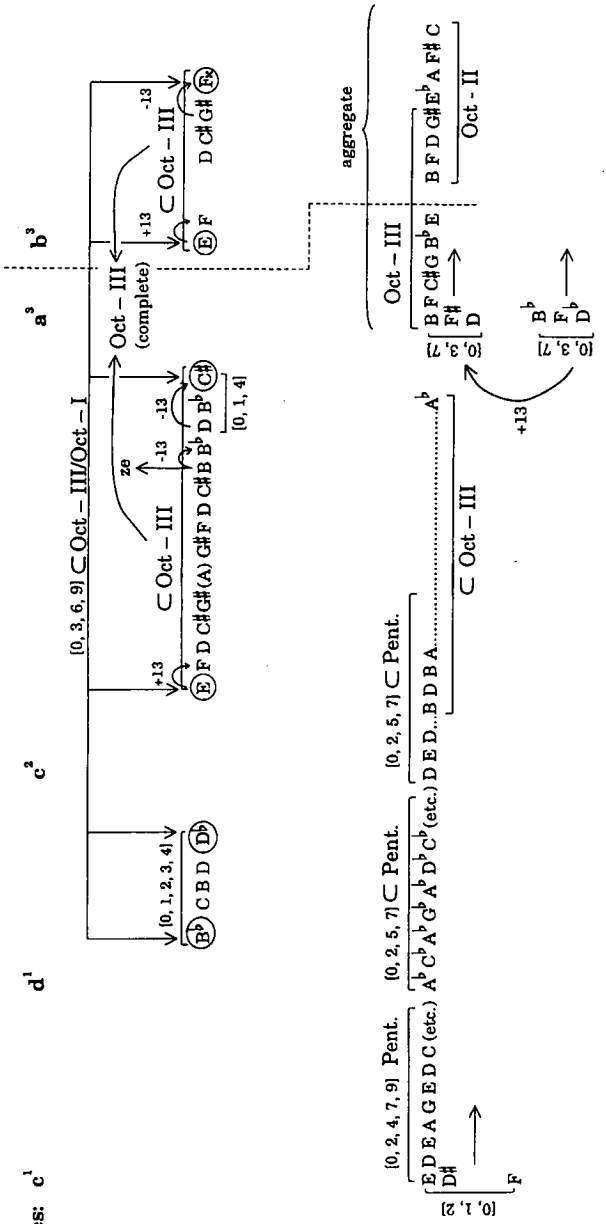
because the four pitch-classes in the middle of the progression are those that are shared between the Oct-III and Oct-I collections: the diminished-seventh chord set C♯-E-G-B♭. The final piano sonority in b1 is the chromatic dyad D♯-E in a higher register, also belonging to the Oct-I collection.

Figures a2 and b2 are an exact transposition of a1 and b1 a tritone higher--a simple procedure, but one that makes evident a process of pitch-class accumulation to achieve completion of the octatonic collections as well as the chromatic aggregate. Because the "Petroushka-chord" set is transpositionally symmetrical at the tritone (T_6), the pitch-class content of the piano's highest line in a2 and b2 is the same as before for all the sonorities except the final chromatic dyad. Therefore the Oct-III content is unchanged in the piano, but it is completed in the voice part with the combination of figures b1 and b2. The chromatic dyads in the piano combine with the preceding Oct-I subsets in b1 and b2 to complete the Oct-I collection, and the note A in the final dyad completes an aggregate as well. A final pitch-class connection that contributes to the unity of this passage is provided by the set of pitches that begin and end the two vocal segments--C♯ and E in b1, G and B♭ in b2, which are circled in Example 4: these are again the four pitch classes that are shared between the Oct-III and Oct-I collections. The example also points out the highest vocal pitch within these figures, which is the pitch B^5 near the end of figure b2, marked "ze" as an abbreviation for "zenith." These four figures, taken together, form a structure that is largely self-contained, yet there are also implications, or possibilities, here that Crumb pursues as the movement proceeds.

As with the a and b materials, all the figures labeled c and d are related by their use of similar constructional units. The pitch structure of figures c1, d1 and c2 is illustrated in the first part of Example 5.[8] The piano's basic unit is the chromatic trichord [0,1,2], arpeggiated and arranged to cover the span of a major seventh. This represents an expansion of interval-class 1 as a basic element

[8]Although the pitch content of the movement is largely represented in the analytic examples, the reader will benefit from viewing them together with the published score: George Crumb: *Apparition: Elegiac Songs and Vocalises for Soprano and Amplified Piano* (New York: C.F. Peters, 1979).

Example 5: Pitch Structure, Section I: Figures c^1 - b^3



expressed earlier in the relationship between the two minor triads of the piano sonority, the minor-ninth skips in the voice, and the piano dyads that complete figures b1 and b2. But the transpositional pattern in figures c1, d1 and c2 is based on pentatonic, rather than octatonic, content.

The pitches in the uppermost line of the piano trichords form a complete pentatonic set, or [0,2,4,7,9], in figure c1, then a [0,2,5,7] tetrachordal subset of a different pentatonic collection in figure d1. At this point the voice presents the line "When it is so, when thou hast taken them" as a pentachordal chromatic set, carrying further the expansion of the chromatic collection.

In figure c2, the piano shifts to a [0,2,5,7] subset of another pentatonic collection, but by the end of the figure it emphasizes pitches that belong to the Oct-III collection. At the same time, the voice also returns to Oct-III content with a melismatic flourish that features minor-ninth leaps similar to those in the earlier figures, with a zenith once again on the pitch B^5. The minor-ninth span from D^5 down to $C\sharp^4$ at the end of the line now appears with an interpolated $B\flat$ to form a [0,1,4] trichord--a new gesture that is carried into the middle section of the movement.

The Oct-III pitch classes in figure c2 lead naturally into the return of the opening material as figures a3 and b3, shown near the end of Example 5. The piano in a3 is a transposition of a1 (specifically, at T_3), but the transpositional pattern in b3 is altered, and the result is two complete, overlapping octatonic sets in the highest line, completing the aggregate in half as much space as in the earlier a and b material. Figure b3 is also the first to introduce the remaining octatonic collection, Oct-II, and serves to complete a larger scheme in Section I that cycles through all three forms of the octatonic set. The voice in figure b3 enters much earlier than before in relation to the piano, overlapping the end of a3 in a dramatic representation of death drawing nearer.

The vocal pitches in figure b3 belong to Oct-III and complete the collection begun in c2—a process similar to that of b1 and b2, but occurring this time between two contrasting, rather than similar, figures. Another connection with the earlier vocal material is the continued use of the same four pitch classes for the beginnings and

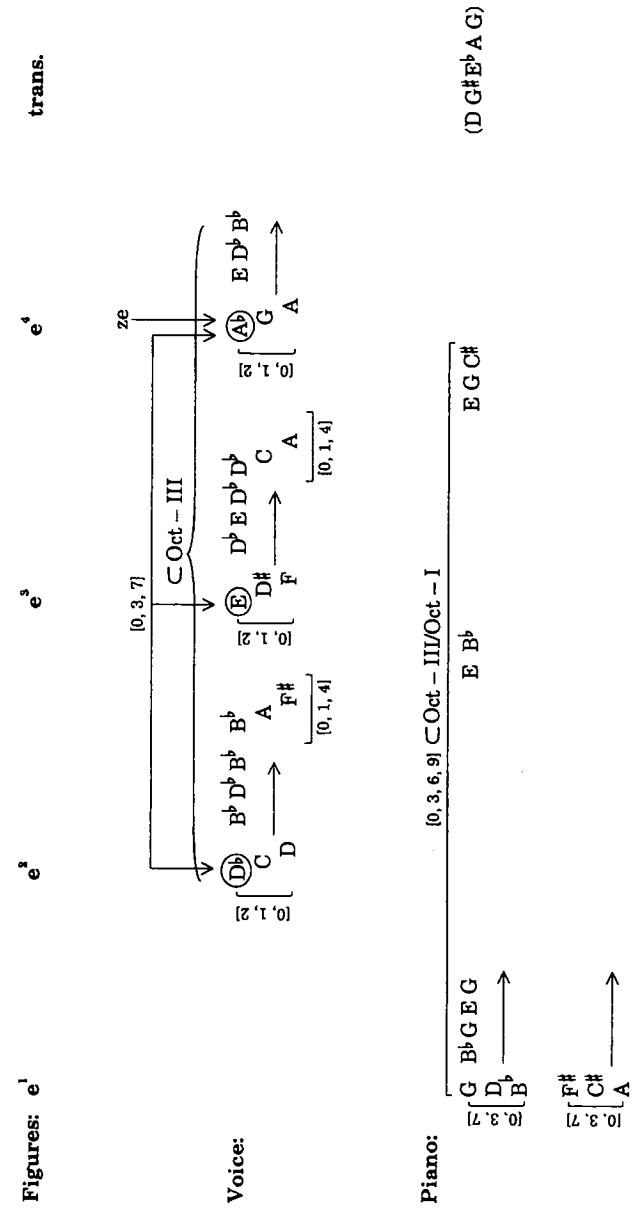
ends of figures, which is the most consistent large-scale scheme thus far in the movement.

The middle section, consisting of figures e1 through e4, is related to the preceding figures in some obvious ways. As illustrated in Example 6, the piano makes exclusive use of the vertical construction found in the a and b material, while the voice takes up the chromatic-trichord gesture from the piano part in the c and d figures. The vocal lines at e2 and e3 end with [0,1,4] trichords that refer back to the conclusion of the melismatic passage of figure c2; and all the pitch classes in the highest line of the piano belong to the same diminished-seventh set expressed earlier by the initial and terminal notes of all the vocal figures. The uppermost pitches of each trichord in the voice belong to the Oct-III collection, and the first vocal pitches in e2 and e3 are members of the diminished-seventh set emphasized in the piano. There is a remarkable alteration in the transpositional pattern at figure e4, however, which is four half-steps rather than three half-steps higher than e3. The resulting [0,3,7] transpositional scheme unfolds a large-scale minor triad in the vocal part that parallels the use of the same triad-type as a basic unit of construction in the piano part. The first pitch produced by the altered transposition of figure e4 is A♭^{5}, which is the highest pitch of this section.

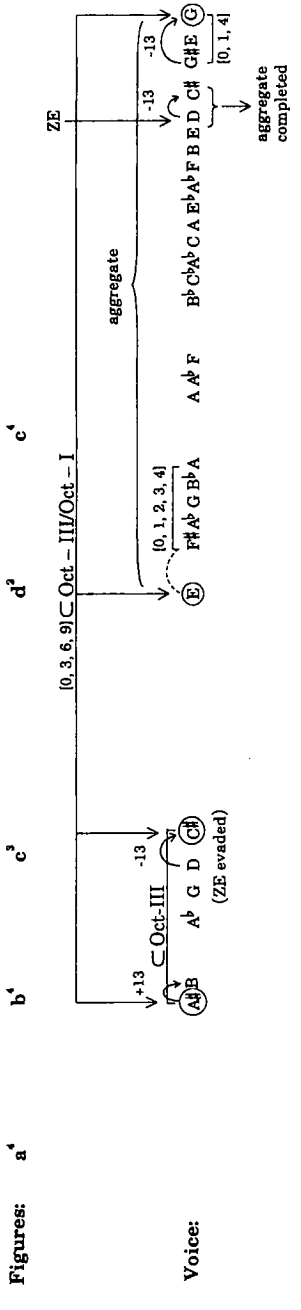
The short, transitional gesture in the piano following Section II dissolves the Oct-III collection by introducing the pitch classes E♭ and A, which lead to an emphasis on Oct-II at the beginning of figure a4. Example 7 shows the arrangement and structural content of most of Section I′, through figure c4. Its similarity to Section I is apparent, but there are some significant differences between the two sections as well. There is only one pair of a and b figures at the beginning of the section. The highest pitches of the piano part "modulate" from an Oct-II to an Oct-III subset in b4, while the voice continues to use Oct-III pitch classes as in most of the earlier figures (that is, all except d1). The descending minor-ninth leap in the voice at the end of b4 is displaced to the lower octave, evading what would have been a new melodic zenith on D^6, replacing the B^5 zenith of Section I.

In the c and d material of Section I′, the piano shifts as before to chromatic trichords in a pentatonic transpositional scheme, but its pentatonic organization dissipates as the voice presents a melisma in figure c4 that is longer and more elaborate than the

Example 6: Pitch Structure, Section II: Figures e^1 - e^4 and transition.



Example 7: Pitch Structure, Section I: Figures a^4 - c^4.



corresponding line of c2. The line in figures d2 and c4 expresses a complete aggregate in the voice for the first time in the movement, and the completion occurs at the climactic, descending minor-ninth leap from D to C♯. This passage that contains the aggregate is framed by pitches belonging to the same diminished-seventh chord set as before. The upper note of the minor-ninth leap is the pitch D^6 that was anticipated, but avoided, earlier, through the octave displacement in figure b4, creating a clear correlation here between the dramatic climax--that is, the melodic zenith of the entire movement (and in fact in the whole of *Apparition*)--and a point of structural articulation within the larger scheme of aggregate completions. Crumb provides an *ossia* at this point, which places the last four notes of the melisma in the lower octave. This did not appear in the original version of the published score, but was added in subsequent printings because Jan DeGaetani, who premiered and recorded the work with Gilbert Kalish, used the *ossia* herself.[9] Nevertheless, because this is such a focal point of the piece, the original, higher octave should be taken if at all possible.

Section I′ concludes with a restatement of figures a2 and b2 (not shown in Example 7), which reestablishes the Oct-III emphasis in the voice and at the same time completes a cycle of octatonic subsets in the piano part of the section: Oct-II moving to Oct-III in figures a4 and b4, with Oct-III moving to Oct-I in the final appearance of a2 and b2. A short piano coda recalls the chromatic-trichord gesture in figure c5, and material from the middle section in figure e5. The final two sonorities of e5 are the same as the first two of a1, but in reverse order, so that the movement ends with the same chord as it began.

This analysis shows how Crumb uses a limited number of simple constructions as basic materials for a piece, but it also points out long-range goals and large-scale processes within which the smaller structures operate. In this movement, restatements of figures involve changes that disrupt what otherwise would be a

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[9]This reason for the addition of the *ossia* was acknowledged by Crumb in remarks made during a special session on *Apparition* at the annual meeting of the Society for Music Theory in Philadelphia, November 9, 2001.

straightforward pattern or cycle of transpositions. At the same time, seemingly contrasting figures are connected through similarity of pitch-class content and set types, and through an emphasis on specific pitch classes. The persistence of the Oct-III collection in the voice is counterbalanced by the quasi-cyclic presentation of all three octatonic collections in the piano. Pitch classes taken from a single diminished-seventh chord set that appear as the first and last notes of vocal figures in Sections I and I′ occur as the highest notes of the piano chords in Section II. Conversely, a disruption in the transpositional pattern of the voice part in Section II moves out of the diminished-seventh collection, using instead a [0,3,7] pattern that refers back to the vertical minor triads in the piano. The line of text at the point of disruption is the only line that is stated just once in Crumb's recasting of Whitman's text.

Processes of octatonic and aggregate completions are important structural features of the music that convey on some level the totality and all-encompassing nature of death. In the first four figures (a1, b1, a2 and b2), the voice assembles the Oct-III collection while the piano simultaneously completes both the Oct-I collection and the aggregate. The voice presents another complete Oct-III collection later in Section I, in figures c2, a3 and b3, and the piano completes the Oct-II collection as well as the aggregate in a compressed space in figures a3 and b3. Finally, in Section I′ it is the voice that unfolds the aggregate, and the point of completion coincides with the melodic climax of the movement.

"Approach, Strong Deliveress!" is well suited for use in a theory class that seeks to explore relationships between analysis and performance. Students typically encounter post-tonal analysis at this moderate level of sophistication during their junior or senior year, and this is also a time when, in their applied studies, they are likely beginning to move away from musical expression that relies almost completely on their teachers' instructions or demonstrations, and toward a more autonomous approach to interpretation. This is therefore an opportune time to introduce students to some of the benefits analysis can bring to performers and listeners.

In this analysis I have employed some rudimentary terms and expressions from set theory, but I have also described materials and procedures in less formal ways that performers can grasp on a more

intuitive level: minor ninths, minor triads, and diminished-seventh chords; octatonic, pentatonic, and chromatic collections or "scales;" transposition; and melodic climax or zenith. What I call "figures" are comparable to phrases, and larger formal divisions arise from the ways in which figures are grouped. Of particular importance is the identification of points of structural articulation that grow out of the disruptions or completions of processes. Such moments serve as musical goals, and directed motions into and out of these goals are essential aspects of the performers' interpretation. By using the points of structural articulation identified in the analysis as the focus of class discussion, students can be encouraged to contribute specific ideas related to interpretation of the music. I offer the following questions and comments for guiding the discussion:[10]

Question 1. Among the points of structural articulation noted in the analysis, which ones (if any) should the performers take special care to emphasize?

There are numerous spots in the piece that might be discussed in response to this question, but two in particular seem to warrant special consideration: the D^{6}-$C\sharp^{5}$ leap in the voice in figure c4, which comes at the end of the longest melisma, acts as the melodic zenith of the vocal line, and also completes a process of aggregate accumulation in the voice in figures d2 and c4; and the $A\flat^{5}$ at the beginning of figure e4, which is the vocal zenith of the middle section, initiates the only line of text that is not restated elsewhere in the movement, and which disrupts the ascending minor-third transpositional pattern to create an expanded reference to the minor-triad sonority that is most prevalent in the piano part throughout.

Question 2. How much emphasis, if any, would you expect the performers to add to the emphasis that would flow naturally from simply following the composer's indications given in the score?

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[10]The instructor may also wish to draw from the more comprehensive list of questions given in Berry, pp. 10-44

Referring, for example, to the two events noted in the comments to question 1 above, consider what information in the score already creates emphasis: the A♭^{5} in figure e4 begins the last of three related vocal figures in Section II, and the only one marked *forte* (the preceding two begin *pianissimo* and increase to *mezzo-piano*). This increase in dynamic intensity, together with the higher tessitura, will place this note in relief to a considerable extent, but could the performers still contribute some subtle enhancement to the arrival of this note?. The D^6-C♯^{5} leap in figure c4 is also marked *forte*, but it is not the dynamic climax of Section I'. The extremely high register of the D^6 is so striking in its effect that a louder dynamic marking is hardly required, but if the singer finds it necessary to take the *ossia*, with the leap in the lower octave, how much compensation should she make in other ways, to draw the listener's attention to this structural event?

Question 3. Assuming that the performers decide to contribute, as Dunsby states, an "expressive edge" at certain moments (see note 1 above), what types of emphasis might be considered?

Some things, like pitch and rhythm, would of course not be subject to interpretive license because they are so specifically notated. However, dynamic shaping leaves some room for flexibility, as do other aspects such as timbre (for the singer) and voicing (for the pianist). Slight fluctuations in tempo, and agogic accent are particularly useful in focusing the listener's attention on structural points in the music. In any piece, however, some interpretive decisions will be more appropriate than others, and expression poorly applied can damage the essential character of the music. In "Approach, Strong Deliveress!" for example, *too* much flexibility of tempo, or "holding back" just before points of arrival such as those mentioned under question 1 above, could detract from the relentless quality of the movement. Therefore the performers must consider ways of emphasizing specific events in the piece without altering the essential character of the music.

It is in response to this final question that students will begin to suggest various expressive techniques, both vocal and instrumental, that would influence not only their interpretation

of the work as hypothetical performers, but also their expectations as listeners. The goal is not to achieve consensus about a certain set of interpretive decisions, but rather to engage students in a discussion that centers on connections between analytical findings and musical expression. When analysis is able to bring together aspects of compositional structure, performance, and listening in this way, it can be especially rewarding, particularly for students whose musical interests are centered primarily on performing. It is important that the analysis itself does not represent an attempt to prescribe a specific interpretation; it should be clear, however, that the relationships and processes it reveals argue for a performance that takes into account not just the novel timbral effects of the music and the effective execution of the various types of figures, but also, and especially, the overall structural contour of the piece.[11]

[11]I have limited discussion in this study to intramovement relationships in "Approach, Strong Deliveress!," but there are also numerous connections between the musical materials in this movement and other sections of the piece. Some of these are surface details that are easily recognizable in a performance, whereas others are somewhat more subtle. In any case, these relationships contribute to the continuity of the complete work in the same way that the aspects of structure explored here provide unity within a single movement, and they have similar implications for performance.

An Aural Skills Approach to Context and Modulation in Tonal Music

Timothy S. Cutler

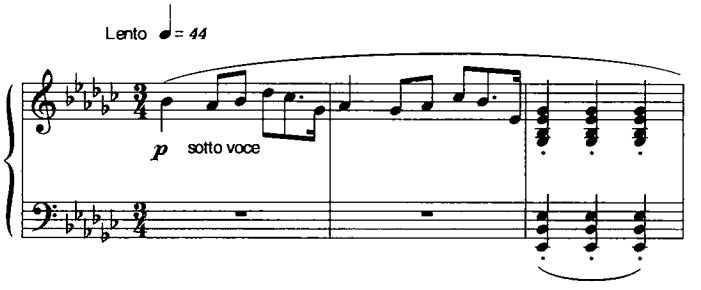
There is a lonely quality to the opening of Scriabin's Prelude op. 16 no. 4 (Ex. 1). The slow tempo, stepwise descending sequence, *sotto voce* marking, and monophonic texture all contribute to this solitary mood. Something else, however, drives the melody forward. It is searching for its own meaning, a *tonal* identity that will be determined retrospectively when the Prelude's tonic is confirmed in m. 3.

In tonal music, the function of any pitch depends on its context. This is particularly relevant to the study of modulation. One of the most fundamental modulatory techniques is the pivot, when a pitch or harmony acquires dual meaning in order to provide a smooth transfer from one key to another.

Typically, the subject of modulation is taught during the later stages of a harmony course. Viewed as one of the more advanced topics in the study of tonal music, an overview of modulatory techniques is withheld until the more "grammatical" aspects of theory are explained: triads, seventh chords, and their inversions; Roman numeral analysis; the syntax of harmonic progressions—structures contained within a single key.

If one wishes to introduce modulatory concepts any sooner, a different route can be sought, one that relies less upon the language of Roman numeral and figured bass analysis. Employing an ear training approach, it is possible—and can be beneficial—to introduce the fundamental ideas behind modulatory techniques to students earlier in their music theory education. Beginning with only major and minor scales, and later adding triads, an ear training approach allows students to ingrain these ideas in their ears well in advance of their theoretical indoctrination to the subject.

Example 1



Why is this beneficial? Aural familiarity with music, which includes varying degrees of unconscious mental understanding, naturally precedes conscious intellectual consideration. Some students struggle in theory classes when this order is reversed. These students, who often possess little experience with classical music, find music theory impractical and irrelevant because they lack a reservoir of aural references to connect actual sound with intellectual codification in a musically meaningful way. In general, a young musician has a greater chance of understanding and appreciating theoretical concepts, such as the techniques of modulation, if he/she first gains an aural awareness of them. When the same techniques are introduced later in a more theoretical setting, hopefully the student will react by stating, "I already know what this *sounds* like," or "Yes, I know what this *feels* like." The theory will simply place labels on something already in the inner ear of the student. (In this sense, shouldn't all ear training instruction be one step ahead of its music theory counterpart?) The following exercises stress tonal context and serve as basic preparation for the study of modulatory techniques.[1]

[1]Presently, tonal context is a central topic in aural skills research, but few scholars have extended their ideas to the topic of modulation. For other approaches related to issues of context, with occasional reference to modulatory concepts, see Gene J. Cho, *Melodic, Dyadic, and Harmonic Singing*

Warm-up

Before beginning the context exercises, students should be fluent with major and minor scales, especially the functional tendencies of each scale degree. (In essence, one should be able to express in some manner what each scale degree *feels* like in various contexts.) As a warm-up, sing major and minor scales, first with scale degree numbers or solfège and then using note names.

Anyone with some knowledge of tonal music can hum a major scale without having to think about it. For most, singing scales with degree numbers or solfège also poses few problems; it merely adds the simplest of labels to the pitches being sung. The purpose of performing scales with note names is to engage the mind concurrently with the ears and voice, especially in keys with numerous sharps or flats. Such mental processes increase the ability to visualize music in one's head. Much like a strong chess player sorts through specific combinations of moves or maps out long-term strategies in his/her mind, a good musician benefits from the powers of visualization in numerous settings: dictation (the ability to translate aural sounds into a notational picture on staff paper); species counterpoint (looking ahead is essential); composition; memorization; and so on. Students should be discouraged from reciting note names by calculating the intervals between adjacent scale degrees. Instead, they should imagine the scale written on a staff and take careful notice of the key signature and accidentals. Consequently, they are training themselves

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(Iowa: Kendall/Hunt Publishing Co., 1989); Gary S. Karpinski, *Aural Skills Acquisition: The Development of Listening, Reading, and Performing Skills in College-Level Musicians* (New York: Oxford University Press, 2000), especially pp. 199-213; William E. Lake, "Interval and Scale-Degree Strategies in Melodic Perception," *Journal of Music Theory Pedagogy* 7 (1993): 55-67; Steve Larson, "Scale-Degree Function: A Theory of Expressive Meaning and Its Application to Aural Skills Pedagogy," *Journal of Music Theory Pedagogy* 7 (1993): 69-84; Michael Rogers, "The Jersild Approach: A Sightsinging Method from Denmark," *College Music Symposium* 36 (1996): 149-161; Joseph P. Swain, "Connections in Modulation," *Journal of Music Theory Pedagogy* 1 (Spring 1987): 13-24; Bruce Taggert, "Sight Singing Schubert: A Study in Solfège," *Journal of Music Theory Pedagogy* 11 (1997): 75-98; Paula Telesco, "Contextual Ear Training," *Journal of Music Theory Pedagogy* 5 (Fall 1991): 179-190. I have found only one major work that focuses specifically on modulation and aural skills, *La modulacion en el solfeo* by Adelino Barrio (Madrid: Musicinco, 1988), but I have been unable to obtain this text.

to see the larger picture rather than merely tying together bits of detail.[2] After some practice, singing with pitch names will become as natural as humming a scale itself.

The Context Exercise

Acquiring fluency with scales is not an end in itself but a means by which one progresses to a more sophisticated idea: the function of a pitch depends on its context. I like to begin the presentation of this concept by going to the piano, playing a pitch (f-sharp^1, for instance), and posing a simple question, "What scale degree am I playing?" After an initial chuckle and a little head scratching, most will assume that they are hearing the tonic. The f-sharp^1 can be confirmed as the tonic, but just as easily its function can be radically altered (Ex. 2).

The primary context exercise goes as follows:[3]

a) The teacher plays or sings any pitch. It is not necessary to identify its note name.
b) Assign the pitch a scale degree number.[4]
c) Using scale degrees, the student sings from the starting pitch through the longer part of the scale to the tonic—descend if the scale degree is five or higher, ascend if it is four or lower.
d) Practice major and all forms of minor scales. Later, actual pitch names can be used to increase the difficulty (Exs. 3a and 3b).[5]

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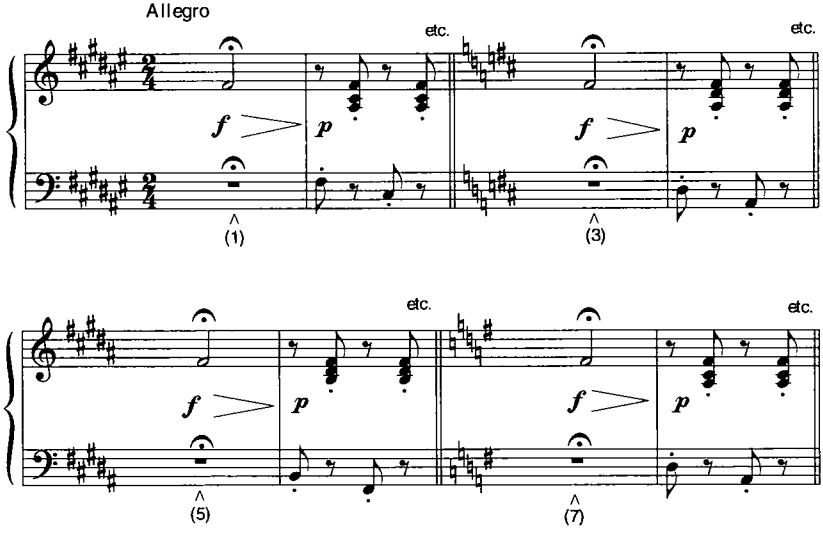
[2]Essentially, this is the concept of "clumping" or "chunking." It is easier to recall one piece of information—the number 279,561—than it is to remember seven consecutive non-related digits—2, 7, 9, 5, 6, 1.

[3]In the following exercises, scales should be considered a linear expression of the tonic triad and nothing more. Scale degrees 1, 3, 5, and 8 are stable, and the other degrees function as unstable passing or neighbor notes.

[4]For the remainder of this paper I will refer to scale degree numbers, but the exercises will work equally well with movable do.

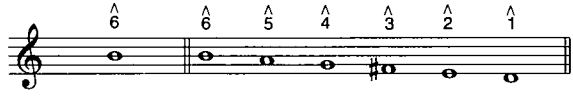
[5]A descending harmonic minor scale starting on scale degree 7 is arguably the most difficult scale segment to perform because one is immediately confronted with a descending augmented second. Often, a student will accidentally sing a major third, transforming the initial leading tone into the tonic, and sing the following scale degrees: 8, 6, 5, 4, 3, 2, 1.

Example 2



Example 3

A)



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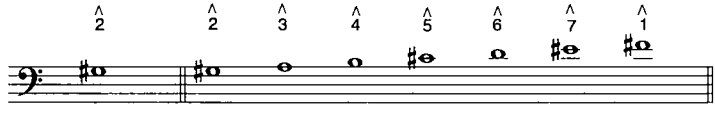

e) In Ex. 3a, the instructor plays b♮[1] at the piano (Ex. 3a). This pitch is scale degree six in a major scale. From this pitch, sing down to the tonic using scale degree numbers. In Ex. 3b, the instructor plays g♯ at the piano (Ex. 3b). This pitch is scale degree two in a harmonic minor scale. From this pitch, sing up to the tonic using scale degree numbers.

For homework or classroom practice, I organize the exercises similar to the following, promoting the comparison of the same pitches in different tonal contexts (Ex. 4).[6] Throughout the presentation and practice of these exercises, one need not invoke ideas of modulation and pivot chords. It is enough to state, "The function of a note depends on its context." The notion of a pivot is stressed subconsciously by hearing a pitch in two or more successive tonal settings (see Ex. 4, nos. 5-8).

Solving the Context Exercise

In executing the scale segments, there are two general strategies for solving these musical puzzles. (No matter what, preparation should be done *internally*—never aloud—as it is essential to develop the mind's ear.) The first method is intervallic: By knowing the intervallic configurations of the major and minor scales, one can sing from pitch to pitch with only three intervals in mind—minor, major, and augmented seconds. I recommend avoiding this method or using it only in limited situations. Stringing together a random series of intervals does little to create a context in which each note of the scale acquires unique meaning. Intervallic singing is necessary in certain types of atonal music, but it runs contrary to the whole idea of tonality. The point of this exercise is to appreciate the importance of tonal context; intervallic singing teaches little if anything about context.

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[6]Given a pitch name and scale degree number, I normally ask the students to identify the key before anything else. In Ex. 4 no. 2, there will be no difference between the natural and descending melodic versions of the minor scale.

Example 4

1) A is scale degree 7 in a major scale. Sing down to the tonic.
2) A is scale degree 6 in a natural minor scale. Sing down to the tonic.
3) E is scale degree 2 in a major scale. Sing up to the tonic.
4) E is scale degree 3 in a melodic minor scale. Sing up to the tonic.
5) B♭ is scale degree 5 in a melodic minor scale. Sing down to the tonic.
6) B♭ is scale degree 3 in a major scale. Sing up to the tonic.
7) B♭ is scale degree 4 in a harmonic minor scale. Sing up to the tonic.
8) B♭ is scale degree 7 in a major scale. Sing down to the tonic.

A more beneficial strategy begins by using the starting pitch and its scale degree identification to locate the tonic. The tonic can be determined in various ways, such as internally singing through the short side of the scale, especially when the starting scale degree is 2 or 7. Above all, one should—in the mind's ear—ground him/herself in the tonic before anything else. This is not necessarily an easy task, for it requires imagining one pitch while hearing another aloud (itself an essential skill for the good musician). When one can firmly feel the tonal center, each scale degree takes on unique tonal characteristics within the context of its key. In Ex. 3a, b-natural[1] functions as a relatively unstable neighbor note to the more consonant dominant scale degree. (See Ex. 20 for an illustration of this effect.)

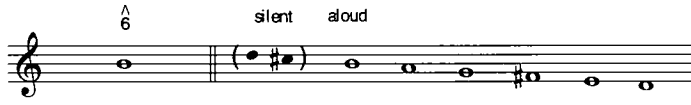
In doing these exercises, students (and teachers) will discover shortcuts to aid their preparation. One technique involves using a silent head start. In Ex. 3a, determine the tonic above scale degree 6, sing the missing scale degrees 8 and 7 internally, and then "enter" aloud on scale degree six (Ex. 5). Another shortcut involves using a famous melody as a reference. Students who have trouble descending from the dominant to the tonic will be surprised to find they have little or no difficulty beginning the "Star Spangled Banner" on the

same pitch. To gain tonal orientation when singing a major scale segment from scale degree 3, try hearing "Three Blind Mice." The first movement of Mozart's Keyboard Sonata in B-flat, K. 333 serves as an excellent example of a major scale segment that descends from scale degree 6 to 1 (Ex. 6). Because the tonal properties of a scale degree are not affected by transposition, this shortcut works with any starting pitch. Beginning the sonata on a^2 merely transposes the composition to C Major.

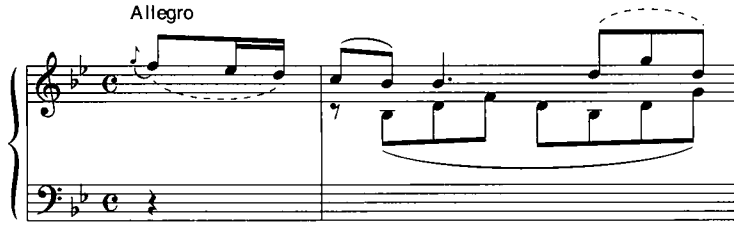
This useful aid is borrowed from the traditional method for learning intervals: Memorize a famous melody that features a particular interval, such as the augmented fourth in Bernstein's "Maria" aria from West Side Story. Although familiar tunes are helpful for the scale segment exercise described above (pitches within a tonal context), it must be noted that there is a serious flaw when using them to remember abstract intervals to be imported into a tonal context. For example, the "NBC" theme is a ubiquitous melody with a prominent major sixth (Ex. 7). A third and unwanted note enters the equation, but more importantly the major sixth represents more than an abstract interval—the two pitches strongly suggest scale degrees 5 and 3 in a major key and imply a tonic triad. What happens when the tune is placed in a different tonal context (Ex. 8)? The function of the "NBC" pitches has changed. The third pitch, G, is now discordant with the underlying harmony. Consequently, the "NBC" tune might be deemed unusable for this excerpt, and the major sixth may go unidentified. The closest thing to the "NBC" theme that fits Ex. 8 is its *minore* variant, f-sharp^1-d^2-b^1, which has no major sixth!

A third technique uses scale degrees other than the tonic as footholds for completing the segments. This works especially well when performing a descending scale, major or minor, that begins on scale degree 6 or 7. After the tonic, the dominant is the most readily recognized and consonant scale degree. Therefore, carefully negotiate from scale degree 6 to 5 or 7 to 5, and the remainder should be smooth sailing. I sometimes find myself slightly accenting the dominant, as if I am stressing a place of momentary repose (both in terms of technical difficulty of the exercise and concordance with the tonic) (Ex. 9).

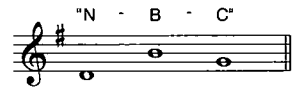
Example 5



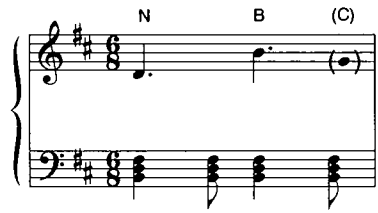
Example 6



Example 7



Example 8

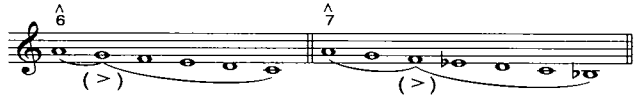


Expanding the Context Exercise

When students are suitably fluent with this exercise, it can be varied in several ways. Here are just a few. The first is a "rapid-fire" version in major and its melodic-minor variant in the opposite direction (Exs. 10a-b). This version of the context exercise is less important than the original and more randomized scale segments (see Ex. 4) because some students may simply memorize the "rapid-fire" melodic patterns and forget about the various contexts created. Nevertheless, it should illustrate how quickly the function of a pitch can change.[7]

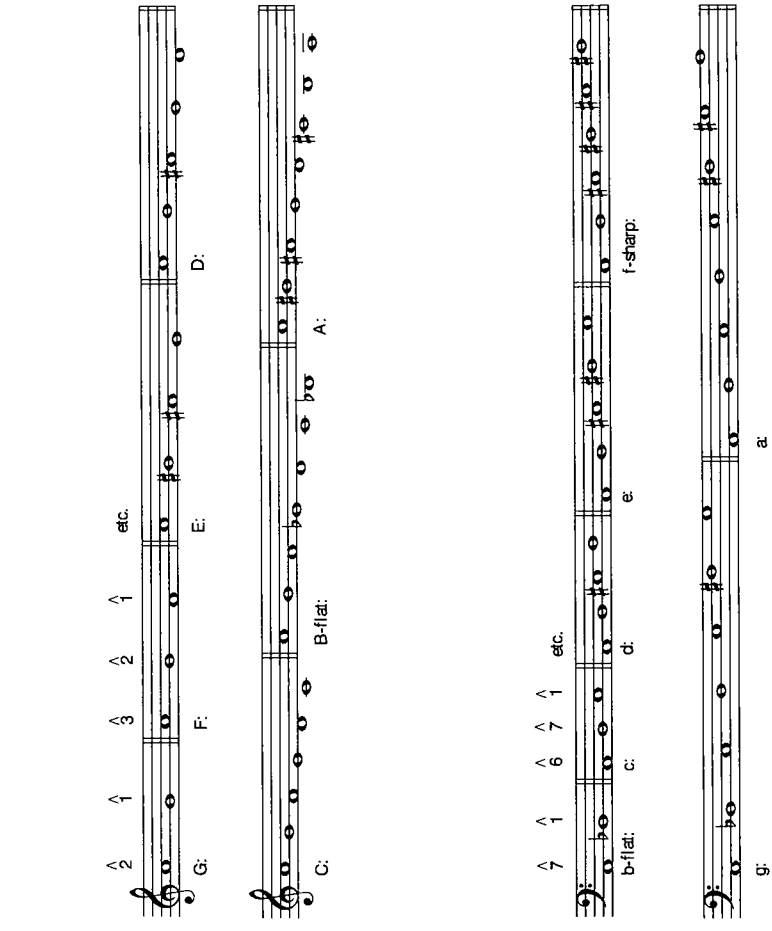
One can also add chromatic elements to the scale segment exercise. Rather than beginning solely on diatonic pitches, the instructor can ask a student to begin on chromatic neighbor notes. For example, an ascending C major scale segment might begin on sharp scale degree 2, or a descending C major scale segment could commence with flat scale degree 6. In both these and other instances, one will understand each chromatic element in relation to its more stable diatonic neighbor, thus increasing one's comprehension of the melodic/ornamental function of chromatic neighbor notes.

Example 9



[7]See, for instance, mm. 97-108 in the first movement of Haydn's Symphony no. 83, "La Poule." In this complicated passage, the pitch G is prominently displayed in the lower voices, first as the dominant of c minor (m. 97), then as a brief tonic in g minor (m. 106), and lastly as the subdominant of d minor (m. 108).

Example 10



The context exercise can be transformed into dictation form as well. The student is given a starting pitch and listens to a scale segment played at the piano, the terminal pitch always being the tonic. The objective is to determine the key and mode of the scale and write out the segment with proper pitches and accidentals. In many ways, the dictation version is easier than the primary context exercise because its focus is shifted. To determine the scale degree of the initial pitch, one simply needs to count how many pitches were played. The difficulty lies in assessing the mode of the scale, thus drawing one's attention away from context and toward modal color.

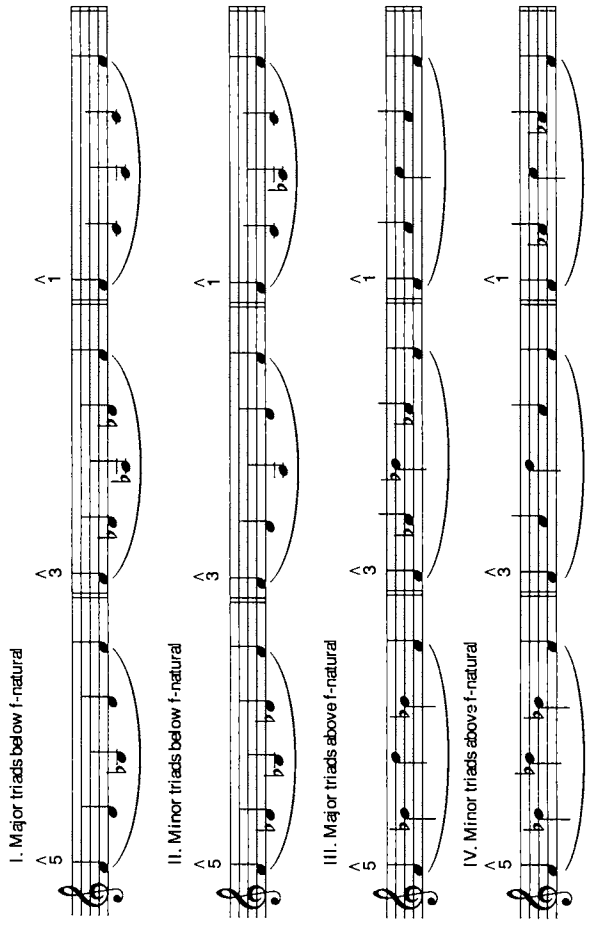
When students have learned the basics of triad construction, a triadic version of the context exercise can be added (Ex. 11). Given a starting pitch, students sing major and minor triads, ascending and descending, in root position, first and second inversion, using scale degree numbers, solfège, or note names. It should be noted that only when scale degree 3 is the initial pitch do the roots of the major and minor triads differ. Other triads and seventh chords can be added later.

Applications

Ear training students need to be reminded constantly how their aural skills practice relates to the real world of music making. Here are just a few of the numerous exercises and musical excerpts that illustrate why ear training need not occur in a non-musical vacuum. Some of these excerpts contain fairly advanced compositional ideas, so emphasis can be placed on their aural content rather than their theoretical underpinnings, and how and when they are explained to students are up to the discretion of the teacher.

1) Single pitch as pivot. The term *pivot* describes the action that occurs when the function of a harmony or pitch is transformed from one thing to another. The context exercise can be done internally to illustrate this: Play any note on the piano, hear (and feel) it as the tonic, then shift its identity to scale degree 3 of a major scale, then imagine it as another scale degree, and so on. Or, in other words, play only the fermata measures in Ex. 2, but with regard to the contextual

Example 11


I. Major triads below f-natural
II. Minor triads below f-natural
III. Major triads above f-natural
IV. Minor triads above f-natural

harmonies that follow.

From there, one can progress to more expansive musical examples. Establish B-flat Major with a perfect authentic cadence. While the other tones of the final tonic triad fade away, reiterate the tonic for several seconds, during which students are asked to imagine the function of this pitch transform from scale degree 1 in B-flat Major to scale degree 3 in G-flat Major. Sing an ascending B-flat major scale from the tonic, followed by an ascending G-flat major scale commencing on the mediant, paying special attention to the change in color and feel of the pitch B-flat. This is what occurs in the second movement of the Violin Concerto no. 1 by Max Bruch (Ex. 12).[8]

2) Pair of pitches as pivot. In an excerpt from the last movement of Beethoven's Piano Trio in E-flat, op. 1 no. 1, two pitches function as a pivot. Although a theoretical explanation of the passage is more complicated than in the Bruch example, the pivot itself is just as explicitly highlighted (Ex. 13a).[9] The passage begins with an authentic cadence in mm. 332-333. After this key-defining cadence, the texture turns sparse, and Beethoven introduces mixture in the form of c-flat^3. To what extent mixture needs explanation depends on the level of the class, but students should at least know that c-flat is a lowered form of scale degree 6. Repeated throughout mm. 337-340, the textural density diminishes even further. Much like the Bruch example, extraneous information is put aside so that the pivot

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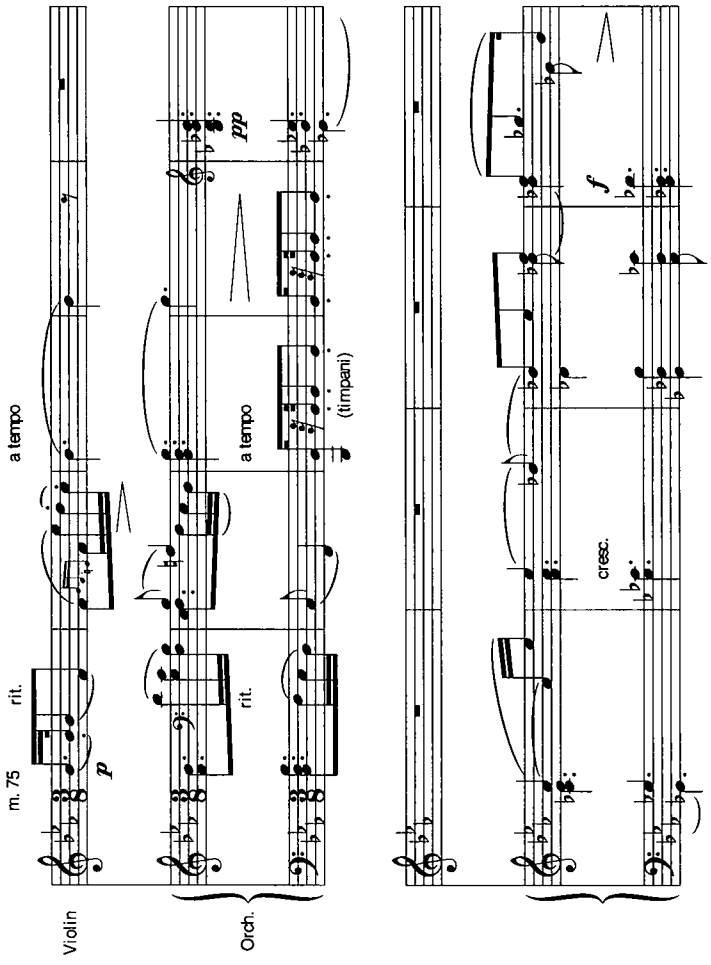
[8]The same descending major third modulation occurs in Beethoven, Piano Trio in c minor, op. 1 no. 3, fourth movement, mm. 155-180 and Elgar, "Enigma" Variations, between variations VIII and IX. Other examples of a single tone as pivot include Schubert, Symphony no. 8 in b minor, first movement, mm. 38-42 and 252-256; Mendelssohn, Symphony no. 3 in a minor, first movement, mm. 201-209 (second ending) and 419-427; Mozart, Fantasy in c minor, K. 475, mm. 25-26; Brahms, Intermezzo, op. 118 no. 2, m. 48; Beethoven, "Wellington's Victory," op. 91, mm. 421-423 (second part, mm. 59-61); Tchaikovsky, Piano Trio in a minor, op. 50, second movement, between variations V-VI and X-XI.

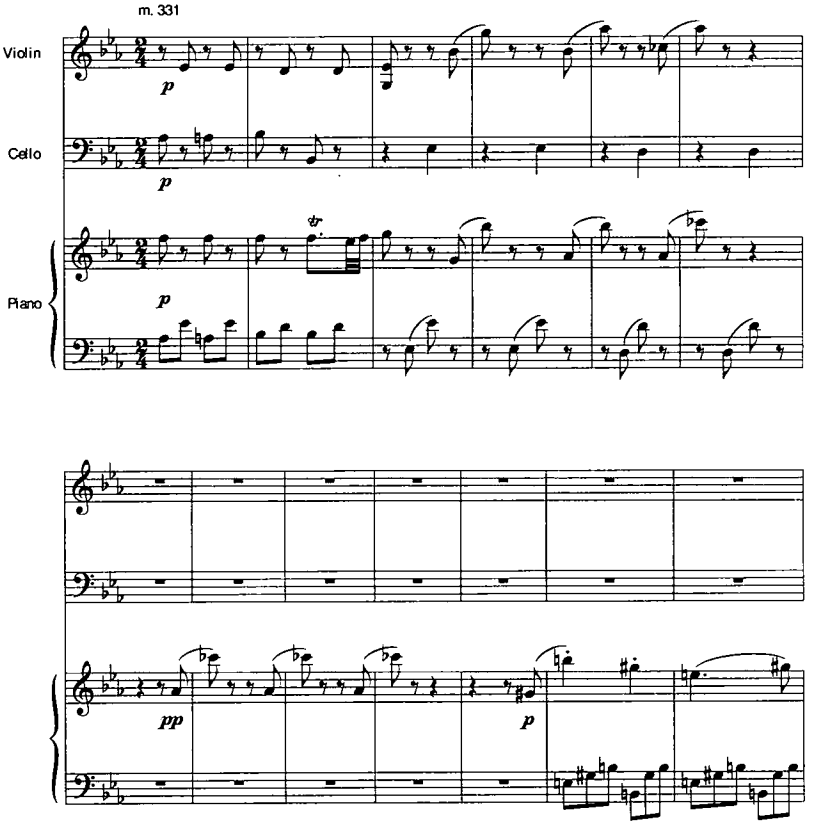
[9]Another composition that uses pairs of pitches as pivots is Brahms' "In Der Fremde," op. 3 no. 5. The song is set in f-sharp minor and makes brief modulations to A Major and D Major. The former key uses the pitches A and C-sharp (m. 9) to return to the main tonic, while the latter uses A and F-sharp as pivots (mm. 15-16).

Example 12

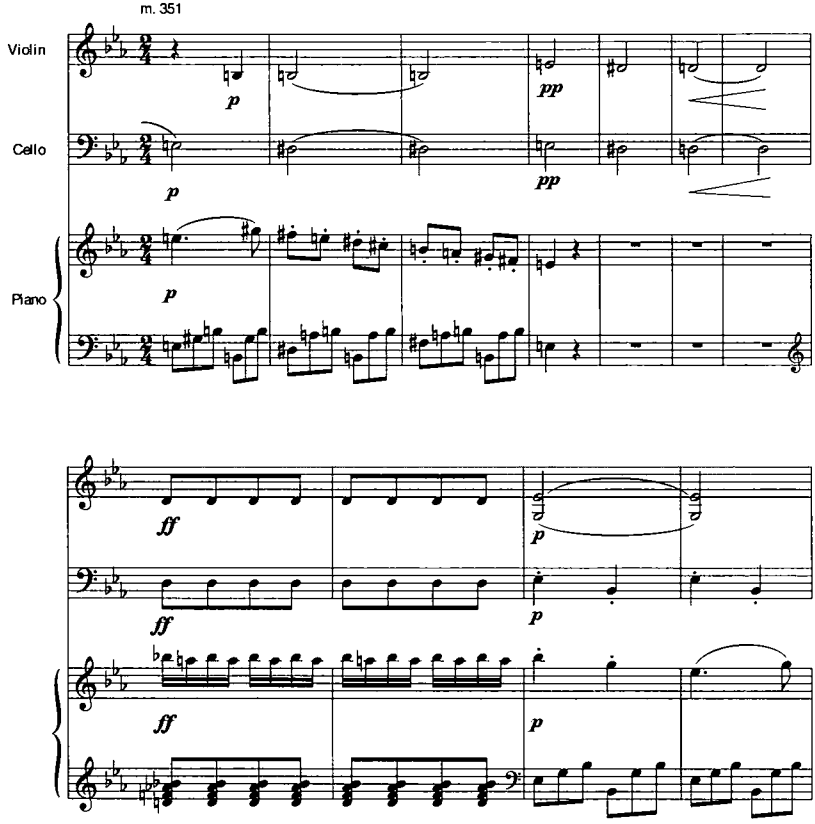


Example 13

A)



B)



to the upcoming key is as clear as possible. Somewhere between mm. 337 and 342, scale degrees 4 and flat 6 in E-flat Major become scale degrees 3 and 5 in E Major, and the music modulates to an enharmonic respelling of the Neapolitan (or ascends by semitone if students are unfamiliar with flat scale degree 2).

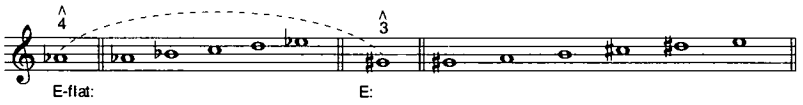
As witty and Haydnesque as this modulation is, the return to the original key of E-flat Major is even more humorously abrupt (Ex. 13b). Once again, a sudden textural liquidation in m. 354 foreshadows a modulation. The actual pivot note is debatable (E-natural in m. 354 equals F-flat), but for the purposes of the context exercise the most illuminating analysis is to reinterpret the D-sharp in m. 355 as E-flat within the same bar. Thus, the leading tone in E Major becomes the tonic of E-flat Major. These modulatory techniques can be expressed in scale segment exercises (Exs. 14a and 14b). Triadic versions of these exercises are also possible.

3) Pivot chords. So far, discussion has mostly centered on the pivot possibilities of a single note. A further step in gaining aural comprehension of the pivot concept is learning to alter the meaning of an entire harmony. For some, this may involve a two-step process (Ex. 15). After choosing a pivot chord (in Ex. 15 I will use the downbeat of m. 2 as the pivot), the first step in hearing a chord as a pivot is to examine each of the four voices individually and concentrate on the pivot moment. If necessary, scale segment exercises can be extracted from each line. In some sense, a pivot harmony is nothing more than a group of pivot notes sounding simultaneously. But rather than hearing multiple pitches pivot concurrently, it is more efficient to hear a single harmonic entity performing the same task. Therefore, the second step is to learn to hear the downbeat of m. 2 not merely as four pivot notes sounding simultaneously, but rather as one harmonic pivot. In other words, what does a C major triad feel like in C Major compared to its tendencies in G Major?

4) Common tones. Passages need not modulate to demonstrate the function of a pitch changing according to its context. In the second movement of Brahms' Third Symphony, op. 90, the common tone C-natural plays the role of root, third, and fifth of major triads within a brief span (Ex. 16). The contrast between the first two measures, I-IV, and the latter two measures, I-flat-VI, typifies the relationship between the natural and flatted forms of a scale degree, an idea that

Example 14

A)



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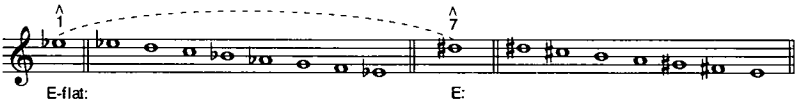
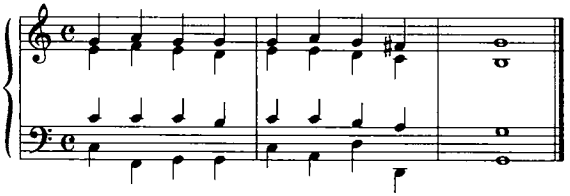
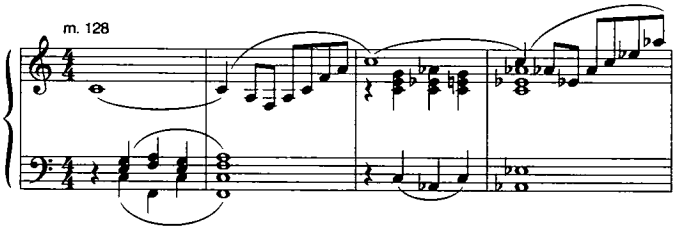


Example 15



Example 16



can be traced back to the opening measures of the first movement, where A-natural and A-flat are pitted against each other within the context of F Major. To demonstrate the effect of harmonic context, have the class sing C-natural along with this passage to illustrate how this pitch is pushed and pulled according to its harmonic surroundings.[10]

5) Pedals. A pedal tone has a somewhat different relationship to its surroundings than the common tones in the previous Brahms example. A tonic or dominant pedal in the bass normally renders the upper pitches less harmonic and more ornamental in function. In the first movement of Brahms' Violin Sonata no. 3, op. 78, a dominant pedal governs the entire development section (mm. 84-129). This is perhaps the most explicit example of dominant prolongation during the development section of a sonata form that exists. Brahms, however, finds ingenious ways to intermix the incessant bass A-natural with the above harmonies (Ex. 17). During the development section, A-natural serves as the root, third, and fifth of major and minor triads, the root of a dominant seventh chord, and the third of a diminished seventh chord, among others. This remarkable passage can be reduced to the triadic version of the context exercise (Ex. 18).[11]

So you still don't believe in the power of context? Four musical "tricks"

1) One traditional aural skills exercise involves the identification of melodic or harmonic intervals played without regard to tonal context. The following example illustrates how issues of context can sneak into this more abstract soundworld. Quickly play the two dyads shown in Ex. 19 and request someone to identify them (Ex. 19). Certainly, few will have difficulty correctly naming the

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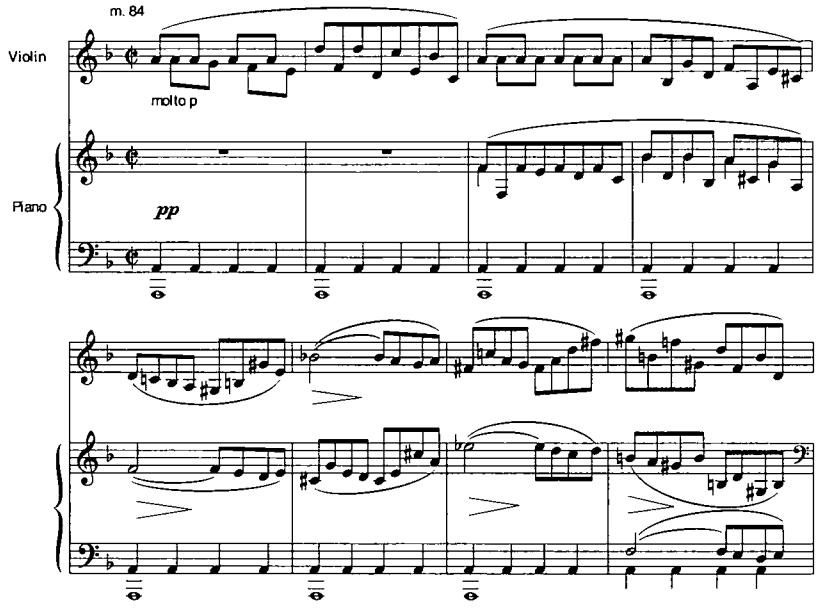
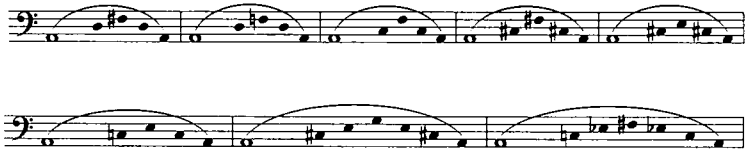
[10]The effect would be even greater if C-natural were to become a dissonant chord tone. For a more advanced example, make a harmonic reduction of Brahms, Concerto for Violin and Cello, op. 102, first movement, mm. 270-278, then sing and discuss the effect context has on common tones and enharmonic equivalents.

[11]Two other interesting passages illustrating similar ideas are Verdi, Otello, Act IV, scene 2 (an upper pedal E-flat in Desdemona's "Ave Maria" aria, the first 11 measures) and Verdi, Falstaff, Act III, second part, mm. 89-101 (the clock strikes midnight).

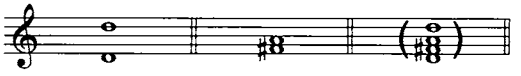
Example 17



Example 18



Example 19

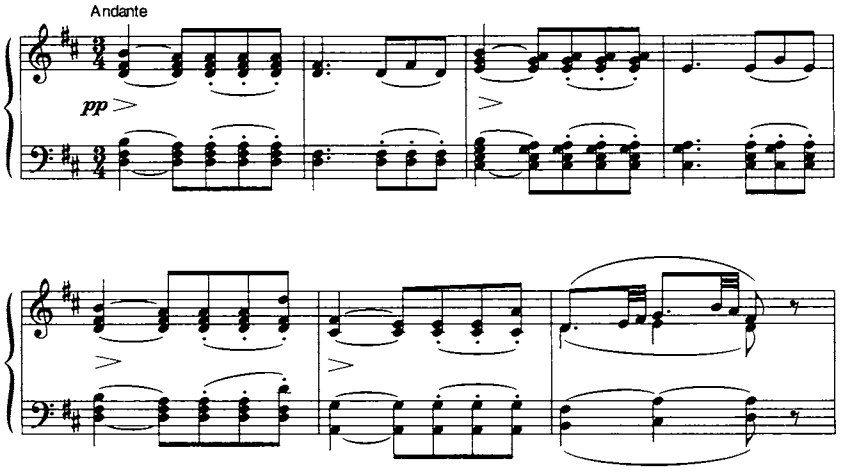


octave, but a surprising number of listeners will incorrectly label the latter interval as a major third. This should not be interpreted as the product of a careless ear, but rather the result of one who is influenced by a more persuasive musical factor—namely, that the two intervals, when combined, form a major triad. Consequently, the listener is more struck by the composite major mode of the resultant triad than the actual minor quality of the second dyad, and thus misinterprets the latter interval.

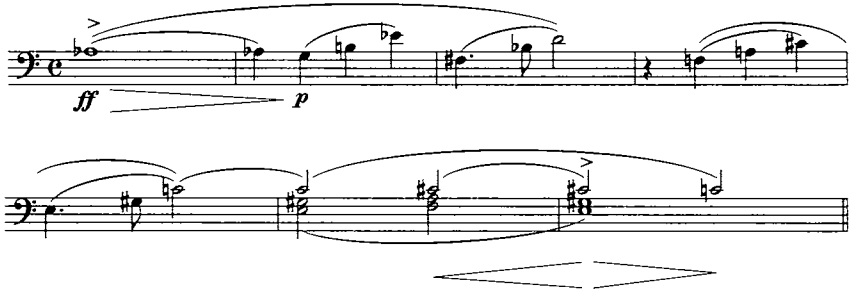
2) A beginning harmony student would be hard pressed to find an analytical interpretation other than "vi^{6}" for the opening sonority of the second movement of Schubert's Piano Sonata in A Major, D664 (Ex. 20). Yet, we know that what we see on the page does not always concur with what our ears hear. After listening to only a few bars (if not right away), one realizes that the opening sonority is but one in a long line of downbeat appoggiatura motives (totaling close to forty by the end of the movement!). Even though the initial appoggiatura creates the illusion of a consonant "vi^{6}" harmony, it possesses the quality of a 6-5 embellishment over an opening tonic harmony (B is a nonharmonic tone wanting to resolve to A). Thus, a better analysis interprets the opening chord as a tonic I harmony with melodic ornamentation (I$^{6\text{-}5}$). The consistent motivic context convinces the listener to hear the upper voice in the initial sonority as a nonharmonic (dissonant) embellishment. The way one perceives the relationship between the pitches B and A and their tonal context in m. 1 has crucial significance on the way the passage is performed. Schubert marks this and other similar moments with accents not because they are downbeats, but because they are moments of dissonant stress.

3) As in the previous example, the beginning of Liszt's *Faust* Symphony creates a context in which a seemingly consonant

Example 20



Example 21 (slightly recomposed)



harmony, a minor triad in first inversion, is made to sound dissonant (see m. 7 in Ex. 21) (Ex. 21). By saturating the music with augmented triads at various levels, this sonority—and not a major or minor triad—convincingly serves as the harmonic center of the introduction. The augmented triad is so firmly established as the harmonic "tonic" that when a first inversion minor triad appears on the downbeat of m. 7, c-sharp[1] sounds like a dissonant upper neighbor to the more "consonant" augmented triad. Thus, context creates a situation in which the consonant and dissonant properties of two harmonies are swapped in comparison to their normal tonal tendencies. Ultimately, however, the dominance of the major triad is reestablished in the Faust Symphony when the initial governing harmony C-E-A-flat eventually resolves to C-E-G.

4) One's aural recognition of a cadence may have great significance on an analytical interpretation. For instance, choosing the harmonic label $V^{6/4}$ versus $I^{6/4}$ often depends on whether this harmony is involved in some sort of cadential process. Along these lines, the harmonic label "III^6" may be dubious if it occurs after a predominant chord at a cadential moment. Often times, this harmony is better viewed as a dominant chord with an escape tone.[12] Near the end of Act III of La Bohème, Puccini writes a unique version of this scenario (Ex. 22). At rehearsal no. 35, the dominant pedal is both implied and explicit, with the lowest notes of the harmony (found in the right hand of the piano reduction) not sounding but still present until their resolution to a tonic harmony two measures later. This two-bar dominant pedal renders the voice and harp pitches ornamental and non-structural and defines a relatively straightforward, albeit highly embellished, authentic cadence. By omitting the dominant pedal with a slight bit of recomposing, a musical situation occurs that highlights an unusual substitute for a dominant chord (Ex. 23).[13] A visual analysis of the final three

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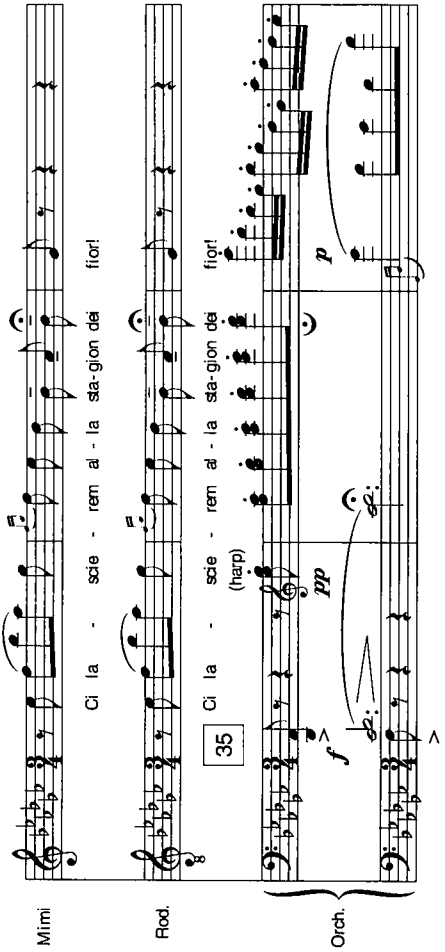
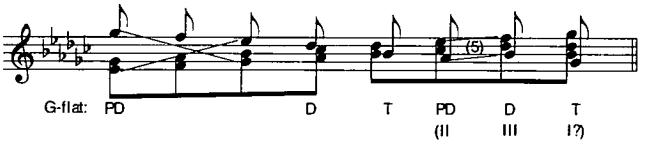
[12]Contrarily, this is not the case in m. 29 of the second movement of Dvorak's String Quartet no. 12 in F Major, op. 96, "The American." Although a literal "III^6" functions as the dominant in this measure, the origin of the A is not an escape tone. (The cadence in mm. 29-30 includes interesting parallel fifths in the second violin part.)

[13]In Ex. 23 I have labeled the function of the chords as PD (predominant), D (dominant), and T (tonic).

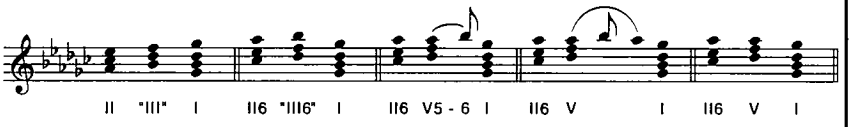
Example 22


Mimì
Rod.
Orch.
Ci la - scie - rem al - la sta-gion dei fior!
Ci la - scie - rem al - la sta-gion dei fior!
35
(harp)
pp
f
p

Example 23



Example 24



harmonies would reveal the unsightly progression II-III-I, as well as parallel fifths. Nevertheless, one can untangle this passage and trace its cadential origin as well explain the parallel fifths (Ex. 24). The parallel fifths stem from contrapuntal embellishment, similar to the more common parallel fifths that occur when a V chord with an 8-7 motion coincides with a scale degree 2-1 anticipation of the tonic as found in Bach Chorales, for instance. The "III" chord, therefore, is not a mediant, but rather a dominant whose escape tone is elided with the change in harmony. At the foundation of Ex. 23 is a common II^6-V-I perfect authentic cadence, illustrating once again that we cannot always believe what we see. (It is better to trust what we hear.) And, just as a pitch is consonant or dissonant depending on its tonal surroundings, context can transform the functional properties of other seemingly fixed musical material in many fascinating ways.

Whether we are discussing the function of a note within a chord, a chord within a key, or a key within an entire composition, context works at all levels of tonal music. In this sense the topic of modulation is not so advanced as we might tend to think. It is innately connected to the idea of context, which is one of tonal music's most basic features. And the sooner we can hear it, the sooner we can understand it.