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Volume 12

Tonal Markers, Melodic Patterns, and Musicianship Training
Part II: Contour Reduction

Laurdella Foulkes-Levy

In Part I of this two-part series on "Tonal Markers and Musicianship Training" (Volume 11, 1997), I presented a reduction technique based on rhythmic/metric procedures used to identify tonal markers. Tonal markers are pitches that are selected by a specific reduction procedure and form patterns commonly found in tonal music on levels above the surface. Common tonal patterns— scales and scale segments, neighbor notes, triads, sequences, pedal points, and pitch segments (psegs)[1]— are found on the surface as well, where they connect tonal markers. Fundamental to this reduction procedure is an understanding that tonal melody is hierarchical. Because the focus of these studies is on the identification of these tonal markers and the relevance of common tonal patterns to musicianship training, the levels we are studying are the most foreground ones, namely the surface and levels close to it. The reduction techniques are frequently applied to melodies of one to four phrases in length and do not attempt to show any large-scale background unity. The musicianship skills addressed in relation to these techniques are memory, ear training, sight singing, improvisation, and dictation.

This article, Part II, focuses on a second type of reduction, one based on melodic contour. While contour reduction is a fairly straightforward procedure, there are several aspects to it which need to be explained. I begin with a short explanation of some ideas about contour reduction in relationship to atonal melody as pre-

[1]Psegs are pitch segments of 3-5 pitches which form common tonal patterns having one or more leaps: SD 1-2-3-5 and 1-5-2 are typical psegs.

sented by Robert Morris.[2] Contour analysis traditionally has been applied to a study of the surface level features of folk, atonal, and non-tonal melodies. The "new direction" Morris presents is an approach to contour analysis in which he admits to "taking a cue from tonal music."[3] This involves two important innovations. The first is the hierarchical approach, whereby the traditional identification of pitches found at melodic turning points on the surface level is expanded so that some of those contour pitches are selected, through a designated process, to represent higher levels. Each new level, which he labels a *depth*, consists of a group of contour pitches that form a unit including the first, last, and all pitches found at turning points either within separate phrases or a complete piece.

The second innovation Morris brings to contour analysis comes form his understanding of the importance that composers place on the outer voices of a composition. He first discusses this compositional idea in his book, *Composition with Pitch-Classes*,[4] and takes a two-voiced approach to melodic contour analysis by labeling local high pitches *maxima* (*max*-pitches) and local low pitches *minima* (*min*-pitches). Thereafter he treats each group as a separate voice, taking the max-pitches to form a *max-list* and the min-pitches a *min-list*. From each list he selects, according to a *contour reduction algorithm*, the appropriate pitches to represent the higher levels, accomplished by *pruning* pitches that no longer represent local turning points at that level. The final reduction is called the *contour prime*. Its depth number indicates a contour complexity. For example, the surface level written without rhythm and labeled depth, a melody whose contour prime occurs at depth 2 is recognized as less complex than one whose contour prime occurs at depth 4. Another important aspect to the analysis of the Schoenberg melody presented in Morris' article (see Example 1) is that he discusses relationships among the pitch-class sets found at various depths, illustrating aspects of unity among levels.

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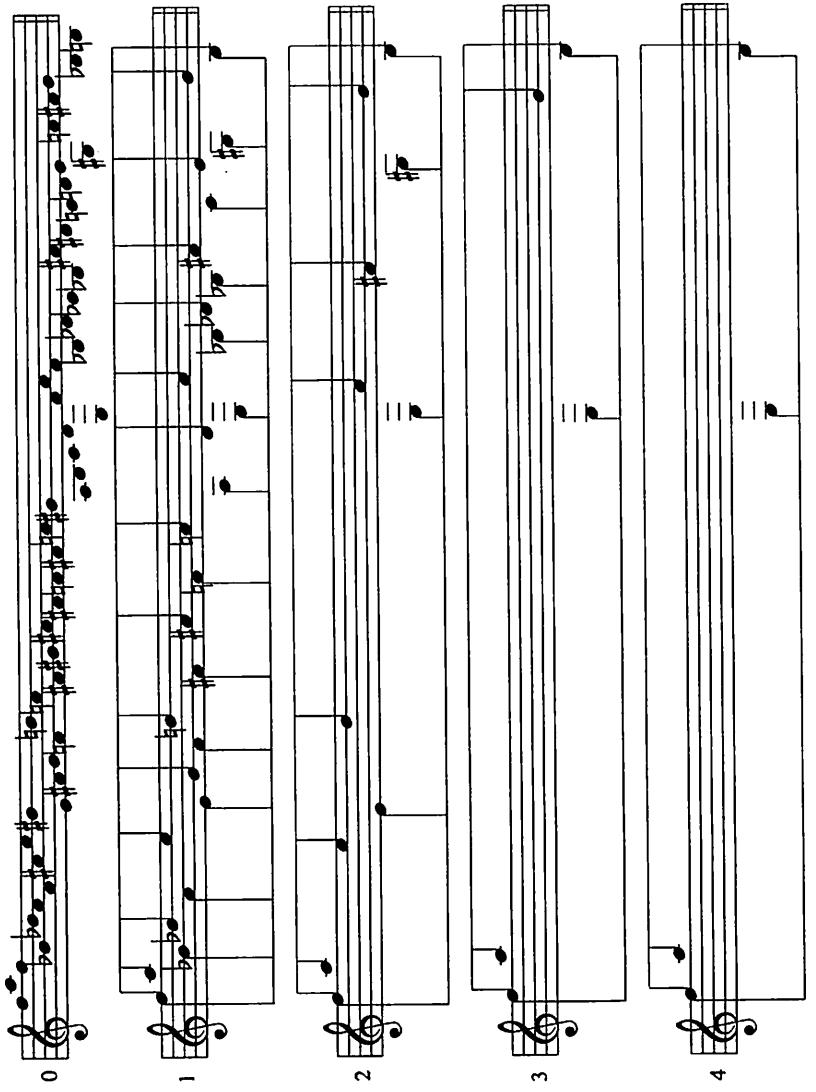
[2]Robert Morris, "New Directions in the Theory and Analysis of Musical Contour," *Music Theory Spectrum* 15 (1993): 205-228. The "melody" he uses is from Schoenberg's Piano Piece, Op. 19 No. 4.

[3]Ibid, 212.

[4]Robert D. Morris, *Composition with Pitch-Classes: A Theory of Compositional Design* (New Haven: Yale University Press, 1987): 37.

EXAMPLE 1: Morris (1993), Ex. 18, p.217: A contour reduction of the melody from Schoenberg's Op. 19, No. 4 [5]



[5]This analysis is reproduced as it is shown in the article, although the penultimate pitch, Bb_3 should be included in the min-list at depths 1 and 2. It would be pruned at depth 3.

In Morris's reproduction of Schonberg's melody, the top staff (depth 0) presents all the pitches in the melody without rhythm. At depth 1, the first, last, and all pitches at turning points are stemmed, with max-pitches receiving upward stems and min-pitches receiving downward stems. At depth 2 each list or "voice" is pruned separately. In the max-list, for example, only pitches that represent a new high pitch *within the max-list* are retained; all others are pruned. The third pitch of the max-list, Db_5,[6] is eliminated at depth 2 because it is not an upper turning point (Db_5-E_5-G_4). It is removed at depth 3 because it is no longer a local turning point in the upper voice. The same procedure is followed for the min-list except, of course, that the pitches which remain are local low turning points. After the first pitch, which remains a member of both voices, Bb_4 and A_4 are pruned since they do not reflect a change of direction in the bottom voice. The motion does reverse direction with E_4, and that pitch represents the min-list at depth 2. It is subsequently pruned in depth 3. This process continues until no further pruning can take place, leaving only the contour prime, here at depth 4.

CONTOUR ANALYSIS APPLIED TO TONAL MUSIC

While Morris's contour theory focuses on atonal music, I apply that theory to the study of tonal melody, taking a cue from Morris's work on atonal melody and using this procedure to identify tonal markers. I combine the concept of hierarchy in tonal music with Morris's contour theory which, as noted above, is also hierarchical and influenced by the two-voiced concept of melody. This can be accomplished by adapting his *contour reduction algorithm* to tonal music, by means of a few supplementary rules. In addition, I use his terminology of depths, max- and min-pitches, max- and min-lists, and the visual representation in which the surface level is on top and subsequent depths below. Included in the visual representations are noteheads with and without stems, beams, and slurs that show hierarchical relationships. The noteheads with stems are tonal

[6]The notation of pitches is based on the practice of the Acoustical Society of America, where middle C is C_4.

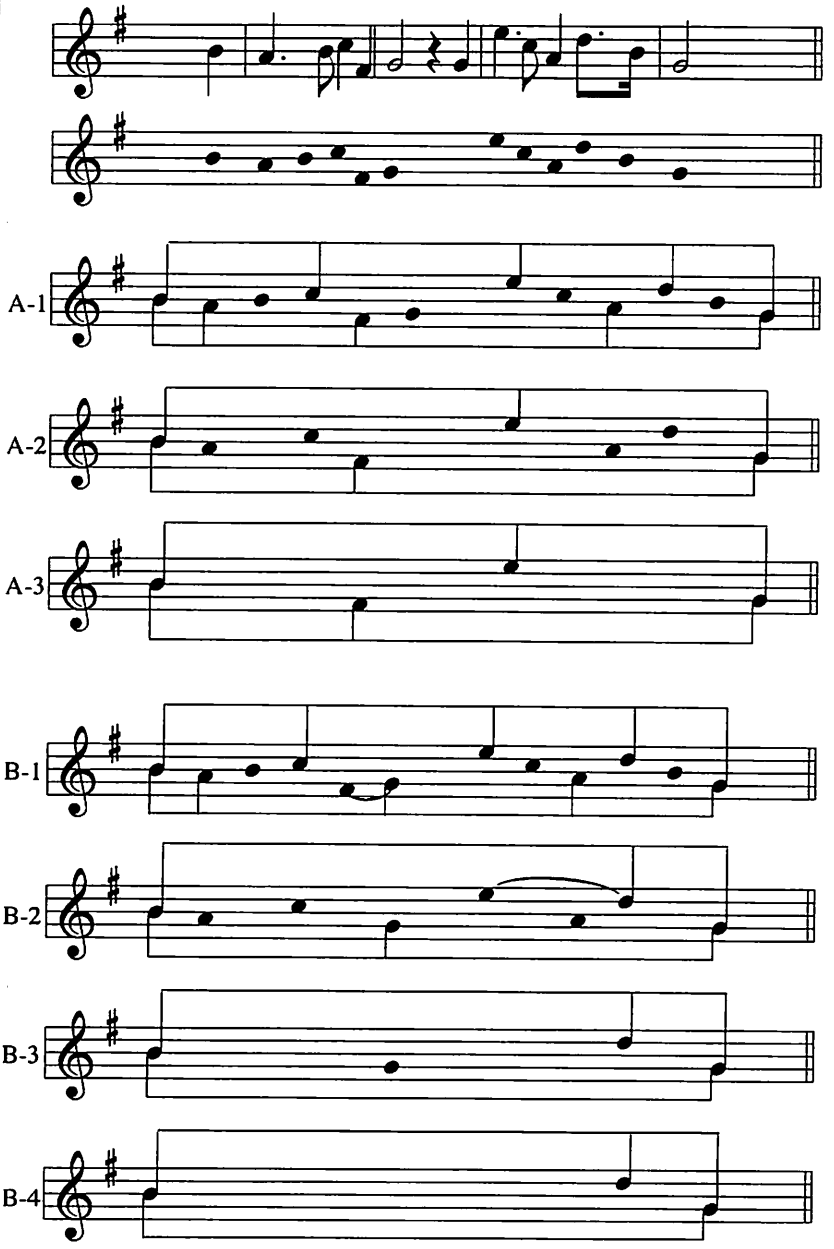
markers and the beams group them. The adoption of this terminology and visual representation separates this work in contour reduction from my preceding work in rhythmic reduction (where hierarchical levels are given rhythmic representations such as half and quarter notes) and levels are notated *above* the surface, visually reinforcing the idea of higher levels. The representations are meant for analytic purposes rather than pedagogical ones; they are not intended for classroom use.

In contour analysis we are concerned with pitches that establish specific boundaries, in particular the opening and closing pitches of a phrase, as well as the upper and lower turning points. While there is only one opening and one closing contour pitch, there may be any number of upper and/or lower turning points, depending upon the shape of the melody. A melody which is a simple arch form may, for example, have only an opening, closing, and one upper turning point, but a wavy-line melody may have two or more upper and lower turning points.

In applying contour analysis to tonal melody the focus is on identifying contour pitches that reinforce the tonality of a given melody and serve as tonal markers. Herein lies the first and most important difference between contour analysis as applied to atonal melody and contour analysis applied to tonal melody. In atonal melody an upper or lower boundary (Morris's max- or min-pitches) is the *exact* pitch that is highest or lowest at a turning point. In tonal melody, however, the actual highest or lowest pitch may be tonally subordinate to the pitch it precedes and/or follows. In other words, the tonal marker may not be the actual highest or lowest pitch at a particular turning point.

The melody by Haydn shown in Example 2 is analyzed twice, once strictly following Morris's algorithm (levels A-1 - A-3) and once with tonal adaptations (levels B-1 - B-4). The surface level and depth 0 belong, of course, to both analyses. Depth A-1 reveals a max-list of B_4-C_5-E_5-D_5-G_4, and a min-list of B_4-A_4-$F\#_4$-A_4-G_4. In the subsequent depths each list is reduced separately, following the algorithm. In the max-list at depth A-2 both C_5 and D_5 are de-selected and

EXAMPLE 2:. Haydn, "She Never Told Her Love," mm. 1-4



pruned at depth A-3, leaving E_5 as the highest contour pitch.[7] In the min-list at depth A-2 both A4's are de-selected and pruned at depth A-3, leaving $F\#_4$ as the lowest contour pitch of the melody. The contour prime, depth A-3, combines the two lists: B_4-$F\#_4$-E_5-G_4. While the min-list of this final reduction (B_4-$F\#_4$-G_4) makes good tonal sense, the max-list (B_4-E_5-G_4) gives a stronger impression of e minor than of G major. The prime itself, therefore, is not the most convincing representation of this tonal melody, indicating that the correct tonal markers have not been selected.

With several adaptations to bring out the tonal strengths of the melody, we see that $F\#_4$ (the leading tone) at depth B-1, rather than being selected as a tonal marker within the min-list, is considered a lower neighbor note to the tonic and attached to it, obviously the stronger tonal pitch and marker. Likewise $F\#_4$ is eliminated at depth B-2, and G_4 in m. 2, as a repeated pitch within the min-list, is eliminated in favor of the final G_4 for the contour prime. The max-list at depth B-1 is the same as that in depth A-1, but at depth B-2, E_5 is treated as an incomplete upper neighbor note to the dominant pitch, D_5. D_5 is therefore the tonal marker. The tonal markers in the contour prime (B_4-D_5-G_4) form a tonic triad, revealing the strong tonal implications of this melody.

Neighbor notes (complete and incomplete) and appoggiaturas are the most common pitches attached to tonal markers that are not located at the actual turning points. These attached pitches are eliminated at the next depth, leaving the stronger tonal pitch as the appropriate tonal marker. Melodic sequences may also be eliminated in favor of the tonal markers to which they are associated. Example 3 shows a melody that opens with a sequence. This short surface-level sequence consists of an ascending third and descending second (E_5-G_5-F_5-A_5-G_5). Rather than choose each pitch as a tonal marker, even though each produces a change of direction on the surface, only the opening and closing pitches of the sequence are selected as the depth 1 tonal markers. These first three tonal markers reveal an opening ascending tonal triad (E_5-G_5-C_6) distributed between the max- and min-lists at depth 1.

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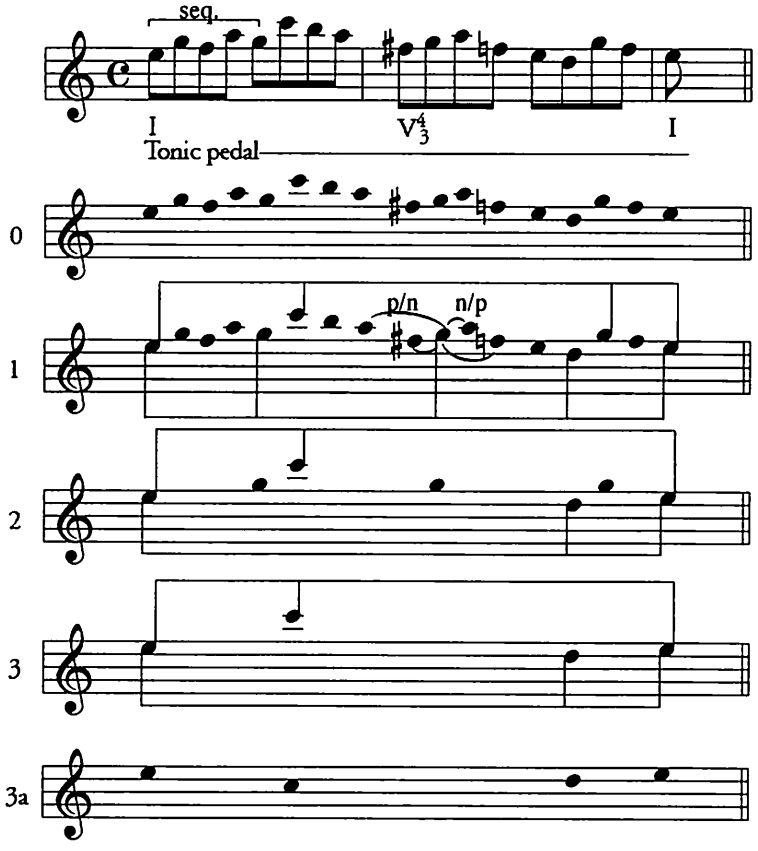
[7]Unlike Morris's graphs, mine contain pitches without a stem that are de-selected pitches eliminated at the following depth.

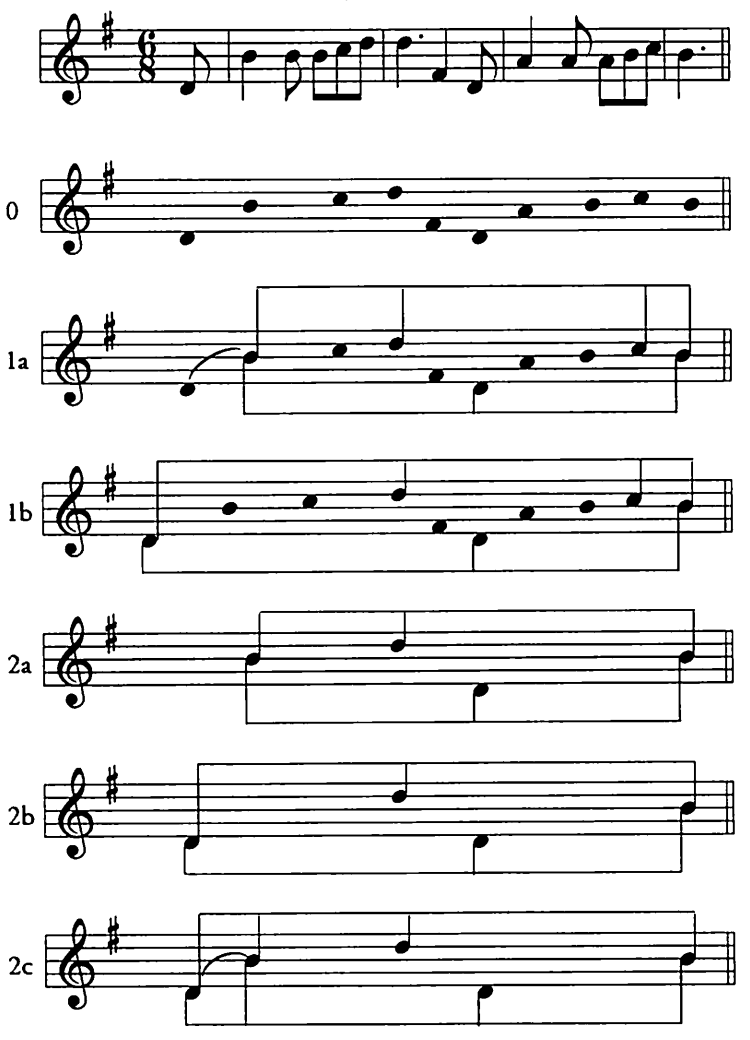
EXAMPLE 3: Mozart, *String Quintet in C*, K. 515, I, mm. 273-75



In addition to the elimination of pitches that are actual contour pitches in favor of associated tonal markers that occur at melodic turning points but are not the actual contour pitches, tonal music has several other features that distinguish it from atonal melody. One concerns repeated pitches and the other upbeats. Example 4, a melody by Mendelssohn, contains an example of each.

The immediate repetition of one or two pitches is much less common in atonal music than in tonal music, and Morris's algorithm

EXAMPLE 4: Mendelssohn, "Auf Flügelndes Gesanges," mm. 1-4



reflects this. But in tonal music repeated pitches frequently appear on the surface, requiring an adaptation to the algorithm. In tonal melody repeated pitches are eliminated at depth 0, before the first tonal markers are identified, as shown in Example 4.

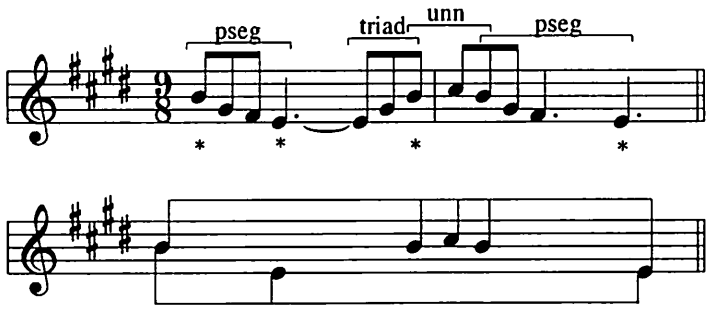
Upbeats in tonal music may be interpreted as emphasizing the second pitch, the metrically stronger pitch and a possible opening tonal marker. Depths 1a and 1b of Example 4 present different possibilities, the first with the goal of the upbeat (B_4) being chosen as the tonal marker and the second (depth 1b) with the upbeat itself (D_4) as the tonal marker. Depths 2a and 2b present their respective primes. Depending upon which solution appears to represent the melody better, the upbeat may or may not be eliminated. However, a third possiblity exists, namely to consider the first two pitches a *double* opening tonal marker (D_4-B_4), as shown in depth 2c. This interpretation is often helpful in musicianship training situations, as discussed below. The slur connecting the two notes is the visual representation for the two-pitch upbeat opening.

Another situation in which a multi-note tonal marker is sometimes appropriate is with a single neighbor note. The melody in Example 5 is a very simple one with a contour prime consisting of these tonal markers: B_4-E_4-B_4-E_4 with $C\#_5$ being eliminated as less important than the dominant B_4.[8] Since the $C\#_5$ in the complete upper neighbor note pattern occurs on the downbeat, emphasizing its prominence, a possibility for singing the tonal markers is to sing B_4-E_4-[B_4-$C\#_5$-B_4]-E_4 to bring out this feature of this melody. While it may seem more viable theoretically to choose only a single tonal marker in upbeat and neighbor note situations, I have found that the multi-note selections work better for students in aural training situations. I will discuss this point further when considering training musicianship skills.

This introduction to tonal melody contour reduction has given us insights into the selection of tonal markers and some of the patterns they create at each level. It remains to notice the patterns that connect the tonal markers themselves. On the surface level of Example 5 there are several common tonal patterns. First is a pseg (B_4-$G\#_4$-$F\#_4$-E_4), followed by a tonic triad connecting E_4-B_4. That B_4 is prolonged by the complete upper neighbor note pattern men-

[8]Beginning with this example, asterisks mark tonal markers that are clearly seen without the use of a graph.

EXAMPLE 5: Tchaikovsky, "Whether Day Dawns," Op. 47, No. 3, mm. 1-2



tioned above (B_4-C#$_5$-B_4), and the ending B_4-E_4 is connected by the same pseg which opens the melody (B_4-G#$_4$-F#$_4$-E_4).

If we return to Example 3, some interesting patterns emerge at depth 1. After the opening sequence connecting the first pitch E_5 to G_5, the two tonal markers G_5 and C_6 form a triadic leap. C6 is then connected to D_5 through a scale (C_6-B_5-A_5-G_5-F_5-E_5-D_5) that encompasses both passing and neighbor motion. In the middle of this motion there is an emphasis on G_5 (the dominant pitch) by way of a figure I call "passing/neighbor" (B_5-A_5-F#$_5$-G_5) that elides into a "neighbor/passing" figure (G_5-A_5-F_5-E_5). In the first, the "passing/neighbor" configuration, A_5 acts as both a passing tone and part of a double neighbor-note pattern surrounding G_5, while F#$_5$ is, of course, its lower neighbor. The reverse happens on the other side of G_5, with A_5 functioning as an upper neighbor and F_5 as both a passing tone and a member of a double neighbor-note pattern following the main pitch. With this emphasis on G_5, it might be appropriate to label it a tonal marker at depth 1, even though it is deselected at depth 2 and eliminated in the prime at depth 3.

Tonal melodies that are reduced using the contour reduction procedure described above reveal features that include tonal markers and common tonal patterns. The patterns are found as combinations of tonal markers and as the melodic configurations connecting individual markers.

Contour reduction procedures obviously focus on melodies that exploit melodic space, and sometimes the tonal markers that form the contour prime are at a great distance from one another. The prime found in Example 3 above consists of the pitches E_5-C_6-D_5-E_5. As ordered *pitch classes* (pcs = E-C-D-E) it is easy to see a close tonal and scalar relationship. If we *transform* this pseg so that all pitches are as close as possible, the result is: E_5-C_5-D_5-E_5, as shown in depth 3a. The collapsing or transforming of a contour prime allows for a stronger understanding of the underlying tonal pattern that generalizes the contour prime's tonal markers. A transformed pattern is not considered a new depth, since nothing more is eliminated, but an octave adjustment of one or more tonal markers is made within the prime. It therefore retains the same depth number as the prime, although at a subsidiary level.

When composers do not exploit the metric properties of a melody by placing tonal markers in important metrical positions, contour reduction, with appropriate tonal adjustments as presented above, is usually the procedure that brings out the strongest tonal features of a melody. The information presented below teaches students both to understand these properties of melodic contour and to develop stronger musical skills. These skills are the same as those addressed in Part I: musical memory, ear training, sight singing, improvisation, and dictation.

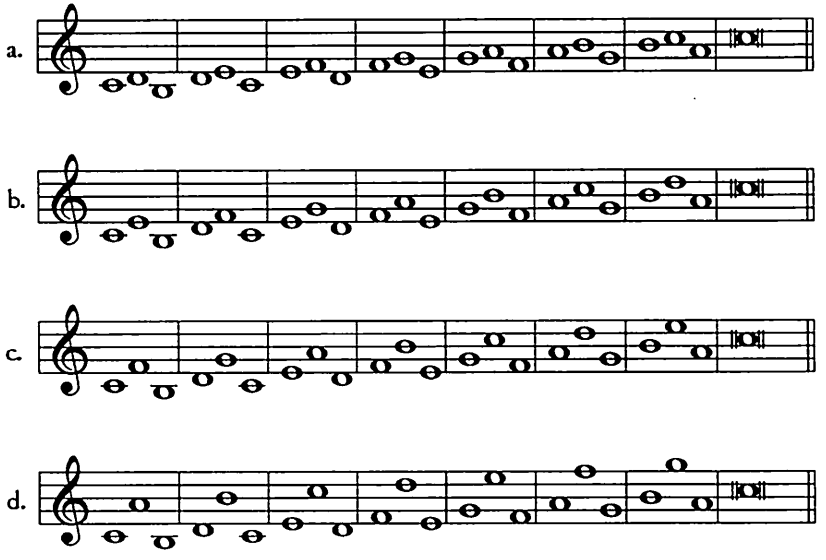
SKILL BUILDING ACTIVITIES: MEMORY

An important first goal in developing musical memory is to learn common patterns. The article on rhythm reduction presented exercises for learning common patterns found at all levels of structure in tonal music, based on specific rhythm patterns. The melodic patterns include scales and scale segments, neighbor-note patterns, triads, sequences, pedal points, and psegs. In that article each pattern reinforced a particular metric background and was related to a given rhythm pattern. When studying patterns in relationship to contour, the focus becomes the up-and-down relationship of pitches. Example 6 works with trichords in which the movement is up-down and the last pitch is lower than the first. As a contour class, the

trichord is labeled CC <120>, where 0 represents the lowest pitch, 1 the next highest, and so on.[9] In Example 6a the pattern is an ascending second, descending third, in Example 6b, an ascending third, descending fourth, etc. Obviously the possibilities for different patterns are endless, and the goal is not for students to memorize each and every pattern, but rather to develop a fluency that allows them to reproduce any ascending-descending relationship with ease. The usual nmemonic devices of solfége syllables, numbers, and absolute pitch names are, in my opinion, essential to encode important relationships and strengthen the musical ear.

An exercise that helps students understand transformed contour primes and how melodies exploit melodic space is based on octave prolongations of pitches. Example 7 contains several ex-

EXAMPLE 6

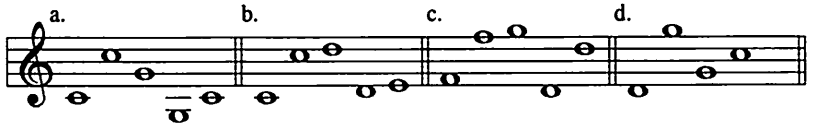


[9]Two definitions of contour classes are presented by Michael Friedmann, "A Methodology for the Discussion of Contour: Its Application to Schoenberg's Music," *Journal of Music Theory* 29/2 (1985): 227-30 and Robert Morris, *Composition with Pitch-Classes* (1987): 28-29.

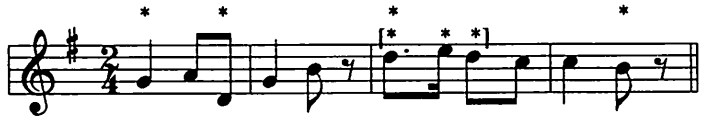
amples that play with contour space, although they do not always represent the contour prime. Example 7a plays with tonic and dominant pitches, using ordered pcs C-G-C, while Example 7b uses a scale segment (pcs C-D-E), and Examples 7c and 7d use psegs (F-G-D and D-G-C respectively). The teacher may want to design other such exercises that contain no stepwise motion. Using C-D-E (as in Example 7b) a harder exercise would be: C_4-C_5-D_4-E_5-E_4. Again, the goal is for students to gain a basic level of fluency with these types of patterns and to learn to use the voice when there are quick register changes, but not to memorize them all. The teacher must decide how many the students memorize to attain fluency.

In addition to memorizing patterns, contour reduction can facilitate memory of melodies. In the following melody, students first establish the tonality, perhaps by singing this chord progression in G with absolute pitch names: I-ii^6-V-I. Students first sing the tonal markers that constitute the contour prime, in this case G_4-D_4-D_5-B_4 (marked with asterisks). The prolonged upper dominant (D_5-E_5-D_5) could be sung as a multi-pitched marker (G_4-D_4-[D_5-E_5-D_5]-B_4). At this point the rhythmic and metric aspects of the melody are included as the students sing the markers with the appropriate connecting patterns. For example, the opening tonal marker (G_4) is followed by an incomplete upper neighbor note (A_4) that, along with D_4, is a member of the dominant. These patterns are so clear and obvious that, if the students have previously memorized them as common tonal patterns, they will recognize them quickly, making the singing and memory of this melody an easier task. If this activity is done during class, the quicker and more experienced students should be required to transpose the melody D to other major keys with absolute pitch names. While this memory work is a pre-dictation skill, this type of exercise in which students are not expected to notate is valuable for developing quicker memory skills and at the same time reinforcing melodic patterns and the relevance of contour studies to tonal melody.

EXAMPLE 7



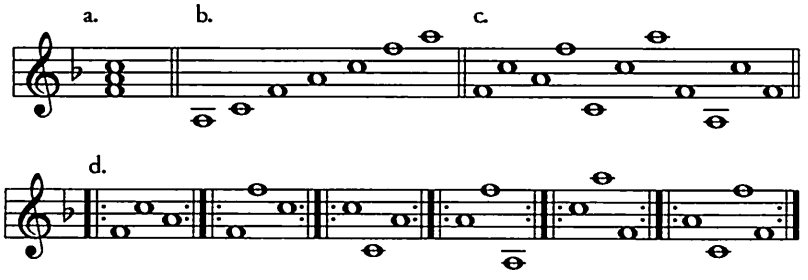
EXAMPLE 8: Mussorgsky, *The Fair at Sorochinsk*, Act II
"Song of Khivria," mm. 1-4



EAR-TRAINING ACTIVITIES

Ear-training activities are designed to reinforce the principles of contour reduction. To prepare students for an understanding of a contour prime, they must be able to sing members of the tonic and dominant triads in an extended vocal range. An early activity is to "explore the space" of a tonic triad, emphasizing these wide ranges, as shown in Example 9. The pcs of the triad are F-A-C, as shown in Example 9. They are written on the staff in a range extending from A_3 to A_5 in Example 9b. The teacher points to them in a random order as, for example, in Example 9c, while the students sing the appropriate solfége syllables or numbers. Next, an echo procedure is used. The teacher plays or sings a group of pitches on a neutral syllable and the students answer with the correct solfége syllables, numbers, or absolute pitch names. The order of pitches in Example 9c can be used for echoing single pitches, while echoes of 3-4 pitches are illustrated in Example 9d.

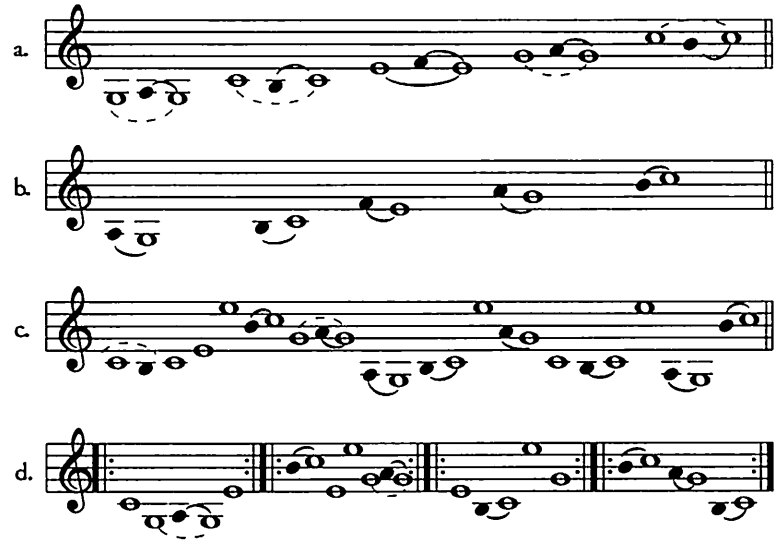
EXAMPLE 9



The next exercise contains examples for practicing tonal markers with upper or lower neighbor notes attached to them. Example 10 focuses on the members of a C major triad ranging from G_3-E_5. These procedures to "explore the space" and echo sing use open noteheads for the triad members and closed noteheads representing the neighbor notes. Example 10a begins with complete neighbor note configurations and Example 10b with incomplete ones. It is clear that the leading tone is connected to the tonic, the subdominant to the mediant, and the submediant to the dominant. Once the exercises in Example 10a and b are mastered, "exploring" takes place. This simply means that those patterns are performed in a random order, as illustrated in Example 10c. The teacher points to various portions of Examples 10a and 10b, resulting in Example 10c as one possible manifestation of the exercise. The next step is an echo procedure, as discussed before and shown in Example 10d. The teacher either sings or plays one of the selected patterns. Individual students repeat the pattern, using either solfége, numbers, or absolute pitch names.

Another ear training exercise based on contour patterns that helps prepare the students for sight singing and dictation of contour primes works with four-note primes in an echo procedure. In Example 11 they consist of members of the tonic and dominant seventh chords, some with neighbor notes. The students repeat the four pitches with the correct solfége, numbers, or absolute pitch names, after the teacher sings or plays a complete pattern. Example

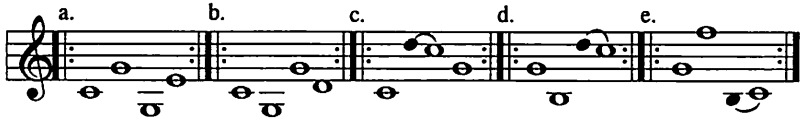
EXAMPLE 10



11a works with a C major triad with the middle pitch, G, prolonged by octave. In Example 11b the final pitch, D_4, is a member of the dominant chord, and in Example 11c an incomplete upper neighbor note is attached to the tonic pitch which is prolonged by octave repetition. The final two examples (Examples 11d and 11e) show other incomplete neighbor notes with closed noteheads.

Another ear training activity includes the identification of specific contour pitches and patterns in melodies that the teacher plays or sings on a neutral syllable. This is clearly a pre-dictation activity whose purpose is to teach students to focus on specific contour pitches. After an initial preparation to establish the tonality of a melody, the students must identify the first and last pitches. The teacher can decide whether or not to do more—for example, to identify all the markers in the contour prime—or to concentrate only on the first and last pitches in several melodies. The teacher may also assign harder tasks for the quicker students. Everyone may be required to get at least the first and last pitches after a specified number of playings, while those who are able also identify the contour

EXAMPLE 11



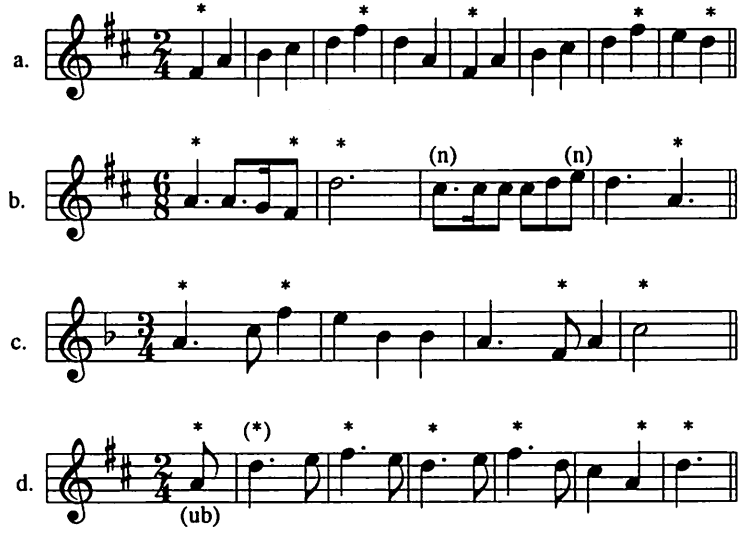
prime and, if the melody is not overly difficult, learn the complete melody. Since notation is not the goal here, the quicker students should be required to memorize the complete melody. Rather than notate the melody, the teacher may play it again the following day, so that students can commit it to memory again, but hopefully more quickly this time. The melodies in Example 12 contain examples of simple contour primes addressing the problems of tonal markers (labeled with asterisks), such as the pruning of neighbor notes (Example 12b) and upbeats (Example 12d). The teacher may decide whether or not to allow the use of multiple-pitch tonal markers in these cases. It is important that there be pre-dictation activities that do not require notation, but which direct the students' attention to important aspects of a melody, in these cases tonal markers derived from contour reduction procedures.

SIGHT-SINGING ACTIVITIES

The role of contour reduction in developing sight-singing skills is a fairly simple one. First, students establish the tonality by singing the tonic and dominant chords. Next, they sing the tonal markers that constitute the contour prime of each phrase. Depending upon the difficulty of the melody, this may only be the first, highest, and last pitches (as in Example 13a), or first, last and several high and/or low pitches (as in Example 13b). In Example 13a the prime itself (marked with asterisks) consists of the pitches B_2-$D\#_4$-B_3, while the depth closer to the surface adds 2 pitches (marked with plus (+) signs), resulting in a more wave-like contour: B_2-$F\#_3$-$D\#_3$-$D\#_4$-B_3. Having sung those pitches, the students next conduct and sing the melody as notated. Even with such a simple melody, this contour

EXAMPLE 12: A. Sullivan

a. *The Gondoliers,* Act I, No. 1, "Thank you, gallant gondolieri," mm. 563-70
b. *The Sorcerer,* Act I, No. 14, Finale, "Eat, drink, and be gay," mm. 1-4
c. *H.M.S. Pinafore,* Act I, No. 5, "Sorry her lot," mm. 18-21
d. *The Sorcerer,* Act I, No. 1, "Ring forth, ye bells," mm. 1-6

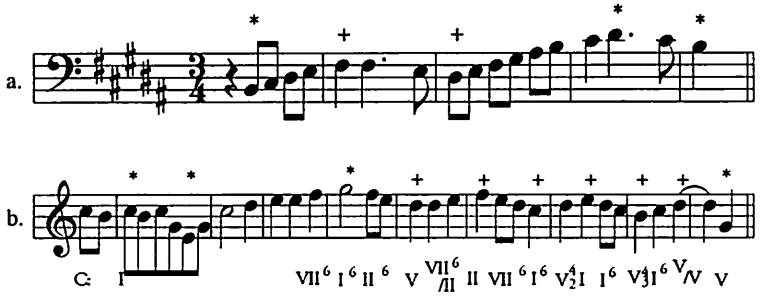


introduction prepares for a successful and flawless singing of the complete melody.

The melody in Example 13b is a more difficult one which can be introduced using contour information. The tonal markers forming the contour prime are C_5-E_4-G_5-G_4 (marked with asterisks). The melodic line connecting G_5-G_4 consists of a sequence of contour pitches (marked with plus signs): G_5-D_5-F_5-C_5-E_5-B_4-D_5, then a leap down a fifth to the final pitch, G_4. After singing this contour introduction students can recognize the opening tonic prolongation, triad, and scale segment that connect the first three tonal markers of the

EXAMPLE 13

a. Berlioz, "Serenade de Mephistopheles," mm. 1-5
b. Beethoven, *Violin Sonata in C minor*, Op. 30, No. 1, III, Trio, mm. 1-9

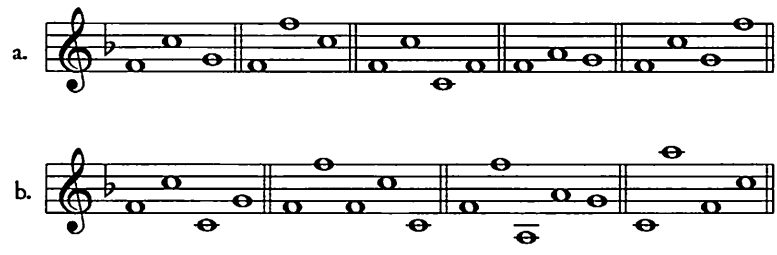


prime. With this knowledge they are prepared for a singing experience in which they can pay attention to the flow of the melodic line and proper phrasing.

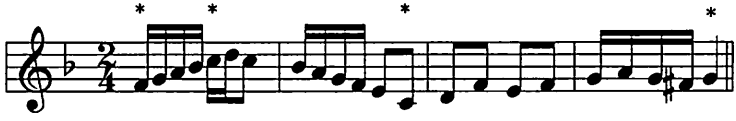
IMPROVISATION ACTIVITIES

Improvisation can begin with students making up short contour primes, such as those presented in Example 14. Example 14a demonstrates primes with tonal markers that consist of various patterns (psegs, triads, and scale segments), while Example 14b adds more octave doublings and wider spaces between pitches. The next step would be to improvise patterns to connect the tonal markers in a prime. Example 15 gives a short example, based on a prime of F_4-C_5-C_4-G_4. This improvisation exercise is made more complicated when more tonal markers are added to the prime, producing a melodic line with more waves in it. Students need to be encouraged to sing large intervals between tonal markers to allow space for the melody to go. Of course, rhythm and meter must be incorporated so that students do not just sing at random with no temporal sense. Therefore, they need to be encouraged to sing simple melodies that allow them to incorporate all of those dimensions at the same time.

EXAMPLE 14



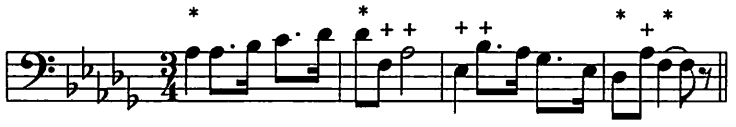
EXAMPLE 15



DICTATION ACTIVITIES

The memorizing of common tonal patterns, contour primes, and melodies using contour reduction procedures are essential preparatory steps to dictation. Several other steps can be taken before complete dictation is required. One such activity is for students to notate without rhythm the tonal markers that constitute the contour prime and other depths closer to the surface. In Example 16 the contour prime consists of these tonal markers Ab_3-Db_4-Db_3-F_3 (marked with asterisks), as the first, highest, lowest, and last pitches. The next level closer to the surface adds contour tonal markers (with plus signs) that connect Db_4-Db_3 (F_3-Ab_3-Eb_3-Bb_3), as well as the Ab_3 connecting Db_3-F_3 at the end of the phrase. While all students should complete this information, some may be able to go ahead and notate the correct rhythm and pitches for the entire melody. However, the goal of this activity is to concentrate on the tonal markers that serve as contour pitches.

EXAMPLE 16: Donizetti, *Don Pasquale*, Act I, "Bella siccome un angelo," mm. 1-4

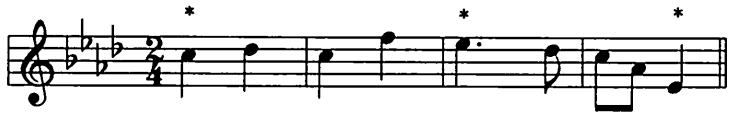


Another form of dictation is to give the contour prime and have the students first pay attention to certain tonal features, such as upbeats and neighbor notes. The melody by Schubert in Example 17 offers ample opportunities. The given prime is C_5-Eb_5-Eb_4. Students first identify the upper neighbor note (Db_5) at the beginning and the incomplete upper neighbor note (F_5) attached to Eb_5. Alternatively, they may be given the tonal markers on a level closer to the surface of the melody and asked to fill in the connecting pitches. Last, they add the correct rhythms. Example 18 shows a depth containing tonal markers G_4-E_5-G_4-G_5-E_5 (marked with asterisks). Students fill in the correct rhythms and pitches to connect those markers. This activity allows them to reinforce their knowledge of common tonal patterns within the context of a melody by a master composer.

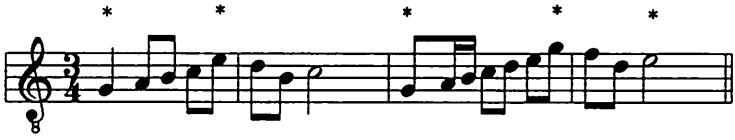
Eventually students must be required to notate complete melodies, such as the one presented in Example 19. After the tonality is established, the students notate the pitches of the contour prime (D_3-B_3-D_3-B_3) before "filling in the gaps" and correctly notating the entire melody.

One final and more challenging dictation activity is to give the students the ordered pitch classes of a transformed contour prime. Their first goal, after the tonality is established, is to notate those pitch classes as pitches. In Example 20 the ordered pcs which are given the students are C, Bb, A. Once the actual pitches of the contour prime are known (C_3-Bb_3-A_2), the students can work on an orientation to the meter and rhythm patterns and the surface-level pitches. Working backwards is often helpful, since students usu-

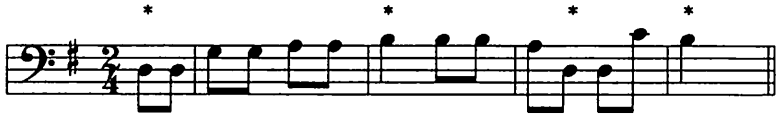
EXAMPLE 17: Schubert, "Gemeines," Op. 14, No. 2, mm. 1-4



EXAMPLE 18: Bach, Cantata No. 135, *Ach Herr, mich armen Sünder,* "Tröste mir, Jesu," mm. 1-4

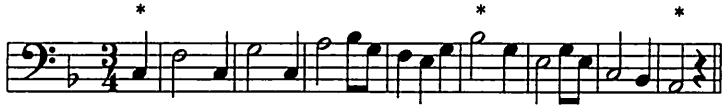


EXAMPLE 19: Smetana, *The Bartered Bride,* Act II "Komm, mein Söhnchen," mm. 1-4



ally remember best what they heard last. In this case it means notating the final three pitches (C_3-Bb_2-A_2), a surface-level rendering of the contour prime. The opening three measures are another clear focus with a C_3 pedal supporting an ascending scale segment (F_3-G_3-A_3). The double neighbor-note pattern following that A_3 (Bb_3-G_3) takes the melody down to the tonic F_3. This pitch is prolonged

EXAMPLE 20: Mozart: *Die Zauberflöte*, Act II "O Isis und Osiris," mm. 1-8a



by its double neighbor notes (E3-G_3) before the arrival of the highest pitch of the melody, Bb_3. The descending third motion away from this pitch is an arpeggiation of the V7 chord (Bb_3-G_3-E_3-C_3) and the connection to the final scale segment mentioned above. In addition to playing the melody many times, the job of the teacher is to help the students focus on various parts of the dictation process: the tonal markers, the patterns connecting them, and the rhythm patterns on the surface.

CONCLUSION

These two articles on "Tonal Markers and Musicianship Training" introduce several features of tonal melody that are useful in developing and training musical skills such as memory, ear training, sight singing, improvisation, and dictation in an undergraduate aural skills curriculum. The two reduction techniques are predicated on a hierarchical understanding of tonal melody, although I make no claim that they are the only procedures for attaining higher levels. Teaching students to understand tonal hierarchy and the prevalence of common patterns can greatly facilitate the musicianship training of our talented students, whose abilities deserve to be developed to their highest potential.

The Use of Binary Logic and Processing to Enhance Learning and Instruction in the Undergraduate Theory Classroom

Rudy Marcozzi

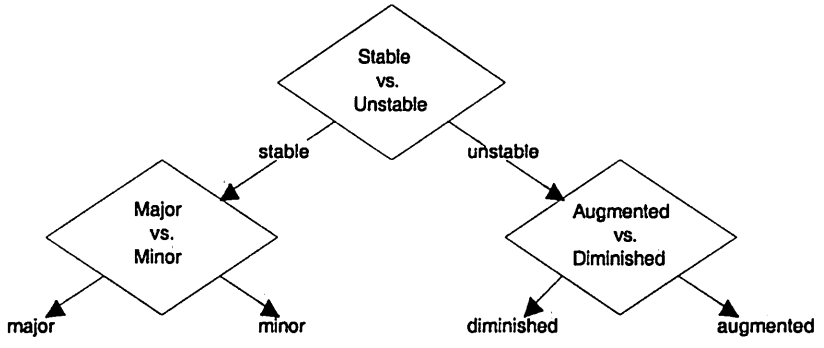
The ubiquitous personal computer, nowadays complete with full-color monitors, interactive CD-ROM drives, and lightning-fast internal modems, has revolutionized nearly every facet of our lives, including the way we teach and learn. Yet hidden beneath all the high-tech wizardry, the computer offers us a simple model that can enhance our learning and teaching, a background paradigm that is usually taken for granted, no doubt because it is overshadowed by the alluring sparkle and shine of the foreground technology.

I am referring to the fact that the computer's speed and efficiency is due to the way in which it breaks down every task into a series of binary questions or decisions. Since there are only two states (yes/no or on/off), the processing is extremely rapid, even when many thousands of such decisions are arranged in lengthy sequences. I call this "binary processing," and have used it as a successful problem-solving approach in the undergraduate theory classroom with both written and aural topics. In this article, I will first present binary process models for a few very basic topics and comment on the many advantages this type of approach brings to the learner. Next, I will present two hypothetical models of binary processing for an advanced topic and use them to compare aural and visual (or cognitive) approaches to the same problem. Here, I will show how models of binary sequences can help teachers discover the most effective pedagogical approaches to a given topic, and will argue for the early incorporation of aural processing into all instructional sequences. I will conclude with a critique of the ideas that have been presented and a summary of the advantages they bring to learning and instruction.

HELPING LEARNERS: SIMPLE BINARY PROCESSING AND ITS BENEFITS

Let's begin with a very rudimentary example, relevant to the early weeks of a beginning aural skills class when students are typically required to be able to identify the four common types of triads, discriminating them one from the other. A diagram that illustrates the possible binary processing involved for this problem can be seen in Figure 1.

FIGURE 1: Aural Discrimination of Four Basic Triad Types



Each diamond of the diagram requires a decision involving only two choices. In the highest diamond, the student is actually creating two broad families from the four possible choices by deciding if the triad sound is comparatively stable (major or minor) or unstable (diminished or augmented). Once that decision is made, the process follows the appropriate branch to the next level of decisions. Following the stable branch, the student must next distinguish a major triad from a minor one; following the unstable branch, the student must next distinguish an augmented triad from a diminished one. Teaching these discriminations can usually be accomplished fairly quickly using a student's inner hearing and imaginative association (for example, major is brighter or lighter than

the darker sound of minor; an augmented triad might sound eerie, while a diminished triad sounds tense) without having to arpeggiate the triad or break it down into component intervals.

At first, breaking such a rudimentary task down in this manner may seem cumbersome or unnecessarily complex, but those who have taught ear training for any length of time know that it is not at all uncommon for some students to have trouble with this kind of basic problem. More important for our purposes, even the simple binary processing involved in this example—limited to only two decisions and two possible branches— illustrates many of its pedagogical advantages.

Of primary importance is that the processing is comparative. Similarities and differences among sounds that are familiar are used to learn about sounds that are not. As students compare sounds to one another, they discover and articulate relationships among them. Since music is a network of relationships and not a series of isolated events, it is the ability to process relationships rather than isolated events that will later lead to more musical performance and analysis. As Michael Rogers notes, "Developing an appreciation for discriminating and articulated comparisons is a habit worth cultivating for all aspects of theoretical study."[1]

Another crucial advantage of the approach is that it relies on the aural imagination of each student, hence focusing the task from the very beginning on the real goal of all ear training: the development of the inner ear. Class discussion of associative possibilities will allow students to understand that the range of potential associations is very broad and choices of meaningful associations vary from student to student. This will enable them to capitalize on the idiosyncratic nature of their inner ear and develop reliable individual strategies. The process also focuses on the musically salient feature of the triad, its harmonic quality, while avoiding mechanical dissection into component intervals (melodic events). Such parsing is a necessary skill, but it is often impossible for beginners; even when it is achieved, it usually remains a very time-consuming (and, there-

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[1]Michael Rogers, *Teaching Approaches in Music Theory: An Overview of Pedagogical Philosophies* (Carbondale IL: Southern Illinois University Press, 1984), 43.

fore, musically impractical) task. More significant, this kind of processing does not transfer well to subsequent activities when the same triad qualities are encountered in different inversions and voicings.

The binary model offers further advantages to students because it fosters early success. While it is typical for some students to confuse augmented and diminished triads, most students usually can negotiate the earlier decision diamond (stable vs. unstable) or even the parallel one (major vs. minor) with relative ease. Hence, even those students who are encountering difficulties with later decision diamonds can see at least partial success with earlier ones. This early partial success lessens the despair that often sets in as some students encounter difficulty with an activity that seems to pose no problems to others in the class. More significant, the initial success, even though incomplete, motivates further practice and proficiency, and leads ultimately to total mastery of the entire process.

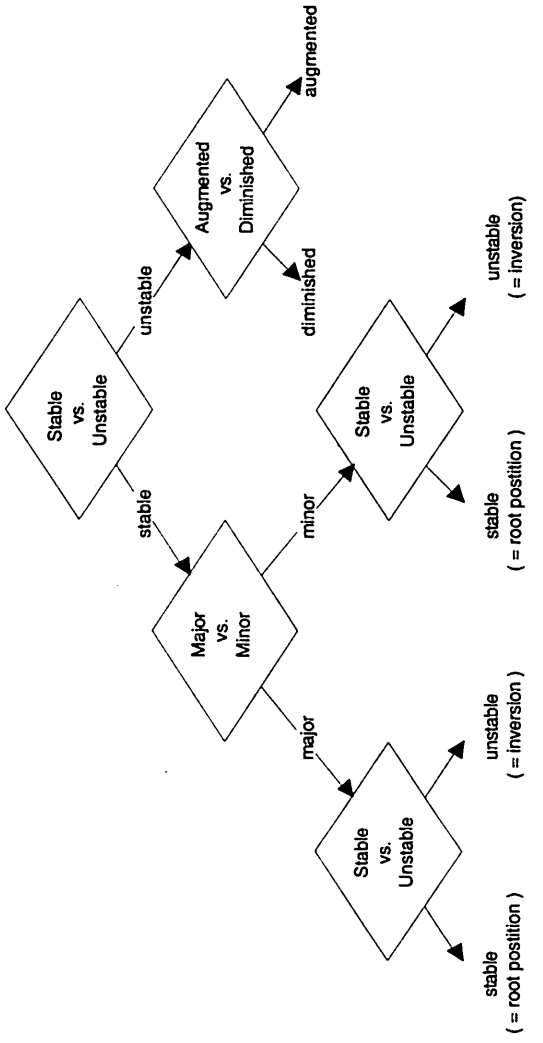
Perhaps most important, the use of binary processing allows students and teachers to accurately diagnose and isolate problems so that efficient practice prescriptions can be formulated. Once students identify a decision diamond that presents difficulty, they can focus on practice activities that address that particular diamond using a variety of resources (practice partners, CAI programs, tapes, etc.). When the troublesome diamonds are mastered, they can be re-incorporated into the whole process.

Telling students that they should "practice more" is almost always unhelpful because students in trouble usually don't know how to practice. For them, more practice often means only more wasted time, more frustration, less success, and ultimately less belief and interest in further practice. Using binary processing, teachers can design and students can discover the kind of directed practice that is most likely to achieve the best results. Tangible intermediate success encourages further practice, and promotes attention to and refinement of practice habits. In other words, binary processing can teach students how to practice smarter so they don't have to practice longer. Students who invest time in mastering this valuable lesson reap dividends that reach well beyond the theory classroom into all other aspects of their musical training.

Finally, by establishing this kind of practice and problem-solving, the binary model can lay the foundation for future topics so

that advancing through a semester or even a curriculum is achieved smoothly and efficiently. As an example, let us move to the point when students begin to encounter first-inversion major and minor triads. (We will assume that the unstable triads will remain in root position.) The number of possible answers has now increased from four to six chords. A possible binary processing model is illustrated in Figure 2.

FIGURE 2: Expansion of Processing to Include First-Inversion Triads



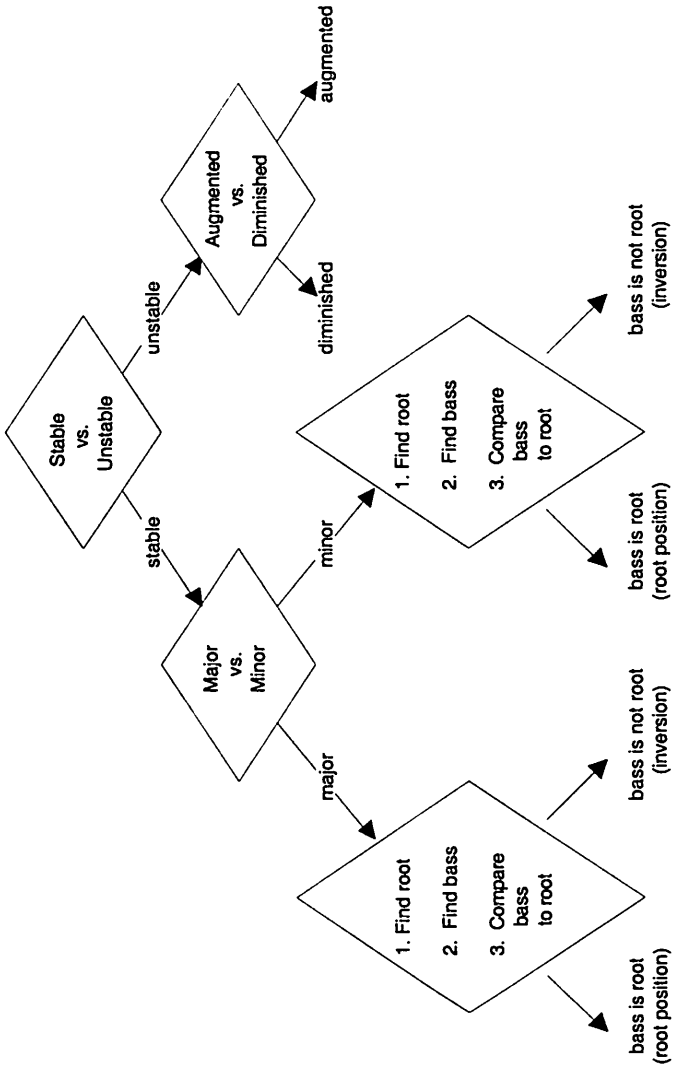
It is at once apparent that the earlier model serves as the foundation for the later one. The first and second layers of decisions are identical, but additional branching occurs on the left side of the model to create a third layer of decisions to discriminate between root position and first-inversion. Here, the earlier strategy of stable vs. unstable can be used again, but this time to compare an inverted triad with its root-position counterpart. Like the earlier theme, this variation avoids dissection of a harmonic event into melodic segments that may vary according to voicing.

At this point, it is possible to introduce other processing strategies which involve manipulation of the triad's component pitches. The fundamental task common to these strategies is the comparison of root and bass factors, a highly valuable skill that can be transferred and used in the solutions of many other subsequent problems. Sequentially, it is best introduced here, after students have established a solid foundation using less involved inner ear processing. A revision of the model that includes this kind of strategy might look like the one illustrated in Figure 3.

The third layer of decision diamonds in Figure 2 has been replaced with a vertically oriented process diamond. This is, in effect, a subroutine that is needed to arrive at the identification of the position. The numbered steps once again help students practice efficiently by allowing them to precisely identify what they are unable to do. Most students who encounter difficulty will typically engage in futile repetition that is focused on comparing the bass and the root (step 3). But the real source of the problem is that they can't accurately find the root (step 1) or the bass note (step 2) in the first place. Hence, the comparison involved in the final step is rendered impossible by the inability to perform the earlier two. Focused practice on these initial steps using a drill partner or teacher-student conferences usually leads to quick mastery of the entire subroutine.

Regardless of which strategy is used to discriminate between inverted and root-position triads, a comparison of Figure 1 with either Figure 2 or 3 suggests that the use of binary processing can assure effective sequencing that continually relates new problems to old solutions. Such sequencing should occur throughout the semester as new concepts are introduced. The flow charts of Figure 3 can be easily expanded to include second inversion triads, all posi-

FIGURE 3: Alternative Processing of Inversion



tions of common seventh chord types (when introduced in a gradual and systematic way), and typical sonorities from more recent repertoire (quartal chords, or common tri-chords and other pitch sets) Rogers observes that this kind of teaching is "almost painless, since the additional doses of truly new material are always relatively tiny. . . . Almost never is it necessary to start a 'new' topic from square one. . . . Each new[ly] achieved goal becomes a springboard for additional study."[2]

HELPING TEACHERS: COMPARING BINARY MODELS, OR, TROMPE-L'OEIL MA TRIOMPHE DE L'OREILLE

When I taught aural and written skills as separate classes, I often found myself developing different binary models for the same topic in an attempt to maintain some coordination between the two strands that had been unraveled by the curriculum. In the process, I discovered how the development of multiple binary process models for a single topic often reveals pedagogical strengths and liabilities of a given instructional approach. Figure 4 is an attempt to represent both an aural and written (or cognitive) approach to that most serpentine of chromatic topics: the diminished seventh chord. Let's assume that students have mastered the use of chromatic fully-diminished seventh chords used as functional secondary dominants, and are now being introduced to the idea of the diminished seventh as an embellishing sonority.[3] For pedagogical efficacy, let us also assume that our examples will be restricted to those that do not involve "incorrect" (i.e., enharmonic) spellings.

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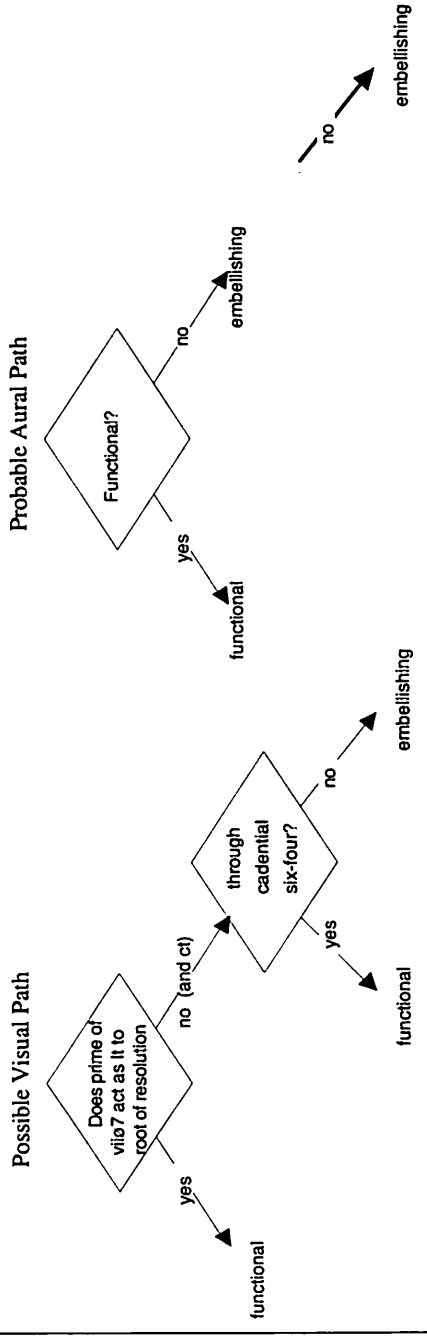
[2]Rogers, *Teaching Approaches*, 6.

[3]In textbooks that treat these chords separately, this is the usual order of presentation. For examples, see Stefan Kostka and Dorothy Payne, *Tonal Harmony*, 3rd ed. (New York: McGraw-Hill, 1995) or Robert Ottman, *Advanced Harmony*, 4th ed. (Englewood Cliffs NJ: Prentice-Hall, 1992). The distinction is made more clearly in Kostka/Payne. In Ottman, the presentation is nearly contiguous and seems flawed by the assignment of functional Roman numerals to both the functional and embellishing sevenths.

FIGURE 4: Two Processes for Distinguishing Secondary and Embellishing Diminished Sevenths



Aurally, only a single discrimination must be made: Is the relationship of the diminished seventh and chord that follows decorative or functional? If the relationship is decorative, an accurate label can be immediately assigned. If a functional relationship is perceived, then the analysis symbol is assigned based on the function of the resolution chord.

Compare this to the more complex branching in the visual path. Once the chromaticism is identified as a diminished seventh, we must determine if the prime of the seventh is acting as the leading tone to the root of the resolution chord. If it does, we can once again assign an analysis symbol based on the resolution chord. If not, a commonly prescribed strategy is to use the presence of a common tone or tones as a visual clue for an embellishing seventh.[4] Nonetheless, even if a common tone is present, one more decision or check is required to eliminate a very prevalent fly-in-the-common-tone ointment: vii°7/V moving through the cadential six before arriving at the dominant.

The model devoid of sound clearly involves more branching and decisions and, therefore, more potential for problems. As the number of discriminations in any paradigm increases, the efficiency and tempo of the processing decreases, accompanied by far greater potential for inaccuracy. On the other hand, the aural path is streamlined, relying solely on the most appealing dimension of the music—its sound, and remaining totally unencumbered by confusion generated either by notation (including especially the "enharmonic misspellings" that will soon be encountered) or the artistic inconsistencies of the music (such as incomplete voicings or delayed resolutions).

It is possible that as a given topic becomes more developed and complex, the efficiency of aural processing (and the inefficiency of visual processing) actually increases. For example, consider the next variation of the diminished seventh theme that usually occurs: enharmonic re-interpretation. An expansion of the early paradigms to include this possibility can be found in Figure 5.

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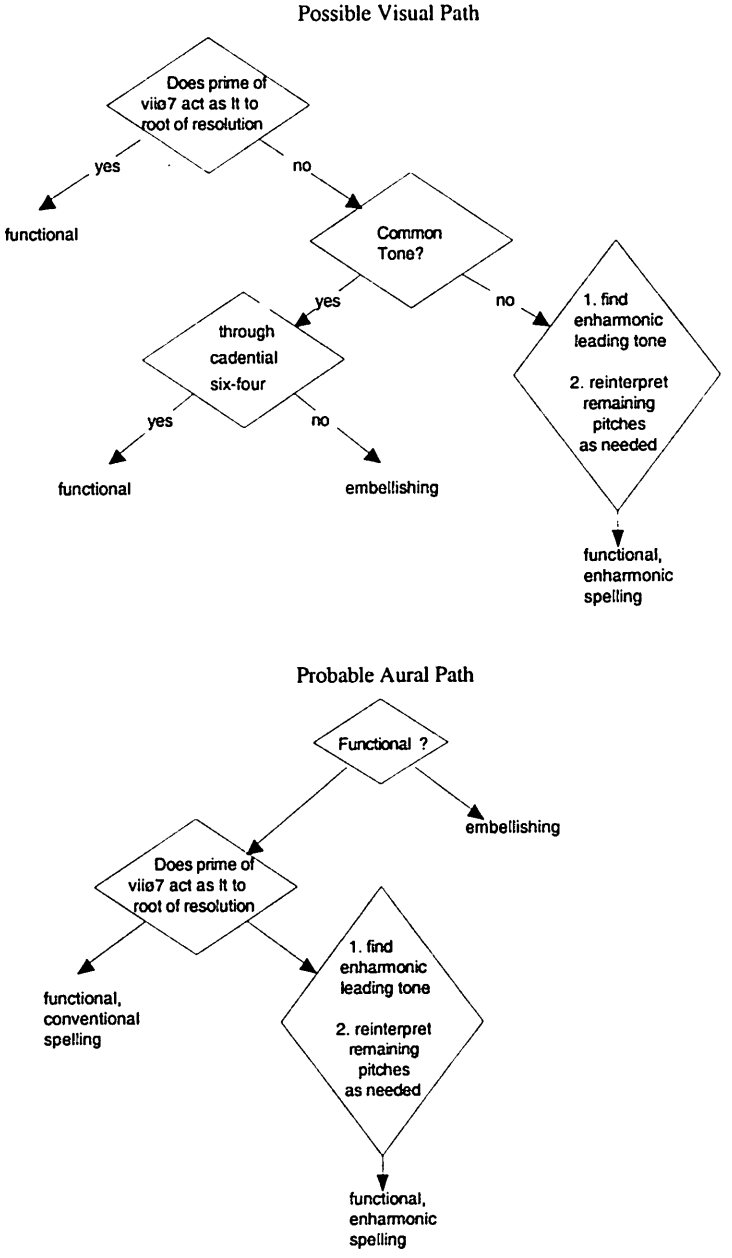
[4]See Kostka and Payne, *Tonal Harmony*, 433-436, where the embellishing seventh chord is called a common-tone diminished seventh.

FIGURE 5: Secondary vs. Embellishing Diminished Seventh with Enharmonicism



Multiple additions to the visual path are necessary before it is possible to arrive at an accurate musical analysis. In the aural path, the identity of the chord is known far earlier; the additions to the process are actually visual/cognitive ones necessitated by the inconsistencies of the notation. A more serious pedagogical problem with the visual paradigm is that it undoes prior learning. It is now impossible to find the expected leading tone resolution, and students will have to alter or even unlearn a technique that up until now was reliable. This is a task as arduous and time-consuming as unlearning wrong notes that have been practiced into kinesthetic and aural memory over many months.

Figure 5 demonstrates that as the chromatic and notational complexity of tonal music increases, all processing will become more intricate, but those that rely on aural operations will always be simpler than those relying on visual or cognitive ones. These binary models show that even as the eye is fooled, the ear will triumph, since the number of functional sounds will always be less than the number of visual ways that can be used to represent them.

In reality, it is probably impossible to separate aural and visual processing; the models above using isolated modalities are therefore, to some degree, artificial and contrived. Nonetheless, the moral of the story told by the paradigms is that the ear should be involved from the very beginning in every task that students undertake. After all, they have been listening to music far more longer than they have been looking at it. As the music studied becomes more and more complex, the ear remains the analyst's best tool. Though often perceived by students to be the analytic tortoise, the ear always beats the visual hare who must stop to (w)rest(le) in the inconsistencies and inadequacies of notation. The integration of sight and sound must be done early and often; those wedded to reliance on visual analysis will be doomed to plodding and inaccuracy.

HELPING EVERYONE: A CRITICAL CONCLUSION

What are the drawbacks of these instructional strategies? Many will argue that is an artificial attempt to order something that is inherently unordered. While this may be true, the paradigms do

allow students to become comfortable with the disorder as they work through it systematically, rather than be continually overwhelmed by it. Even though I know that you can teach a baby to swim by throwing her into a swimming pool, I am still reluctant to use that technique with my own child. I am far more comfortable with a safe and organized progression of smaller steps.

It can also be argued that this kind of aural skills pedagogy trains students to reason deductively rather than truly hear. While this might be true in the initial stages, the deductive reasoning is soon replaced by actual hearing. Like any other reference system, it is discarded as mastery occurs with repetition and practice. In the meantime, the deductive reasoning serves as an important motivating tool and strategy for problems that are difficult to practice in a focused manner. Students are not likely to practice anything when they have been given no suggestions about how to practice, or when practice fails to yield tangible improvements. Techniques based in binary logic overcome both these obstacles.

Mastery itself is another issue. The flow charts may suggest to students a very cumbersome and unnecessarily complex thought process, filled with a confounding number of steps which can each take an infinite amount of time. In reality each of the decision diamonds must be practiced in isolation until it can occur almost subconsciously, measured not in minutes but in nanoseconds. Most students will already be able to operate with this kind of fluency in at least a few of the earliest diamonds, and the speed requirement must be an insistent goal of the practice. Unmastered material will come back to haunt students in an exponential way.

Finally, it might be argued that the methodology attempts to impose uniformity on thinking and reasoning patterns that are highly idiosyncratic. In fact, even after a cursory examination of the models above, many readers might already have objections or alternatives to the content and ordering of the decision diamonds. Perhaps so, but it is precisely as students discover the ways in which their own listening, thinking, and hearing differ from a given model that the greatest amount and most exciting kind of learning occurs. Students report back with intense excitement that "this really worked," or "for me, it only works if I change x to y." They begin

not only to help themselves, but to teach each other. This change from learning to teaching mode is a sure sign of thorough understanding and accomplishment.

I often help individual students encountering a particularly vexing problem unique to them to design their own flow charts. The process never fails to help me develop further insights and refined strategies for a wide variety of perennial problems. I am more and more convinced that successful teaching, particularly skills teaching, is about presenting as many different solutions as possible to the same problem so that students can develop their own hybrid approach as they practice.

While no technique is perfect, I maintain that binary logic may be used to achieve greater teaching and learning efficacy with a wide variety of theory topics, especially when they include the early incorporation of an aural dimension. Binary paradigms provide a systematic practice routine that fosters early success and motivates continued practice. With such instructional design, the skills learned build on past learning, transfer well to future learning, and can have immediate relevance in everyday musical situations encountered in the practice room and rehearsal hall. Most importantly, we move beyond music, theory, and the immediate task at hand, as we teach our students to think independently and develop problem-solving skills and habits.

Some Guidelines for Writing Temporally Equidistant Three-Voice Canons in Sixteenth-Cenruty Style

Steven Strunk

Most courses in counterpoint in sixteenth-century style involve some work with canonic imitation. Although the literature generally features free imitation in which only a head motive is retained, or in which the pitch interval of imitation varies, it also contains numerous examples of strict canons by Palestrina and others. The composition of such canons, which the early theorists called "fugues,"[1] can pose a challenge for both teacher and student. This study will limit itself to the problems of composing a representative type of strict canon: the three-voice canon with temporally equidistant entries.[2]

Writing a three-voice canon with equally spaced entries in sixteenth-century style can be relatively easy, but it can also be extremely difficult. Students and teachers who attempt the task will find that much depends upon the pattern of voice entries and the resulting mapping of vertical intervals between the pairs of voices created by the entries. An investigation of the possibilities will reveal guidelines for writing such canons.

Consider Example 1, the opening of a mass movement by Palestrina,[3] a strict canon on the text "Crucifixus etiam pro nobis."[4]

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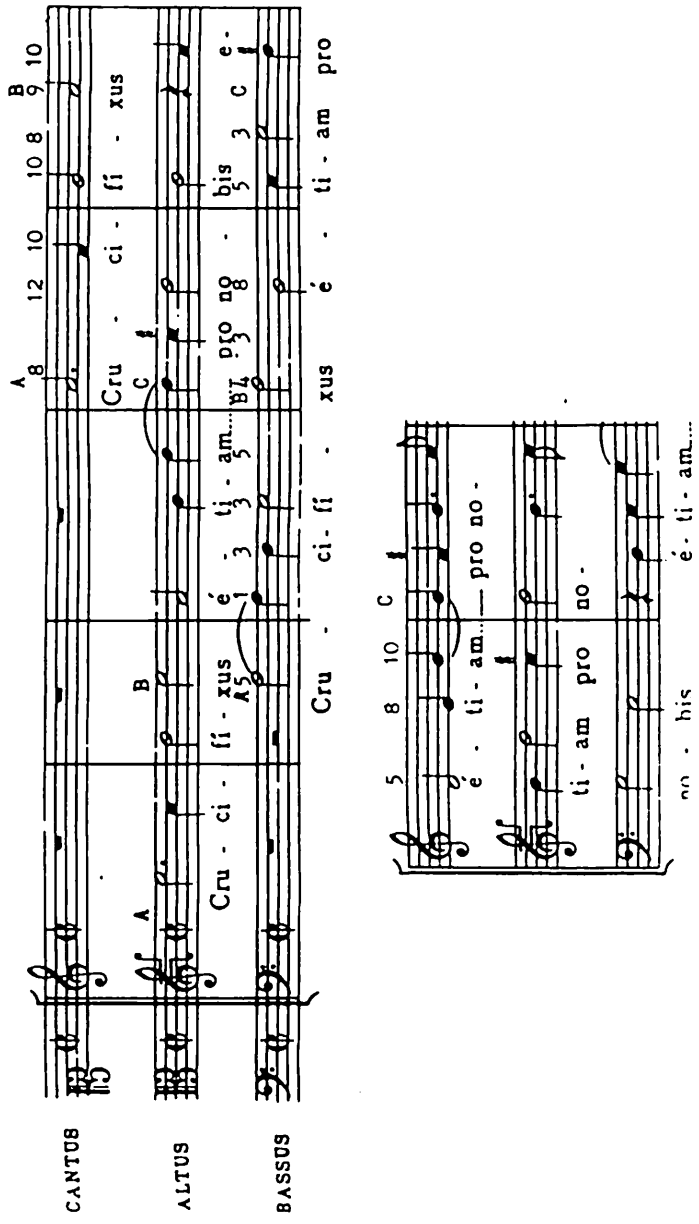
[1]For information on early contrapuntal terminology, see Alfred Mann, *The Study of Fugue* (1958; reprint ed., New York: Dover, 1987), 9-30.

[2]General sixteenth-century style rules of voice leading and dissonance treatment are not addressed here. This discussion applies primarily to the sixteenth-century style because it takes into account the usual restrictions on interval patterns between entry pitches in that period, discussed below.

[3]All musical examples are taken from *Giovanni Pierluigi da Palestrina: Le opera complete*, ed. Raffaele Casimiri (Rome: Edizione Fratteli Scalera, 1939-).

[4]The cantus breaks the canon on the first syllable of "nobis."

EXAMPLE 1. Palestrina, *Missa: Repleatur os meum laude*: Crucifixus (Vol 6, p. 137)



Here each entry is separated by three half-note beats. The order of voice entries can be described as middle, low, and high. The entry pitches are e′, a, and a′, suggesting an Aeolian modality which is confirmed by the final cadence at the end of the movement. Within this modality the entry pitches represent scale degrees 5, 1, and 1, respectively. The melodic content of the canonic voices can be diagramed as in Table 1 (the letters are also marked on Example 1).

Table 1. Opening melodic segments, Palestrina, *Missa: Repleatur os meum laude*: Crucifixus

		A	B	C
A	B	C		
	A	B	C	

Note that at the first interaction of the middle voice with the low voice, B is above A, and C is above B; whereas, at the first interaction of the high voice with the low, A is above B, and B is above C. Clearly this is a case of invertible counterpoint. The intervals produced by BC over AB (see Example 1) are 5, 1, 3, 3, 5, 4, 3, 8, 5, and 3; the corresponding intervals produced by AB over BC are 8, 12, 10, 10, 8, 9, 10, 5, 8, and 10. The mapping of these intervals onto each other is the familiar one of invertible counterpoint at the twelfth (Table 2).[5] Canons of this form (temporally equidistant entries with middle voice: scale degree 5, low voice: scale degree 1, and high voice: scale degree 1) will always produce invertible counterpoint at the twelfth, and will always be as easy to write as invertible counterpoint at the twelfth—certainly within the capabilities of teacher and student.

Table 2. Invertible counterpoint at the 12th, interval inversions

1	↔	12
2	↔	11
3	↔	10
4	↔	9
5	↔	8
6	↔	7

[5]The double-headed arrows indicate that the mapping is to be read both ways: 1 maps to 12, 12 maps to 1, etc.

Consider next Example 2(a), the opening of another mass movement by Palestrina. Entries are temporally equidistant in the form high voice: scale degree 1 (g'), middle voice: scale degree 5 (d'), and low voice: scale degree 1 (g).[6] However, in Example 2(a) the canon is not yet complete: segment A has been copied into the altus and bassus, and it is now time to copy segment B into the altus in mm. 5-6. This has been done in Example 2(b), with unfortunate results. Almost every interval between altus and bassus is a dissonance. The intervallic mapping between the two versions of A over B is shown in Table 3.

Table 3. Interval mapping, Example 2(b)

1	→	2
2	→	3
3	→	4
4	→	5
5	→	6
6	→	7
7	→	8
8	→	9
	↓	

In contrast to the mapping in Table 2, which is both familiar and closed, the mapping of Table 3 is unfamiliar and open-ended (it could be continued to infinity). The mapping also indicates the near impossibility of writing a strict canon with entries in this form. Palestrina's solution is shown in Example 2(c). In m. 5 the altus enters one step lower than in the strict version, producing the identity mapping shown in Table 4, and retaining in the altus and bassus the original intervals of the cantus and altus.

If the third entry produces the same vertical intervals as the second (the identity mapping), the canon will be relatively easy to write.

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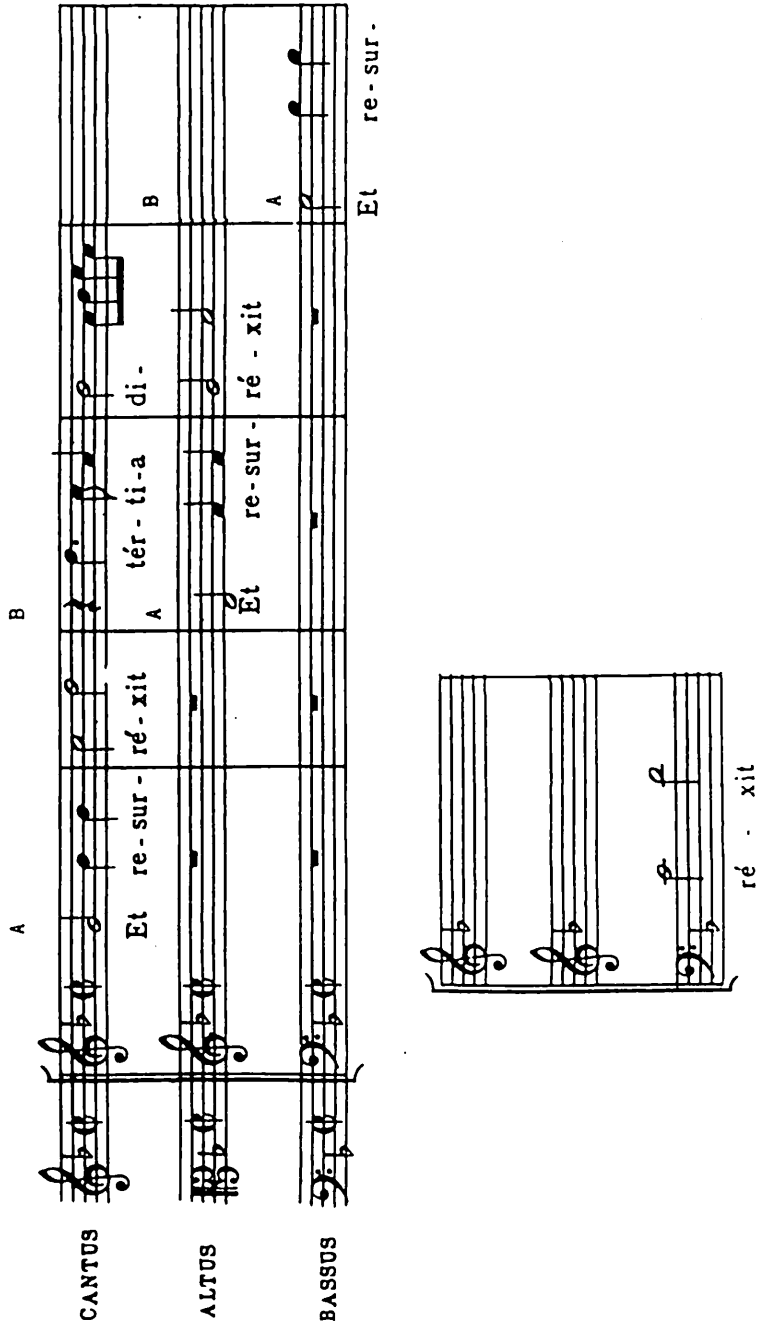
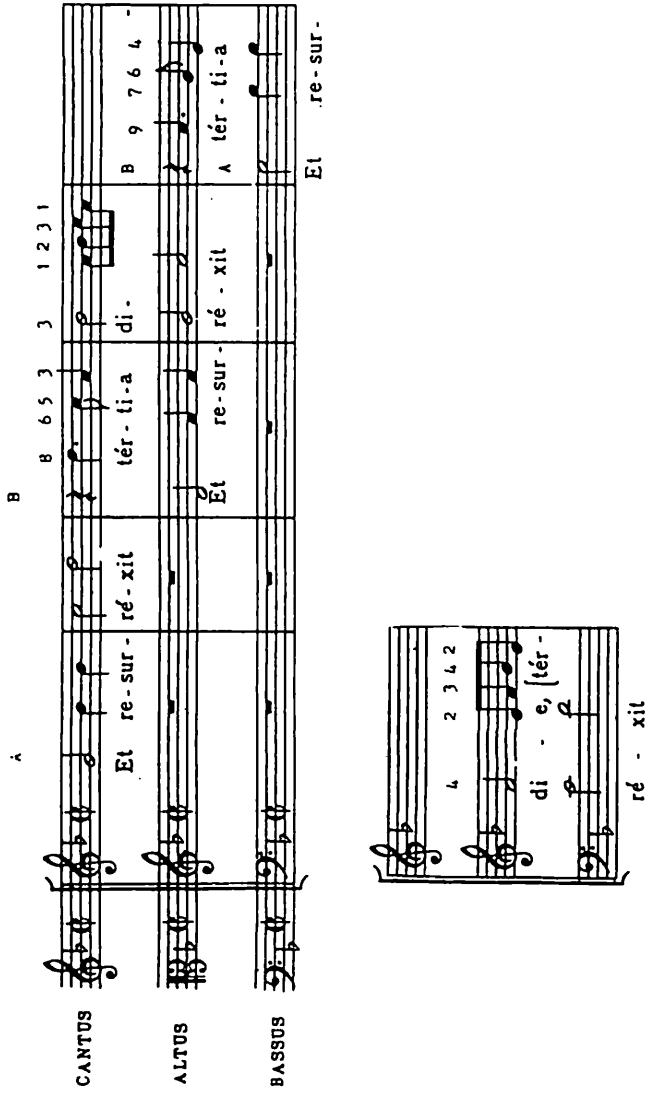
[6]The "key" of the scale degrees is arbitrary. The classification of the piece in a particular mode need not enter into the practical work of classifying scale degrees of entry pitches. Any entries which are separated by the intervals of a fifth and a fourth can be assigned scale degrees 1 or 5 in some tonality, which is all that is required here.

EXAMPLE 2a: Palestrina, *Missa: Primi toni*: Et ressurexit (Vol. 6, p. 46).



EXAMPLE 2b: (cont)



EXAMPLE 2c: (cont)

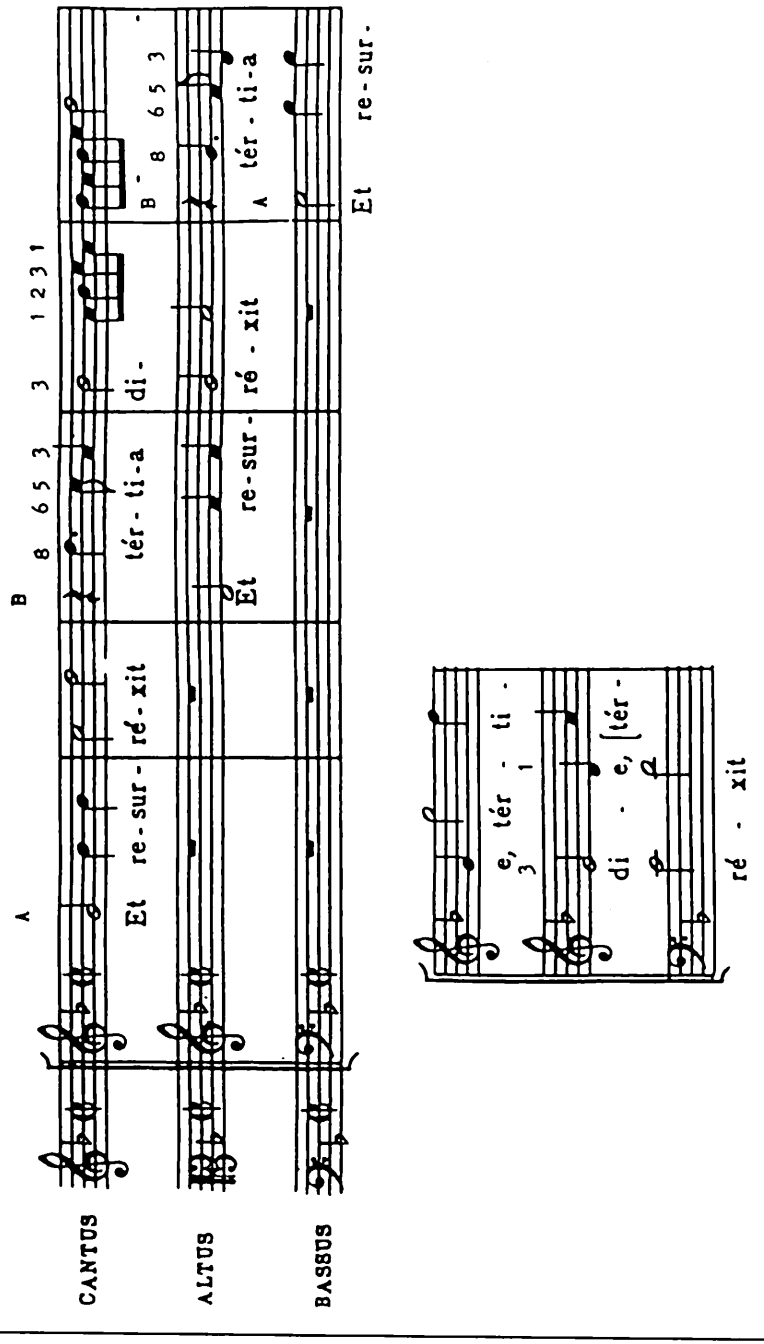


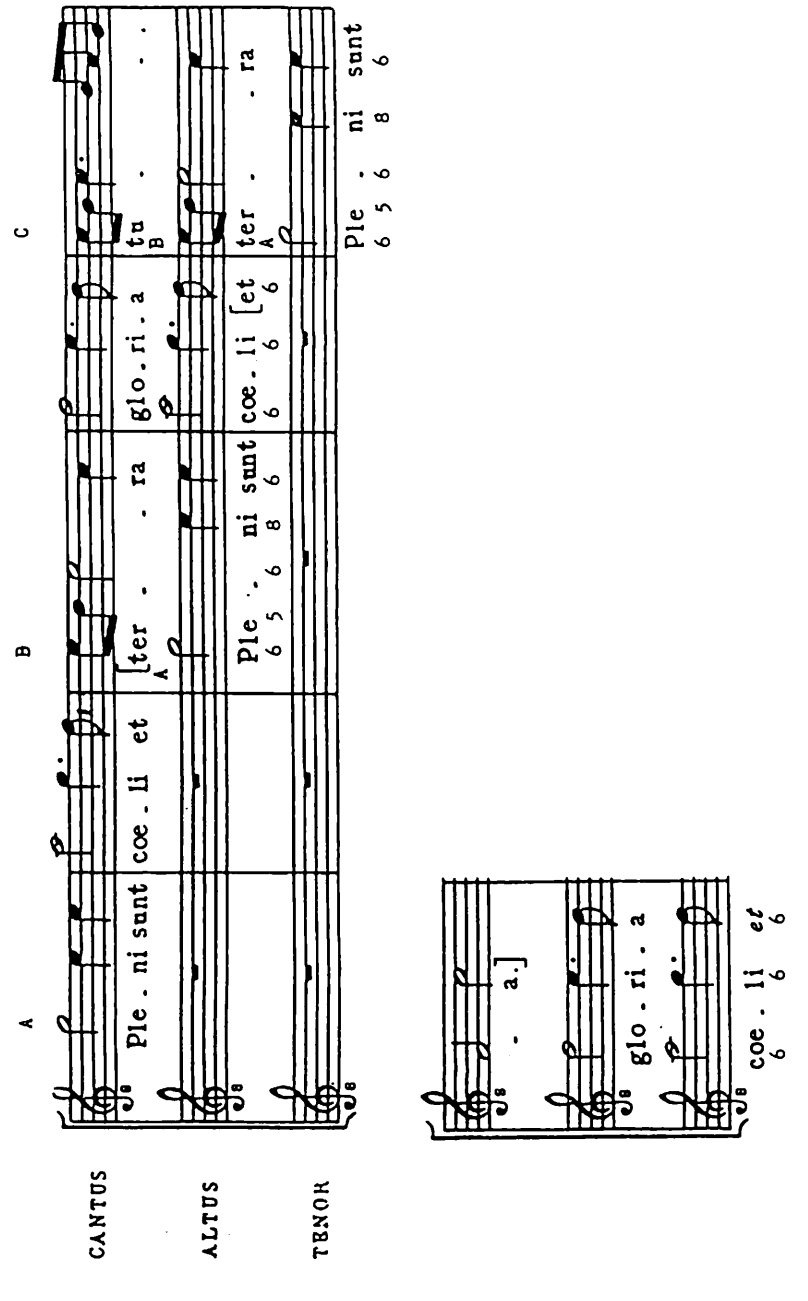
Table 4. Interval mapping, Example 2(c)

1	→	1
2	→	2
3	→	3
4	→	4
5	→	5
6	→	6
7	→	7
8	→	8
	↓	

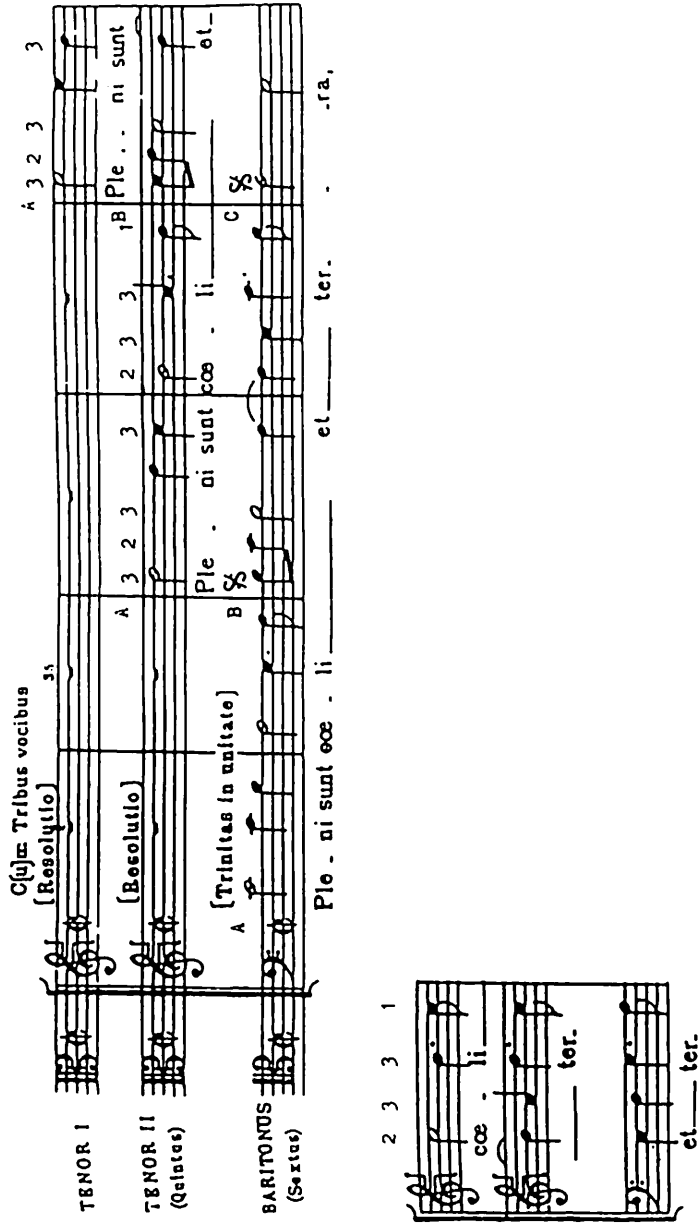
The other temporally equidistant entry combinations that are found in the openings of Palestrina's three-voice movements, and which preserve vertical intervals at each entry, are shown in Examples 3, 4, and 5. These all have pitch intervals that are equal in size and direction between the starting pitches of the successive voices. In Example 3, the pitch interval between the successive voices is the perfect unison, in Example 4 it is the ascending major second, and in Example 5 it is the descending perfect fifth. Although canons of these forms constitute a small minority in Palestrina's work, it yet may be useful to know that any canon possessing temporally equidistant entries and intervals equal in size and direction between successive entry pitches will preserve the vertical intervals at each successive entrance, and therefore will be relatively easy to compose.

The great majority of three-voice canons have entry pitches separated by combinations of different perfect intervals. For the purposes of this investigation, these entry pitches can most easily be represented as scale degrees 1 and 5 of some modality. Entries of these forms always produce mappings other than identity, and some mappings are more difficult to work with than others. Table 5 identifies the mappings that result from the possible forms of this type of canon. In Table 5 the top of each column gives the order of entry of the voices, with H = high voice, M = middle voice, and L = low voice. The rows are labeled on the left with ordered entry pitches given as scale degree numbers. At the intersections of the rows and columns appear the letters A through J, which refer to the mappings given in Table 6. In Table 5, the last four columns are incomplete because two of the voices are of the same voice type (i. e.,

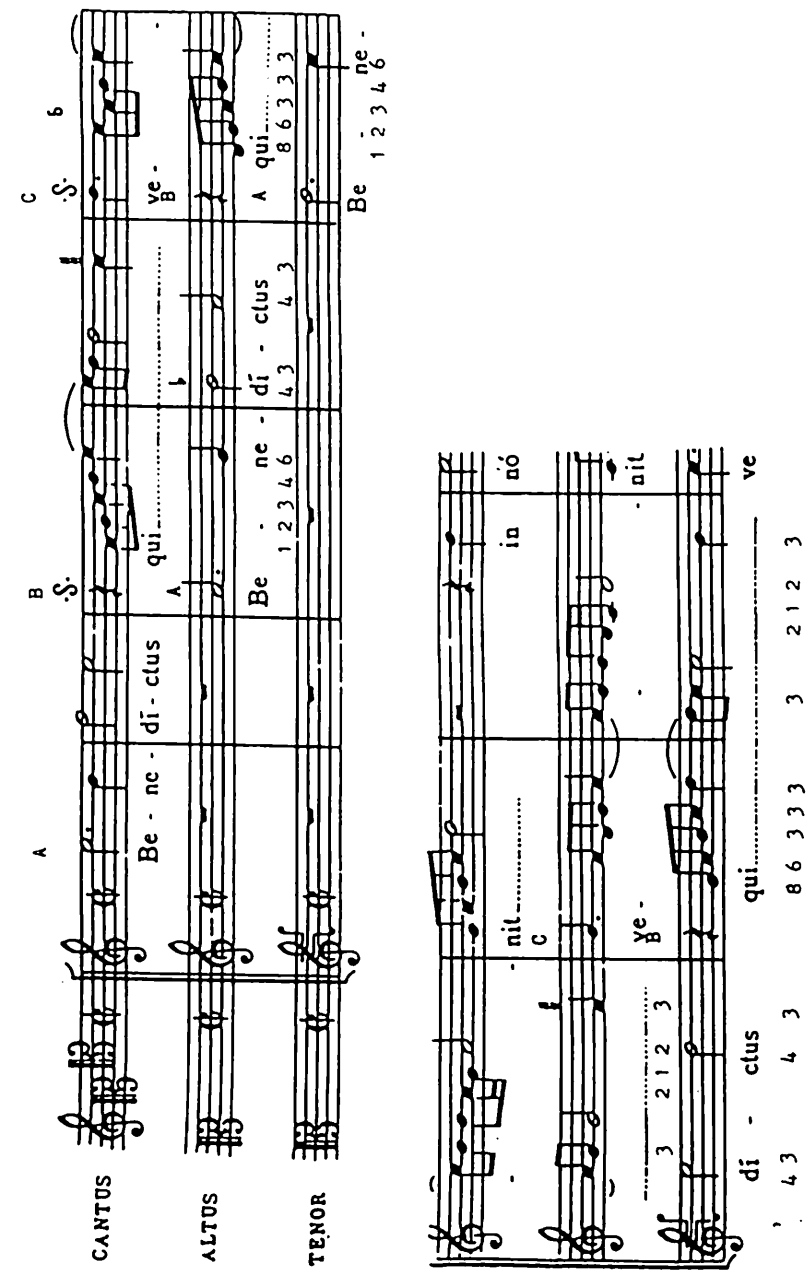
EXAMPLE 3. Palestrina, *Missa (sine nomine)*: Pleni (Vol. 18, p. 187)



EXAMPLE 4. Palestrina, *Missa: Sacerdotes Domini*: Pleni (Vol. 24, p. 187)



EXAMPLE 5. Palestrina, *Missa: Ad fugam*: Benedictus (Vol. 4, p. 86).



high, middle, or low). This pattern limits the possible scale degree combinations to those in which the duplicated voice also duplicates the scale degree.

Table 5. Interval mappings, perfect interval entries

	HML	HLM	MHL	MLH	LHM	LMH	HHL	HLL	HLH	LHL
115	G	A	D	A	D	H	G	-	-	-
151	E	B	C	B	C	F	-	-	B	C
155	I	D	A	D	A	G	-	H	-	-
511	G	A	D	A	D	I	-	J	-	-
515	F	C	B	C	B	E	-	-	C	B
551	H	D	A	D	A	J	I	-	-	-

Table 6. Interval mappings, perfect interval entries, interval inversions

A	B	C	D	E	F	G	H	I	J
1↔12	1↔7	1↔9	1↔11	1→2	2→1	1→4	4→1	1→5	5→1
2↔11	2↔6	2↔8	2↔10	2→3	3→2	2→5	5→2	2→6	6→2
3↔10	3↔5	3↔7	3↔9	3→4	4→3	3→6	6→3	3→7	7→3
4↔9	4↔4	4↔6	4↔8	4→5	5→4	4→7	7→4	4→8	8→4
5↔8		5↔5	5↔7	5→6	6→5	5→8	8→5	5→9	9→5
6↔7			6↔6	6→7	7→6	6→9	9→6	6→10	10→6
				7→8	8→7	7→10	10→7	7→11	11→7
				↓	↓	↓	↓	↓	↓

Some comments on the mappings are in order. A mapping is usable to the degree that it maps dissonances onto dissonances, and consonances onto consonances, with some advantage gained by mapping perfect consonances onto perfect consonances and imperfect consonances onto imperfect consonances. Mapping A, which appears eight times in Table 5, is the mapping for invertible counterpoint at the twelfth. It is the most usable mapping of the group, having all the advantages listed above, with the sole disadvantage of mapping the seventh (a dissonance) onto the sixth (a consonance) and vice versa. An examination of the openings of the 116 three-voice movements in the (Italian) Palestrina complete edition reveals that strict canons at equal temporal intervals are limited to six examples of the form MLH/511,[7] two examples of the form MHL/

551,[8] and the three special examples given in Examples 3, 4, and 5. It is curious that the four other entry patterns yielding mapping A are not used in any of these openings. It may be that they are used in interior entries of these or other multi-voiced works.

One could almost say that the other mappings and their concomitant entry patterns are of no use and should be avoided. Mapping B has the advantages of sending thirds to fifths and fourths to fourths, but parallel thirds would be impossible, and sixths and unisons would have to be treated as dissonances (a canon in eighteenth-century style might be possible with mapping B). Mappings C and D have only one pairing each of like intervals, 5↔ 5 (C) and 6 ↔6 (D), making them both virtually unusable. Mappings E through J can be grouped in three pairs (E and F, G and H, and I and J) by the retrograde relationship held by their corresponding elements. E and F hold no promise other than the mapping of 5 → 6 (E) and 6 → 5 (F), and that is surely not enough. G and H have the advantage of the mappings of 3 → 6, 4 → 7, and 5 → 8 (G), and 6 → 3, 7 → 4, and 8 → 5 (H). These advantages would probably be enough to work with, given that other intervals would be treated as dissonances. I and J also have only one pairing each of like intervals, 1 → 5 (I) and 5 → 1 (J), making them basically unusable.

In summary, the degree of difficulty of three-voice canonic writing with temporally equidistant entries in sixteenth-century style is directly related to the pattern of voice entries with regard to scale degrees and the relative highness or lowness of the entries. Students and teachers attempting to write such canons would do well either to memorize one or more of the usable entry patterns or to check their chosen entry pattern against Tables 5 and 6 above. In this way, potential problems may be circumvented, and successful strict canons composed.

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[7]These are 1) *Missa: De Beata Virgine*: Crucifixus (Vol. 4, p. 12); 2) *Missa: Repleatur os meum laude*: Crucifixus (Vol. 6, p. 157); 3) *Lamentationem*: Liber Quartus. Sabbato Sancto. Lectio I Pars mea. (Vol. 13, p. 227); 4) *Hymni totius anni*, 38. In Festo S. Antonii de Padua. V. *Sub tanto* (Vol. 14, p. 199); 5) *Magnificat*. Liber Primus. XIII. Quarti toni. 10. Sicut (Vol. 16, p. 72); and 6) *Missa: Gia fu chi m'hebbe cara:* Benedictus (Vol. 27, p. 49).

[8]These are 1) *Lamentationem*. Liber Secundus. Feria VI. In Parasceve. Lectio III. Meminavit (Vol. 13, p. 76), and 2) *Magnificat*. Liber Secundus. III. Toni 8. Esurientes. (Vol. 16, p. 130).

Rheinberger, Boulanger, and the Art of Teaching Composition[1]

E. Douglas Bomberger

At first glance, it would be hard to find two musicians more different than Josef Gabriel Rheinberger (1839–1901) and Nadia Boulanger (1887–1979). He was a German Romantic composer who lived in nineteenth-century Munich, rubbing shoulders with Wagner, Strauss, and Hans von Bülow. She was a twentieth-century French musician who studied with Fauré, but gave up her own compositional aspirations to dedicate her life to teaching. A closer look at their lives and work, however, reveals similarities between these two musicians so different in time and place: both were devout Catholics, both called the organ their principal instrument, and both had a remarkable impact as composition teachers, particularly of American students. An examination of the teaching methods of Rheinberger and Boulanger further demonstrates that, although their musical backgrounds and personal musical aesthetics were very different, their teaching was so similar as to suggest some universal truths about the successful teaching of musical composition.

In 1904, Louis Elson wrote that Rheinberger "almost deserves a chapter to himself in an American history of music"[2] because of the large number of prominent American composers who had studied with him in Munich. Among the former Rheinberger students who played crucial musical roles in turn-of-the-century America were George Whitefield Chadwick, Horatio Parker, Frederick Shepherd

[1]This paper was presented at the annual conference of the College Music Society in Portland, Oregon on 10 November 1995.

[2]Louis C. Elson, *The History of American Music* (New York and London: Macmillan, 1904), 252.

Converse, and Arthur Battelle Whiting. In addition to these men were other composers whose works were highly regarded in their day but are less well known today: Franz Xavier Arens, Frederick Field Bullard, Sidney Homer, Henry Holden Huss, Walter Raymond Spalding, and about sixty other American musicians.[3] Nadia Boulanger likewise developed a reputation that attracted many American students. Beginning with Marion Bauer in the first decade of the twentieth century, she taught some of the most prominent composers of the twentieth century, including Elliott Carter, Aaron Copland, David Diamond, Ross Lee Finney, Philip Glass, Roy Harris, Douglas Moore, Walter Piston, Louise Talma, and Virgil Thomson. This last composer called her "a one-woman graduate school so powerful and so permeating that legend credits every U.S. town with two things—a five-and-dime and a Boulanger pupil."[4] That no other composition teacher had such a broad impact on American music as these two raises the question of what they did in their composition classes that was so effective. Fortunately, their students commented extensively on the goals, methods, and ideals espoused by these teachers, allowing us to form a clear picture of the values they held in common.

Boulanger herself said, "It is not possible to teach composition, only those things which help us appreciate it."[5] Rheinberger undoubtedly would have agreed, for both teachers disclaimed any credit for their students' creativity and originality. Boulanger and Rheinberger concentrated primarily on the materials of music and, through these materials, strove to equip each student to attain his or her own creative goals.

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[3]For further information on Rheinberger's American students, see E. Douglas Bomberger, "Amerikanische Musiker als Studenten bei Josef Gabriel Rheinberger," *Jahrbuch des Historischen Vereins für das Fürstentum Liechtenstein* 93 (1995): 317–36.

[4]Virgil Thomson, "Greatest Music Teacher—at 75," *The New York Times Magazine* (4 February 1962): 24.

[5]Richard Forrest Woods, "Nadia Boulanger: A Diary of Lessons," *The Diapason* 72/1 (January 1981): 1. Aaron Copland expressed a similar idea in "An Affectionate Portrait," *Harper's Magazine* 221 (October 1960): 49.

As the foundation of their teaching method, both teachers illustrated the principles of composition through reference to historical and contemporary models. Boulanger and Rheinberger were credited by their students with an encyclopedic knowledge of the repertoire, which then allowed them to illustrate solutions to nearly any problem with a concrete example. Aaron Copland wrote:

> Nadia Boulanger knew everything there was to know about music; she knew the oldest and the latest music, pre-Bach and post-Stravinsky, and knew it cold. All technical knowledge was at her fingertips. . . . She had a teacher's consuming need to know all music functions, and it was that kind of inquiring attitude that registered on the minds of her students.[6]

Composer David Ward-Steinman, who studied with Boulanger in 1958–59, discovered firsthand her intimate knowledge of the techniques of Palestrina. One of his first assignments was to realize some exercises according to the rules of sixteenth-century counterpoint. When he submitted the completed exercises to Boulanger and saw her making corrections, he protested that he had done everything according to Jeppesen's book on counterpoint, which he knew well. Her response was a frosty, "Then Jeppesen is wrong." When he was able to check her assertion in the library, he discovered that her corrections had indeed been more faithful to the music of Palestrina than had Jeppesen's rules.[7]

For both composers, the ultimate example of solid craftsmanship combined with expressive genius was Mozart. Rheinberger held no other composer in such high regard, telling his students, "Mozart, überhaupt Mozart!" [Mozart, above all Mozart!].[8] Boulanger expressed wonder at the mystery of Mozart in this much-quoted story she related in 1962:

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[6]Aaron Copland, *Copland on Music* (Garden City, New York: Doubleday, 1940), 87.

[7]Personal interview with David Ward-Steinman, 10 November 1995.

[8]Georg Hild, "Wie's beim Meister war," *Jahrbuch des Historischen Vereins für das Fürstentum Liechtenstein* 40 (1940): 156.

> A few weeks ago I was listening with some friends to a new recording of Mozart's "Figaro." At one point we all simply stopped the music and stared at each other. An unbelievable miracle was unfolding, which we could not describe or even begin to understand. And what is most remarkable is that Mozart creates his mysteries with the most commonplace materials.[9]

It is significant that although they both helped shape the music of the future by training young composers, neither had any sympathy for ultra-modern techniques. For Rheinberger, this meant that he encouraged his students to write absolute music rather than program music and to avoid the seemingly aimless harmonic experiments of the late Romantics. For Boulanger, this translated to an antipathy for the 12-tone method of composition and an embracing of Stravinsky's neoclassicism because of its strong connection to the traditions of Western music. This fundamental conservatism was perhaps the biggest cause for complaint about both teachers, as both were accused at times of being insufficiently adventuresome in embracing new trends. There seems to have been considerable freedom for students to follow their own paths in later years, though, as each of the two teachers produced students who went on to compose in a remarkable diversity of styles. For both, style was secondary to the techniques of musical composition, which provided the necessary foundation for whatever the student chose to do in the future.

Both teachers demanded from their students—and illustrated themselves—a highly developed sense of inner hearing. Their legendary feats of score analysis are illustrated by two accounts from their students. Huss wrote,

> I remember the case of a new student who had (I believe) just graduated from some North German conservatory. Mr. A (let us call him) submitted to Rheinberger's inspection a ballade for chorus and orchestra.... Mr. A stood anxiously awaiting a verdict at Rheinberger's

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[9]Alan Rich, "The Busy Boulanger," *New York Times* (25 February 1962):9.

elbow, the latter meanwhile turning over the leaves at about the rate of speed a person would use who wished to see if the pages were correctly numbered. Mr. A lost patience at this apparent dilly-dallying, and as the last page was turned said, with ill-concealed impatience in his tones: "Now, Mr. Professor, I should like to show you some debatable passages; for instance, in the andante of the second part is the passage effectively scored?" "You mean this place," said Rheinberger, instantly turning to the place; "well, the first horn is rather high, but it will do." A few remarks of like tenor convinced the now astonished and almost dazed student that his new teacher had in the space of a few moments actually grasped all the salient and many of the minor points of the work of fifty odd pages.[10]

Virgil Thomson wrote of a similar skill in Boulanger:

> What she does possess to a degree rarely matched is critical acumen. She can understand at sight almost any piece of music, its meaning, its nature, its motivation, its unique existence; and she can reflect this back to the student like a mirror. Suddenly he sees that which has caused him pain, struggle and much uncertainty unveiled before him, without malice or invidious comparisons, as a being to which he has given birth. Naturally he is grateful. His work has been taken seriously, has received the supreme compliment of having its existence admitted to be real.[11]

In order to foster this sense of inner hearing, both teachers encouraged their students to compose away from the keyboard. In Rheinberger's class, all exercises were done on the blackboard. The teacher played the piano only when it became necessary to unravel what Huss called "a knotty point," in which case the student at the board was expected to hear and notate immediately what Rheinberger played. Sidney Homer wrote of this remarkable experience:

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[10]H(enry) H(olden) Huss, "Rheinberger as a Teacher," *The Musical Courier* 17/1 (4 July 1888): 18.

[11]Virgil Thomson, "'Greatest Music Teacher'—at 75," 33.

> What a strange sight for an outsider who should occasionally look in! A long bare room badly lit by gas. A small gray-bearded man with burning eyes and expressive hands; twenty absorbed students watching a blackboard on which notes were being written, waiting breathlessly in absolute silence for the next progression: a beautiful passage in the alto, a thrilling touch in the tenor, a delicate, satisfying melodious step in this or that voice—the whole *sounding* wonderful. Sounding! When you could hear a pin drop? Yes, every student was listening, and the little white notes were sounding out clearly as they were written.[12]

Of all the techniques, skills, and knowledge that they shared with their students, both Rheinberger and Boulanger felt the most crucial was the study of counterpoint. Rheinberger's classes at the Akademie der Tonkunst in Munich were simply called "Kontrapunkt," despite the fact that they also embraced harmony, form, and instrumentation. During the three-year course of study, Rheinberger's students worked from simple two-voice counterpoint through various forms of fugue, fughetta, and canon at all intervals, to six- and eight-voice choral textures. The counterpoint exercises were begun as a class on the blackboard, with each student taking a turn adding a measure. The unfinished exercises were then completed individually as homework.

Boulanger's students also testified to her predilection for counterpoint. Philip Glass, for instance, says that he spent five or six hours daily on counterpoint exercises during his student days in Paris.[13] One might ask what place counterpoint has in the minimalist music of Glass, but he cited these exercises as an important factor in boosting his confidence in his technique. The emphasis on counterpoint is a reflection of one of Boulanger's overriding principles, the concept of "la grande ligne." She felt that music of the late nineteenth century had become too preoccupied with harmony, losing sight of the traditional importance of melody. Her interest in the

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[12]Sidney Homer, *My Wife and I* (New York: Macmillan, 1939), 34.

[13]Interview in *Mademoiselle: A Portrait of Nadia Boulanger*, directed by Dominique Parent-Altier (Bloomington: Indiana University Audio-Visual Center, 1987).

interaction of melodic lines led to a fascination with early music, particularly the works of Monteverdi, whom she considered one of the five greatest composers of history, along with Bach, Beethoven, Mozart and Stravinsky.[14]

Copland wrote, "All Mademoiselle's pupils wrote, among other things, motets and a passacaglia."[15] Both he and Virgil Thomson wrote passacaglias of such high quality that they were later published. Rheinberger also required each student to write a lengthy variation set on an eight-measure theme in triple meter, a passacaglia in all but name. Engelbert Humperdinck's piece has been published, and Parker's fulfillment of this assignment may be seen in the Parker Collection at the Yale University Library.[16]

In order to foster an appreciation for vocal textures, Boulanger brought her students together on Wednesday afternoons to sing part-songs and motets, especially the madrigals of Monteverdi and the motets of Bach. Rheinberger began in the first year of his counterpoint classes with simple vocal textures and progressed to eight-part choral texture by the end of the third year. This emphasis on vocal writing helped shape the career of Horatio Parker, who had never written a vocal piece before his arrival in Munich. Under Rheinberger's guidance he produced several large-scale works for chorus, and by the mid -1890s his oratorio, *Hora Novissima*, had earned him the reputation of America's leading choral composer.

If an overriding concern with counterpoint was common to both teachers, there were additional technical matters on which they agreed. Both teachers insisted on intimate familiarity with all clefs. Huss advised prospective students to brush up on alto and tenor clefs before arriving in Munich, in order to avoid embarrassment at the placement examination, which was performed at the blackboard before the whole faculty. Boulanger had her students sight read in

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[14]Woods, 3.

[15]Aaron Copland and Vivian Perlis, *Copland: 1900 through 1942* (New York: St. Martin's, 1984), 78.

[16]Hans-Josef Irmen, *Engelbert Humperdinck als Kompositions-Schüler Josef Rheinbergers* (Cologne, Germany: Arno Volk and Vaduz, Liechtenstein: Josef Rheinberger-Archiv, 1974), 114–32.

all clefs during lessons, changing clefs with each measure and chiding them if they stumbled.[17]

The word that is used most often to characterize the teaching of both Rheinberger and Boulanger is "discipline." Both teachers felt that before one could write freely and originally in his own style, a composer needed to master the rules of traditional music theory, particularly counterpoint. Copland reports that Boulanger subscribed to the Stravinsky maxim, "If everything would be permitted to me, I would feel lost in this abyss of freedom."[18] She once told a student, "Loose is not beautiful, loose is loose."[19] A byword for Rheinberger was, "Über den Zwang zur Freiheit!" [From constraint to freedom!].[20] Both teachers were known to tell their students, "For now, you must do it my way, later you may do it your way."[21]

Both teachers also demanded a fanatical attention to detail, and their classes were primarily devoted to analysis at the most minute level. Elliott Carter cites this detailed study as a factor in allowing him to appreciate the intricacies of great music: "It's such a pleasure to me now to hear certain of the simplest progressions in the music of Bach and realize that there could have been many other voice-leadings, and that the one that has been chosen is especially meaningful coming as and where it does in a particular work."[22] Rheinberger likewise devoted so much attention to the details of voice-leading that the class often covered no more than sixteen measures in a two-hour session.[23]

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[17] Woods, 3; Suzanne R. Hoover, "Nadia Boulanger," *The American Scholar* (Fall 1977): 498.

[18] Copland and Perlis, 63.

[19] Laurence Rosenthal, "Confronting the 'Next Impossible': Musical Studies with Nadia Boulanger," *Parabola* 14/1 (1 February 1989): 83.

[20] Josef Schmid, "Joseph Rheinberger—der große Lehrer, Mensch und Freund," *Jahrbuch des Historischen Vereins für das Fürstentum Liechtenstein* 40 (1940): 141.

[21] Schmid, 140; Nadia Boulanger, "A Composer is Born," *Music Journal* 20 (April 1962): 48.

[22] Allen Edwards, *Flawed Words and Stubborn Sounds: A Conversation with Elliott Carter* (New York: Norton, 1971), 50.

[23] Felix Kircher, "Joseph Rheinberger in der Kontrapunktstunde," *Jahrbuch des Historischen Vereins für das Fürstentum Liechtenstein* 40 (1940): 167.

Both teachers insisted on neat and accurate scores, even in exercises. Rheinberger told his students, "Get used to using good, clear notation early, and you will save yourself much vexation later."[24] For Boulanger, attention to detail was a way of life. Elliott Galkin, when he told Boulanger that he thought it was of minor importance to draw bar lines with a ruler, received the response, "A composer who does not draw bar lines with a ruler is like a gentleman who neglects to shave in the morning or who has a button missing from his coat." Galkin, who went on to become director of the Peabody Conservatory of Music, had to admit that he was guilty of both transgressions that day.[25]

This discipline and attention to detail were reflected in their respective attitudes toward punctuality. Felix Kircher wrote of his former teacher, "Rheinberger himself usually appeared punctually at eight a.m.; he was very seldom late, and if so, he always apologized with utter politeness. One could easily tell that he could not stand lateness by the students."[26] Copland wrote, "No one ever came to a Boulanger class late more than once; her disapproval could be annihilating."[27]

Their attention to detail was supported by a tremendous capacity for concentration and hard work. Georg Hild, who studied with Rheinberger during the last two years of his life, wrote that the teacher gave no indication of weariness during the strenuous two-hour classes, that he never missed a day because of illness, and that he was never late for class.[28] Boulanger continued teaching past her ninetieth birthday, still maintaining a full schedule. Both teachers devoted six days a week to their classes, and both used a system of scheduling that may have contributed to their ability to keep up

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[24]Hild, 153. Ironically, Rheinberger's class notes, preserved in the Josef Rheinberger-Archiv in his birthplace of Vaduz, Liechtenstein, show that he developed a hand tremor in later life that made it difficult for him to write legibly.

[25]Quoted in Alan Howard Levy, *Musical Nationalism: American Composers' Search for Identity* (Westport, Conn.: Greenwood Press, 1983), 56.

[26]Kircher, 167.

[27]Copland and Perlis, 63.

[28]Hild, 149.

their interest and energy. Copland recalled, "She had an unusual method of rating her students: the poorest ones were taught on Monday. On each successive day in the week the quality improved, so that by Saturday she was teaching her best students. Then, in each category, she put the poorest students earliest each day, so everyone knew that those who came late on Saturday were Mademoiselle's favorites."[29] Rheinberger arranged his three counterpoint classes similarly, so that the lowest level met on Monday and Thursday, the second level on Tuesday and Friday, and the advanced class on Wednesday and Saturday.

All of the similarities discussed thus far have to do with the working methods of Rheinberger and Boulanger. What is perhaps most important, and what seems to have been most memorable to the students, was the way each teacher related to them personally. Curiously, both teachers were accused of showing a preference for foreigners, and indeed their most successful students came to them from abroad. Boulanger considered it part of her mission to help develop the national music of countries that had not yet established their own traditions in art music.[30] Likewise, Kircher characterized Rheinberger's classroom as "a miniature league of nations."[31] For both teachers, though, talent was the only important criterion for acceptance and encouragement of a student.

The reports on the personalities of these two musicians contain some contradictions. It seems that both were candid to a fault, and this resulted in encouragement for some and wounded egos for others.[32] One of Boulanger's maxims was, "As long as I am exacting,

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[29]Copland and Perlis, 64.

[30]Hoover, 498.

[31]Kircher, 168.

[32]As famous teachers, both had to endure the indignity of having their work castigated in print by disgruntled former students. Hild reports that a former Rheinberger student by the name of Karl Gleitz published a polemic in which he attacked the teacher for his preference to foreigners, among other things. David Diamond's memoirs contain an unflattering account of his tempestuous studies with Boulanger. A recently published letter from Virgil Thomson to Aaron Copland in 1931 shows that he also had lost much of his respect for Boulanger's teaching (*Selected Letters of Virgil Thomson*, ed. Tim Page and Vanessa Weeks Page (New York: Summit Books, 1988), 100–1).

there is hope. If I am nice, that is a bad sign."[33] A recent biography states:

> She had no use for the weak; once she found them out—and this was true for those who performed under her direction as for her own students—she went after them relentlessly, pushing them to the limit in a way that seemed cruel: many were those who burst into tears beneath the lash of severity, sometimes even in the presence of other musicians. Even some well-known artists fell victim to these humiliating scenes, so painful for a third party to witness, but which left Nadia Boulanger as unmoved as a block of marble.[34]

Rheinberger's technique was perhaps not so direct. He was known instead for his sarcasm with weak students, as illustrated by an anecdote related by Josef Renner:

> Looking through the work of a student, Rheinberger remarked, "This spot in the horn part sounds horrendous!" The student, completely disconcerted, said timidly, "But, Herr Professor, it is only supposed to be played pianissimo."—"That is exactly the same," answered the Master, a smile playing around the corners of his mouth, "as if someone were to go to confession and say: 'Reverend, I have told a lie, but I told it very softly.'"[35]

The rarity with which they gave compliments made their encouragement even more gratifying to gifted students like Copland. He wrote, "The confidence she had in my talents and her belief in me were at the very least flattering and more—they were crucial to my development at this time of my career."[36] Hild reported that the seldom-heard compliment, "This piece can be performed," would set off a joyful celebration in Rheinberger's class.[37] Both teachers

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[33]Quoted in Rosenthal, 79.

[34]Jérôme Spychet, *Nadia Boulanger*, translated by M.M. Shriver (Stuyvesant, New York: Pendragon Press, 1992), 71.

[35]"Anekdoten," *Jahrbuch des Historischen Vereins für das Fürstentum Liechtenstein* 40 (1940): 249.

[36]Copland and Perlis, 64.

[37]Hild, 153.

were notoriously parsimonious with flattery, but they were always ready to give an honest compliment for a job well done, which deepened their students' respect for their sincerity.

Finally, both teachers paid the ultimate compliment to their most talented American pupils with actions rather than words. On 25 January 1885, during Horatio Parker's final year as an organ and counterpoint student of Rheinberger, the teacher entrusted him with the solo part in the premiere of his *Organ Concerto in F*, op. 137. On the same concert, he arranged for the premiere of Parker's own setting of Psalm 23 for soprano soloist, harp, organ, and women's chorus.[38] This generosity was matched by Boulanger forty years later, when she commissioned the unknown Aaron Copland to write a piece for organ and orchestra to be performed on her American tour in 1925. The premiere of that piece was the beginning of Copland's American career. When she first mentioned the idea of writing this piece for an instrument for which he had never written, he asked, "Do you *really* think I can do it?" She pointed at her student and replied, "*You* can do it."[39]

Josef Rheinberger and Nadia Boulanger lived in very different surroundings, but their approach to teaching was remarkably similar. Both believed in disciplined study of the masterworks of the past as models for student composition, both stressed counterpoint above all other skills, both had a fanatical attention to detail, and both were completely candid with their students, praising good work and correcting poor work. While it would be naive to claim that this is the only way to teach composition, the subsequent success of so many students reflects an unmatched impact on two generations of American composers. Their methods and ideals continue to offer much that is worthwhile for those who are guiding the next generation.

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[38]*Elfter Jahresbericht der Königlichen Musikschule in München* (Munich: Wolf, 1885), 35.

[39]Copland and Perlis, 92. Boulanger also arranged for a concert of American works in Paris on 5 May 1926 that was important for the growing international reputation of the young generation of American composers.

Evaluating Student Work Using Models Derived from Those Used in Nationally Administered Examinations

Joel Phillips

Each year thousands of students take one of two music examinations administered nationally by the Educational Testing Service. Students who hope to attend graduate school in music take the revised Graduate Record Examination (GRE) in Music and high school students who wish to receive undergraduate credit for the first year of music theory take the Advanced Placement (AP) Examination in Music Theory.

For a number of years both of these examinations have incorporated tasks typical of those given in college music theory classrooms. As examples, students are asked to realize a figured bass, take melodic and harmonic dictation, or harmonize a melody. Because of the complexity of these tasks the responses must be judged by human experts. These experts must agree upon the way in which an item will be scored and apply those standards with such consistency that, given a particular student response, all experts who have been so trained should arrive at the same score within a very small margin of error.

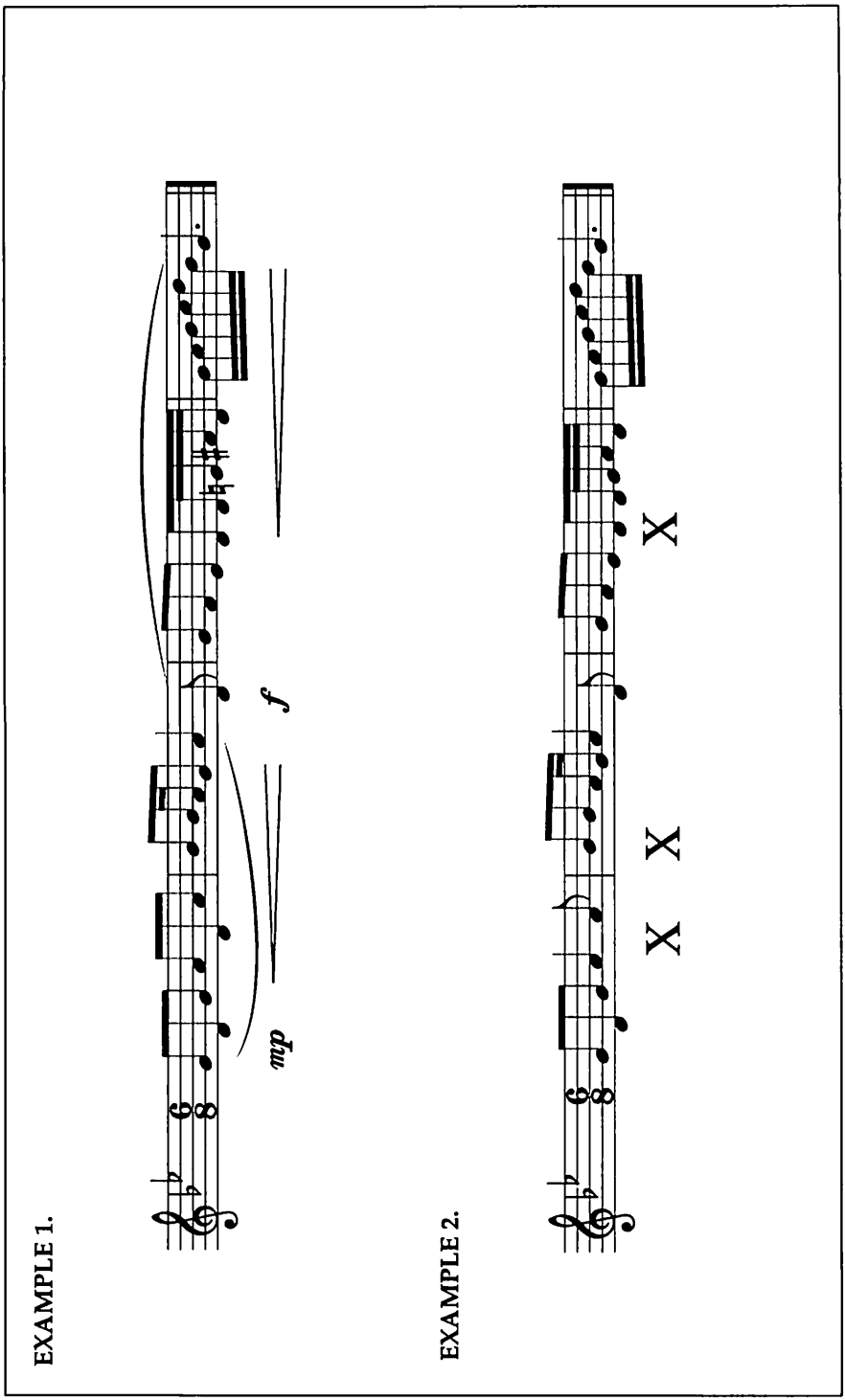
In this article I will describe and illustrate the types of judgements made in these examinations. Then I shall demonstrate how I have applied models derived from the scoring guides of these examinations to meet my own classroom needs. Because the nature of the feedback on the national examinations differs from that found in the classroom, I will also demonstrate the type of feedback I give students, with particular emphasis on peer evaluation and collaborative learning. Because I have had the privilege and pleasure of training readers for each of these examinations I can offer what I hope to be an interesting perspective to the task.

Though these models of scoring might not be appropriate for every type of work one evaluates in one's own classroom, there are many possible derivations that have the potential to make day-to-day judgements faster, fairer, and more consistent. Among the people who might see immediate benefit from these examples are teachers of classes with large enrollments, departments that offer multiple sections of the same class but which have different teachers, persons who supervise graduate assistants, persons who must make real-time judgements (such as those made during auditions or in aural skills classes), and persons who score placement tests.

There are two fundamental types of judgements rendered in these examinations. These I will characterize as *analytic judgements* and *holistic judgements*. Some scoring guides are purely analytic and some guides are purely holistic. Sometimes the guides are comprised of a combination of both analytic and holistic judgements.

The analytic judgements are typically used for items that are indisputably right or wrong. The harmonic dictations given on either examination lend themselves well to this type of judgement. In these questions students are asked to record the soprano and bass pitches of a harmonic dictation and to supply the Roman numerals and figures of the progression they hear. From the judge's point of view the student responses are deemed either right or wrong. A pitch is either correctly notated or it is not. The chord choice a student circles is either correct or it is not. A second example of analytic judgement is the regular scoring guide for the AP melodic dictation. In the regular scoring guide each segment (usually half a measure) completely correct in both pitch and rhythm is awarded one point. After judging all segments one additional point is added to the subtotal to obtain the final score. (This last point helps discriminate people who did everything wrong (=0 points) from their colleagues who did at least one thing right (=1 point).)

Consider Example 1 to be a melodic dictation typical of that played in a first year class. Consider Example 2 to be a student response to the melodic dictation played in Example 1. This response features five correct segments each worth one point to which an additional point is added for a total score of six. Each incorrect segment is marked with an X.


EXAMPLE 1.
f
mp
EXAMPLE 2.

Analytic judgements may also be used for items that have clearly defined, generally accepted answers. For example,when students are asked to resolve an augmented sixth chord, there are but a small number of possible responses that are characteristic of the common practice period. Readers are trained to anticipate those potential responses and to accept no others.

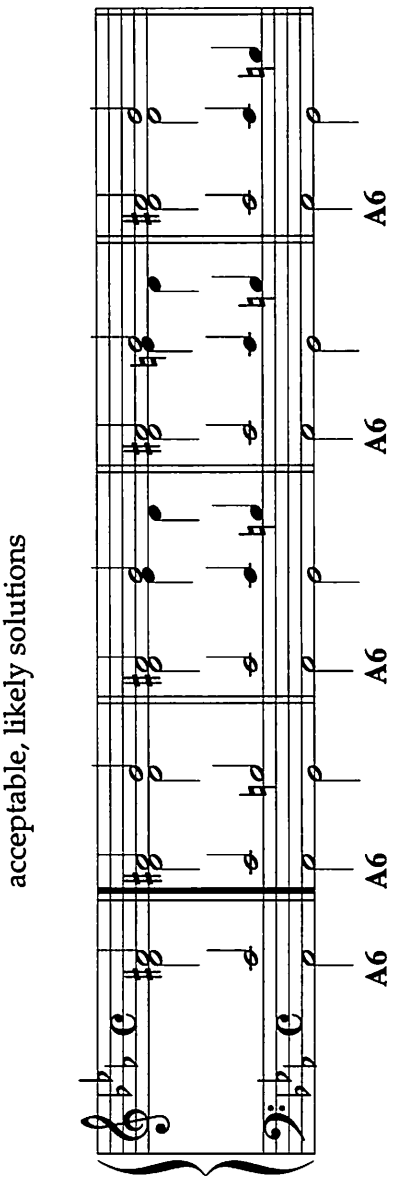
Example 3 illustrates a problem of this type followed by four acceptable answers. Note that there is some flexibility in this process; after all we are dealing with music! If a student paper reveals a musically satisfying resolution that is not on the list of acceptable responses, the judge simply asks the person who trains the readers to permit the unanticipated solution. If you are about to read several hundred papers, these types of relatively objective, analytic judgements can save a great deal of time.

Holistic judgements are used in situations where there are many possible correct solutions and for responses in which the answers might depend upon the context in which they are found. Thus in holistic judgements an entire example or a portion of an example might be viewed with a certain subjectivity. The purest of the holistic judgements might be characterized by the use of descriptive words or a phrase that applies to a response. Perhaps the most familiar type of holistic scale is the traditional grading scheme of A=excellent, B=good, C=satisfactory, D=unsatisfactory and F=failure.

In the composition question on the AP examination students are asked to write a bass line to counterpoint a given melody, and to write the harmonic implications of the line below the staff. A judge studies each phrase and decides upon a score using descriptive words or a phrase to describe the perceived quality of that phrase. For a phrase that demonstrates an "excellent treatment of the bass, harmonic progression, and Roman numerals" a judge awards 4 points. For a phrase that demonstrates a "good treatment of the bass, harmonic progression, and Roman numerals" a judge awards 3 points, and so on. As to what criteria constitute an "excellent treatment," the subjectivity of the judges is tempered in an extensive training lasting more than half a day that includes more than thirty samples from actual student papers as reference. An additional ho-

EXAMPLE 3.

Compose a resolution of the following chord in common practice style.



listic judgement is made after each phrase is judged. The judgement reflects the musicality of the composition as a whole.

Example 4 is an actual student response to the composition question and includes the rationale for the decisions made in awarding the submission a score of 16. Note that in this student's paper an additional discretionary point is awarded for the overall musicality of the composition.

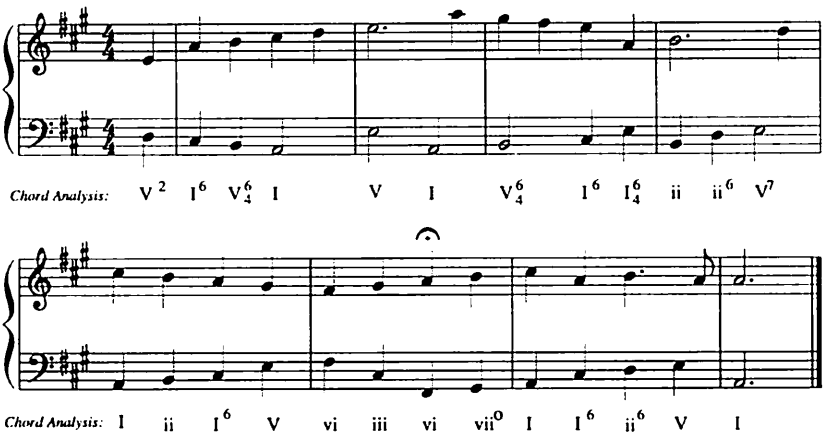
Another example of holistic judgement is the use of alternate scoring procedures for sight singing on the AP examination. These alternate procedures are used for responses in which students substantially disregard either the pitch or the rhythm of a melody. (For typical responses a regular scoring guide, similar to the analytic guide used to judge melodic dictation, is used. Consider the music of Examples 1 and 2 to be a sight-singing melody and a student's attempt to sing the melody.) If many of the pitches are incorrect in a sight-singing melody, two points may be awarded for rhythm that is correct or mostly correct. Similarly, if many of the pitches are incorrect in a sight-singing melody, one point may be awarded for rhythm that is about half right.

Consider Example 1 to be a melody to be read at sight. Example 5 notates a student response that would invoke the use of the alternate scoring guide. Because this student disregarded the pitch and sang about half of the rhythm correctly, this response would receive a score of one point. Each rhythmic error is marked with an arrow. On the other hand if a response's rhythm is mostly inaccurate, up to four points may be awarded for correctly sung pitches. Example 6 notates a response that lacks rhythm, but in which the pitches sung are mostly correct. This response would receive a score of three points. Each pitch error is marked with an arrow.

In addition to these alternate scoring guides there are further examples of holistic judgements made in the sight-singing examination. The scores of 0 and 1 can also be applied to a response with "no redeeming quality" and a response with "some redeeming qualities" respectively.

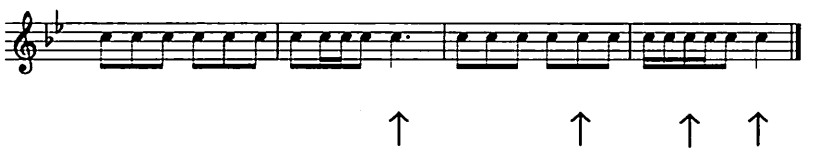
Sometimes analytic and holistic judgements are combined to obtain the score for a single item. In judging the free counterpoint item on the GRE each segment (usually one beat of music) of a response is worth one point. If there is any major error, such as paral-

EXAMPLE 4. Sample AP Composition Question

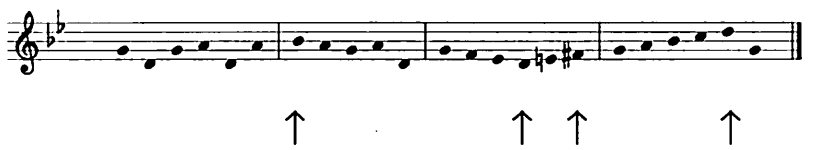


This is an example of an excellent response. The harmonic motion of the first phrase is completely logical, including the opening on the V4/2 chord that resolves to the I6; four points are awarded for this phrase. The second phrase is a bit rougher, due to the use of the passing V6/4 on a strong beat (the downbeat of m.3) and the awkward I6/4 on the last beat of that measure. If one looks to the third beat of m.4 for a cadence, the landing on the dominant works well. This is an example of "good treatment of bass, harmonic progression, and roman numerals," resulting in 3 points. Phrase 3 works fine as is, though it could be improved by a passing vii6 chord instead of the ii chord in m.5, and by a V/vi chord instead of the ii chord in m.6. It receives 4 points. Finally, the fourth phrase exhibits a logical bass line and harmonies (even though a V6/5 would have been a better choice than a vii chord in root position for the pick up of this phrase), resulting in 4 points for the student. Thus, the student receives a total of 4 plus 3 plus 4 plus 4 points, resulting in 15 points. Because the bass line shows sensitivity to contrapuntal principles (contrary motion, combination of conjunt and disjunct motion, and so on), this student is awarded the extra "aesthetic" point, resulting in a final score of 16 points.

EXAMPLE 5.



EXAMPLE 6.



lel fifths, the entire point is subtracted; if there is a minor error, such as an unresolved leap, one half point is subtracted. There is a list of major and minor error types that accompanies the scoring guide to the problem. After making these analytic judgements the reader views the entire response holistically. An additional deduction may be made for responses that are especially unmusical.

Though there is far more to the scoring process on these examinations than has been presented here, the reader is now familiar enough with the concepts that I can demonstrate how I have adapted these procedures for my own use in class. I shall choose four models for the purpose of illustrating the process I use with the understanding that if one finds the ideas useful one will certainly be able to apply the concepts to one's own classroom. For each model to be discussed I asked myself four questions designed to help me structure the evaluation. They are:

1. What are the goals of the judgement?
2. What feedback, if any, is required?
3. What are the criteria for this evaluation? (The more unique the judgment, the more thorough I want to be and the more specific the criteria for evaluation need to be.)
4. Is there a way to get the evaluation from the students themselves (peer evaluation)?

The first model deals with scoring individual performances in sight singing. Many times a soloist and teacher are the only people who pay attention to a sight-singing performance. Others busily study the remaining melodies in case they might be called upon. I established several goals to improve this activity: 1) the teacher should not have the sole responsibility of engaging students in class activities, students must develop a sense of ownership in their music making; 2) performers should sing before an attentive audience of critical listeners; 3) each class activity must emphasize as many skill levels as possible; and 4) everyone should be involved during each performance.

I then established criteria by which the goals could be judged. I emphasize five skill areas in sight reading: pitch, rhythm, solfege, conducting and musicality. Each may be judged holistically, like each phrase in the AP composition question. For example, pitch may be judged *good to excellent, adequate to fair,* or *poor,* receiving scores of 2, 1 and 0 respectively. The five skill area scores are tallied. An additional, discretionary point may reward an outstanding job in four areas and a poor job in the fifth. For example, during an otherwise superior performance a performer who forgot to conduct might earn the extra point. To correct errors made in their initial performance, students may sing twice. The performer receives the higher of the two scores from each evaluator. The class practices this peer evaluation for several days before the first scores are recorded.

In order to maintain the intensity of interest I desire, I insist that everyone evaluate each performance, detecting errors and offering suggestions for improvement. Because they must evaluate the performers' conducting, the reviewers must watch the performers. Just like conductors, the reviewers must glance at their music, memorize a segment, look up at the performer and compare what they

hear with what they remember. These actions reinforce the skills I am attempting to develop in the students. Reviewers take this job very seriously because they know that their colleagues' grades depend on the accuracy of their evaluations. Moreover, their colleagues will potentially see these scores and comments.

After a performance I collect evaluations from two peers. If the two reviewers are within one point of each other's judgements, as they almost always are, I record the higher of the two scores. If there is a difference of two points, I record my score. Frequently there is complete agreement between both peer evaluators and myself. Example 7 is a handout I give my students when performing peer evaluations of sight reading.

This system of peer evaluation is derived from the scoring method used in the GRE. In the GRE most questions are read by two readers whose independent judgements must agree within one point of each other. On the rather infrequent occasions when there is a two point disagreement, a third, independent reading is made by the person who trained the item. This third score is recorded for the student.

This system of peer evaluation works beautifully for me. In addition to the scores recorded in each area of evaluation, student evaluators frequently offer fine suggestions for improvement or words of encouragement to their peers. My students are developing a much greater awareness for the art of critical listening. There is a focus in this type of class that I could never muster in the past. Best of all I have given up the role of "grim reaper" and assumed that of facilitator. For those of you who might wonder, given my example of an otherwise superior performance which lacks conducting, what the score of 9 really means, let me share with you that my class operates on a narrow scale; a 9 is a B+, an 8 a C, etc.

The second model is a harmonic dictation team project. For several weeks I use the beginning of each class to introduce many of the harmonic patterns inherent to common practice music. The class and I collectively derive "harmonic dictations" from the music we study by removing melodic diminutions from the surface of the music. Then we create new music through the systematic melodic diminution of these harmonic and melodic outlines. Each phrase we analyze is deconstructed into "chunks" which may be catego-

EXAMPLE 7: Peer Evaluation of Sight Singing Performance

Areas of Evaluation	Possible points*
Pitch	2, 1, 0
Rhythm	2, 1, 0
Solfege	2, 1, 0
Conducting	2, 1, 0
MUSICALITY	2, 1, 0
total	10 points

*2 means good to excellent; 1 means adequate to fair; 0 means poor, inadequate or absent

If you have scored the performance as noted above and the score seems too low or too high to you, you may adjust the final score by one point up or down. For example, if the score is an 8 because the conducting was poor, but everything else was outstanding, you may add 1 discretionary point for a final score of 9 points.

Each performance will be evaluated by everyone in the class. I will collect the evaluations from two of your peers. If the peers are within one point of each other, the recorded score will be the higher of the two. If the peer scores differ by two or more points, my score will be recorded.

Evaluation Form
Please copy or emulate this form for use when evaluating each other in class.

Evaluation of _____ **Evaluator** _____
Date _____ **Singing Exercise #**_____

Areas of Evaluation	Possible points* First Attempt	Possible points* Second Attempt
Pitch	2, 1, 0	2, 1, 0
Rhythm	2, 1, 0	2, 1, 0
Solfege	2, 1, 0	2, 1, 0
Conducting	2, 1, 0	2, 1, 0
MUSICALITY	2, 1, 0	2, 1, 0
optional discretionary point (+ 1)	_____	_____
total score	_____	_____

*2 means good to excellent; 1 means adequate to fair; 0 means poor, inadequate or absent

Comments or suggestions for improvement:

rized as tonic establishment chunks, connective chunks, or cadential chunks. We record these chunks for later inclusion on a worksheet that accompanies the collaborative project guidelines. Thus each example students create serves two purposes: the music might be used as a harmonic dictation or as the outline for composing or improvising a phrase.

After students are familiar with the processes just described I sort them into teams. The teams are comprised of two partners each of whom composes, performs, teaches, listens to, and scores harmonic dictations. Unlike the classroom method, the speed and interaction between participants may be customized. Hints may be given and questions may be asked as long as no specific detail is revealed.

The projects are scored analytically and the method of judgement is conceptually identical to that used in each of the nationally administered examinations. The grade is determined by using a simple formula: students add the number of soprano pitches, bass pitches and Roman numbers/figures that are correct and divide that number by the total number of possible responses to obtain the score for the dictation.

Like the sight singing peer evaluation, there is a suggested format for the harmonic dictation peer evaluation. Once again the burden of responsibility rests with the students. Dictation becomes an active, musical process. The team activity eventually replaces the daily harmonic dictations in class. For additional practice these team projects are also supplemented with individual work using computer-assisted instruction software.

The third model deals with the judgement of sight singing in juried examinations. Each semester my colleagues and I must jury the examinations of all persons enrolled in our sightsinging courses. A minimum of two faculty members must hear each student— the student's teacher and a department member at-large. Sometimes the second faculty member can only stay for part of the examination and is relieved by a third member of the department.

I have two scoring schemes for this type of evaluation. My first scoring scheme is derived from the AP examination, which now includes an evaluation of sight singing. Each judge listens to the performance, awarding one point for each segment of music performed correctly in both pitch and rhythm in the case of the melo-

dies, and rhythm alone in the case of non-pitched rhythms. One point is added to the score if there are no hesitations or restarts in the performance. If a minor melody is consistently transformed to major during a performance, the performance is scored as if the tune had been written in the major mode. Three points are then deducted from this subtotal to obtain the final score. The second scheme is identical to the method discussed earlier for the peer evaluation of melodies.

Regardless of which scheme I use, the two teachers' scores are later compared by the teacher of the examinees who averages them. These scores are usually identical and seldom differ more than one point. This scoring method permits the performance of two melodies and two non-pitched rhythms during a seven-minute individual hearing. Because these examinations extend for hours this method of scoring helps the judges maintain their focus. If students have questions about their performance after the examination, there is a record of the exact places where they made their errors. To prepare for the experience of the jury I hold mock juries during the last two classes in order to minimize test anxiety.

There are some differences when compared to the judgements made in the AP examination. Like other items in the AP examination, the sight singing portion is scored by a single judge, though there are frequent checks of the readers' judgements by the item trainers to ensure continued vigilance on the part of the readers. The judge listens to a tape of a student performance until a judgement can be rendered—usually two or three times.

Many simpler models exist in my revised "bag of tricks" for the classroom. In the past I devoutly scored every homework assignment on a scale of 100 without really appreciating how much time I spent fitting the assignment to the scale and tallying the scores, but to what end? For most daily work I now use a system that minimizes the time I spend scoring a paper and maximizes the time I spend giving feedback on the paper. The system is an embarrassingly simple, holistic scale. Perhaps you recognize it? A *check* means the paper demonstrates a fair to excellent grasp of the material, a *minus* means the paper demonstrates a poor grasp of the assignment and a *zero* means the assignment was not turned in or was substantially incomplete.

EXAMPLE 9. Harmonic Dictation Team Project, p.1

This team project will replace much of our classroom activity in harmonic dictation. Because you will work privately with a peer there will be more flexibility than is possible in our classroom setting. This project will be an excellent opportunity to reinforce many diverse concepts because you will each play the role of composer, performer, listener and teacher.

Stage 1: Compose your harmonic dictations. The progressions you compose should be comprised of "chunks" from the HD Chunks handout (or from other pre-approved dictation materials). Choose first a tonic establishing chunk, then a cadential chunk and, finally, a chunk that links the tonic to the cadential chunk. I strongly encourage you to derive your progressions from the music we are studying. If so, please cite the piece, composer name and the measures from which you have derived your music. Progressions should be approximately 8-10 chords in length, written in SATB or 4-part keyboard style with good voice leading. If you have a more experienced partner you may, of course, compose longer progressions. Once you see the individual strengths and weaknesses of your partner, compose progressions that will best help your partner improve on his or her weaknesses.

Stage 2: Have the teacher review your compositions. You are required to submit your progressions to the teacher for approval prior to giving them to your partner.

Stage 3: Perform your music for your partner. At a private meeting with your partner you will perform your musical examples and, as a teacher, help your partner to improve her or his skills. Use a similar approach to that developed in class. You may, however, play the example more often than is possible in class as well as at different tempos. You may give your partner generic "hints," but do not reveal any specific information about the particular example being performed. Now that you understand melodic diminution, remember that these dictations are the outlines of real music and, as such, deserve to be performed as musically as possible.

Stage 4: Listen and take dictation. This stage is exactly what you are accustomed to from your class experience. However, now you have the opportunity to interact more freely with your teacher/partner. You may ask to hear the progressions at different tempos. Perhaps you may wish to hear the bass voice more loudly, etc. For obvious reasons, do not ask questions of your partner that would compromise your own learning experience. Don't use your partner as a crutch!

Stage 5: Report on the progress of your peer. Each partner must report on the progress of his or her peer by the specified deadlines below. You are required to document each meeting with your peer. If your partner has special needs, please feel free to consult with me for helpful hints.

EXAMPLE 9. p.2

Deadlines for Reporting Individual Progress:

High Noon, Friday, 25 October
High Noon, Friday, 8 November
High Noon, Friday, 22 November
High Noon, Wednesday, 11 December

You may use copies of this page to turn in as a progress report.

Report of Progress in Harmonic Dictation

Evaluation of _____ Evaluator_____

Date of Meeting: _____ Duration of meeting: _____minutes

1. Attach a copy of the progressions played for your partner. Indicate the number of times you played each progression on your music.

2. Attach your partner's graded dictations. (To grade, add the number of soprano pitches, bass pitches and Roman numbers/figures that are correct and divide that number by the total number of possible responses to obtain the score for the dictation. For example, assume a dictation has 9 soprano notes, 8 bass notes and 7 chord symbols and that your peer misses 2 notes and one chord symbol: 21 correct/24 total responses = 87.5. Round up to 88%.)

3. Make a list of the hints you gave your partner.

4. Make a list of the suggestions you gave your partner for his or her improvement.

What I do with the additional time is to give much more feedback to the student. To do so I employ numerous time savers. When judging figured bass realizations, for example, I use a system in which each of the common errors is assigned a number. Objectionable parallels is given the number 1, improper use of the six-four chord the number 12, incorrect suspension the number 17, etc. The students have a "legend" that lists the errors by number, but which also refers them to an outline we built together in which those errors are explained in some detail. These errors are grouped into major errors and minor ones, as in the counterpoint of the GRE or the figured bass in either examination.

What probably seems obvious to the reader is the fact that these ideas are so simple. Yet they were not apparent to me until my experiences with these examinations. Being an ETS reader turned out to be better than a pedagogy seminar! I now realize that the scoring decisions I was making were not only unnecessarily laborious, but also somewhat capricious. Further, I was so accustomed to spending time devising scoring schemes for each assignment and scoring student papers that I was unable to give as much feedback as my students deserved. By combining my own methods of giving feedback with the modified scoring methods used on these examinations, I believe I now operate more fairly and efficiently as a teacher.

For those people who might be interested in further information pertaining to these examinations, the names and addresses of the test development specialists at ETS who are responsible for overseeing the development of these instruments are listed below. Both would be happy to provide you with additional details regarding the content and scoring of these examinations as well as information on the potential opportunities to participate as a reader in the scoring process.

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Teaching Pitch Internalization Processes

Edward Klonoski

Most music educators would agree that one of the primary goals of aural skills training is to develop in students the ability to recognize and understand musical relationships with "the mind's ear." That is, we strive to teach students to *internalize* pitches and pitch relationships. By internalize, I mean the ability to mentally create or recreate auditory images without singing, playing, or otherwise outwardly reproducing the pitches.[1] Yet most of the strategies traditionally used to teach both aural skills in general and dictation skills in particular rely exclusively on ex-

[1]Edwin Gordon (*Learning Sequence and Patterns in Music.* Chicago: G.I.A. Publications, 1977) uses the term *audiation* to describe essentially the same idea that I invoke with the term *internalization*. However, there are several important differences between our respective approaches to teaching the concept. Gordon's audiation begins with a wider range of concepts, activities, and objectives than does pitch internalization. For example, audiation includes the aural understanding of key relations, modes, tonality in its broadest sense, and rhythm and meter. Audiation also begins with pattern recognition and recall. In short, the focus of audiation from its earliest stages of development is the apprehension of tonal and rhythmic patterns within a larger context such as a key or mode. In this way, from the outset, context is a crucial to the learning process. Although pitch internalization also ultimately strives for an intuitive understanding of musical events within larger contexts, its more immediate goal is to teach students how to develop the ability to access imagined pitches. Internalization seeks first and foremost to teach the *process* of creating or recreating pitches in one's mind. Once this has been achieved, students can begin to incorporate larger patterns and contexts into the learning process.

ternal sound sources.[2] This reflects the tacit assumption that students can learn to internalize musical relationships through exercises and drills that exclusively utilize external sound.

In this paper I will: 1) consider some of the reasons why the use of external sound sources remains so prevalent in aural skills instruction; 2) examine some commonly-used aural skills teaching strategies that are based on the assumption that instruction with external sound sources will result in internalization; 3) propose strategies for determining early on which students are likely to struggle with or fail to translate external sound sources into pitch internalization; and, 4) suggest several approaches designed to teach internalization more directly, approaches that can be used in conjunction with more traditional instructional techniques.

FACTORS CONTRIBUTING TO THE OVER-RELIANCE ON EXTERNAL SOUND SOURCES

Pedagogical tradition aside, there are numerous reasons underlying the reliance on external sound sources for aural skills instruction, perhaps the most obvious of which is that music is an aural phenomenon. If the goal of aural skills training in the broadest sense is to help students to better understand the music they hear and play, external sound sources would seem a logical and even necessary point of departure. Moreover, many of the widely-accepted aural skills instructional techniques and strategies in use today that rely exclusively on external sources have long and proven histories of success in teaching average and above-average music students. For these students, experience over time with such sound sources usually results in the ability to internalize pitches and pitch relations.

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[2]The authors of two recently published aural skills manuals encourage students to utilize auditory images in the execution of various perceptual tasks: see David Damschroder, *Listen and Sing: Lessons in Ear-Training and Sight-Singing* (New York: Schirmer, 1995); and Arthur Gottschalk and Phillip Kloeckner, *Functional Hearing: A Contextual Method for Ear Training*, (New York: Ardsley House, 1997). However, they do not attempt to systematically teach internalization skills and appear to assume that all students are already proficient at pitch internalization even before they begin formal aural skills study.

Perhaps the most compelling—though least pedagogically justifiable—reason for the exclusive use of external sound sources is testing: how else can one measure a student's progress? In order to gauge a student's ability to internalize pitch relations, it is necessary to evoke from the student a testable response. Typically these responses are either notated, sung, or played on an instrument. While the evaluation of students' progress is essential to the timely and logical presentation of gradually more advanced aural concepts, it is important to be clear about precisely what we want our tests to accomplish.

Most tests are designed to assess students' progress in one or more areas of competence, although tests can also be used as instructional tools that require the student to synthesize skills, thought processes, and information that may have been presented or learned independently. Still, testing should not be the primary means of instruction, nor should instruction be compromised for the sake of testing. Unfortunately, both of these scenarios are all too common in aural skills classrooms, where over-reliance on testing is a real danger. One particularly glaring contradiction inherent in the exclusive use of external sound sources is that while students are ultimately tested on their ability to internalize pitch relations—via dictation, sight singing, error detection exercises, etc.—they rarely are taught specifically how to master this skill. Rather than teaching internalization directly, instructors assume that it will develop indirectly and largely on its own. In the absence of such direct instruction, all classroom activities become, in effect, a series of tests. Should we not first teach the skills that we will later test?

TRADITIONAL APPROACHES

The following is a small sampling of commonly-used aural skills tasks that reveal the pervasiveness of the assumption that the exclusive use of external sound sources develops pitch internalization skills. The focus will be restricted to some of the more rudimentary activities, since it is here that so many of the difficulties that students experience at all levels of aural skills study originate. Later, I shall offer some alternative approaches to beginning aural

skills tasks that more directly incorporate pitch internalization into the learning process.

In the broadest sense, dictation exercises test three different skills: 1) the ability to remember what was played without analyzing or interpreting it; 2) the ability to identify the pitches and rhythms played, and to understand their relationship to other events in the exercise; and 3) the ability to notate what was heard. Typically, students must perform all of these tasks silently. That is, they must internalize the pitches and pitch relationships. The first two skills will be the primary focus of the ensuing discussion.

One of the first considerations in setting up a dictation exercise is whether or not to establish the key, a task that is more complex than it might on the surface appear to be. Establishing a key is not merely the identification of the tonic note; rather it entails grasping the entire nexus of relationships that combine to create the perception of a single pitch as the tonic. If the key is given, it can be established in a variety of ways: by playing a short chord progression, a melodic pattern, a single chord, or perhaps simply by playing the tonic note itself. All of these strategies require the student to internalize external sounds and then mentally recreate the rest of the relationships inherent in the key just to set up the exercise. If the student already has difficulty with pitch internalization, s/he will not be able to construct the necessary contextual framework. Since the fundamental activity in performing musical dictation is a comparison of what is known with what is unknown, the absence of a key context precludes such comparison and undermines the student's chances for success.

Other means of establishing the key involve the student more actively. For example, the class can sing a chord progression, the tonic chord, or the tonic pitch. However, having students sing a given pattern does not guarantee that they can accurately mentally recall or access it in the absence of singing.[3] More importantly, since students often are not allowed to sing during a dictation exercise—let alone during a public performance— establishing the key by having the students sing is, at best, an indirect preparation for the task of internalizing what they hear.

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[3]This idea is considered in greater detail further in the ensuing section.

It might also be desirable *not* to establish the key prior to an exercise. This approach tests the student's ability to determine the key based on the content of the exercise. Specifically, it requires the student to hypothesize a tonic pitch based on cues contained in the example, and then to compare the rest of the pitches in the exercise to the tonic—no mean feat for someone who might have difficulty accessing even a single imagined pitch.

Determining the starting pitch of an exercise is among the most important and, for some students, the most difficult aural skills tasks. We have all seen student dictation papers wherein the failure to correctly identify the starting pitch virtually eliminates any chance for success. Without knowledge of the starting pitch, the student is usually unable to identify any other pitch in the exercise because the proper key orientation is missing.

Some instructors try to compensate for student weaknesses by providing starting pitches, assuming that in time the students will no longer need to be given such information. However, in providing the initial pitch, we tacitly tell the students not to worry about deciphering this information: since they know that the starting pitch will be provided for them, they don't bother to practice how to determine it for themselves. More importantly, instructors miss the opportunity to *teach* the students how to identify the starting pitch. Often the result at later stages of study, when the starting pitch is no longer provided, is that students spend an inordinate amount of time trying to figure out the starting note because they were never taught how to do so.

Other clues intended to assist the students include the placement of reference pitches at strategic points throughout an exercise. Again, if the student cannot mentally recall these pitches between playings, they will be of little use. These are just a few of the many examples of rudimentary exercises that require students to internalize pitch relations, but which fail to actively teach the process of internalization. With the exception of tonal memory drills—wherein the goal is not identification or analysis, but simply the recall of a given pattern—all dictation exercises that exclusively utilize external sound sources require students to be able to internalize pitches and pitch relations.

IDENTIFYING STUDENTS FOR WHOM PITCH INTERNALIZATION IS LIKELY TO BE PROBLEMATIC

Recent research in auditory imagery suggests that creating or recreating music in one's mind uses similar neuronal processes as perceiving music with one's ear, but the latter appears to be substantially easier than the former.

> Although performance varied considerably across individuals, all subjects reported that—with more or less difficulty—they had been able to generate the song internally during the imagery task. . . . In keeping with our previous experience with similar tasks, the imagery condition was significantly more difficult than the perceptual condition (all but two subjects performed better on the perceptual task).[4]

Given the potential differences in students' ability to internalize pitches, it is important to identify as early as possible those students for whom pitch internalization already is or is likely to be a problem. The following are strategies that have proven to be effective in uncovering student difficulties: Ask a student to imagine a pitch, and then to sing the pitch when certain that they can do so. When the student sings a pitch, ask if it is the pitch the student was imagining. I have received responses to this question ranging from 'Yes, it was the pitch I imagined,' to 'No, it was a different pitch,' to 'I can't tell if the pitch I sang was the same pitch I imagined.' For those students who accurately sing the pitch they imagined, pitch internalization is not likely to be problematic, since they have already figured out how to access their "inner ear." For the others, particularly those who cannot tell if what they sing is what they hear mentally, unless they are taught to recognize and reproduce what they are hearing, it will be much more difficult to develop the ability to internalize pitch relations.

The importance of this first step in the internalization process—learning to imagine and access a single pitch—cannot be over emphasized. Experiments conducted by Hubbard and Stoeckig reveal

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[4]Robert J. Zatorre, et al, "Hearing in the Mind's Ear: A PET Investigation of Musical Imagery and Perception," *Journal of Cognitive Neuroscience* 8/1 (January 1996): 29.

that it takes less time to imagine a single tone than it does to imagine a chord.[5] This suggests that some imagery tasks may be more complex than others. In light of this, it is likely that the difficulties encountered by those students who struggle to internalize isolated pitches will increase dramatically as the complexity of the course content increases.

Sometimes students can actually sing a melodic pattern, such as a major scale, with relative ease, yet they may not be able to mentally recreate or access the auditory image of the same pattern.[6] This can be confirmed with the following exercise: Direct a student first to sing a major scale, then to mentally recall individual notes within the scale, and finally to sing scale degrees at various points in the mental hearing process. For example, direct the student to recall the first three scale degrees and then to sing the fourth degree. Even though the student may readily be able to sing the first four scale degrees in succession, s/he may struggle or not be able to sing the fourth scale degree without the benefit of having sung the preceding three.[7]

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[5]Timothy L. Hubbard and Keiko Stoeckig, "The Representation of Pitch in Musical Images," in *Auditory Imagery* (Hillside NJ: Lawrence Erlbaum Associates, 1992).

[6]I often begin with a major scale because most students are reasonably familiar with its sound, regardless of their musical experience or background. More important, research suggests that there is a strong link between auditory imagery and *subvocalization*, which will be considered more fully in the section on alternative strategies. Subvocalization can take several forms. It occurs when one initiates the physical motions necessary to create a particular sound, but stops short of actually producing the sound. Alternatively, one might silently pronounce a sound or series of sounds, say "do-mi-sol," and *listen* with the "inner ear" to this reproduction by the "inner voice." The idea here is that the physical changes occurring in the vocal chords, lips, tongue, etc., provide kinesthetic cues that can facilitate recalling a sound. By starting with a familiar pattern, such as a major scale, the students can utilize the physical sensations associated with singing to help access their inner ear.

[7]This suggests one plausible explanation for why some students can be reasonably competent with sight singing and yet struggle with dictation. In sight-singing exercises, the student provides essential pitch references in the form of external sounds which are absent in dictation exercises, where the student must mentally supply the pitch references.

ALTERNATIVE STRATEGIES

Let us now consider some specific strategies for developing pitch internalization. Clearly there are many techniques available, and this discussion is not intended to be exhaustive. Although some of these techniques can be employed at any level of instruction, most of them are designed to develop skills that will provide the foundation for later study. As such, they are most appropriate for the early stages of aural skills training.

After employing some of the techniques discussed earlier for identifying those students for whom pitch internalization is potentially problematic, the focus shifts to the task of recognizing and retaining a single pitch (usually the tonic). The way in which sounds—either imagined sounds or sounds perceived via the ear—are recalled involves one of two processes. First, externally generated sounds provide direct access to the short term memory. The listener can simply recall the means through which the sound was presented—the piano, another person's voice, etc. Second, if the sound is to be imagined without first being perceived via the ear, the listener must provide some form of covert articulation or subvocalization in order for the inner ear to "listen" to it.[8] This covert articulation may take the form of the listener imposing on the to-be-imagined (TBI) pitch a particular instrumental timbre, the sound of someone else's voice, or the sound of their own voice. There are potential advantages to the student imagining her/his own voice as the mode of presentation. The information provided by the physical cues associated with actually singing the TBI pitch can help the students to recall the target pitch. Smith, Reisberg, and Wilson hypothesize that the motor plan—whether realized or not—necessary to reproduce the TBI pitch in effect "loads" the inner ear in much the same way that external sound loads the short term memory store.

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[8]The following discussion of the use of subvocalization in teaching pitch internalization is based on David J. Smith, Daniel Reisberg, and Meg Wilson, "Subvocalization and Auditory Imagery: Interactions Between the Inner Ear and Inner Voice," in Daniel Reisberg, *Auditory Imagery* (Hillside NJ: Lawrence Erlbaum Associates), 1992.

Students who report difficulty in accessing and singing an imagined pitch often can improve significantly by *initiating* the process of singing the imagined pitch, but not actually doing so. By paying attention to the changes taking place in planning to sing, these students report greater success in recalling and accurately reproducing the imagined pitch. After the class establishes the key by singing a major scale as many times as is necessary for everyone to become thoroughly familiar with its sound, ask individuals to sing the tonic pitch, making sure that those students who struggled with the earlier mental imaging exercises get a chance to sing the tonic note. Direct the students to imagine the tonic, asking them to confirm that they can, in fact, hear it. If any student cannot mentally recall the pitch, repeat the entire process until s/he can do so. Occasionally, even after singing the scale several times, a student is still unable to retain the tonic. While the rest of the class sings the scale, direct that student to quietly hum the tonic pitch, paying particular attention to the physical sensations associated with singing the pitch. This is typically sufficient to enable the student to recall the pitch.[9]

Once all of the students are confident that they can mentally hear the tonic pitch, play a short melodic pattern in the key established at the outset of the exercise, but one that does not include the tonic note. The students confirm that they have retained the tonic by singing it either on a neutral syllable or on "do."[10] Little by

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[9]Admittedly, the task of retaining the tonic pitch has as much to do with tonal memory as it does with auditory imagery. However, memory tasks such as this are very helpful in developing imagery skills and teaching students to access their inner ear.

[10]Diana Deutsch suggests that decrement in pitch memory is not simply a matter of limited storage space in a general memory store, nor the result of attention distraction. Rather, she posits that there exists a specialized system for pitch memory. She describes this system as a "lateral inhibitory network," wherein each new pitch introduced inhibits memory of the immediately preceding pitch. This hypothesis offers a plausible explanation for student reports of being "overrun" by too much information during dictation exercises. Tonic retention drills of the sort described here aim at helping students minimize the distracting effect of each newly introduced pitch. See Diana Deutsch, "Memory and Attention in Music," in *Music and the Brain: Studies in the Neurology of Music* (London: William Heinemann Medical Books, 1977).

little, the length and complexity of the melodic patterns increase until, finally, the pattern contains cadential figures that suggest another tonal center. Since the students' only task is to remember a single pitch, they should be able to retain the original tonic even with the implication of a new key area. The students should practice these types of distraction exercises on their own until they can direct their attention toward other events taking place in the music and still recall the tonic note at any time.

When the class can successfully recall the tonic on demand, the students are asked to recognize where in a short melodic pattern the tonic note occurs. At first, the pattern may need to be as brief as two notes. As the students become more proficient, the exercises get longer, culminating with the addition of meter and the students being required to place the tonic in its proper metric and rhythmic position. This, of course, is a variation on the common strategy of providing notated reference pitches throughout an exercise, only the references are now in the student's mind rather than on the page.

By now the class is ready to return to the task of mentally listening through the major scale. Even those students who previously struggled with this exercise tend to have greater success the second time around, because their original referent—the tonic note—is more firmly established, and because they have been shown how to practice accessing internalized pitches. When the students can imagine the entire major scale, they are guided to mentally locate and then sing various scale degrees, and eventually combinations of scale degrees. This exercise will later serve as the basis for interval identification drills.

When a student makes a mistake, another student is asked to identify which scale degree was actually sung. At this point, the original student is directed to recall the nearest reference to the desired scale degree. If s/he "gets lost," they are to return to the tonic and start over again. If they cannot find the tonic, another student sings the tonic note for them and entire process begins again. In this way, the student is not given the answer, but rather is led through a process that will allow her/him to uncover the answer on their own. Ultimately, the process is transferable from context to context, the answer typically is not. Given that mistakes are quite common at this stage, it is easy to keep the class engaged, since the students are

responsible for monitoring each other's responses to ensure accuracy.

Scale degree identification exercises can be expanded to include pitch patterns of varying lengths. For example, one student can recite a three- or four-note pitch pattern in solfége syllables, scale degree numbers, or note names that another student is then asked to sing. Since the student who composed the pattern is responsible for detecting any errors in the singback, s/he must also know what the pattern sounds like. Students often discover on their own which melodic combinations are easier to hear mentally and which ones are more challenging. This exercise can fruitfully be reversed as well, with one student singing on a neutral syllable a pitch pattern that another student must then identify. Again, the rest of the class is monitoring for errors. Finally, harmony can be added to the exercise, with students creating pitch patterns that reflect an underlying harmonic progression. This lays the foundation for the introduction to improvisation.

Pitch pattern drills can also be used expressly for error detection, while reinforcing internalization skills. For example, the instructor—or, later in the term, one of the students— writes a series of solfége syllables on the board. The class is directed to internalize the pattern. Once they have the pattern in their mind's ear, the melody is played with one or more notes changed. The students must first sing the pattern on the board, then sing what was played, and finally identify where the error(s) occurred and the errant note(s).

I mentioned earlier that starting pitch identification, a skill which few aural skills texts require students to perform, is often left up to the students to develop on their own. Once again, auditory imagery studies provide compelling research that can be applied in the design and presentation of exercises that teach starting pitch identification directly. In an experiment in which subjects were asked to identify a target pitch as soon as the pitch became loud enough to detect, Farah and Smith found that subjects could better identify the target pitch when instructed to imagine the same frequency before the target pitch was actually played.[11] In short, subjects per-

[11]M.J. Farah and A.F. Smith, "Perceptual Interference and Facilitation with Auditory Imagery," *Perception and Psychophysics* 33 (1983).

formed better when the imagined pitch and the target pitch were the same, and performed poorer when the imagined pitch and the target pitch were different. Moreover, performance was better when subjects imagined the pitch prior to the target pitch being played, rather than imagining it concurrent with the playing of the target pitch.

The following exercises utilize Farah and Smith's findings.[12] Establish the key through internalization drills such as imagining a major scale, scale degrees, or pitch patterns. Since most dictation melodies at this juncture in the aural skills sequence begin on some member of the tonic triad, tell the class that the starting pitch will be one of two members of the tonic chord —say, the root or third; later, all three chord tones can be incorporated. Direct the class to mentally hear either the root or the third of the tonic triad. Play one of the two tonic chord members and ask the students to compare the note they are imagining with the one played. If a student responds incorrectly by saying, for example, that the two pitches are different when they are in fact the same, ask the student to sing the pitch they are imagining. Typically, the student realizes at this point that the two pitches are the same. As the students become more proficient with this drill, increase the level of difficulty by expanding the registral range of the pitches played.[13]

Other exercises that are somewhat more advanced include having the students imagine two different members of the tonic triad in alternation, and then deciding which of the two is being played.

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[12]I assume that at this point the students are able to recall the tonic note on demand. If they cannot, I return to exercises that develop their ability to retain and recall the tonic note, and reinforce strategies for practicing this skill on their own.

[13]The strong connection between subvocalization and pitch internalization discussed earlier provides a plausible explanation for why pitches in more extended ranges are more difficult to internalize. Since the student cannot physically sing the pitch to-be-imagined, s/he cannot impose her or his voice on it, a tack which may represent the student's principal means of internalization. Drills of the sort discussed here can minimize student difficulty in hearing pitches outside of their vocal range, particularly if the student is encouraged to impose other carriers on the TBI pitch, e.g. an instrument, or another person's voice.

Students can also be asked to imagine a member of the tonic triad and then locate its position in the chord as it is played on the piano. This task is especially challenging in that it requires the student to mentally isolate the members of the chord. Still, it lays the groundwork for more sophisticated listening tasks that will be encountered later in the term, such as identifying inverted triads. Finally, when doing sight-singing exercises, students can be directed to mentally locate the starting pitch of each new exercise, and then to establish the key for the rest of the class. Admittedly, this is an advanced skill, and it may be prudent to delay its introduction until later in the term. Nonetheless, it can serve as a primer for future exercises involving modulation. Unless the immediate goal is to teach tonal memory or to practice intonation or some other task which might require external sounds, there is little need to use the piano to set up every new exercise.

Drills requiring students to alternately imagine two or more pitches provide a logical stepping stone from single line exercises to counterpoint drills involving multiple lines. Students are often correctly cautioned against treating two-voiced dictation exercises as two separate and unrelated melodies. Aside from the fact that such a tack ignores numerous clues provided by the interaction of the two parts—harmonic implications, cadence types, obligatory voice leading motions, intervallic successions, etc.—as the exercises increase in length and difficulty, there is rarely enough time to finish both parts independently. Students can be taught to handle multiple lines simultaneously by building on exercises they have been practicing already.

By the middle of the first term sudents should be able to alternate mentally between two scale degrees, and can now begin practicing putting the two together. Direct the students to first imagine the tonic pitch, and then the third scale degree. While mentally *sustaining* the third, have them recall the tonic. With practice they should be able to mentally hear both pitches simultaneously. Once they are able to do so, direct them to move one or both of the voices in a stepwise fashion. This helps to develop an internal sense of various types of motion between two voices. When students are competent with hearing two pitches simultaneously or in alternation, they can be shown how to mentally shift between a moving voice and a sta-

tionary voice. This type of practice helps students protect against being overwhelmed by too much stimuli during dictation exercises.

The exercises described above incorporate aspects of both dictation and singing, but sight-singing skills can also be isolated and approached in a manner that reinforces internalization more directly. Since most beginning sight-singing melodies are almost entirely stepwise, the students should be well equipped at this point to hear the melodies internally. If leaps are included in a melody, the students should be able to figure them out as a result of their practice with pitch patterns and scale degree identification drills. It is helpful to have students mentally hear melodies in real time while conducting. Once they have heard the melody, ask them to sing it aloud without looking at the score. This presents numerous opportunities for teaching tonal memory and discussing listening strategies that utilize pitch references students have already developed.

Finally, we all try to impress upon our students the importance of listening to others when performing in an ensemble. Yet, the ability to listen to others while playing their own part is a skill that students must consciously practice. To help students develop this skill, have them mentally listen through one line of a duet. When they are confident that they can hear the part, have them listen to it while someone else sings the other part of the duet. When they are successful, switch parts.

SUMMARY

Some of the issues that have been raised in this paper are by no means new. Instructors have long struggled with how to reach those students for whom traditional teaching techniques fail to produce success in the aural skills classroom. Nor are the teaching methods proposed here intended as being wholly original; other educators undoubtedly employ some of these and other similar techniques. The point I wish to stress is the underlying pedagogical belief that if we want our students to internalize pitch relations, we must consciously and actively teach them how to develop that skill.

Refocusing the early stages of aural skills instruction on pitch internalization does entail some compromises. First, and most importantly, the initial pace of the class must be slowed considerably. The instructor must be patient enough to allow students ample time

to learn how to develop and access their "inner ear." However, it must be constantly reinforced that a slower pace does not imply a lackadaisical approach to learning. On the contrary, instructors must show students how to develop focused, concentrated practice habits. Ideally, the class serves as a model for the students for how to practice aural skills on their own.

A slower pace also requires greater creativity in the development and presentation of classroom exercises. Since part of the role of the instructor is to identify individual student's weaknesses, a significant amount of one-on-one interaction is necessary. Keeping the rest of the class engaged and active in the learning process requires innovation, organization, and energy. On the other hand, such an environment fosters both independent and cooperative learning. Students can be paired or put in small groups, with each student in turn playing the role of the instructor. In helping one another the students increase their own understanding by clarifying the learning process for themselves. While the slower pace at the outset can be viewed as a tradeoff, it more than pays for itself later in the course and throughout the entire aural skills sequence. The firmer the foundation of listening strategies and skills, the faster material can be presented later, and the less backtracking that will be necessary.

Although there are many advantages to focusing on pitch internalization in the early stages of aural skills instruction, the following five seem particularly noteworthy:

1) Students for whom pitch internalization is likely to be problematic are identified early. For many students, perhaps even the majority of students, traditional approaches ultimately produce success in the aural skills classroom. However, for some students these same techniques simply do not work because they have yet to develop the most fundamental of all aural skills: learning to access their inner ear.[14]

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[14]One may question whether a student who struggles with pitch internalization, or one who cannot accurately sing internalized pitches, is qualified to study music, especially at the college level. However, there are numerous factors contributing to student difficulties with internalization

2) Students are shown precisely what skills are crucial to success in the class and, equally important, are provided strategies to develop them. The more clearly we can communicate to our students what we are trying to achieve together, and the specific means by which each task is to be learned, the more focused and effective the learning process will become. Far too often students are urged to "go to the practice room and work on aural skills" without being told exactly how to develop each individual skill.

3) Directly teaching pitch internalization provides students with the references necessary for understanding musical relationships. This in turn provides instructors with a means of teaching listening processes and strategies that the student can apply regardless of the musical context. In a dictation exercise, for example, when a student is unable to decipher a particular note or passage, the instructor can guide the student to recall the internal references that will allow the student to find the answer on his/her own. In this way, the student learns a process that is transferable to other contexts, not just the correct answer within a limited framework.

4) Students for whom the use of external sound sources alone will, in time, result indirectly in the ability to internalize pitch relationships develop better internalization skills earlier and, as a result, are able to proceed at a faster pace throughout the entire aural skills sequence. Success with aural skills tasks at any level of instruction depends on competency with rudimentary, though not necessarily easily-mastered, skills. Skills such as pitch retention, scale degree recognition, the on-demand recall of diatonic pitch references, starting and ending pitch identification, and others that are often viewed as simple rather than as fundamental, are crucial to success at all levels of study.

5) Finally, by focusing more directly on pitch internalization, we will better prepare our students to accomplish the tasks that we will later test.

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that have little to do with talent or preparedness. These include lack of experience with mental imagery tasks, physical problems associated with changing voices (especially for young men), inadequate singing experience, and nervousness stemming from performing in front of a group.

Conference Report

Developing the Musical Ear
Mannes College of Music, September 9, 2000

By J. Kent Williams

The conference opened with welcoming remarks by Joel Lester, Dean of the Mannes College of Music.

Morning Session 1: Rhythm and Hypermeter

Numerical Rhythmic Articulation: A Longy Legacy
Christopher Stone (Mannes)

Stone described Numerical Rhythmic Articulation, a method of rhythmic solmization devised by Mme. Renee Longy-Miquelle and taught at the Longy School in Boston, the Curtis Institute of Music in Philadelphia, the Juilliard School in Manhattan, as well as at Mannes. The method does not rely on durational fractions but instead emphasizes proportions. Students are taught to recognize a finite number of basic durational patterns. Stone noted that this approach seems more suitable for "right-brain types" because it engages the senses before the mind.

Stone provided a handout that showed how Numerical Rhythmic Articulation would be applied to exercises from Robert Starer's *Rhythmic Training*. In counting, the student reads the basic pulse (Takt) and the subdivisions within that pulse. Each note is counted with a numeral and only notes are counted. A subdivision pulse is not counted unless a note begins at that time point. The word "dash" is used to indicate subdivisions within a note. The word "check" is used to acknowledge a rest.

It's About Time: Hypermeter in Aural Skills Training
Gary Karpinski (University of Massachusetts-Amherst)

Karpinski, described how concepts of meter and hypermeter are developed in courses at UMass. Entering students are given a diagnostic placement exam which includes clapping to a recorded excerpt. Those who can clap at least one pulse level are placed in the main sequence of courses; those who cannot are placed on a remedial track. The emphasis in all courses is on developing a strong aural sense of meter without recourse to notational symbols. Pulses are conceived as points in time and represented in proto-notation by vertical lines of varying length. Durations are represented as horizontal lines of varying length. Students represent the meter and rhythm of a heard passage with a combination of pulse and duration symbols. Once a plausible meter signature has been chosen, their symbols can be translated into conventional notation. In addition to traditional dictation skills, students also learn to perceive and represent higher levels of pulse and metric grouping (hypermeter) as well as significant metric events such as hemiola and elision. Karpinski provided a thirteen-page handout that contained several examples and an extensive list of references from research literature for music theory and music cognition.

Morning Session 2: Pitch and Solmization

What's the Use? Practical Applications of Fixed-do
Robert Fertitta (SUNY-Purchase)

Fertitta began by reminding his audience that solfège syllables are merely substitutes for the letters of the musical alphabet in English and German. Syllables are preferred over letter names because: all syllables begin with a consonant, four vowel sounds are represented, and three pairs of syllables rhyme (do-sol, mi-si, fa-la). Fixed-do syllables are usually not inflected to acknowledge chromatic alterations. For example, "do" can represent C natural, C sharp, or C flat.

Fertitta asserted that the goal of the fixed-do approach is to sing melodic lines with no hesitation, to "declare the music as it appears in the score." He also claimed, however, that the method encourages one to hear tonal function as well as melodic and harmonic relationships. To demonstrate, he sang melodic and bass lines from the opening of Brahms's Third Symphony but admitted that significant musical properties, such as interval size and quality, modal pitch inflections, and tonal function were not accounted for by his syllables. Awareness of these properties is, however, assumed to be "automatic."

Fertitta also discussed the problem of enharmonically equivalent keys. He recommended that singers adopt a practical approach and reckon their syllables from the pitches of the notated key even if the enharmonically equivalent key is more "correct." An example would be Schubert's respelling of Fb major (bVI of Ab major) as E major.

Fertitita sang lines from J. S. Bach's Fantasie in G Minor for organ to demonstrate the advantage of the fixed-do approach in modulatory contexts. By reckoning syllables from nameclass letter names, the singer avoids the problem of naming pitches in terms of their scale-degree function in a fluctuating tonal environment. Awareness of tonal function is, again, assumed to be automatic. In Fertitta's words, "The educated listener will know that a certain pitch has a certain tonal or harmonic function."

This reviewer, an advocate of moveable-do, would question whether teachers can assume such a high level of awareness. It would seem that an instructor's task is to develop awareness and sensitivity to tonal context. Modulatory contexts are often difficult to navigate with moveable-do syllables, but they are not impossible as Fertitta would have us believe.

The Thinking Ear
Drora Pershing (Queens College, CUNY)

Pershing began by describing and demonstrating the moveable-do system as she teaches it. She reviewed the Guidonian hexachordal system and called attention to terms and slogans that pertain to

tonal function and voice leading. She then noted that the modern moveable-do system is simpler than Guido's system but just as practical. In her opinion, all solmization systems have their advantages. The advantage of the moveable-do system is its explicit regard for tonal function.

Pershing has her students sing scales during the early weeks to develop tonal fluency and a sense of basic tonal concepts. Later, they sing short pitch patterns first collectively, then individually. In her approach, listening, hearing, and notating are merely different views of the same problem.

The presentation continued with a discussion of features of the moveable-do system that remain consistent across all major and minor keys: tonal function of the various scale degrees, and voice-leading tendencies. Moveable-do syllables clarify the relations between chromatic chords and their diatonic antecedents, for example V/V vs. ii. The do-based minor system (Pershing's preference) encourages the conception of parallel major and minor keys as one large key area.

Pershing showed how the modulations are navigated in the moveable-do system, by using the same technique as Guido: double-name the pivot tone, then continue in the new key. Using "Auf dem Flusse" from Schubert's *Die Winterreise,* she also demonstrated solmization of music with third-related key areas.

In her conclusion, Pershing allowed that no system is perfect. Moveable-do is best for tonal music, but it has limitations in highly chromatic tonal idioms, and is unsatisfactory for atonal idioms. She opined that the best approach is to learn all of the extant systems and utilize each for the musical style(s) it facilitates. A short question-and-answer session followed during which an audience member asked how to cope with students who possess absolute pitch. Pershing responded that students with absolute pitch don't need moveable-do to audiate pitches, but they do need it to acknowledge tonal function.

Absolute and Relative Pitch: The Best of Both Worlds?
Donna Doyle (Graduate Center, CUNY)

Doyle began by positing that musicians fall into three groups: those with relative pitch, those with absolute pitch (AP), and those with quasi-absolute pitch. In her opinion, musicians need to develop both senses: absolute pitch and relative pitch. Absolute pitch (AP) enables listeners to maintain a sense of tonal balance in registral pitch space and adds pleasure to the musical experience. Relative pitch contributes meaning and affect.

Doyle noted that few viable methods exist for developing absolute pitch. She advised singing scales with pitch-class letter names and finding the tonic of sightsinging exercises from a remembered pitch. Above all, the student must be attententive and persistent. Her procedure for identifying absolute pitches and keys in tonal music involves comparing a remembered pitch (for example, middle C) to a heard tonal context and determining whether the remembered pitch is a diatonic scale degree in the heard key. If it is not, the remembered pitch is raised or lowered a semitone to become diatonic. The scale degree function of that tone is then determined by relative pitch. Students with AP need to develop a sense of relative pitch. To do so, they should sing and take dictation using scale degree numbers.

During the subsequent discussion Gary Karpinski noted that research studies have not shown that adults can acquire AP. The issue of historical performance was also raised. How do musicians with AP cope when hearing or performing music played at lower pitch level? Finally, several audience members with AP noted that their sense of pitch has risen gradually as they have aged.

Afternoon session: Advanced Applications

Memory, Improvisation, and Species Counterpoint
Ford Lallerstedt (Curtis Institute of Music)

Lallerstedt began by noting that about twenty years ago he asked himself, "What is it that I know about music?" Having taught from

a draft of Aldwell and Schachter's *Harmony and Voice Leading* during his first two years at Curtis, he was impressed with Schenker's idea that species counterpoint is the foundation of tonal music. Since then he has devised a set of dictation exercises to develop his students' sense of tonal memory.

The method begins with first species examples where students listen for relative motion, first between two voices, then among three voices. Second species exercises are introduced by omitting the second half note and playing only the first beat of each measure. When the requisite proficiency has been attained, the second half notes are inserted and students are required to acknowledge melodic/voice-leading function of those tones, presumably using terms from Salzer and Schachter, *Counterpoint in Composition.*[1] Lallerstedt reported that this approach has proved successful. His students can notate 5-6 measure exercises in three-voice second species.

He has also used this approach for improvisation exercises. Here the goal is to improvise an acceptable solution (one with correct voice leading) in a prescribed number of voices and species, repeatedly play the solution, sing each line, then notate the result. Lallerstedt reported success with problems involving first through fourth species, but noted that students found combined species exercises much more difficult.

During the ensuing discussion period, one audience member asked how students refer to the vertical sonorities in their exercises. Lallerstedt answered that they use figured-bass numerals. Joel Lester noted that Lallerstedt's approach has historical precedent: species counterpoint was used to teach singers to improvise.

From this talk and a question posed by this reviewer, it would seem that Lallerstedt teaches his students to hear and conceive polyphonic textures in terms of melodic intervals, harmonic intervals, and relative voice motions. Awareness of tonality is apparently deemed less significant or deferred to a later stage in the process. Lallerstedt's presentation would have been clearer if he had provided a handout with musical examples to illustrate his method.

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[1]Felix Salzer and Carl Schachter, *Counterpoint in Composition* (New York: McGraw-Hill, 1969), pp. 43-47.

Similarities and Continuites:
Stravinsky, Schoenberg and the Goals of Ear Training
Michael Friedman (Yale University)

Friedman began by quoting Stravinsky:"Music that is based on ontological time is generally dominated by the principle of similarity."[2] Friedman noted that remembering is the first step toward understanding. As listeners, we should ask, "What does the composer want us to hear?" To illustrate, Friedman provided a handout containing brief score excerpts and analytical reductions. For the opening of Schoenberg's *Piano Piece*, Op. 33a, the crucial point is the replication of the framing interval (11 semitones) in the first and last chords within each measure. When this initial phrase is restated later in the piece, the focus is upon textural thickening and registral expansion. Using Bartok's Minor Seconds, Major Sevenths (*Mikrokosmos*, VI: 144), Friedman showed how the structural dyads form an expanding wedge of odd-numbered interval classes. In the opening phrase, a listener can distinguish between "principal and dependent sonorities" and these distinctions have important implications for the music that follows.

At the conclusion of his talk, Friedman noted that aural skills pedagogues should occasionally pause and reflect upon the question, "What are we training ears for?" He recommended that we encourage our students to ask, "What are the nuts and bolts of the composer's message?" and "How can I as a performer train my listeners' ears to grasp that message?"

Concluding Session 1: Open Discussion

The conference concluded with a roundtable discussion among members of the Mannes Techniques of Music Department and Mary Anthony Cox of the Juilliard School. In his opening remarks, Robert Cuckson observed that a composer never finishes developing

[2]Igor Stravinsksy, *Poetics of Music* (Cambridge, MA: Harvard University Press, 1942), p. 31

his or her musical ear. Ongoing tasks for all musicians include learning to pay attention correctly and learning how to direct attention.

Cuckson went on describe the Mannes curriculum in general terms. He noted that all music majors take essentially the same skills courses, and that some topics are addressed in separate courses while others are treated in a single course or course sequence. Elizabeth Aaron followed with a more detailed description of course requirements and pedagogy. She noted that the Mannes emphasis upon fixed-do solfège, score reading using all seven clefs, and "visual immediacy" in both sight-singing and dictation is inherited from French conservatories.

David Gagné talked about his intensive ear training class at Queens College CUNY. Gagné uses moveable-do, which would seem more compatible with Schenker's theories of tonal structure. Mary Anthony Cox provided a brief description of the Juilliard aural skills program, which is similar to that of Mannes. She also described her recent visit to Cuba where she observed some impressive musicianship under development in that country's Soviet-style approach to music education.

The discussion gradually widened to include audience members' questions and statements. When the question of the historical authenticity of fixed vs. moveable-do solmization arose, Peter Urquhart, a musicologist from the University of New Hampshire, observed that in the post-Guidonian era, letter names and hexachordal syllables were used concurrently. Musicians used the former system to fix the position of pitches in absolute pitch space and the latter to orient their ears to hexachordal pitch space, the antecedent of our tonal, or relative, pitch space.

The Mannes faculty and administration are to be commended for mounting such a wellrun and informative conference , and for being such gracious hosts.

From The Classroom

A Different Species of Counterpoint

By Justin London

A few years ago my colleague here at Carleton College, Stephen Kelly, wrote an article for the College Music Society newsletter about effective teaching in the music history classroom. In that article Steve makes a convincing case that the best way to teach music history is to have students "do music history and be music historians, rather than just accumulate facts and observe scholarly controversy about the music of the past" (*CMS Newsletter* (March 1992), 1). In a similar fashion I believe that the best way to teach music theory is to have our students *do* music theory and *be* music theorists, rather than just learn about music theory, and be told how various pieces of music purportedly work. Of course, the special challenge for the theory teacher is that we are not only engaged in the teaching of music theory, but also the teaching of the prerequisite skills necessary for any analysis or theoretical work—score reading, score hearing (i.e., solfegge and ear training), the fundamentals of tonal syntax, and so forth. And by the time we have finished with these fundamentals there is no time left to have any fun with them, to use them to do some real theory (or so one would think). One can, of course, ask whether or not all of these fundamentals are truly necessary. But one may also try and combine the acquisition of various skills and basic concepts with the activities of making and critiquing music theory. What follows is intended to be an example of such a synergistic lesson.

In the usual teaching of modal or tonal counterpoint, students proceed from simpler to more complex rhythmic textures, along the way adding to and refining the "rules" which govern their exercises. In so doing they (hopefully) gain a knowledge of how added complexity and added compositional choice are balanced by new

and different constraints on melodic construction and harmonic dissonance. All too often, however, the student is caught in a myopic net of simply trying to finish the darned exercise, and when choler and frustration run high, the student probably isn't gaining any high-level understanding of either musical syntax or a particular contrapuntal style. Simply not having any parallel fifths is good enough.

In an attempt to prevent my students from having such experiences, especially early on in their careers as contrapuntists, I now approach second species (over a modal cantus firmus) in the following way. The basic idea—the passing dissonance between two consonant intervals—is introduced in class lecture. Students are reminded of the various species of contrapuntal motion (contrary, oblique, similar, and parallel), as well as the prohibition against parallel perfect consonances. They are then given the following assignment: through trial and error, simply list ALL of the possible second species passing motions—both ascending and descending, and both above and below—for any given pair of cantus notes. They are given the list of "two note cantuses" shown in figure 1 just to avoid any confusion. This is the entire assignment. In class we go over all of the possibilities of oblique motion, and produce the list shown in figure 2. This establishes the protocols used in the assignment (i.e., labeling intervals, keeping track of ascending vs. descending melodic motion and the relative positions of the voices). The students are told that they may include examples which involve voice crossing, but I do not specify how to categorize crossings (e.g., if a passing motion starts below the cantus, but ends up above it, as the cantus skips down, should we then regard this snippet as being above or below the cantus?). In the subsequent class discussion we fine-tune the ways in which we categorize the motions (another topic is how to count—or not count—octave doublings), and in so doing the students must deal with small but significant problems in the organization of their data.

Why have the students bother with such a "mindless" exercise? As readers may be quick to point out, listing all of the passing motions is trivial; the real challenge comes in putting together entire melodies with a coherent, well-formed shape that complements the given cantus. True enough, but this listing isn't entirely mindless.

FIGURE 1: "Two note cantuses" used in assignment

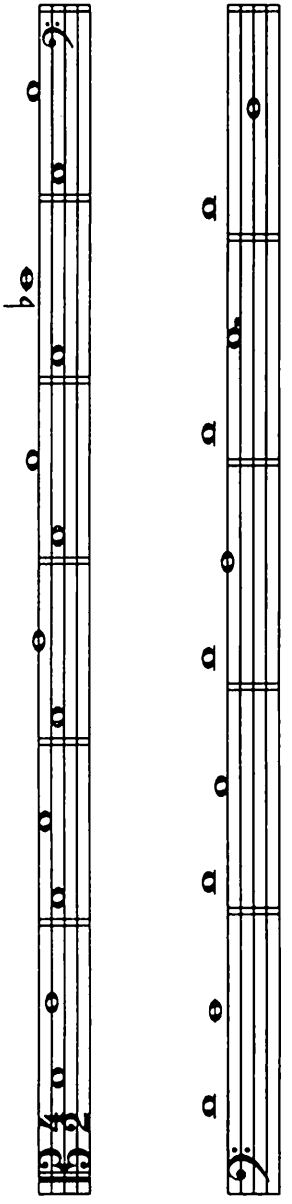
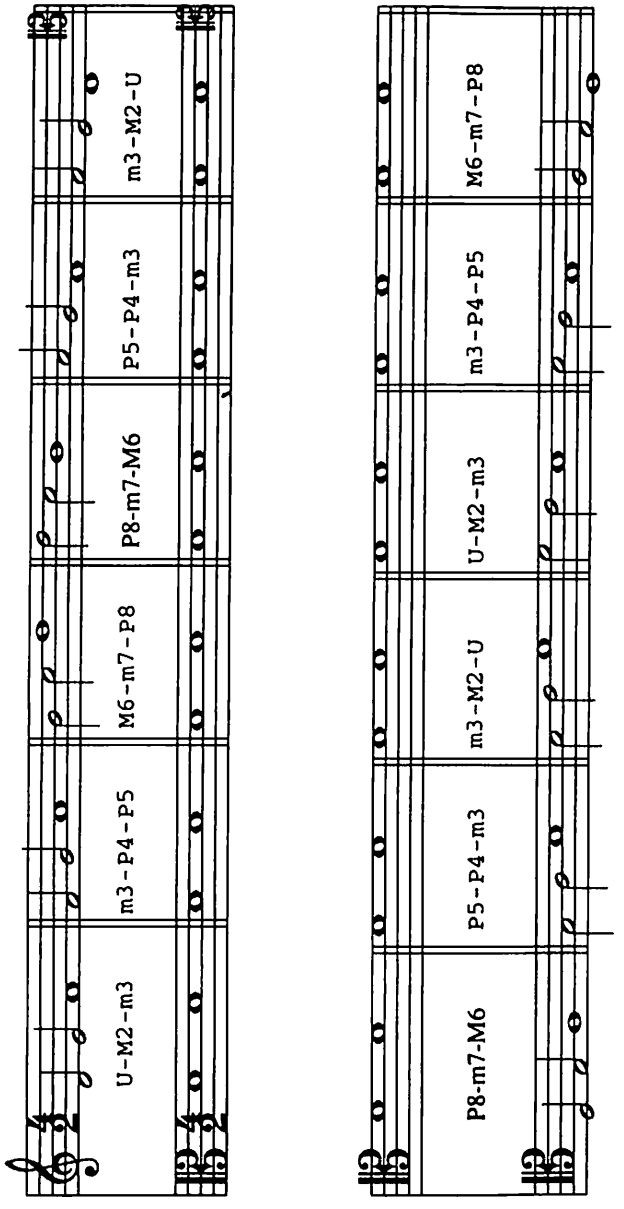


FIGURE 2: List of all possible oblique motions



First of all, there is the practical benefit of practice. Having completed this exercise the student will be quite familiar with the ways that three-note figures fit various portions of the cantus, and it is hoped that they also begin to see patterns of consonance-dissonance-consonance both in their own exercises as well as in the examples from the repertoire that they study. But the principal value is not practical; it is theoretical. For in completing this exercise the students do more than simply follow the rules of counterpoint—they investigate the workings of the very rules themselves. When they are finished they will have discovered the size and shape of the second species universe, at least in terms of the passing dissonance (one could perform a similar exercise with other three-note figures, such as an ascending third followed by an ascending second, an ascending fifth followed by a descending step, etc.). One lesson to be taught here is the value of doing the empirical legwork needed to answer a theoretical question. Even more interesting, however, is what follows as the shape (or what might be termed "structure") of this universe, since the passing tones are not evenly distributed among the various classes of contrapuntal motion and relative positions (in terms of treble and bass) of the voices.

Type of motion	Oblique	Similar	Contrary	TOTALS
Ascending over CF	3	6	13	22
Descending over CF	3	4	10	17
Ascending under CF	3	5	8	16
Descending under CF	3	5	11	19
TOTALS	12	20	42	74

As one can see from the table in Example three, contrary motion is far more "available" than similar motion, simply given the possibilities of the musical syntax. In short, the musical grammar is biased in a systemic way toward contrary motion. It is not at all intuitively obvious that this bias should be present, and one of the values of having students do such a brute force assignment is to show its value in uncovering such "hidden" aspects of harmonic syntax. The presence of the "contrary bias" gives rise to an interesting chicken-versus-egg kind of question, a question that can be discussed with the students: is the aesthetic preference for contrary motion

simply a reflection of the underlying bias of contrapuntal syntax, or is the syntax itself—the very rules about various successive consonances and dissonances, the placement of dissonance, and so forth—driven by the aesthetic value placed on contrary motion? To put it another way, where do the "rules" of counterpoint come from? And there are other interesting questions that may be discussed here as well: What does this tell us about the way that horizontal versus vertical aspects of musical grammar interact? If you were programming a computer to write your counterpoint, how could you make use of this list? What other lists would you need in order to write such a program? Are there other rules that apply over larger spans of the counterpoint? (and here one may have the students read David Lewin's excellent essay, "An Interesting Global Rule for Species Counterpoint," *In Theory Only* 6.8 (1983): 19-44). And doubtless there are other questions for discussion.

Of course, having the students do this assignment means that one must eliminate at least one other species exercise, but I am happy to do so. First, it may well be (one of course cannot really "prove" these assertions) that this preliminary exercise allows the students to do subsequent compositions with greater facility. Just in case some readers were wondering, after this theoretical exercise I do have my students write second species melodies (and worry about their melodic peaks, skip-step constraints, consecutive skip rules, and so forth), as well as fit upper and lower parts to an extended cantus. But in starting their study of second species counterpoint with this particular exercise, students are forced to engage with the larger, "theoretical" issues behind the study of counterpoint, the relationship between music's vertical and horizontal dimensions, and the notion of musical styles as syntactic systems.

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Edward Klonoski is Assistant Professor of Music at Northern Illinois University, where he teaches undergraduate and graduate music theory and aural skills courses. He holds a Ph.D. from the Ohio State University, and his research interests include aural skills pedagogy, auditory imagery, and Schenkerian theory. His article, "A Perceptual Learning Hierarchy: An Imperative for Aural Skills Pedagogy," is scheduled for publication in the forthcoming electronic version of the *College Music Symposium*. He is currently a member of the Editorial Board for the College Music Symposium.

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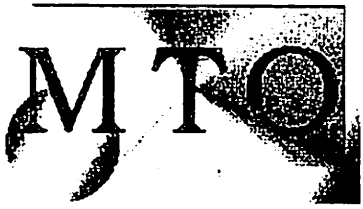

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