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SPECIAL TOPICS ISSUE

TEACHING AURAL SKILLS

This issue of JMTP features articles relating to various aspects of ear training (sightsinging, dictation, listening and identification activities, CAI). In addition, the first article continues our Curriculum Design Series inaugurated in the Fall 1987 issue. Future issues will also include articles on aural skills so we still welcome submissions on this topic (including relevant research on perception and cognition) at all times. Other topics (curriculum design, reviews, teaching analyses, concepts/terminology, comparative methodologies, etc.), of course, are always welcome too. [See Contributors' Guidelines in this issue.]

Curriculum Design Series

SIGHTSINGING AT NEW ENGLAND CONSERVATORY OF MUSIC

LYLE DAVIDSON

LARRY SCRIPP

PREFACE

This set of articles is intended to open a discussion of sightsinging skill development at the college level. In the course of revising the sightsinging curriculum at the New England Conservatory of Music, we investigated three facets of musical education: a) psychology of skill development; b) re-formulation of traditional instructional practice to reflect cognitive-process theory; and c) concepts of assessment designed to take into account these new perspectives.

In the first of the three articles that follow we will reinvestigate the domain of sightsinging skill acquisition from a developmental perspective. Here we share our views about how musical knowledge develops in all children in our culture and how important it is that basic musical skills become increasingly articulate, internalized, and operational with training—independent of instrumental technique. We chart the growth of musical knowledge from the level of *kineshetic* knowledge (enactive finger-ing) to the *externalized* knowledge (singing to demonstrate musical intentions) and finally becoming *internalized* representation (inner aural imagination).

In subsequent articles we present the teaching and assessment models that work with this developmental perspective. The *pedagogical framework* adopted by New England Conservatory solfege courses is partly a response to the re-investigation of traditional teaching with respect to a developmental view of musical skill acquisition. The framework defines the task of teaching sightsinging in terms of a *cognitive process model* (Lin, 1979). This view of music reading articulates the structure and scope of the many subskills that can be addressed separately or integrated in musical perform-

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ance. In the final article the *multiple assessment techniques* in use at the conservatory are reported. Both quantitative (standardized departmental examinations) and qualitative analysis (error analysis and classroom observations) were developed to help teachers trace the growth of sightsinging skills. We are pleased to report that multiple assessment also makes students active and reflective participants as they track their own stages of development in sightsinging skills.

DEVELOPMENT OF SIGHTSINGING SKILL AT NEC

"By mastering an art such as music-reading, we can see the mind functioning in order to understand, and that might reflect how it works when attempting to solve problems of more abstract nature"—2nd year solfege student (composition major).

The solfege program at NEC is the entry point for developing the skills necessary for a broad musical literacy in performance. On the basis of the strength and depth of the aural skills that are developed in these courses, subsequent work in other areas of music activity proceed with closer connections between the technique of the instrument, the musical score, musical interpretation, and concepts stemming from an informed integration of the musical "eye and ear." Although entering conservatory students are highly skilled instrumentalists, the basic skills of literacy—sightsinging in particular—have not extended beyond the literature for their instrument. Typically, musical realization and concepts are limited to whatever can be performed with technical skills acquired through the instrument. Therefore, it is incumbent upon the solfege course to develop basic literacy skills to the point where students can freely and fluently express music independent of their instrument in a wide variety of musical contexts.

During the first two years the courses feature the development of basic skills. More specialized courses, as well as courses in twentieth-century music, are offered during the third year. The four solfege courses (Theory 101, 102, 201, and 202) lead to fluency in sightsinging and sightreading as developed through a fixed-do pedagogy. The focus is on exercising skills through "problem solving" in performance, not on memorizing materials or literature. Development of skills is measured by standardized departmental examinations in sightsinging (given twice each semester) and course work assigned by each instructor. Readings (in cognitive psychology, reading development, and skill acquisition) and term papers are assigned and form an important part of the class work. Ensemble music performed from scores in class includes Bach chorales, string quartets,

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symphonies of Mozart, Haydn, Beethoven, Dvorak, Debussy, Renaissance sacred music (in original clefs), and various pieces from the twentieth century.

Although musical performance is the primary focus of activity in the course, students are asked to do more than develop their performance skills. They are challenged to show they can problem solve during performance (demonstrating various strategies and practice techniques in score reading, coaching, etc.), apply their *performance skills to perception tasks* (through error detection and transcription), and demonstrate a level of *reflection* necessary for integrating their new skills into their musical practice (as a performer, conductor, composer, teacher, etc.). Serving this last goal students are asked to participate in classroom research projects, tutoring and self reflection by writing papers comparing pedagogical techniques, learning strategies or mindfully documenting their own development as they proceed through four or more semesters of basic literacy skill acquisition and development.

LEARNING TO READ: SEMESTERS ONE AND TWO

The first solfege course (Theory 101) assumes no background in reading music. This course serves as a prerequisite for all theory courses. The focus for this course (and the next one) is learning to read without the aid of an instrument. All sections stress knowledge of tonality as represented by scales and scale degree functions. The materials of the course feature melodies in major and minor keys, rhythms in standard meters, modulations to the dominant, the relative major, and the relative minor, and their use in small forms. Readings and papers are assigned and students work with the Humanities faculty on these assignments. Students become fluent in treble and bass clefs. The texts for the course include Danhauser, *Solfege des Solfege* (vol. 1); Bona, *Rhythmic Articulation* (No. 1-90); and Dandelot, *Manuel Pratique*. Ensemble music includes Bach chorales and Mozart symphonies (No. 22-26). Departmental examinations focus on tonal and rhythmic materials within simple diatonic melodies. Students *must* perform at a baseline level of sight singing competence in the departmental examination to pass the course.

The second solfege course (Theory 102) builds on the skills begun in Theory 101 through extensive drill and practice in basic materials and a carefully expanded range of musical contexts. The basic materials of the course feature melodies in most major and minor keys, more remote modulations, more complex rhythmic subdivision and syncopation, note identification, pattern-reading exercises in the treble, bass, and alto clef.

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Score-reading skills continue to be expanded through literature including Bach chorales, classical symphonies, and other vocal and instrumental music chosen by the instructor. To pass the course, students must demonstrate sightsinging competence at a significantly higher level within the more complex diatonic contexts of the standardized departmental examination. To qualify for the highest grades in the course, a student must sightsing the more chromatically enriched melodies of the departmental exam. The texts for the course include Danhauser, *Solfège des Solfège*, (vol. 2); Bona, *Rhythmic Articulation* (No. 91-120); and Dandelot, *Manuel Pratique*. Ensemble music includes Bach chorales, Vivaldi concerti, Mozart quartets, and Haydn symphonies (No. 102, 103, and 104).

READING TO LEARN: SEMESTERS THREE AND FOUR

After two semesters of solfège, students' ability to read diatonic music at sight becomes relatively stable. Recognizing this, the focus of the solfège courses shifts toward a broader and deeper use of basic skills to explore and learn literature beyond the context or range studied in the private-lesson studio. Because the inner musical ear is increasingly refined by the internalization of musical ideas gained *away* from the instrument, student classroom participation depends increasingly on the exchange of musical ideas through solfège performance. A hallmark of the developing mastery is the increasingly spontaneous expression of nuance while singing at sight. Accordingly, the standardized departmental exams shift to this more interpretive aspect of musical performance.

The third semester of solfège follows the same developmental model as the previous courses. At this level, the application of students' more sophisticated skills in increasingly complex performance situations is stressed. The materials include note and pattern reading in five clefs (treble, bass, soprano, alto, and tenor), use of the clefs for transposition when reading scores, rhythms using changing time signatures and complex subdivisions and tonal melodies featuring rapid modulation. The texts for the third level course include Danhauser, *Solfège des Solfège*, (vol. 3.), Weber, *Sixty Lessons in Rhythm*, (vol. 1), and Dandelot, *Manuel Pratique*. Score-reading materials include Bach chorales in open score (4 clefs), Mozart Quintets and Divertimenti for transposing instruments, Beethoven symphonies (No. 1-3), and other instrumental scores with transposing instruments. Appropriately, the departmental test now requires expressive performance in highly modulatory melodic passages as well as score reading requiring the use of clefs and transposition.

The fourth semester features a wide range of musical materials neces-

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sary for insuring the development of sightsinging proficiency across various musical styles. Assignments include note reading and transposition in all seven clefs (in wide registers), advanced rhythmic problems in subdivision, syncopation, and conducting, as well as chromatic and atonal melodies. The texts for the fourth-level course include Danhauser, *Solfege des Solfege*, (vol. 3 and 4), Weber *Sixty Lessons in Rhythm*, (vol. 1 and 2), and Dandelot, *Manuel Pratique*. Recognizing that music reading is linked to specific musical styles, this semester emphasizes sight reading in a wide variety of musical styles and formats. Therefore, score-reading materials include more complex vocal, keyboard, and orchestral repertoire: for example, our own anthology of vocal renaissance music in the original clefs, Schubert Symphony No. 5, Brahms Symphony No. 4, Dvorak "New World" Symphony, Debussy "Prelude to the Afternoon of the Faun," Mahler Symphony No. 4, and Stravinsky Symphony of Winds, as well as music from the repertoire of jazz (e.g., Guiffre, "Four Brothers"). Additionally, students are assigned solfege performance projects to prepare literature based on their repertoire. Examples for projects include demonstrations of Indian and jazz improvisation, transposing chamber music at sight, arranging solo works for solfege ensemble, etc.

Throughout all four semesters of study, "solfege parties," which spontaneously occurred at various times during each semester, now have become featured events of the Conservatory's sightsinging program. These are important occasions during which students from all classes and levels have an opportunity to sight read and perform for one another as well as in ensemble. These occasions provide the beginning students with examples of different levels of music-reading skills that help them form realistic self-assessments and goals for their continuing development. The more advanced students, on the other hand, have an opportunity to reflect on the extent and depth of their own development. Recently, literature for sight reading has included songs from Manhattan Transfer, masses by Victoria, cantatas by Bach, Mozart arias from "Marriage of Figaro," Haydn's Concerto for Trumpet, and Beethoven's Piano Concerto No. 3. Solfege students form the solfege orchestra providing the "orchestral" accompaniment for the soloist.

ADVANCED SOLFEGE/ASSISTANTSHIP PROGRAM

Once students have entered the mastery level of sightsinging skills they are candidates for the advanced solfege class and/or the assistantship program. This is an opportunity for qualified graduate and undergraduate students to refine their skills and prepare for teaching basic literacy.

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Because teaching assistants are able to work with students at earlier stages of sightsinging development, they are able to observe the developmental approach to skill acquisition and to revisit and re-evaluate the stages of their levels of mastery.

Advanced solfege includes a comprehensive review of solfege materials dealing with clefs, interval studies, advanced rhythmic materials, and advanced score reading. Course work includes individual projects in preparing to conduct scores drawn from repertoire and a survey of texts and pedagogies used in different cultures. Term papers are required that feature topics in educational psychology, philosophy, and skill development. A written proposal for a solfege and ear-training curriculum is developed at the end of the course. A graduate of this course will have the background and experience to teach solfege and sightsinging at any level.

Those students selected as teaching assistants participate in a weekly pedagogy seminar where educational theory—as it applies to a conservatory context—is read, discussed, and immediately practiced in remedial sessions and private tutoring. Videotapes and protocol analyses of classes and individual lessons are used for group review and discussion. The materials for the course focus on the three facets of musical education: a) psychology of skill development; b) re-formulation of traditional instructional practice to reflect cognitive-process theory; and c) concepts of assessment designed to take into account these new perspectives. The following articles have developed out of the discussions in the course and the summer workshops for teachers of basic literacy skills.

Finally, we welcome this opportunity to express our appreciation to those teachers, faculty, and teaching assistants who have helped us formulate this perspective concerning the learning of basic literacy skills in the conservatory. We are particularly indebted to the late Albert Bernard—former instructor of solfege at NEC and conductor's seminar at Tanglewood—for his vision, dedication, and success in adapting traditional solfege materials to the American conservatory; to faculty members F. John Adams, Alan Fletcher, and John Felice, who have contributed greatly to the formation of this curriculum and in particular the development of the standardized departmental exams; to the teaching assistants and students—especially Terry Becker, Jim Torres, Mike Malone, and Matt Sonnenborn—who, with us, participated in the long and arduous task of designing, reviewing, and revising test items, making classroom observations, and allowing documentation of classroom activities, projects, and test performances so useful for teacher workshops; Anna Strickland for her proofreading and help with figure layouts; members of the Harvard Project Zero “Thursday Night Music Group”—especially Patricia Welsh, Joan

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Meyaard, and Alys Terrien-Queen—for their helpful suggestions and musical insight; Jack Wohlwill for his lucid insight into the possibilities of investigating musical issues through developmental and cognitive psychology; and finally to Howard Gardner and the support of Harvard Project Zero research projects, which have long supported the investigation of learning, cognition, and development in the musical arts. The following articles represent our best efforts at recapturing the high spirit, hard work, and free exchange of ideas that occurred while pursuing the converging paths of music, education, and human development.

PART ONE

A DEVELOPMENTAL VIEW OF SIGHTSINGING

LYLE DAVIDSON

LARRY SCRIPP

Some years ago we unintentionally used a range of test items (to evaluate a group of junior sightsinging students) that were also used during their first year. Thus, inadvertently, we were able to compare test results with their previous performance as freshman two years earlier (See Figure 1). Many questions were raised among the faculty, because surprisingly little improvement in sightsinging accuracy was evident in the juniors' performances. That students, after two years of instruction, failed to show significant improvement confirmed the worst fears of some faculty members.

Figure 1. Target and Performances Showing Errors Typical of First Year Students.

TARGET MELODY
♩ = 90

TYPICAL STUDENT PERFORMANCE ERRORS

*N.B. Once first interval is missed there is no recovery of pitch orientation

**N.B. similarly once meter is lost metric orientation is not recovered

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Why didn't the sightsinging performance accuracy change dramatically in the third year? Were there problems with the students' practice habits? Did students memorize examples by rote, playing them on their instrument over and over? Did students merely learn to guess notes and rhythms in the style of the melodies presented in the text? Was too much expected in assuming that skill in sightsinging would transfer across styles as diverse as *Modus Novus* (Edlund, 1963) and Bach Chorales? Or perhaps the measurement of the performance skills was not appropriate. If we only look at single issues of accuracy or focus only on the rote acquisition of materials, we may overlook important aspects of the development taking place.

The educational "crisis" we discovered in our sightsinging classes illustrates the need to understand skill development from a multi-dimensional perspective. This broad perspective has to be sensitive to musical issues, the demands of educational psychology, and the apprehension and processing of musical knowledge. A more complete accounting requires that we think again about what happens—and what we expect to happen—in sightsinging courses.

MUSICAL DEVELOPMENT

"Domains were [previously] broken down into their principles and theories, but not studied in terms of the ways in which individuals move from encounter to engagement, from engagement to mastery of early levels, from apprentice to journeyman, and so on" (Feldman, 1980, p. 168).

Developmental psychologist David Feldman makes a strong case for the necessity of rethinking the relationship between skill development and educational practice. Traditionally, developmental psychologists have been concerned with building and refining models of intellectual growth within various domains (Furth, 1969; Fischer, 1980). They seek to convincingly describe, whenever possible, invariant and universal sequences or stages representing qualitatively ordered changes in cognitive and skill development from novice to expert. For example, in the case of concept of space, children first create topological features, then conserve geometric relations, and finally are able to represent 3-dimensional features of cubes (Piaget, 1956).

These models, representing stages of intellectual advancement, are useful to researchers and educators alike. Psychologists and teachers also share a concern with *how* students go from one stage to another. Once levels of knowledge within the domain have been diagnosed, the practical ques-

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tion becomes "How can students be supported through the various stages of development?"

To be useful as a pedagogical orientation, a developmental view requires that we take into account the entire range of discursive knowledge and intellectual skills a student brings into the classroom. We need to understand how individuals change as they move from "initial engagement" of youth, to "early mastery" of middle teens, from "apprentice to journeyman" and beyond to become mature artists. We want to place conservatory students' range of knowledge against the background of musical knowledge and skills characteristic of children, adolescents, and adults. Additionally, we take to heart Feldman's emphasis that a developmental perspective requires that we identify levels of achievement which are *intrinsic* to a domain (e.g., musical development as expressed through singing, playing, or conducting) as opposed to those *extrinsic* to the domain (e.g., textbook knowledge of music theory or notation systems). Thus we ask about the antecedents of students' current musical knowledge by approaching it from a psychological as well as a musical perspective, in hopes that with this experience, we will be better able to understand and assess the skill, talent, and artistry that support musical expression.

CHILDREN'S GRASP OF MELODY

Most adults would say that children learn to sing by imitation and assume one of two explanations: 1) children use discrete intervals to construct the melody; or 2) through trial and error, children gradually refine the shape of the melody until it matches the tune. Each theory suggests certain pedagogical stances. For instance, if our pitch knowledge is the accumulation of increasingly stable knowledge of isolated intervals, we would expect to see intervals featured in music teaching and assessment. In this particular context one can easily imagine intervals at first linked to specific songs ("Brahms' Lullaby" provides the minor third), slowly become detached from specific songs and associated with patterns of notes (melodies and scales), specific conceptual terms (minor third), and finally with specific symbols on a page or fingers on an instrument. A pedagogy based on this hypothetical developmental sequence would be structured to articulate and reflect these stages in pitch knowledge. Teaching materials, drills, and testing would all be designed and used to diagnose problems or to facilitate progress along the lines of this particular trajectory.

But what if that is not the story? What if children learn the rudiments of tonal structures by "trial-and-error" approximation of melodic contours without regard for intervals? If tonal structures of melodies are the result

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of tracing the ups and downs of melodic contours without regard for the intervallic or scalar stability that is characteristic of the phrase, then the pedagogy might be very different. The task for a sight-singing teacher, then, might be to teach several melodies that share the same contours, organizing the entire repertoire according to a criteria such as length of melodic phrases, or maybe teach those songs that characteristically have smooth and one-directional contours before teaching those with more angular shapes.

So how do children, in fact, learn to control pitches of their songs? Systematic observation of nearly 80 children over a seven-year period at Harvard Project Zero, suggests that "contour schemes," rather than gradual refinements in the overall contour or interval matching, account for the route of emerging tonal knowledge (Davidson, 1985). Although other researchers confirm that musical pitch development follows neither course associated with the adult predictions suggested (Dowling, 1984; Pond, 1978), a systematic and empirical model of pitch development had not previously been offered. With the Project Zero research a model emerged suggesting that there are five specific levels of pitch development in young children's singing between the ages of one and six years. These levels characterize children's structural knowledge as expressed through *contour schemes* (see Figure 2).

While singing invented and conventional songs, pre-school children first use these melodic schemes with a descending motion. Except for the first contour scheme, the phrases children sing are longer than individual notes or intervals, yet, at the same time, smaller than the individual melodic phrases of model songs. With development, the vocabulary of schemes grows from those that span roughly a third to those that span roughly a sixth. However, these contour schemes do not develop in ways one might logically predict from interval learning (i.e., proceeding from smaller to larger fixed intervals). Although they begin as small, descending motions and expand as leaps outlining a fourth, a fifth, and sixth, this simple line of development does not immediately account for the occurrence of stepwise motion within each tonal frame.

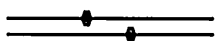
Significantly, stepwise motion within a contour scheme occurs only *after* the next larger contour scheme using leaps is in use. Only then does the child fill in the gap between the top and bottom of the previous contour scheme with stepwise motion. For example, not until a child has acquired the ability to reliably sing a fourth (as a leap) does the child fill in the earlier leap (the third) with stepwise motion. This "backing-and-filling" process continues until finally the contour scheme of a sixth has been achieved. At this point the accretive process of development stops. Contour schemes do not continue to develop beyond the span of the sixth. The octave, which emerges only later, appears to arise from fundamentally different processes.

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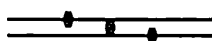
Figure 2. The contour schemes of young pre-school children.

Levels 1a and 1b: Contour schemes of a third

Level 1a, leap: a high-low motion with an unfilled space between the boundary notes.



Level 1b, step: the same boundary with the intervening space filled with stepwise motion.



Levels 2a and 2b: Contour schemes of a fourth

Level 2a, leap: level 1a with a step added (either on the top or the bottom).

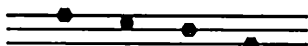


Level 2b, step: the same boundary with the intervening space filled with stepwise motion.



Levels 3a and 3b: Contour schemes of a fifth

Level 3a, leap: some combination of levels 1a and/or 1b which outline an interval of a fifth.



Level 3b, step: the same boundary with the intervening space filled with stepwise motion.

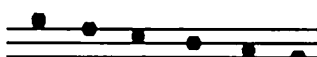


Levels 4a and 4b: Contour schemes of a sixth

Level 4a, leap: some combination of levels 1a and/or 2a which outline an interval of a sixth or a seventh.



Level 4b, step: the same boundary with the intervening space filled with stepwise motion.



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Figure 3 shows how these schemes function only in very local contexts (i.e., within an individual phrase) when pre-school children sing "Row, Row, Row Your Boat." Substantially more developmental change is required to construct a tonal stability that can be maintained across phrases and in a variety of contexts.

Figure 3. Transcription of a typical pre-schoolers performance of "Row, Row, Row Your Boat" with contour scheme analysis below.



The increasing differentiation and stability of pitches are two characteristics of pitch-singing development in the early years. At first, pre-school children fail to return to established pitches or reference points in their songs as they generate only the individual contours that form the child's repertory of melodic schemes. As the repertory of contour schemes grows, the number of different reference pitches used when singing a song decreases until there is a relatively stable one-to-one correspondence between the pitches of a model song and the pitches the child sings. However, the locus of this stability is still within the phrase during the pre-school years. It does not extend across all the phrases of songs yet.

In summary, children's grasp of tonal relationships undergoes systematic development in two ways: first as they expand their repertory of contour schemes, and second as they more often return to individual referent notes of the model song. However, development does not proceed neatly from steps to leaps, nor does it follow a direct sequence from simple to more complex intervals. Nonetheless, by the age of six or seven, a significant preliminary phase leading to mastery of tonal space is complete.

After this first phase, development continues as contour schemes are integrated into the hierarchical structure provided by the scales of the culture. This second phase continues during the elementary school years where there is a great deal of musical activity (organized and spontaneous singing) during which the stability of tonality begins to extend across

phrases. As tonal memory and the use of scalar structures expands, sensitivity to tonal functions increases and the contour schemes are gradually coordinated with the tonal vocabulary of the culture. The culture provides the means of integration, knitting the first melodic units (contour schemes) into the stable, hierarchical tonal structures of songs—the musical scales that support the culture’s musical expressions. However, without further intensive formal training (including instrumental *and* theoretical: writing and sightsinging or solfege), the complete integration of contour schemes into stable and operational tonal systems appears to remain incomplete.

SUPERFICIAL KNOWLEDGE OF SCALES AND MELODIES

The musical growth of the young child-musician is a story of how young singers build an increasingly large repertoire of contour schemes that are integrated into more stable structures (scales), and how they develop musical perception of tonality [knowing when notes belong to a “key” (Frances, 1958) or “conserving” melodic structures across many transpositions (Bartlett & Dowling, 1980)].

Accordingly, by the time music students enroll in a college-level sightsinging class, they bring with them a vocabulary of contour schemes, the perceptual knowledge of tonal functions, a first-draft knowledge of the scale, and years of instrumental training and exposure to music literature. Given this background, why does their knowledge of scale systems and tonal melodies remain incomplete and superficial when they enter the conservatory? Why, for example, are approximately 80% of entering conservatory students *unable* to write out the tune “Happy Birthday” correctly (Davidson, Scripp, and Welsh, 1988)?

Every teacher of sightsinging can think of many examples of this superficial stage of tonal knowledge. Just a few moments with a beginning class reveals their relatively figurative grasp of scales. Although they may easily learn to sing scales and melodies, they will be unable to easily sing specific notes of a melody or degrees of the scale on demand. For example, if individuals are asked to sing a one-octave span on a neutral syllable starting on scale degree two of a major mode, one of three things happens. Some students will sing the octave but transform the second scale degree into a tonic and sing a major scale. Many more students stop singing when they reach the tonic, instead of completing the octave by continuing up one more note. Still other students use their extrinsic knowledge that eight steps make an octave to determine when to stop. They solve the task by counting

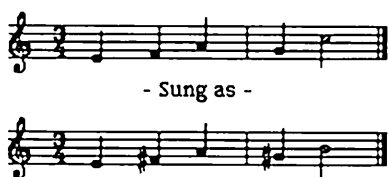
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up eight notes as they sing. In each case the students often are not aware of what they've done.

We take these responses as evidence that students have not yet learned to functionally partition their musical space. They are singing the scale as if it were a "melody" and they stop where it "feels right," not where they are asked to stop. In other words, they are unable to monitor and control their performance of the scale to show musical understanding of the parts in the context of the whole; merely counting the number of steps is not enough to engage intrinsic musical sensibilities.

Another example of students' figurative grasp of tonal space is evident from the mistakes they make when asked to sing a melody. For example, a melody that begins 3, 4, 6, 5, 8 will be sung as though it began on scale degree 1 (see Figure 4). These errors are systematic and predictable at early levels of development.

Figure 4. Transcription of pitch errors typical at early levels of sight singing development.



PARTITIONING TONAL SPACE

If we step back from these examples for a moment and define them in psychological terms, we can gain a new and useful view of what takes place. The psychological task facing adult and child alike is how to partition the physical continuum (the gamut of pitches) into meaningful units (Werner, 1948). The way students partition tonal space depends on their developmental level. A young child substitutes contour schemes for the notes of the melody, while the untrained adult and the beginning music student exhibit the partially formed tonal stability that superficial knowledge of the scale makes possible.

Another view of partitioning tonal space has been carefully described in the research of Jeanne Bamberger. She reports children and untrained

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adults arrange the Montessori bells in the order that the notes of the melody are performed rather than first making a scale and extracting the notes from that operational scheme of tonality to form the melody. They require one bell for each of the notes of the melody, including the repeated tones (Bamberger, 1986). In their understanding of the melody, the notes of the tune and the order of the action of bell playing are fused together, making it unthinkable to repeat a bell to sound a repetition of a note. In contrast, musically trained children and adults use their symbolic understanding of hierarchical tonal structures. They represent the melody on the bells by constructing the scale that serves as a tonal model from which many melodies can be constructed.

From this perspective, the sightsinging class presents a context of exercises that gives students the opportunity to integrate the small contour schemes into increasingly larger tonal structures. These tonal structures create a qualitatively different orientation by filling tonal space with functional units that often stand in fragile relation to one another, making issues like key stability and modulation (regulation of a tonal hierarchy) important. With integration, stable relationships that allow measurement across the entire tonal space become possible. In contrast, when contour-scheme knowledge forms the basis for the representation of tonal space, integration of pitches across register or even across phrases is not possible. For the young child, the figurative shape of the contour is sufficient. Intonation and regulation are not yet an intrinsic part of the musical performance.

Given this point of view, the role of teaching can be seen from a cognitive perspective. It is in part a result of the classroom activities that the knowledge of tonal space becomes increasingly operational. The classroom context establishes the circumstances for knitting the contour schemes of early childhood into hierarchical structures that become robust enough to enable the student to make, remake, and undo transformations as requested or at will. In short, the classroom is a specific setting to make knowledge that can be acted upon.

INTERNALIZATION AND OPERATIONAL KNOWLEDGE

"... as a result of their internalized and integrated nature, concrete operations are actions accompanied by an awareness on the part of the subject of the techniques and coordinations of his own behavior" (Piaget & Inhelder, 1969).

Piaget's concept of operationality is useful when considering the evolving mastery of sightsinging by adults. Piaget describes contrasting

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levels of thinking: *figurative* and *operational* (Piaget, 1970). The figurative aspect has to do with the initially passive aspect of knowledge relating to perception, imitation, and mental imagery. According to Piaget, mental imagery at this level is internalized imitation. It is expressed through kinesthetic, visual, and auditory modalities. The finger movements that so often accompany the piano student's sightsinging, the arm movements of the trombone player, or the physical feeling of the vocal placement for the singer are all examples of the kinesthetic mode of representation linked to an auditory image at the figurative level. Similarly, the visual symbol can become linked to an auditory image. With practice, students report they can close their eyes and imagine the written form of a melody on a staff. Additionally, the consistent use of a specific set of syllables or names for notes creates a condition where the mention of two syllables (e.g., "sol" and "mi") evokes a mental image of their sounds or functional relationship. Similar to "silent decoding" in written language, mental imagery plays an increasingly important role in the establishment of music literacy skills as "inner hearing" or "hearing with the eyes" develops.

Musical "figurative" thinking can be enriched and progressively operationalized by requiring students to mix images from different modes of representation. For example, playing notes while singing them with syllables deliberately combines kinesthetic and symbolic modalities. On the other hand, for a sharper focus, one might use a single modality (e.g., only imagining the sound of the melody). Although the solfege student at first imitates the sounds of notes and melodies by singing, gradually, more of the imitation can be imagined and transformed mentally (without vocal expression) as the student's knowledge of tonal space becomes increasingly articulated and internalized.

This increasingly *operational* aspect of musical thinking deals with the transformation and "reversibility" of actions from one state to another (e.g., singing "Happy Birthday" in a major mode and then in minor). Children cannot do that because they lack the stable, internalized structure that makes the transformation possible. They might be able to perform it one way, but not both. As one's grasp of tonal relations becomes internalized, it also becomes increasingly operational. Piaget describes three distinct stages leading to the development of operational and internalized knowledge: sensory-motor, concrete operational, and formal operational (Piaget and Inhelder, 1969). In musical terms, Piaget's stages might translate into knowledge accessible through *kinesthetic*, *externalized*, and *internalized* operations.

Examples of the kinesthetic stage include learning to repeat back a melody (like a novice chorus member) or fingering a melody (in the sensory-motor fashion of an instrumentalist) without being aware of the

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aural relationships made by the sounding notes. The learning process at this stage is usually based on repetition and rote. At this level one can make transformations on the entire melodic set, but not on elements of the set. For example, a student may sing the entire melody at a different tempo or a different dynamic, but cannot easily change or transform the dynamics or tempo of small segments within the melody. In the second stage, students require externalized vocal production in order to maintain appropriate intonation of notes of a melody or to be sure of their written dictations. In contrast, at the third stage students can imagine the notes of a melody and, upon request, sing specific notes with very accurate intonation. When sightsinging or taking dictation, they do not require auditory monitoring to maintain their tonal orientation or to check their notation.

The process of making tonal knowledge operational is the track of development we witness in the sightsinging classroom. At first glance it is surprising that so many strong instrumental performers rely on their sensory-motor knowledge of instruments to monitor pitch when they sing or write down even a simple melody. However, given their lack of internalization that makes knowledge operational, it is understandable that kinesthetic strategies are required. In spite of several years of instrumental training, including private instruction and ensemble experience, many music students are aurally and notationally illiterate without their instruments "in hand" (Davidson, Scripp, and Welsh, 1988). This research strongly suggests that without the intensive and comprehensive training that leads to the operationalization and internalization of musical knowledge through various modalities—sensory-motor, verbal, and symbolic—this transformation of musical learning into aural and notational literacy will not take place.

TRACING KNOWLEDGE: MODES OF REPRESENTATION

On the basis of our research at Harvard Project Zero and the New England Conservatory, we think that development of music literacy skills does not occur symmetrically in all directions, but follows a path from action to symbolic representation. This is easily observed when students take dictation. One hears beginning students, who lack a stable internal reference system, humming to themselves, and sees finger motions as though the melodies were being played on instruments. The student is at first dependent on singing or playing the item (actual or imagined) to maintain it in memory and subsequently to check the accuracy of the notation. With development, and as the musical image becomes internalized, the singing and playing behaviors disappear (even without instruc-

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tions to stop them). More of the information and the scaffolding necessary to complete the task is internalized.

Finally, in the later stages of internalized operations, a melody is "heard" and understood as an articulated mental image. During this stage, it is possible to imagine various transformations on the melody. For example, "Happy Birthday" can be easily sung with the notes of a whole-tone scale (instead of a major scale) thereby signifying an advanced level of knowledge. With development, the scope of knowledge "on-call" during a performance expands greatly, not only because students learn more theoretical facts, but because the modes of representation become more integrated. With development, the membranes between knowledge as actions, as images, and as symbols become increasingly permeable and information flows from one mode to another more easily and automatically.

It is important to note that as students first begin to use these modes, they can only do so in a specific environment. When students attempt to use new sightsinging skills outside the classroom context, the ability often appears to break down. For example, one often hears applied teachers announce that their student cannot name or sing intervals. These "out of context" situations (such as when the private teacher asks students to identify a harmony, sing an interval or another voice in a score, etc.) are common. They are important signs that a requisite level of internalization has not yet occurred. Even though levels of mastery are easily observed in sightsinging class, success in that context may not transfer immediately to other contexts. Over time and with encouragement to transfer, however, knowledge and skill begin to generalize across increasingly diverse situations.

By constructing rich profiles of sightsinging development instead of basing assessments on one-dimensional factors, it is possible to detect individual differences within the stages of development represented by the levels of behaviors observed in the classroom. By keeping track of the most stable mode of representation a student uses (action, imagery, or symbolization), it is relatively easy to observe early reliance on actions (finger knowledge) being gradually expanded to include (though not necessarily replaced by) verbal and later, symbolic (notational) modes of representation. The gain in flexibility that gradually occurs as a result of the increased availability and integration of different modes of representation dramatically alters students' ability to read, notate, think, and perform expressively.

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THE SIGHTSINGING CLASS: A DEVELOPMENTAL VIEW

To sum up, several concepts are useful when considering sightsinging class from a developmental view. Familiar to developmental psychologists who work with children, these concepts are perhaps not as widely known among teachers of aural skills. The most important include the presence and interaction among the three modes of representation, the stability of the understanding observed within and across the modes of representation, and the operability and internalization that is a symptom of highly skilled performance knowledge.

To use our developmental model, we must identify what students know and understand how students represent their knowledge across contrasting modalities. It is clear from this developmental approach that the construction, visibility, and operational use of knowledge has more to do with the thinking involved in problem solving than with the acquisition of skills by relying only on rote learning or drill and practice. Ultimately, in classes based on a developmental premise, students come to understand that the end state of sightsinging courses can have more to do with the internalization of these processes than with the refinement of performance practice alone.

Students move from one stage to another by assimilating new information or skill into their current knowledge state, and accommodating what they know to new musical demands. Knowledge within each of these stages, then, can be viewed as a separate (yet related) construction the student undertakes that is qualitatively different from the intellectual skills developed through private instrumental lessons. The remaining parts of this article draw on this point of view. A pedagogical framework for developing this approach in sightsinging is presented in "Framing the Dimensions of Sightsinging: Teaching Toward Musical Development." In "Sightsinging Ability: A Quantitative and Qualitative Point of View," a developmental model of assessment illustrates the symptoms of three levels of growth within tonal knowledge observed over a two-year sequence of sightsinging classes.

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PART TWO

FRAMING THE DIMENSIONS OF SIGHTSINGING: TEACHING TOWARD MUSICAL DEVELOPMENT

LARRY SCRIPP

LYLE DAVIDSON

"I now make it a point to sing along often when I play my cello It seems that it is the voice which connects the hands with the ear" (Eugene Friesen—cellist with the Paul Winter Consort after a Symphony Hall Concert in Boston, February 1987).

Musicians of all generations turn to the human voice for musical inspiration. Whether for demonstrating musical nuance or intrinsic knowledge of the music, teachers, coaches, and conductors draw on the expressive powers of the voice. Unfortunately, this resource is not universally nurtured in musical development. Lacking vocal orientation and music literacy skills, many music students prefer to stay within the confines of their own instrumental skill and its role within the ensemble. This rather provincial approach comes under direct challenge in the conservatory environment.

When students first come to the New England Conservatory they are immediately faced with required courses in aural skills/sightsinging in particular. But they do not come with a common understanding about how these skills are learned. Indeed, many believe aural skills evolve as a result of being innately blessed with an good ear and assume those who aren't will be forced to suffer through solfege courses at a constant disadvantage to the more talented students. In short, they question whether the skill can be learned at all. At this relatively late stage in their musical training, few students conceive how the skill can be learned quickly or thoroughly enough to be of any application to their musical studies or professional career skills.

However, most of these same students—sometime within the first two semesters of work in sightsinging—report profound changes in their

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musical life. The quotes below illustrate two levels of response. Early on, and much to their surprise, freshmen find that their sightsinging skills can often contribute significantly to performance on their major instrument. Since they now can effectively enhance their instrumental practice using sightsinging as a way to help organize and monitor their rhythmic, pitch, and interpretive skills, they report a new feeling of performance confidence. Checking their rhythm and intonation using solfege, they no longer need wait for studio instructors or conductors to tell them about the accuracy of their music reading. Efficient practice, sightsinging, and sight reading on their instrument is becoming a way of life.

“During my winter vacation I got together with my high school teacher and he immediately noticed that my rhythm is much better. He wanted to know *what* they were teaching me at the conservatory. I told him I thought that my solfege course was really helping me with intonation and rhythm on my instrument”—a first-year solfege student (performance major).

In the second year students begin to think very differently about what sightsinging means to their music making. At this point students begin to *internalize* their sightsinging skills. Solfege students, not unlike conductors, can now use their sightsinging skills to shape musical ideas.

“. . . I began to see what my hand could show. It wasn't simply repeating a pattern meaninglessly but it was [expressing] something. A firm downbeat, a rebound that was internalized, a lightness, a heaviness showing in my hand I found new ways to cope with problems with ensemble in chamber music”—a second-year solfege student (performance major).

Accurately producing music from notation without the aid of their instrument stimulates a more independent point of view of musical interpretation and expressive nuance in performance. Students are no longer dependent on their studio coach's comments or recorded performances when forming their own conclusions about musical interpretation. They use sightsinging not only to express their musical imagination but also to learn literature or compose music on their own.

“Through sightsinging I have learned to hear music with my inner ear—I can now write music without having to play it on the piano”—a second-year solfege student (composition major).

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Paradoxically, toward the end of their sightsinging courses many instrumentalists report a potential conflict in their musical practice. Now, the process of music reading differs radically depending on the performance modality. Sight reading on their instruments may not necessarily be fully integrated with their new, more internalized, sightsinging skills; and instrumentalists report they are faced with a new choice: whether to monitor and shape their music *as they play it* or to fully imagine the music *before it is performed*.

Faculty members, fortunately, provide guidance on this issue. Bernard Greenhouse, member of the world renown Beaux Arts Trio and currently on the faculty of the New England Conservatory, describes the effect of *internalized singing* on the process of musical interpretation in performance: "The concentration should be on musical ideas rather than on the instrument as such. When I perform today, I find I am not aware of the cello in front of me. My concentration is entirely on something else; I sing the phrase before it is produced. I hear it in my mind and I get ideas for how to perform that phrase before it comes out of the instrument" (Delbanco, 1985).

Deciding in favor of a self-constructed musical conception that guides instrumental performance is crucial to understanding the purpose of developing sightsinging skills. This distinction allows us to better understand how to structure the teaching of this enormously important component of musical development. Clearly, once students master this skill, its value will continue to be essential to musical endeavors long after the solfege classes are over.

In the following sections we present a description of the instructional framework and pedagogical concepts that guide the acquisition of this complex skill in the conservatory environment. Crucial to this description is the articulation of the "end-state" goals of the skill in the context of professional musical life. Woven into this description are the psychological concepts presented in Part I. Accordingly, the framework builds on a developmental perspective of skill acquisition while the processes of internalization and operability of subskills across modalities are in the foreground of this growth. Representations of musical knowledge in sightsinging class take on particular significance as an entire range of performance skills become increasingly articulated and eventually internalized without the peripheral support of instruments or accompaniment. Finally, we offer guidelines for the individual sightsinging instructor's application of the framework. Coherently structuring suitable materials and mnemonic techniques—as well as diagnostically tracking student development—becomes more useful and richly rewarding within the context of an instructional framework.

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A PEDAGOGICAL FRAMEWORK FOR SIGHTSINGING

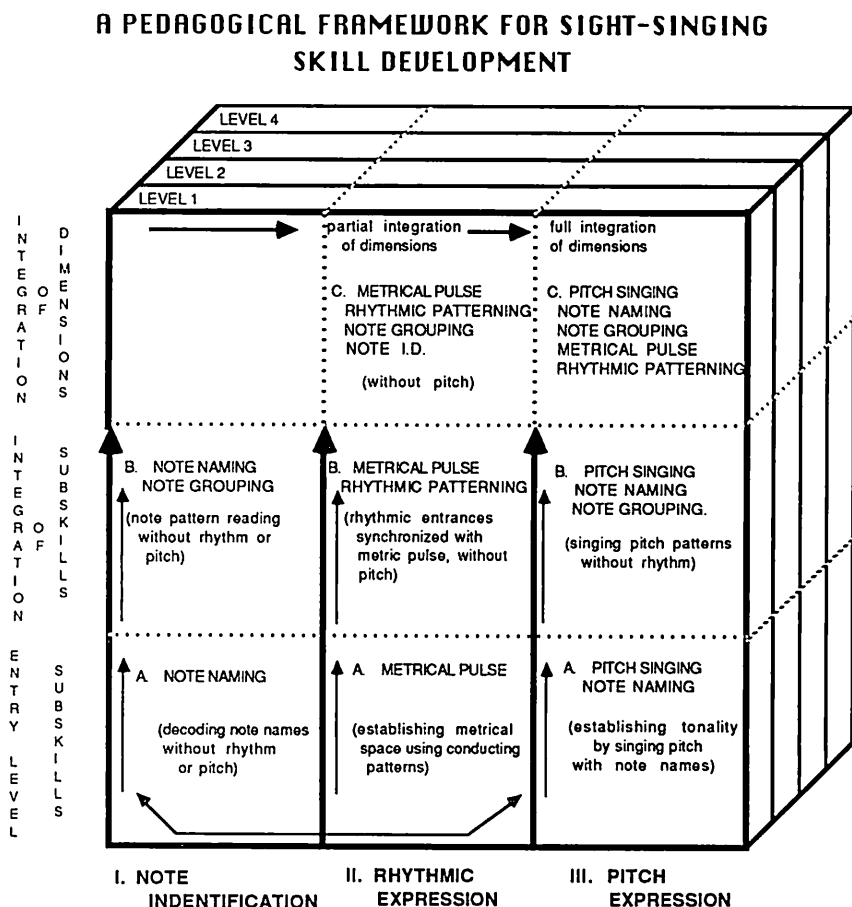
In Figure 1 we see how the teaching of sightsinging skills can resemble the mastery and increasing interplay of sightsinging subskills. Using an open-ended pedagogical framework to reflect the process of acquiring sightsinging skills we can explore conservatory classroom teaching in terms of *cognitive process instruction* (Lin, 1979). By building and refining this framework we are in a position to re-examine the psychological underpinnings of traditional instruction and to establish links with separate, yet integrable, processes at work in the sightsinging classroom.

Accordingly, classroom drills and problem solving exercises throughout all four semesters of solfege can be linked to the various dimensions of the pedagogical framework. These dimensions focus on three performance modes in constant use: 1) *note identification*—decoding the identity of written pitches across various patternings and clef references; 2) *rhythmic expression*—rhythm produced within various meters and using various patternings eventually linked with note identification; and 3) *pitch expression*—pitches produced vocally with note names, in reference to tonal centers, and eventually combined with rhythm. Below we use the framework to define the performance criteria of each subskill and suggest a three-dimensional parallel sequence of skill integration (see Figure 1).

The cumulative implementation of carefully interlocking subskills within three overarching performance dimensions is implicit in this instructional framework. Although the components of this model initially should be engaged in parallel sequences, there is an implied progressive complexity that directs the focus toward increasing integration of the three performance dimensions. Most importantly, the skills at each level must be mastered, operationalized, and made fluent (automatized) before they can significantly contribute to the more complex tasks indicated by the cumulative combination of subskills. In this way the instructional framework allows the pedagogical methods and goals of sightsinging to become more coherently structured and understood by both sightsinging teachers and students. In the following sections we will offer a rationale for why this framework can successfully guide the seemingly impossible task of integration of performance skills.

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Figure 1. A Pedagogical Framework for Sightsinging Skill Development.



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COMBINING MODES OF REPRESENTATION

"[He] teaches his students to sing not only the syllables, but the patterns that can be read in the music itself The student is taught to feel the conducting as he or she says the rhythm"—a first-year solfege student (performance major).

A pedagogical framework that accounts for a range of increasingly complex subskills performed simultaneously best captures how instructors promote the interaction of various modes of representation appropriate to each dimension. In this regard, each instructor (consciously or not) is faced with an important decision: to choose a code that reflects the difference between *explicit* and *implicit* knowledge expressed in performance. For example, in "counting the rhythm," either the durations are explicit and the entrances implicit or vice versa. It is difficult to express both points of view at once. At a conservatory the performance focus should most closely reflect the professional performer's point of view. The orchestral conductor usually structures the entrances of musical events within the beat pattern while the durational aspects of those events occur implicitly. In the second example below the entrances (of notes or rests) are *explicit* and, as a result, the musicians infer the duration of each event to be expressed *implicitly*.

Figure 2. Two codes expressing different aspects of rhythmic orientation.

Figure 2 displays two musical staves, A and B, illustrating different rhythmic coding systems. Staff A is labeled 'A. COUNTING THE RHYTHMIC DURATIONS' and shows a sequence of notes with durations explicitly written above them: 1-2, 1, 1-, 2, 1, 1-2. Staff B is labeled 'B. CODING THE RHYTHMIC ENTRANCES' and shows a sequence of notes with entrances explicitly written above them: 1, 3, 4, 2, 3. Both staves use a treble clef and a common time signature (C).

A. COUNTING THE
RHYTHMIC
DURATIONS

B. CODING THE
RHYTHMIC
ENTRANCES

The sequence and combination of subskills in the pedagogical framework reflect this particular point of view. For note identification or pitch production the clef reference, identity, and grouping of notes are the explicit focus in performance, while the intervallic relationships or scale-degree functions remain implicit. From the conservatory point of view, professional performers are more likely to explicitly detect and correct clef or note

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errors than to focus on the intervallic relationships or scale functions implicit in the music.

Another important aspect reflected by the framework is the need for combined representations in sightsinging performance. Simultaneously connecting various performance codes in sightsinging subskills captures the ways instructors combine representations to structure explicit and implicit musical knowledge. With multiple representations of the three broad dimensions comes the possibility of increasingly refined measures of assessment in the classroom performance. In contrast to the private lesson or ensemble studio, where musical knowledge and expression are judged by how well the embouchure and/or fingers produce the sound on the instrument, in the classroom there is an extraordinary opportunity to track much more. Through the use of combined modes of representation, musically rich mnemonics such as solfege syllables or expressive gestures such as conducting patterns can be employed to reveal students' understanding of their skill development. Error analysis, for example, is greatly enriched when the mode of representation allows a more precise and extensive array of measures (see Figure 3). We can hear students singing correct pitches yet not identifying them correctly—possibly indicating the student is guessing the melody without identifying the notes in a particular clef or pattern. We might also observe students performing one incorrect rhythm without recovering the meter (conducting, in this case, only represents pulse and not the broader metrical framework of the music). A shared representation of musical dimensions, together with a specific mnemonic, provides students and teachers with a more discrete and varied sense of musical phenomena. Throughout, the framework is intended to facilitate this musical exchange.

Conservatory instructors contributed several other criteria for effective implementation of representational codes, ideally: 1) suitable for fluent use at the most advanced levels (e.g., because of the hard consonances and open, simple vowels, most instructors feel that solfege syllables are more suited to fluent performance than numbers); 2) unambiguous (e.g., it is not practical for numbers to represent both rhythmic duration and scale function if they are to be later combined in performance); 3) capable of a full range of musical *expression* (e.g., conducting serves as a richer expression of rhythmic nuance than foot-tapping); and 4) *drawn from conventional techniques* as much as possible (e.g., conductors and publishers are usually more concerned with using solfege to represent concert pitch than to articulate scale or interval relationships). Relatively obscure mnemonic systems (such as “mod-12” notation, hand signals, or shape-note notation) are either designed for purposes other than performance, limited in scope, or have not been universally adopted.

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Figure 3. Diagnosing Typical Sightsinging Errors in Terms of the Pedagogical Framework.

DIAGNOSTIC USE OF THE PEDAGOGICAL FRAMEWORK

NOTE NAMED:

do sol* do sol mi do *** la sol fa mi re

SUNG PITCH:

CONDUCTED METER: **.....**

***Error in Pitch
Expression Level A
(no reference tone)

*Error in Pitch
Identification
Level B (reference note
is correct, scalar
groupings faulty)

**Error in Rhythmic
Expression Level A, B
(priority is given
to metric error when
both meter and
duration are in error)

****Error in Rhythmic
Expression Level B
(error in duration):

Also, because of the increasingly combinatorial nature of the framework, one must be able to represent two or three musical dimensions at once. In this framework, pitch identification and intonation (vowel resonance) can be simultaneously expressed with solfege syllables, but rhythm is represented with a different code and/or contrasting modality. Choosing conducting patterns to express rhythmic entrances allows for the simultaneous expression of pitch verbally (with or without intonation).

In Figure 4 we can see an example of a short melody notated to capture the transformations most likely to occur in the sightsinging classroom. Performed in the eight ways suggested by the framework, this example articulates the abundant set of subskills appropriate in the sightsinging classroom.

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Figure 4. Target Melody and Notated Examples of Component Skills Suggested by the Pedagogical Framework.

[illegible]

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Integrated with
PITCH SINGING AND
NOTE NAMING

coordinated WITH
RHYTHMIC ENTRANCES:
CONDUCTED METER:

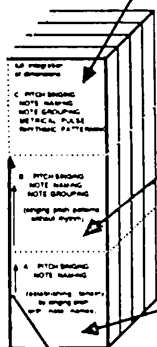
PITCH SINGING/NOTE NAMING PLUS NOTE GROUPINGS
derived from reference tones without rhythm

song at one fixed tempo:
N.B. patterns are based on scales generated from pitch only at
floating scale note represents the orientation of this passage

PITCH SINGING/NOTE NAMING WITHOUT RHYTHM

reference notes (tonic triads) are extracted from
the melody:
G4 B4 C5 D5 E5 F5 G5 A5 B5 C6 D6 E6 F6 G6 A6 B6 C7

song at one fixed tempo:
N.B. pitch orientation is established through context as
on the tonic triads notes regardless of where they fall in the melody



coordinated WITH
RHYTHMIC ENTRANCES:

CONDUCTED METER:

rhythmic patterns
are expressed with
spoken phrases,
exclams, caps, etc.

TARGET MELODY

$\text{♩} = 90$

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SOURCES FOR A PEDAGOGICAL FRAMEWORK

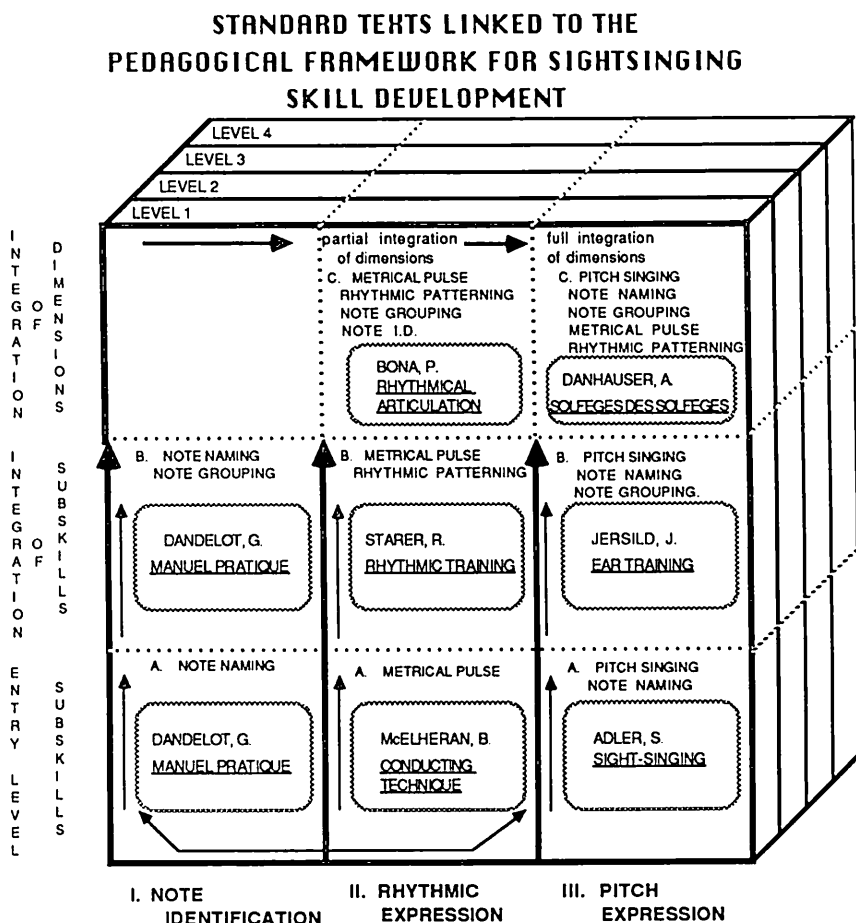
Not only the relation of the framework to musical performance, but its origins are critical to its validity. There are three sources for this framework: 1) traditional textbooks; 2) observing master teachers; and 3) research in the acquisition of music reading skill. First, there are the textbooks traditionally used in sightsinging courses. These texts, as varied as they are, potentially can be structured to provide an interactive framework articulating various component subskills leading toward rich and fluent sightsinging skills (studies in pitch and clef identification, pattern reading, intervals, rhythm, graduated sets of melodies). Although these texts differ greatly in their organizational features, repertoire, and suggestions for instructional strategies, many of these materials fall neatly into the various modules of the framework (see Figure 5).

Since many of the tasks in these texts were not designed to be integrated into a single, more comprehensive pedagogical framework, the individual instructor or curriculum developer is faced with structuring and combining these materials. As seen from the framework, it is possible to express many dimensions of pitch and rhythm simultaneously. Since publishers rarely suggest that competing texts or pedagogical techniques be used in combination, instructors must make extra efforts to broaden the materials and skills suggested by a single textbook. Additionally, many more sightsinging texts can be considered in constructing or supporting alternative instructional frameworks (Rogers, 1984).

A second vital resource for our framework has been our observation of master sightsinging teachers. Searching for sources of an instructional framework involves careful observation of a master teacher's broad synthesis of individually successful techniques. These can be analyzed and combined to form a pedagogical model that is informed and enriched by some of the best teaching available. Successful and imaginative teachers may use similar materials with different points of emphasis. For example, a master Kodaly teacher from the Liszt Academy in Budapest—Erzsebet Hegyi (Hegyi, 1975)—skillfully guides students in alternating pitch representations from scale-function reference (moveable *do*) to absolute pitch names (similar to fixed *do*). Ms. Hegyi successfully trains solfege teachers to value flexibility and to develop impressive feats of musical operability through deliberately disparate modes of representation—hand signals, syllables that may alternatively express pitch name or scale function.

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Figure 5. Standard Texts Linked to Specific Components of the Pedagogical Framework.



A master teacher who was primarily influential in the forming of the pedagogical framework was the late Albert Bernard. Mr. Bernard—who was a Prix des Solfege winner at the Paris Conservatoire, and responsible for training conductors in solfege at the Berkshire Music Festival in Tanglewood—ingeniously combined many traditional and contemporary texts in his solfege classes at New England and Boston Conservatory of Music. His teaching demanded the highest standards of performance skills while he guided students through a series of carefully ordered subskills requiring the integration of several modes of representation. His students—including Claudio Abbado, Phyllis Curtin, and Seiji Ozawa, to mention a few—achieve remarkable levels of fluency in performance with his methods.

Third, we need to explore music reading research. Experimental research in instrumental sight reading provides insight into what cognitive processes need to be made explicit in an instructional framework. For example, the ability to read ahead in progressively larger phrases displayed by more expert sight readers (Wolf, 1976; Bean, 1938), suggests that pattern reading (represented by the modules IB, IIB, IIIB of the framework) is an essential feature of sightsinging development. In other studies, error analysis reveals that expert sight readers show more sensitivity to musical structure in reading processing than do novices (Sloboda, 1974; 1978; 1984). Experts are better able to make musical inferences based on their comprehension of tonal structures than novices who must continually decode note-to-note in a more isolated fashion. Accordingly, when reading for larger patterns, experts are sometimes more apt *not* to notice misprints than novices (Wolf, 1976). Although this research helps us see what characterizes expert sight reading, no instructional framework is suggested. The question remains: how do sightsinging students become more expert in their sight-reading skills?

Research from the analogous field of language reading (Chall, 1983) suggests effective instruction can be based on ordered stages of development. This research emphasizes the need for teaching decoding skills (letter recognition and phonic pronunciation skills) in the first stages of reading. Translating this into sightsinging stages of instruction, we see support for initially emphasizing sightsinging decoding skills similar to the note-naming skills prescribed in the pedagogical framework. Language reading researchers suggest closer contact between reading instruction and the cognitive analysis of reading skills and reading acquisition (Perfetti & Curtis, 1986). Continuing the parallels to language reading research, engaging musical inference skills in service of reading to expand the musical knowledge base can occur more successfully after decoding skills have been established as fluent and flexible skills.

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At New England Conservatory we are pioneering further research in music reading. A study comparing instrumental sight reading and sight singing of freshmen and sophomores suggests there initially exists a largely unintegrated set of reading subskills. Preliminary results suggest that rhythmic development is at first independent of pitch development regardless of performance medium—voice or instrument. Later on, pitch and rhythmic accuracy appear to be more correlated in sightsinging development than in instrumental performance. In this study we will also be able to observe the mnemonics, strategies, and evidence for internalization first- and second-year students bring to sightsinging skills. Although not always more accurate than first-year students, performance processes of second-year students were qualitatively different. In contrast to their first-year performance, sophomores know from their conducting when they have violated meter, when their mispronunciation of solfege syllables results in poor intonation, and they have the ability to recover from wrong notes, or poor intonation, when they are not explicitly aware of key structure in their singing.

In sum, a wide range of materials, instructional practice, and music-reading research support the structure for our pedagogical framework. The framework is intended to help coordinate and combine salient features of numerous sightsinging pedagogies and textbooks. In addition, individual instructors can use the model to creatively and effectively diagnose and respond to particular musical subskills. We intend the framework to provide a comprehensive structure, yet be open-ended enough to generate useful models that can merge and interlock as particular arrangements of the framework's building blocks.

THE END-STATE MODEL: CONTEXT OF THE TASK

"any local organ or activity is dependent upon the context field or whole of which it is a constituent part: its properties and functional significance are, in a large measure, determined by this larger whole or context" (Werner & Kaplan, 1963).

The context of the model must be clearly understood for the framework to specify the various subskills. For example, the scope of the task may vary considerably across different contexts: the conservatory classroom and classes for young children or amateur musicians will likely share many techniques but could be serving contrasting musical goals. As a result, different perspectives must be accommodated. Preparing young children for group singing may not require the same pedagogical model that professional situations demand.

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For the conservatory student, the skills of a professional conductor provide a useful end-state model of music literacy. Many examples of the conductor's role as the consummate musical problem-solver can be seen in most rehearsal or performance contexts. During rehearsal the conductor flexibly monitors and shapes elements of the whole performance in progress, anticipates and alerts the musicians to problems of ensemble, balance, and intonation—all the while developing an effective interpretation of the score that goes beyond accurate reproduction of the notation to the heart of the composer's intent. At this point, the ability to internalize the music—hearing the score without the aid of an instrument and unconfounded by recordings made by others—is critical to creating an original interpretation, to making music on one's own, and to thinking on one's feet. Obviously, the underlying component skills of the conductor—the ability to spontaneously perceive, extract, and demonstrate isolated dimensions of the performance as needed—must be extremely fluent.

To serve these ends the component skills identified in the framework need to be fully integrated and operational. Classroom sight-singing provides an ideal and continuous forum for problem-solving skills in performance. The class can be a real-life simulation of the most demanding reading skills. Students are regularly required to individually produce music without the benefit of fingering an instrument, ensemble cues, or accompanying harmonic context. In short, students are left completely on their own for the expression of the music. Asking students to identify specific mistakes in a performance by comparing what happened with what should have happened, or to stop before a performance problem occurs and describe what mistakes are likely, or to specify strategies appropriate to the problem, all illustrate the potential level of problem solving.

In their course evaluation papers, students are quick to cite examples supporting the problem solving nature of the solfege classroom:

"The key . . . is to predict the errors before they happen We would start off by discussing the 'hard parts' of the piece and finding out what they are, why they are hard and how to practice them. We demonstrate these approaches by trying them in class and seeing how they work and if they are indeed good approaches."

Comparing this environment with courses taken at another school another student remarked:

". . . sight-singing was largely approached as a series of intervals (i.e., remember what each interval sounds like and plug it into the music accordingly) The only reference tone you had was the last symbol you

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sang If I missed an interval it was very difficult to recover because I had no real reference tone to know if I was right or not. At NEC there was a new process, a new emphasis then foreign to me. I was now being asked to sing the tonic on demand. I was allowed to invert intervals at will; the main goal was to be musically convincing."

In sum, although the final goals and standards of professional training must be met, the beginning stages of complex skills must also be carefully represented in the pedagogical framework. This condition makes the framework unique to the American conservatory environment. We must start with the beginning stages of a music literacy skill, then quickly and powerfully forge this development toward a goal of leadership in performance that must include a strengthened capacity for musical expression informed by considerable musical comprehension. This development in sightsinging skills must be rapid, reliable, stable—and, after four semesters of work, leave the student relatively self sufficient. The framework is intended to facilitate this seemingly impossible mission.

MUSICAL DEVELOPMENT AND THE FRAMEWORK

Although a new skill may at first appear in a random or irregular fashion to the classroom observer, there is ample evidence for distinct phases of development. Indeed, a model that accounts for rapid acquisition of aural skills through sightsinging must account for developmental levels in that growth. We assume, in this developmental model, a sequence of phases yielding relatively permanent levels of skill. For example, once students can effectively sight read modulations, we do not expect difficulties to resurface with simple tonal melodies. Similarly, once students can read transposed scores we do not anticipate problems with untransposed reductions of the same material.

In the following figures we define levels of musical development within the context of the framework. Students at level one work within one system of reference in each dimension. Within each dimension the level of task materials covered is listed, as well as a description of exercises or skills that form the criteria for operationality and evidence for the internalization of the skill. Each skill level is to be understood, mastered, internalized, and eventually rendered fully operational under a range of diverse conditions. A student does not have an operational command of diatonic melodies, for example, if tonal orientation can only be established by beginning on a given tonic. Similarly, rhythmic expression is not fully operational if a student can only begin on the first part of the measure (see Figure 6).

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Figure 6. Pedagogical Framework at Level 1.

SIGHTSINGING LEVEL ONE (EARLY FIRST SEMESTER)

NOTE IDENTIFICATION (without rhythm or pitch)

- A. MATERIALS: note reading with one clef (treble) reference; diatonic patterns by seconds, thirds, and fourths.
- B. CRITERIA FOR OPERATIONALITY: stable visual orientation using a single clef reference and reference tones (e.g., c and g) within the clef; ability to perform scale patterns accurately derived from reference notes reading up or down, forwards or backwards.
- C. EVIDENCE FOR INTERNALIZATION: Ability to visualize the clef reference without music; ability to track patterns without having to perform out loud; ability to perform extended note patterns filling in intervals without notation.
- D. SUGGESTED TEXTS: any text can be used ignoring rhythm and pitch; Dandelot, *Manuel Pratique* is designed specifically to deal with this dimension in isolation and with carefully graduated materials.

RHYTHMIC EXPRESSION (with note names, without pitch)

- A. MATERIALS: rhythms in simple meters (4/4, 3/4, 2/4); notes and rests explicitly coordinated with conducted beats and simple syncopations implied by "supporting accents" from conducted downbeats and simple subdivisions.
- B. CRITERIA FOR OPERATIONALITY: ability to generate a precise conducting pattern in various tempos and meters; ability to coordinate note entrances with any beat of the conducting pattern at various tempos; ability to generate note entrances in between the conducted patterns (syncopation) at various and fluctuating tempos; alternating between performing rests and notes; articulating note patterns in performance independent of rhythmic patterns; ability to improvise rhythms maintaining meter and recovering later in the performance.

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- C. EVIDENCE FOR INTERNALIZATION: ability to conserve meter alternately conducting and not conducting; use of other body cues in place of the hand to express rhythmic entrances.
- D. SUGGESTED TEXTS: for conducting, McElheran, *Conducting Technique*; rhythmic patterns in isolation and with note names; Jersild, *Ear Training* and Bona, *Rhythmical Articulation*.

PITCH EXPRESSION (with note names and rhythm)

- A. MATERIALS: vocal warmup with scale, tonic (do, mi, sol) and "tension" or "cadential" (si, re, fa, la) chord patterns in one major key (e.g., C major); diatonic melodies in the one major key.
- B. CRITERIA FOR OPERATIONALITY: ability to establish and reorient a stable memory tone reference (usually the tonic); ability to selectively perform the reference tones; ability to construct scale patterns freely filling in leaps or providing reference tone fluently (e.g., as grace-note ornaments to the music); construction of a fully operational tonal system derived from any scale degree initially given (in the key of C).
- C. EVIDENCE FOR INTERNALIZATION: ability to predict errors by stopping *before* they occur; ability to silently follow a melody and jump in later in the piece; ability to establish a reasonable reference pitch without the piano.
- D. SUGGESTED TEXTS: Danhauser, *Solfège des Solfège*, vol. 1 (no. 1-77), LAZ, *Metodo Graduado De Solfeo* (no. 1-109); warmup exercises suggested by Ottman, *Music for Sight Singing* and Thomson, *Introduction to Music Reading*.

At level one we are concerned with operationalizing one dimension of the materials: note naming in one clef, a small range of rhythms expressed in simple meters, and tonality within a single major scale. Level two primarily introduces a second set of materials or operations to be added to level one: a second alternating clef reference, conducting and subdivision in compound meters, and the harmonic minor scale as well as major. The new set of materials in each dimension is to be mastered while the previous level of skill is maintained. The original tonic must ultimately withstand the

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diversion of chromatic inflection that may temporarily tonicize rival pitches. A steady tempo needs to be maintained in the face of sudden subdivisions of the beat. Here operability and stability demands more than mastery of a new comparable set of materials: through alternation and the first diversification of materials, the student is stimulated to constantly re-explore tonal and rhythmic space. In addition, task dimensions can remain independent of one another. The level of skill in note patterning can be independent of rhythmic complexity. Evidence for internalization increases as students begin to conduct with more ease and to practice silently more often. (see Figure 7).

Figure 7. Pedagogical Framework at Level 2.

SIGHTSINGING LEVEL TWO (LATE FIRST SEMESTER—SECOND SEMESTER)

NOTE IDENTIFICATION (without rhythm or pitch)

- A. MATERIALS: exercises in two clefs (treble and bass); ambiguous or overlapping pattern reading drills.
- B. CRITERIA FOR OPERATIONALITY: ability to maintain pattern reading within clef changes either in isolation or mixed in the grand staff; ability to reread exercises prepared in one clef in the new clef and vice versa.
- C. EVIDENCE FOR INTERNALIZATION: ability to follow performance of note identification drills and identify clef reference without prior knowledge of the clef initially used; ability to generate note patterns in unfamiliar clefs or transpositions.
- D. SUGGESTED TEXTS: Dandelot, *Manuel Pratique*.

RHYTHMIC EXPRESSION (with note names, without pitch)

- A. MATERIALS: examples in compound meters; more extensive syncopations (requiring more subdivision in the conducting patterns—especially on dotted-note patterns; subdivisions of 3 (triplet subdivisions within the beat).

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- B. CRITERIA FOR OPERATIONALITY: ability to alternate freely and fluently from simple to compound meters; ability to alternate subdivisions by two and three; ability to establish and control tempos with carefully chosen thematic materials integrating a range of durational proportions (ranging from 64th to whole notes); continuing to articulate note patterns independent of rhythmic patterns.
- C. EVIDENCE FOR INTERNALIZATION: ability to express subdivision internally or with alternate cues; ability to silently establish tempos in complex pieces.
- D. SUGGESTED TEXTS: Jersild, *Ear Training*, Starer, *Rhythmic Training* and Bona, *Rhythmical Articulation*.

PITCH EXPRESSION (with note names and rhythm)

- A. MATERIALS: full range of chromatic inflection and alterations within a major key; chromatic inflection usually tonicizing the dominant; full fluency with a second key—the relative minor of C major (harmonic minor).
- B. CRITERIA FOR OPERATIONALITY: stable performance of singing simple diatonic melodies freely exchanging both major and minor mode performance of the material; free and spontaneous alternation of treble or bass clefs; ability to freely add accidentals to melodies without loss of tonic stability; ability to improvise short melodies that change modality.
- C. EVIDENCE FOR INTERNALIZATION: ability to detect errors in modality in class; shorter warmup drills are necessary to establish or re-establish tonal orientation.
- D. SUGGESTED TEXTS: Danhauser, *Solfège des Solfège*, vol. 1 (no. 77-106); Bach, *Chorales*; Mozart, *Symphonies* 22-26.

After carefully expanding the range of materials in the first two levels, level three suggests a broad accommodation of materials. Skill levels increase and transfer in geometric proportion to level one or two. For example, now that two clefs are proficient we can quickly test how this skill generalizes across a wide range of clefs. Now that rhythmic skills have been

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diversified, we test their stability by adding a greater range of subdivisions to the task. Since a major and a minor scale have been operationalized, we quickly generalize this skill to a wide range of tonic references and frequent changes across many tonal centers (see Figure 8).

Figure 8. Pedagogical Framework at Level 3.

SIGHTSINGING LEVEL THREE (LATE SECOND SEMESTER—THIRD SEMESTER)

NOTE IDENTIFICATION (without rhythm or pitch)

- A. MATERIALS: ability to identify notes from multiple clef references (treble, bass, alto, tenor, soprano); patterns by compound intervals; pitch identification from the open score.
- B. CRITERIA FOR OPERATIONALITY: ability to maintain pattern reading within clef change; change clef reference freely within melodic lines; identify concert pitch from transposed scores; transpose scores by substituting appropriate clef references.
- C. EVIDENCE FOR INTERNALIZATION: ability to pattern read through multiple clefs without checking clef placement; infer patterns in novel clefs or transpositions.
- D. SUGGESTED TEXTS: Dandelot, *Manuel Pratique*.

RHYTHMIC EXPRESSION (with note names, without pitch)

- A. MATERIALS: examples in changing meters; radical changes in subdivision; extreme syncopations; rhythms combined with dynamic and articulation markings and radically changing registers; examples with radical alternations of subdivisions.
- B. CRITERIA FOR OPERATIONALITY: ability to produce rhythmic nuance in performance; stable performance of rhythms across a wide range of tempos and changes of subdivision, articulation, and dynamics; ability to lead and conduct with nuance; ability to read composite rhythms across the clefs and staves of the score.

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- C. EVIDENCE FOR INTERNALIZATION: ability to anticipate rhythmic features with expressive conducting gestures; ability to anticipate and select measures where ensemble problems are most likely to occur before performance trials.
- D. SUGGESTED TEXTS: Weber, *Sixty Lessons in Rhythm* (vol. 1); Starer, *Rhythmic Training*; and Bona, *Rhythmical Articulation*.

PITCH EXPRESSION (with note names and rhythm)

- A. MATERIALS: melodies in a wide range of major and minor keys; frequent changes of tonal center (modulation); extended length of melodies; full range of expressive nuance indicated in the notation; score reading with multiple clefs and/or transpositions to clef knowledge.
- B. CRITERIA FOR OPERATIONALITY: use of full scale, interval, triad, arpeggio fluency in a wide range of major and minor keys; ability to maintain stable performance through radically shifting keys, registers, and transpositions; ability to reduce instrumental parts to vocal expression; ability to make interpretive decisions of nuance while performing.
- C. EVIDENCE FOR INTERNALIZATION: ability to study scores without recordings or instrumental performance; detect and hear modulations across parts in the score; perform and comprehend scores "silently."
- D. SUGGESTED TEXTS: Danhauser, *Solfège des Solfège*, vol. 2; Ottman, *Music for Sight Singing*, Haydn, *London Symphonies*; Mozart, *String Quartets*, *Horn and Clarinet Quintets*; Beethoven, *Symphonies*; Taylor, *Introduction to Score Reading*.

Finally, at level four, we approach the end-state of sightsinging. The range of materials and operational skills approaches a fair sample of what professional musicians may face in performance: fully transposed scores, open-score vocal music in the traditional clefs, changing time signatures, and ambiguous tonalities. At this level skills increase and transfer in exponential proportions to previous levels. Complete mastery of this level

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is unlikely to be fully achieved in two years. However, it reflects a measure of the potency and energy required to participate in music making, interpretation, and problem solving in musical performance (see Figure 9).

Figure 9. Pedagogical Framework at Level 4.

SIGHTSINGING LEVEL FOUR (FOURTH SEMESTER)

NOTE IDENTIFICATION (without rhythm or pitch)

- A. MATERIALS: note naming in seven clefs (treble, bass, alto, tenor, soprano, mezzo soprano, baritone); maintaining pattern reading within all clef changes; reading the open score and transposing score using all clefs.
- B. CRITERIA FOR OPERATIONALITY: ability to transpose scores or melodies from transposing instruments to new transposing instruments or new keys.
- C. EVIDENCE FOR INTERNALIZATION: ability to pattern read through multiple clefs without checking clef placement; ability to infer patterns in novel clefs or transpositions.
- D. SUGGESTED TEXTS: Dandelot, *Manuel Pratique*; using rhythmic texts with new clefs.

RHYTHMIC EXPRESSION (with note names, without pitch)

- A. MATERIALS: examples in odd or unusual (7/8, 5/4, etc.) meters and changing time signatures; rhythmic ornaments and cadenzas; rhythms in opposition (3 against 4, etc.).
- B. CRITERIA FOR OPERATIONALITY: ability to conduct with nuance and effective ensemble leadership; conducting two meters in combination; generating opposing rhythmic subdivisions during performance.
- C. EVIDENCE FOR INTERNALIZATION: ability to construct transitions in meter silently; full internalization of conducting habits in instrumental performance (as evidenced by rhythmic errors not causing metric errors, etc.).

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- D. SUGGESTED TEXTS: Weber, *Sixty Lessons in Rhythm* (vol. 1); Starer, *Rhythmic Training*; and Bona, *Rhythmical Articulation*.

PITCH EXPRESSION (with note names and rhythm)

- A. MATERIALS: melodies that are tonally ambiguous, bitonal or atonal; full chromatic accidentals added to all conventional keys, enharmonic keys, synthetic modes, and scales.
- B. CRITERIA FOR OPERATIONALITY: ability to pose more than one solution (tonal frame, etc.) to problem of tonal orientation of difficult melodies; reducing the orchestra score into compact thematic or harmonic structures; switching rapidly between parts in the orchestral score; ability to demonstrate and incorporate expressive intonation as nuance.
- C. EVIDENCE FOR INTERNALIZATION: ability to study scores without recordings or instrumental performance; detect and hear modulations across parts in the score; ability to perform scores 's "silently"; detect errors in complex scores.
- D. SUGGESTED TEXTS: Danhauser, *Solfège des Solfège*, vols. 3, 4; Edlund, *Modus Novus*; Thomson, *Advanced Music Reading*, Symphonies by Beethoven, Dvorak, Mahler, and Schubert; Debussy, *Afternoon of a Faun*; Stravinsky, *Mass*; Renaissance Masses in open score.

SUMMARY

"I had a new-found stability in pitch and intonation. I had, in effect, developed a new musical skill from what before made me frustrated, frightened, and insecure What's more, there were immediate results with actual pieces . . .—a second-year solfège student (performance major).

The purpose and goals of sightsinging for the professional musician, the criteria for choosing traditional or new materials for instruction, and methods for gathering empirical evidence for how the skill is successfully developed in the classroom, all need to be considered. Re-examining traditional approaches to sightsinging development requires the integration of several perspectives: the developmental profile of the skill; the context and goals of the skill acquisition; the course materials and instruc-

tional techniques used in various combinations to develop various levels of the skill; music and language reading research from the point of view of cognitive processes and evaluating instructional methods; observing master teachers and their different materials and their pedagogical points of emphasis. When structuring a sightsinging curriculum, hard choices have to be made. For the student and the teacher, the pedagogical framework becomes a system for monitoring the process of skill growth. The structuring of subskills and their combinations, diagnostics, and error analysis all gain additional meaning within the context of a coherent instructional framework. With this framework the student and the instructor are also in a better position to profile and forecast overall development. By participating in classes articulating cognitive process models of instruction we see evidence for students taking a more active role charting their own course of sightsinging development. The task is considered in the context of problem solving rather than rote learning and the course, once defined, emphasizes more *how* to learn rather than *what* to learn.

Finally, modelling the acquisition of a complex skill such as sightsinging makes the process of instruction more visible. As teachers seek to better describe, explain, and understand the multiplicity of skills involved with singing at sight, we will find learning environments that reflect a more insightful developmental perspective of complex skill acquisition. Hopefully, instructional frameworks will enable a broad population of sightsinging teachers to actively contribute other points of view and share their understanding of how this essential—and highly refined—skill is developed.

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PART THREE

SIGHTSINGING ABILITY: A QUANTITATIVE AND QUALITATIVE POINT OF VIEW

LYLE DAVIDSON

LARRY SCRIPP

JOAN MEYAARD

Small groups of students are standing in the hallway, leaning against the walls, sitting on the floor. A classroom door opens. A student emerges, confident and smiling.

"How did you do?" her friend asks.

"I got through eight this time! Last time I only did two."

"I got five last time. I hope I can do better this time," another student adds.

"I can't believe it," the student, fresh from taking the departmental performance examination, explains.

"I almost broke down on one of them, but I was able to keep going. I can't believe it! I got eight!"

These numbers, two and eight, are significant. They tell a story of a dramatic increase in this student's ability to read music. "Getting a two" means that when this student started in the fall, she could only sight read melodies in C major that consisted primarily of stepwise motion. Figure 1 illustrates the level this student could perform at sight with errors in fewer than five of the eight measures.

Getting through eight melodic examples means she can now read diatonic melodies that feature steps and leaps in keys through three accidentals, and can maintain her performance when she makes mistakes (Figure 2). Perhaps at no other time has her progress been as dramatically demonstrated as during the taking of this second examination—at the end of which her first and second tests were compared and discussed.

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Figure 1. Example Illustrating a Number Two on Departmental Exam.

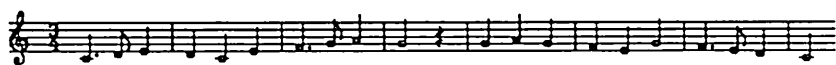


Figure 2. Example Illustrating a Number Eight on Departmental Exam.

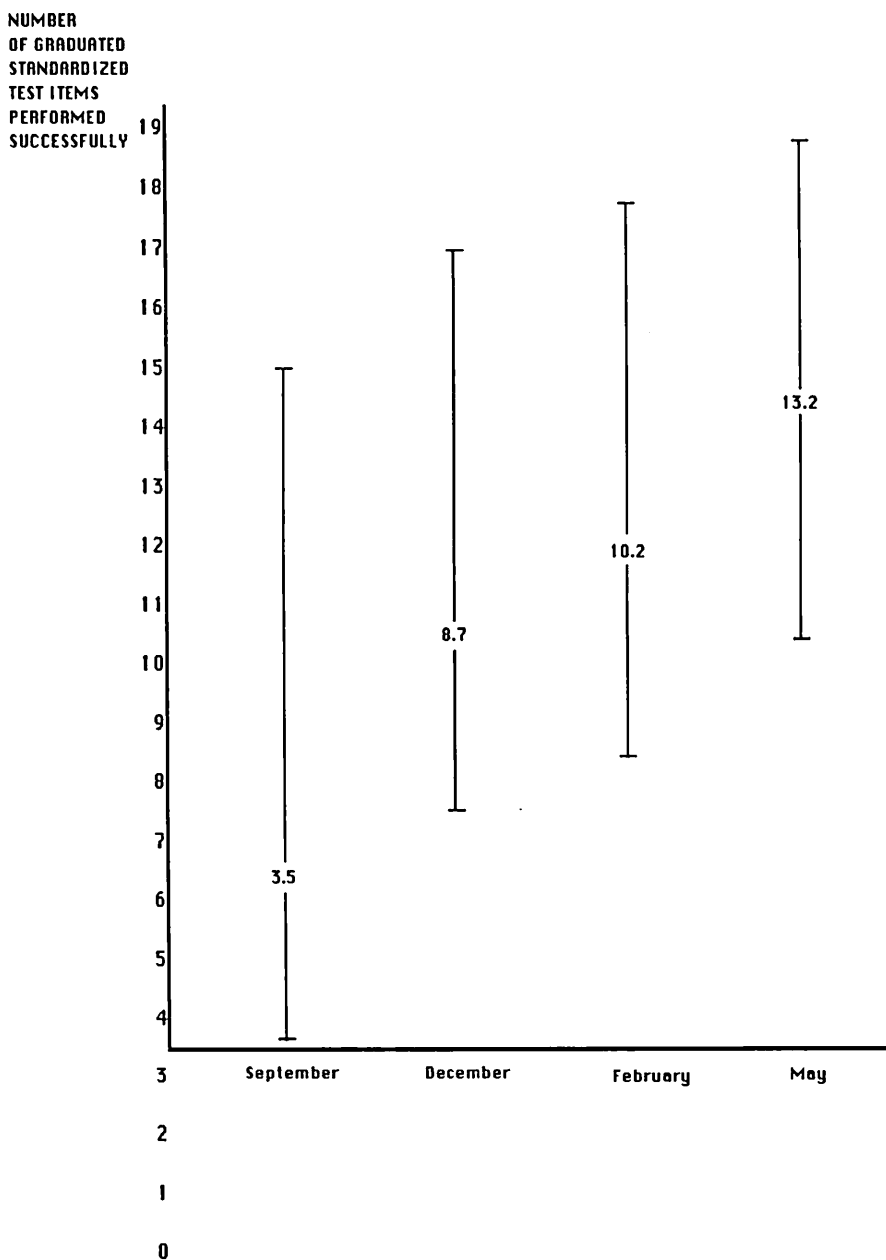


Four times a year the third-floor halls of the New England Conservatory of Music echo with exchanges like the ones recorded above at the end of the first semester. At the beginning and end of the semester students take an equivalent sight-reading examination as part of the placement and evaluation process and likewise about five weeks into the second semester and again at the end of the year in May. Figure 3 shows the range of performance and the average scores for each of the tests.

Usually about 25% of the new students will be unable to sight read *any* melodies with fewer than five measures wrong. We expect about 75% of the entering freshmen will be unable to sight read anything beyond a diatonic and stepwise eight-measure melody with fewer than five errors. Although an average of six years of private instrumental study forms the most important part of an entering student's musical background and preparation for advanced study, year after year the results of this examination show there is surprisingly little transfer of skills (gained through instrumental practice) to a broader musical context.

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Figure 3. Average Range of Performance Scores for First Year Tests.



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MONITORING SIGHTSINGING SKILLS

Comprehensive evaluation of sightsinging development is a challenge. As we currently assess the development of sightsinging ability at NEC, we keep in mind how we might conceptualize typical changes in music reading skills. This helps us specify current levels of ability for individual students and gives us a template for predicting what future changes will look like. We also conduct empirical and observational research so we can begin to explain how those changes might take place. Finally, on the basis of what we have learned, we decide how to best promote and stimulate the growth of knowledge necessary for the development of high levels of music reading skill.

Because of our developmental agenda, we pay unusual attention to two types of evaluation that appear, at least on the surface, to be at some distance from learning to sightsinging as it is usually conceived. At the start, we design departmental examinations that provide a *quantitative* means of rank ordering students on the basis of their sightsinging performance. But we expect the examinations to do more than that by providing a means for making detailed comparisons with a student's own past performance levels as well as comparison with peers.

Beyond the conventional measures of accuracy we also gather evidence of a very different type—that of *qualitative* changes in sightsinging abilities—by making careful observations of classroom behaviors. For this purpose, we employ extensive notes taken by in-class observers, review of video tapes of classes collected on a regular schedule, and intensive interviews with students. We find these means to be extremely valuable ways of developing an understanding of what qualitative changes occur and how these correlate with the quantitative changes we observe on the departmental examinations.

The sightsinging examinations at the Conservatory are based on assumptions about the traces, direction, and impact of development. The more we know about the roots and background of present levels of skill, the more we can use the knowledge students bring with them to the class and rehearsal. So our first assumption is that our students' continuing musical development is based on their prior skills and understanding. Specifically, our evaluation process is based on the assumption that continued musical development (in particular, the development of music reading skills) will grow out of a core of skills that can be found in musically untrained individuals. For musicians these core skills comprise various symptoms of talent. Part I outlines the early evidence of musical behaviors at least in relation to the development of tonal knowledge in the early and middle years. For musicians, these early behaviors are refined and expanded to

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include superior perceptual and memory skills, strong executive and performance skills, and a highly personal stake in one's own musical understanding.

Our second assumption is that continued musical development will be orderly, not random. Part II presents a program for carrying out instruction, and our examination structure is based on the assumption that change in abilities occurs systematically. We expect that future development not only continues the direction of growth outlined in the first paper (i.e., from the use of contour schemes to the development of stable hierarchical tonal structures) but also follows the direction of the class work, drills, readings, and assignments.

Third, we assume that continued development of sight-singing skill will have broad and powerful impact on students' musical knowledge and functional level of literacy. At NEC, we are most concerned with the musical and musicianly use of the abilities developed in the solfege classes. Therefore, at the departmental level, we seek evidence that students' ability to read at sight improves to meet minimum standards during the first year, and that continuing development occurs across a variety of musical contexts during the second year. In short, we want to know that the new knowledge can be used to solve different musical problems. Therefore, we expect the effect of new knowledge and skills to be broad in scope, and to transfer far beyond what is taught in the classroom.

Thus, we have designed comparable sets of departmental examinations that allow us to easily assess the differences between individual students at any one time. Because we have equivalent examinations, comparisons are possible between an individual student's performance on one test and any of those taken earlier. We also are able to see differences between entire groups of students each time examinations are held.

ASSESSMENT BEYOND IDENTIFICATION OF ERRORS

To identify a student's level of development and give the most useful advice, it is necessary to determine the nature and background of the errors made across a variety of increasingly more challenging melodic examples. Some examples will be too easy while other examples will be too difficult. Taken together, the profile of errors that occur during performances across a wide range of difficulty levels allows us to see the particular level at which a student performs. Because we spend so much time watching the errors students make, we are beginning to see there are many different types and causes of errors. A student may miss a pitch or even break down for a

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variety of reasons. For instance, one student will miss a pitch because the reference system of the scale has become fragmented. Another student may miss the same pitch because rhythmic complexity occupies the center of attention. A third student may make a mistake because of not correctly naming the pitch or identifying the duration. Giving each of these students the same advice, "practice your scales," "your intervals," or whatever, will not yield the same results. Each student needs to be supported by advice that draws from an understanding of the causes of the problem, from an understanding of the level at which the error occurs. Our carefully constructed assessments, together with our extensive interviews of students, illuminate the roots of individual errors and begin to sculpt profiles of error types.

The departmental examinations serve many functions beyond monitoring basic minimal standards. Beyond providing a highly visible articulation of standards of performance that help students and faculty understand the goals of the course, the departmental examinations become part of a student's profile—as well as a useful diagnostic tool.

Because they are diagnostic, the examinations help make teaching and learning intra- and interpersonal activities. Teachers and students alike find the diagnostic use of examinations an important part of the process of instruction when advising students what materials to work on, what strategies to use, or what courses to take. Individual critiques (among the most important uses of these exams) make it possible to engage students in dialogues and self-reflection about their musical education, learning styles, and their individual strengths and weaknesses—clearly a central part of the learning process.

STRUCTURE AND ADMINISTRATION OF THE NEC EXAM

The examination for the first and second semesters of solfege consists of 19 graduated eight-measure melodies to be read at sight. Each melody has a detailed scoring system to identify the location and type of errors a student makes during the performance. Above and below *each* bar are letters that stand for the issues to be scored by the examiner during a performance of the test. The issues for rhythm (TMRD) consist of Tempo (T), Meter (M), Rhythmic Pattern (R), and Duration (D). For pitch, the letters (CKPI) represent the issues of Contour (C), Key (K), Pitch (P), and Intonation (I). These categories are arranged in order of increasingly more controlled behaviors. At least some control of the issues to the left within any single category is necessary before those to the right can be successfully

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addressed. For example, if the durations of notes are accurate, then the rhythmic surface of longer and shorter notes, the meter, and the tempo are probably also clear, even though there may be a great deal of expressive nuance throughout the performance. On the other hand, if a student's performance shows problems maintaining the contour of a melody, it is likely that key, correct notes, and intonation will be even less stable and reliable.

The examinations for the third and fourth semesters are similar. However, a much wider range of examples is featured, including melodies that are extremely chromatic, some atonal, and at least one of every three requires students to sight read portions of scores that feature transposing instruments. In the more advanced examination there are five levels of difficulty with three examples in each level—fifteen in all. In this set, the teacher critiques are expected to be broader in scope by including evaluation of articulations, dynamics, phrasing, and musical expression (in addition, of course, to pitch and rhythm).

We do not insist on a specific pedagogy or set of routines in any examination. We count the best of two performances. If, in two attempts, the performance still contains five or more measures of mistakes, the student loses credit. When the student fails two consecutive melodies the examination stops; credit is given for the last successfully completed melody, and the examination score is equal to the number of that example.

Before each evaluation period (four times a year) the solfege faculty practice giving the departmental examination. Tapes of typical performances by students at different levels provide samples on which we can practice identifying the type and the number of errors. We practice with these until we have reached a satisfactory level of agreement.

ASSESSING SIGHTSINGING ABILITY IN THE CLASSROOM

The example of the students who were unintentionally tested with the same materials in different years (presented at the beginning of Part I) raises questions about what measures should be considered when assessing sightsinging skills. Assessment of learning depends on the orientation of the course, but also on a broader understanding of the depth of the changes taking place. Beyond a certain point, measures of accuracy alone do not provide sufficient detail to show how development continues.

Simple quantitative measures of accuracy appear to approach a ceiling by the end of the second semester. However, this leveling off of scores does not mean the end-state has been reached. For example, a solfege student and an experienced conductor may both represent a beat pattern clearly.

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However, although it may be possible to award each an “A” for accuracy or clarity, that grade does not begin to convey the differences between them. It obscures one important difference: the conducting pattern of the relative novice is only clear; the conducting pattern of the expert is clear *and* expressive. The desirability of accounting for *more* than accuracy makes it necessary to award a qualitatively different score to each musician. Descriptions of behaviors displayed by novices and experts can capture differences that are useful when evaluating an individual’s performance. These differences can be called *qualitative* measures.

Qualitative measures are common in developmental research, but are less often articulated and integrated into music classrooms or lessons. Qualitative measures can be used to describe the structural character of the developmental changes under study. For example, when three students at different levels of development sightsing a given melody, their responses may be the same quantitatively (i.e., they may make the same number of errors), but may differ qualitatively. The errors in one performance may suggest an unstable base knowledge of contour matching within a single scale, while those in another may show an unstable grasp of pitch only across different scales, while the third student’s recovery from performance errors may reflect a refined sensitivity to the function of scale degrees despite chromatic alterations.

Subsequent work comparing the sightsinging and instrumental sight-reading ability of first- and second-year students also suggests that once students have progressed beyond a critical threshold of skill, simple measures of accuracy no longer capture the range and depth of the dramatic changes that continue to take place in other musically important dimensions. For instance, our measures of incidental learning show that students at the end of their second semester have a much more powerful memory for music than first-semester students. Similarly, the third-semester students are able to infer far more about the expectations generated by a melodic fragment (i.e., its possible continuations) than the first- or second-semester students. Again, because these changes occur where both groups make a similar number of pitch or rhythm errors, one needs a broad array of qualitatively different measures to be able to see the depth and breadth of changes taking place along these other dimensions.

QUALITATIVE DIMENSIONS OF CHANGE

When assessing sightsinging, since students cannot rely on rote learning to demonstrate application of and the level of mastery of reading skills, we want to have a variety of measures available to assess a broad range of

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development. In addition to measures of accuracy, it is extremely useful to have a description of easily identifiable behaviors along which moments of change can be seen to alternate with periods of stability. The extent to which student responses are stable, specific, and operational (e.g., reversible or transposable), we can use them to appraise changing levels of development. In this section, we want to specify some of the sub-skills that either support or are concurrent with the focal task of sightsinging.

The following information draws on observations of solfege classes. The results were not subjected to statistical analysis for three reasons. First, we are only starting our research and the beginning step in any developmental research strategy is to identify candidate dimensions along which change might be expected to occur (Wohlwill, 1973). Second, we do not yet have the conditions necessary to conduct such an experimental study. Third, we are primarily engaged in the education of professional musicians and must focus our activity there. In the future we will undertake a more rigorous investigation of these issues using the paradigms of basic psychological research.

Nevertheless, the characteristics of different levels of development sketched below are useful. They can be interpreted in at least two ways. First, they can be used in conjunction with the pedagogical framework to aid instructors and students when identifying progress and forecasting development. Second, these dimensions can be used as the basis of research study, either within a cross-sectional design employing regression models or within a developmental design employing correlational and ordinal analysis. We are encouraged that these candidate dimensions, ordinal scales, and observations can serve different purposes.

The dimensions and measures were developed from making in-class observations of four semesters (see Figure 4). Two observers attended three classes a week on a regular basis, made observations of students (who performed individually and in groups), and reported surprising results. Interestingly, many behaviors had not been noticed by the instructor, in spite of many years teaching solfege. Additionally, every two weeks students took a private sightsinging examination that was taped and later transcribed for analysis. Taken together, the quantitative individual exams and the qualitative observations over the two-year period provide the background for our assessment of sightsinging and music literacy.

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Figure 4. Sightsinging Classroom Observation Sheet.

THEORY 101 OBSERVATION SHEET

DATE _____ CLASS _____ TEACHER _____

OBSERVER

COMMENTS: performance methods, evidence for increased internalization or rhythmic or pitch stability, special heuristics or strategies for problems, ensemble performance, peer critique, special exercises, etc

EXAMPLE

(Time on task)

note
in

note
groups

rhythm
only

rhythm
& poeID

pitch
¬eID

pitch
& rhythm
& noteID

OTHER TASKS

Time on task	ID	groups	day	ShooterID	ShooterID	ShooterID

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Over the two-year curriculum, we find three broad characterizations of the sightsinging ability. In the first level, there is a *focus on a single attribute*: for example, reading on a note-to-note level. With development, the characteristics of reading music change. Reading at the second level is characterized by larger chunks (students now turn the pages far earlier) and by *unstable relations among several attributes* (students may read either the notes or rhythms, but may not be able to reliably incorporate the expressive nuances in the notation). At the third level, there is a *stable ensemble of attributes* that emerge with apparent independence and that are finally knit together into a flexible multi-dimensional base that students exhibit as “knowing-in-action” [the student can switch from one mode to another easily, and can recover from mistakes without losing the basic references (Schon, 1987)].

Over the two years, one can observe students developing across all three levels of the following behaviors: the focus of attention, the degrees of internalization, the degrees of stability, the flexibility of scale reference, and the extent to which the student is able to read beyond the notation. Below, each of these behaviors is described with brief examples of the three qualitatively different levels.

A. Focus of Attention

One of the more important observable characteristics is the focus and scope of students’ attention. Making correlations between the extent to which a student bases his or her performance on the visual display and the sound of the melody is a very powerful means of determining developmental level. At first, the student relies almost entirely on the visual appearance of the melodic line. Gradually, the student is able to ignore the visual display of the melody, while simultaneously demonstrating an ability to perform it from an internal image of the sound of the line. While this change is taking place, a parallel change takes place in the degree to which eye contact is independent of the single part being sung during the reading of ensemble music.

1. Reading processes (this measure addresses the relation of the visual and the auditory components of sightsinging).

Level I: the student appears to read from note to note. The orientation is predominantly, if not totally, visual. The student is nearly unable to deviate from the written contour of the melody.

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Level II: the student appears to take in larger groups of notes but still relies heavily on the use of visual cues. Focal notes become stable, resulting in a quicker response to non-chord tones. When score reading, students are able to invert simple intervals (fifths and fourths, octaves and unisons) to accommodate their vocal range.

Level III: the student relies less on visual cues and begins to act on internal representation of the music. When score reading, the student is able to easily transpose registers and intervals so they better fit the voice. When reading clef changes, the student performs from knowledge of note names, not from the visual display of the melody.

2. Eye contact in ensemble (this is a measure of the degree to which students are able to attend to different demands simultaneously).

Level I: there is no eye contact among the students. They look at the conductor (teacher) only occasionally. The focus is entirely on performing their part without errors.

Level II: there is some eye contact with other performers, but usually only with a person who is singing their part. This suggests the student is able to follow the score and coordinate his part with another person singing the same part.

Level III: there is eye contact with other performers, but it is frequently with a person who is singing a different part. This suggests the student is able to follow the score and simultaneously coordinate his part with others in the ensemble.

B. Degrees of Internalization

The three indices below describe the development of increasingly internalized (and therefore operational) knowledge. They all express the development of a stable internal reference system. The contrast between the warm-up behaviors of beginners and more experienced students provides a very clear example of the effect of internalization. That students spontaneously sing pitches they have been asked to name suggests they do not yet easily separate the name, function, or sound of the pitch. The ease with which memorization of pitches occurs is striking in the more advanced

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classes. Their pitch memory becomes so stable that once they have tuned up, they require no more references. Working on score reading with students at this level is almost like rehearsing an orchestra.

1. Tuning and warm-up procedures (before singing, students are asked to tune up: to ground oneself in the tonic key. There are big differences depending on the level of the student's development).

Level I: if the student tunes up before singing a melody, it is usually done by singing the scale up and down out loud.

Level II: the tuning procedure now includes singing the scale, perhaps the tonic triad, and even some other scale degrees out loud.

Level III: tuning is completely internalized. The only way of knowing whether a student tuned up is by observing a brief period of concentrated looking through the melody. This is often followed by the student sitting back and turning to the instructor.

2. Naming notes (students are asked to identify individual notes when played on the piano. Whether they respond by singing or speaking indicates their level of development).

Level I: beginning students sing and name the pitch when asked to identify the notes played on the piano.

Level II: this level marks an in-between stage. Sometimes students sing the name and pitch of most of the notes when asked to identify those played on the piano and sometimes they only say the names.

Level III: students only say the names. There is no singing. This is taken as evidence the sound is internalized.

3. Unit of memory (one dramatic result of solfege classes is the amount and ease with which students can memorize without making that the focal task).

Level I: the student retains the mental image of the sound of tonic and perhaps the dominant of the scale. There is a need for constant reference and

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tuning to those notes during the class period. Certain salient constellations of notes are relatively stable (e.g., scale degrees 7 to 1; 2 to 1; and 6 to 5).

Level II: students are beginning to expand their tonal references to include more pitches over a longer time. There is less need to tune and re-establish the reference notes during class.

Level III: students are developing a memory for most of the 12 chromatic tones. Once the class is tuned up there is little, if any, need to re-tune or re-establish reference tones. If the class is working on score reading, one gets the sense of working with an orchestra—the pitches are on call, the rhythmic nuance is clear, the reading is expressive.

C. Degrees of Stability

Using miscues as a measure of students' stability is a simple, yet effective, strategy for revealing levels of development. At first students are unaware of the conflict. Within two semesters, most students begin to notice, but cannot always resist the implication of the given miscue; during the third semester, students notice the miscue, but sing what is written; by the fourth semester, students ignore the miscue entirely. The second measure of stability charts students' ability to separate the name of a note from its function in a scale. The effect of modulation on performance appears to be highly correlated with stable scale references and with intonation. The effect of mistakes completes the picture, for initially students knowledge is so fragile that they are unable to recover from mistakes. Later, and closer to the end-state, mistakes do not interrupt the performance.

1. Effect of miscue (before beginning to sing, students are given the first note in a context that either reinforces tonic or varies from it).

Level I: when students are given the starting note as part of a non-tonic chord (e.g., the pitch "C" is given as the third of an A-flat major triad), they will sing the contour of the melody in the key of A-flat. This is taken as evidence the students are using their knowledge of contour schemes, which are weakly integrated into scales, and matching the visual contour of the melody.

Level II: the context of the starting note is now handled more subtly (e.g., scale degree 3 being presented as the fifth of a triad).

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Level III: students now correct the instructor, or give knowing looks and comments about the true context of the starting note.

2. Scale reference (the observations here reflect the fixed-do materials and pedagogy in use at NEC. We suspect parallels with other pedagogical materials. The student is initially locked into a single tonality, but slowly is able to generalize to tonic references of other scales).

Level I: a single scale is the most important reference. Students use it as an inflexible template. To sing in a different key, students must start from the beginning and re-tune. They are unable to perform accurately melodies that lie outside that scale.

Level II: students are still unable to let go of the initial aural scalar reference. Their performance of accidentals (in melodies implying keys closely related to the original tonic) is unstable. They are unable to distinguish between the aural function and the visual identity. For example, if students have been singing in the key of C, they will sing the pitch "C" when they are asked to sing tonic—even when the key is not C, or when the melody has modulated to the dominant or the submediant.

Level III: students can quickly construct any tonic and key reference. They can negotiate highly chromatic melodic contexts and maintain their orientation to changed keys.

3. Modulation (this measures the student's tolerance for disorientation. The effect of a modulation can be interpreted as an index of the degree to which a student can reconstruct a stable internal reference system).

Level I: modulations completely disorient the student. Anything beyond the tonic scale becomes an occasion for mistakes and a decline in the sensitivity to intonation.

Level II: the student can negotiate modulations to near keys. The more well-defined the modulations, the more successful the performance. On demand, they can now sing the tonics of new keys, thus giving evidence they can keep separate the home from the local tonic.

Level III: modulations now pose no problem for the student. Chromatic tonal and atonal contexts pose few difficulties.

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4. Intonation (with development, there are dramatic shifts in the ability to perform in tune).

Level I: students can use only the most salient notes (the dominant and especially the tonic) as reference points against which to tune other notes of the melody.

Level II: students can use all the notes of a major scale as reference for intonation. A new scale, especially those at some distance, will disorient intonation.

Level III: students tune to a variety of melodic and harmonic contexts. Distant key relations are no longer problematic. Tuning strategies include reference tones from focal keys and intervals now adjusted to specific tonal contexts.

5. Effects of mistakes (when errors occur in performance there are radically different levels of response).

Level I: orientation is fragile because mistakes are often difficult to undue or the student is slow to respond effectively to the error and often never fully recovers. Musical uncertainty or obliviousness produces hesitations or total breakdowns in performance.

Level II: in this intermediate stage the student can draw on certain salient pitches to re-orient the performance. Although mistakes can be distracting, the student is committed to a full musical recovery. More radical strategies (such as leaving out notes or filling in leaps) are employed toward this end.

Level III: students respond quickly and intuitively to their mistakes. They can think on their feet as they spontaneously recover the flow of the melody—or choose to ignore their mistakes altogether.

D. Beyond the Notation

At first, performances are characterized by wooden, note-to-note qualities. Over time, students spontaneously begin to sing with expression. As they become less concerned with every note and rhythm, they appear to

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have more time during performance to devote to other features of the music. They also are able to scan melodies and scores while performing—suggesting in another way that less attention needs to be focused on deciphering their own single part.

1. Expressivity (performing with appropriate expressiveness is a constant requirement and is linked to levels of development).

Level I: a musically expressive performance will not appear without more or less rote drill. Reminders to make a diminuendo or ritard will be quickly forgotten and dynamics will be ignored.

Level II: in keys and contexts that are easily understood and familiar, students will be able to make expressive nuances while performing—especially if encouraged.

Level III: this level marks a major milestone. Students spontaneously integrate notated expressive marks and often add others they feel are appropriate. Sightsinging now sounds qualitatively different; expressive performance has become automatic, not the result of coaching and rote drill.

2. Unit of analysis (students' behavior, when they study a melody to perform, is linked to levels of development).

Level I: asked to look through a melody and comment on its structure, or to locate the areas that may cause difficulty, the student will search through the piece note by note. Comparisons to the piece just sung are slow and difficult. Students easily lose their places, have trouble locating the recapitulation of material, and are slow to start from the middle of the piece.

Level II: the student will easily locate the tonic and dominant notes of the common scales, will scan quickly, and make comparisons to the piece just sung.

Level III: students maintain their orientation within and across nearly any keys and scales and make quick comparisons with other pieces. They appreciate structural cues and use them in their performances.

The range of these observations is broad. They cover the span from first exposure to mastery. To gain a perspective of each developmental level, the reader is encouraged to regroup the behaviors by level rather than by category.

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SUMMARY

One of the primary goals of the sightsinging program at NEC is to develop music reading to a high degree of fluency. This is a necessary support for the performance focus that is a special feature of a conservatory education. Thus, we place a high value on being able to sightsing melodies with appropriate nuance and musical expression. Of course, other programs may emphasize different goals.

Using both quantitative and qualitative measures for optimal assessment of ability, we found three broad levels that expanded our understanding of development in sightsinging. The first level is restricted to reading of local units. If development stops here, the skill is reduced to reading only contours and intervals. The second level is characterized by reading based on a strong scalar reference, but without the capability to switch keys easily. While the knowledge base is broader, it is not yet fully operational, so modulations disturb the stability of scale reference and relationships held across keys. Finally, in the third level there is a reliable tonal reference system that permits chromatic or even atonal music to be performed.

Because of the structure of our evaluation system, we can use the test as a baseline measure of sightsinging skill, and also as a diagnostic test. Because of the specification of issues made possible by the scoring system, one can construct a profile of errors for an individual student. With this profile of sight-reading performance and the observations made in class, an instructor is able to give each student a detailed summary of strengths and weaknesses, and point out which areas are leading development and which are lagging behind.

In sum, we think the predominant model for evaluating skill in sightsinging should be based on musical performance values rather than language skills and theoretical knowledge; should not rely on single measures (e.g., accuracy alone); should employ quantitative measures as well as qualitative measures that grow out of the specific educational context; and should be useful for diagnosing strengths and weaknesses. Finally, the means of assessing what is learned and developed will depend on the immediate objectives of the specific curriculum.

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PUTTING SKILLS TO WORK: AN AURAL ANALYSIS PROJECT

GARY POTTER

At the end of the required undergraduate music theory course sequence, the student should be able to look back on two or three years of hard work with the sense that all of the various skills and techniques interrelate, reinforce one another and, as a whole are, like good gestalts, worth more than the sum of their parts. While many programs integrate skills and written theory, either by teaching them in the same classes or, at least, by doing some singing and listening in literature and analysis courses, aural skills often end up a separate compartment of the program. And when the final aural-skills test focuses on isolated details such as identifying the nationality of augmented sixths in a block-chord progression played on the piano, the student may question the connection to other aspects of music study and doubt the value of years of effort.

The project presented here, starting with heard music, is recommended for use near the end of aural-skills studies to demonstrate their usefulness in approaching an understanding of music and to emphasize the interrelationship among various aspects of the theory curriculum. It is offered to theory teachers to use in totality or in part, but also in the hope that its goals and some of its methods might be incorporated into similar, multifaceted projects in which sound leads into analysis.¹ The project, an aural approach to the analysis of a classic jazz performance—*Django* by the Modern Jazz Quartet—can be recommended on several grounds:

1. It deals with an entire piece of music. Too often aural-skills courses work with phrase-length patterns to the exclusion of longer musical spans.
2. It begins with sound itself and leads into notation. Approaching a complete piece through listening is inherently musical and apt to be more meaningful than starting from a score.
3. It uses recorded music, which the student can start and stop at will. While there is certainly a place in aural-skills courses for the three-hearing dictation test, transcribing music at one's own pace is a valuable skill as well, one that allows study of longer spans.

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4. It integrates skills with written theory on several levels. It includes music writing, singing, keyboard work, analysis, and dictation. Composition and improvisation may also be included.

5. The student's listening is organized and guided by pointed questions and step-by-step tasks that lead into the music.

6. While this kind of approach can be taken with any piece of music (and I recommend approaching literature aurally whenever possible), this particular project introduces students to a piece in the jazz idiom to which they might otherwise never be exposed. Most theory students welcome the change of pace a fine jazz piece affords. Yet this piece is quite understandable in non-jazz terms; one need not possess esoteric jazz knowledge to accomplish—or teach!—this project. And since there is no complete score for this piece, an aural approach is not only appropriate but necessary.

Django, written by Modern Jazz Quartet pianist John Lewis, is a piece with immediate appeal to jazz- and non-jazz-oriented listeners, unlike some jazz that can be all but unfathomable to the uninitiated. Its delicate instrumentation, sequential themes, and formal balance suggest a classical chamber work; yet jazz writers praise its inventive improvisations and subtle swing. For a sophomore or junior class with experience in the analysis of Romantic composition, there is much in *Django* to notice: a) its form is more interesting than most jazz pieces; b) harmonically static pedal-point sections contrast with unusual chord progressions and modulations involving inversions, secondary dominants, and altered tertian chords; and c) composed and improvised sections balance and complement one another. The recording is readily available in the *Smithsonian Collection of Classic Jazz*, a fine recorded anthology found in virtually all college libraries.

This aural-analysis project can be accomplished in 1 1/2 or 2 class periods with perhaps a week in between for individual student work. The remainder of this article presents an outline of the introductory class period or half-period, the Listening Guide for individual out-of-class work (presented here in its entirety), and an outline of the final class period in which the individual work is discussed and conclusions are drawn. Solutions to the Listening Guide problems can be found at the end of the article.

INTRODUCTORY CLASS (INSTRUCTOR'S OUTLINE)

1. Introduce the project and its goals. Go through the Listening Guide.

2. Introduce the Modern Jazz Quartet, pianist John Lewis, *Django*, and perhaps also Django Reinhardt whom the piece eulogizes.²

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3. Explain jazz-chord symbols, reviewing at least the symbols used in the piece.

4. Define two jazz-specific terms: a) the *head* is the non-improvised ensemble section that begins and ends the piece; and b) *swing eighths* are written eighth-note pairs that are performed more like quarter-plus-eighth triplets than even eighths.

5. Focus attention on the model harmonic progressions (Listening Guide, Figure 1) that need to be understood clearly before continuing with the project. They are presented here in either C minor or E-flat major; in *Django* they do not appear in these keys or in this order. Jazz symbols, Roman numerals, and simplified keyboard voicings are given. Each progression is labeled according to its role in the context of the piece. Note the similarities among 3a, 3b, and 3c, but also note the different roles they play in the scheme of the piece as a whole. The class might sing roots as the progressions are played. The six progressions may be performed without pause in sequence although, again, they do not appear in this order in the piece.

To verify student's understanding and ability to distinguish among the model progressions, play individual progressions, either unchanged or modified by transposition or otherwise, and have students identify by progression number. Encourage students to play the progressions at the keyboard before continuing with individual work.

The instructor may wish to show similarities between some of these progressions and passages from art music literature. For example, Progression 1 is similar to the first five measures of Schubert's *Schwangesang* No. 4, "Ständchen"; VI is used in place of #vi[♭]7. The circle-of-fifths progressions have numerous non-jazz counterparts (e.g., the first seven measures of Beethoven's Piano Sonata, Op. 2, No. 1).

6. Students should hear the entire piece, which is about 5 1/2 minutes in length. The instructor may wish to discuss the instruments and their roles, to identify improvised and non-improvised sections, or otherwise prepare the out-of-class project; most of this can be left to individual listening.

7. Tell students how to obtain the tape for outside study and a machine they can start and stop as they choose. The tape should also contain a half-speed version of the first piano solo chorus as an aid to transcription (it will, of course, sound an octave lower). In the best of situations, students should also have access to a piano as they listen.

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LISTENING GUIDE (FOR INDIVIDUAL STUDENT WORK)

1. At a keyboard play through the Model Progressions several times before proceeding (see Figure 1).

Figure 1. Model Progressions.

1. Establishes key.

Chords: Cm, A $\emptyset$, D $\emptyset$, G 7

Bass line: c: i, øviø 7 , iiø 7 , V 7

Treble line: [V 7 /V]

2. Dominant pedal. Prolongs the dominant alternating V 7 and i6/4.

Chords: G $^{7-9}$, Cm/G, G $^{7-9}$, Cm/G

Bass line: c: V 7 (-9), i 6_4 , V 7 (-9), i 6_4

3a. Circle of fifths to half cadence.

Chords: C 7 , Fm, B b7 , E b7 , A b7 , G 7

Bass line: c: V 7 /iv, iv, b VII 7 , V 7 /VI, VI (dom.7)=Ger.+6, V 7

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3b. Circle of fifths to authentic cadence.

c: V^7/IV iv $^bVII^7$ V^7/VI VI (dom.7) V^7 i

3c. Circle of fifths modulating to relative minor.

c: V^7/IV iv $\rightarrow 5 \rightarrow E^b:I$

4. Bass riff. Blues-related cadence pattern; resolution is plagal (IV to I) with both chords being dominant-seventh sonorities. When this harmonic pattern occurs in *Django*, the bass plays an old blues “riff” adding to the traditional blues quality of this section.

E^b : IV (dom.7) I (dom.7)

2. Obtain a tape and play the piece several times. Construct a simple chart showing the overall formal layout of the piece. (The chart is begun for you in Figure 2). Include these elements, although not in this order: a) opening head; b) closing head; c) interlude (clearly related to the head); d) piano solo; and e) vibes solo. Both soloists play more than one “chorus,” which is a fairly long harmonic progression repeated an indefinite number of times for each solo improvisation.

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3. Listen several times to the opening head and transcribe the melody, starting and stopping the tape as necessary. The first four measures have been completed for you in Figure 3. Space has also been provided for bass notes; complete the string bass line and add chord symbols above the melody, if possible. Notice that several dominant-seventh-type chords have minor ninths as well. You may need to verify your transcriptions frequently at the piano. Converting the jazz symbols into Roman numerals is optional; that process may help you see the progression “in a key” better than you can from the symbols alone. Notice the use of sequence and step progression in the head.

4. The opening head is 20 measures. Conducting at a constant tempo, count the measures in each large section: a) vibes solo; b) interlude; c) piano solo; and d) closing head. Add these lengths in numbers to the form chart of Figure 2. Also indicate the *rallentando* and the vibes cadenza in their proper locations.

5. Unlike most jazz pieces, the harmonic progression used for improvisation in *Django* is not the progression of the head. The solo chorus is not even the same length as the head, as you may already have discovered. *Django's* solo chorus progression has fairly long areas in three different keys; most jazz pieces are in one key with brief hints at a variety of other tonics. Referring as often as necessary to the Model Progressions, listen to the improvised solos. Determine the length of one chorus, the keys through which it moves, and eventually write out the harmonic progression in jazz chord symbols. Notate the roots in bass clef. The first two measures have been completed for you in Figure 4. Use the “Bass Riff” and “Dominant Pedal” sections as clear points of reference. Note that most of the first vibes chorus features the bass playing “in two” (beats per measure); roots are played almost exclusively. When the bass goes “into four,” roots are played on beats one and three of almost every measure. Given this information, sing along with the bass to identify the roots. You may notice slight variability in individual chords from chorus to chorus; for example, the third chord in several sections can be either $ii^{\flat}7$ or $V7/V$.

Figure 2. Form Chart to Complete.

Opening Head | |

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Figure 3. Head Transcription to Complete.

Figure 3 shows a musical score for a head transcription. The key signature is one flat (F major). The time signature is 4/4. The score is divided into three systems. The first system contains four measures with the following chords: Fm, Bbm, C⁷⁻⁹, and Fm. The second system contains eight measures, with the final chord being Fm (Maj⁷). The third system contains two empty measures.

Figure 4. Solo Chorus Progression to Complete.

Figure 4 shows a musical score for a solo chorus progression. The key signature is one flat (F major). The time signature is 4/4. The score consists of three measures with the following chords: Fm, D^ø, and G^[7orø] C⁷.

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Figure 5. First Piano Chorus to Complete.



6. Space is provided for you to transcribe the first piano chorus, single-line right hand only (see Figure 5). Play the tape of this chorus a number of times until you can sing along with the solo line. Listen to the half-speed version of this solo as well, if it is available. Halving the speed lowers the pitch one octave. Transcription of rhythm in many jazz solos is problematic. Some particularly complicated passages have been done for you. Notice that written eighth notes represent the swing eighths you hear. In some cases the soloist's rhythmic pattern does not agree precisely with the notated version. The transcription should be relatively simple to read, even though some of the flexibility and subtlety of a vital jazz performance is rounded off in the process. Keep your place in the chorus as you transcribe by relating the solo to the root pattern and by tapping or conducting.

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7. Write the jazz symbols for the chorus above the transcription. Prepare for class discussion of the piano solo as follows:

a. Note the fluctuation in both piano choruses between fast and slow rhythmic patterns. How does this variety in rhythmic density contribute to the solo's effectiveness?

b. Does the solo use range effectively?

c. Consider the degree to which the solo pitches agree with the operative chord symbols. Sometimes the relationship is close, sometimes not.

d. Search your transcription for recurrent motivic patterns. Notice root-fifth-root chord outlining, chromatic scale fragments, triad outlining, the A-flat-G-F motive, and circling melodic patterns (such as G-flat-E-F), which are common features in jazz.⁴ To what degree do these patterns lend coherence to the solo? Listen to the second piano chorus, paying attention to continued use of the same patterns.

e. Do the two choruses form one large unit? Why does the solo seem to flow smoothly rather than giving the impression of successive melodic fragments? Other than recurrent motivic patterns, what creates the sense of coherence?

FINAL CLASS (INSTRUCTOR'S OUTLINE)

1. Go over form chart (see the Solutions to Listening Guide Problems: Figures 6-9).

2. Check transcriptions of the head. Discuss harmonic progressions, noting prominent tonic-subdominant-dominant-tonic patterns and the circle-of-fifths in measures 4-13. Roots progress according to the diatonic circle in which D-flat (VI) leads to the B^b m6 chord (ii[♭]5 with root G) by tritone root motion. Note the use of step progression and sequence. Sing melody and bass line.

3. As a group listen again to the piece, singing chord roots along with the solos. Then focus on the first piano chorus, singing as a group along with the half-speed version. Discuss student transcriptions and the slight rhythmic variability acceptable among "correct" versions. Then discuss the elements of the solo itself as suggested in the Listening Guide. This could lead into a discussion of aesthetic criteria appropriate for evaluating an improvised solo vis-a-vis a composed one.

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OPTIONAL ADDITIONAL PROBLEMS

1. Write out the head with figured-bass symbols.
2. Write out a solo chorus melody as if it were an improvisation. Play it on your instrument—or sing it—accompanied by a student on piano, by a small group, or by the class singing the four-voice version of the solo progression found in Figure 10, adjusting octaves in the bass as necessary.
3. Improvise a solo chorus, or part of a solo chorus, along with keyboard, instrumental group, or vocal background.
4. Transcribe the second piano chorus or portions of the vibes solo. Write a brief essay discussing the features that make these solos effective.
5. Do additional library research on the Modern Jazz Quartet, John Lewis, or Django Reinhardt.
6. Compare this recording of *Django* (originally from *European Concert*, Atlantic Records #1385) with other versions of the piece also recorded by the Modern Jazz Quartet or by others.
7. With your instructor's help, choose a piece or portion thereof from the (non-jazz) repertoire for your instrument. Listening to a recording without referring to a score, notate portions of the music that lend themselves to transcription, and study as many aspects of the music as possible from this aural perspective. Use this *Django* project as a model. Then confirm and extend your study of the piece with score study.
8. Work through aural-analysis projects presented in the books referred to in Note 1.

SOLUTIONS TO LISTENING GUIDE PROBLEMS

Figure 6. Form Chart Completed.

Opening Head (20mm.)	Vibes Solo (96 mm.)	Interlude (4 mm.)	Piano Solo (64 mm.)	Closing Head (20 mm.)
-------------------------	------------------------	----------------------	------------------------	--------------------------

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Figure 7. Head Transcription Completed.

The musical score is presented in four systems, each with a treble and bass staff. Chord transcriptions are placed above the treble staff. The key signature is three flats (B-flat, E-flat, A-flat).

System 1: Chords: Fm, B^bm, C⁷⁻⁹, Fm, F⁷⁻⁹, B^bm⁷.

System 2: Chords: E^b7-9, A^b, D^b, B^bm⁶, G⁷.

System 3: Chords: C/E, C⁷, Fm(Maj⁷), Fm, B^bm¹¹, B^bm, C⁺, C⁷, C⁷/F, Fm, Fm(Maj⁷), Fm.

System 4: Chords: B^bm¹¹, B^bm, C⁺, C⁷, C⁷⁻⁹/E, Fm.

DJANGO by John Lewis

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Figure 8. Solo Progression Completed.

The musical score is written in F minor (two flats) and consists of three staves of music. The chords and their durations are as follows:

Staff 1: Fm (half), D^ø (half), G^[7 or ø] (half), C⁷ (half), F⁷ (half), B^bm (half), E^b7 (half), A^b7 (half). A first ending bracket covers D^b7 (half) and C⁷ (half). A second ending bracket covers D^b7 (half) and C⁷ (half). The staff concludes with Fm (half).

Staff 2: F⁷⁻⁹ (half), B^bm/F (half), F⁷⁻⁹ (half), B^bm/F (half), F⁷⁻⁹ (half), B^bm/F (half), F⁷⁻⁹ (half). A double bar line follows. Then B^bm (half), G^ø (half), C^[7 or ø] (half), and F⁷ (half).

Staff 3: B^b7 (half), E^bm (half), A^b7 (half), D^b7 (half), G^b7 (half). A double bar line follows. Then D^b7 (half), (D^b7) (half), G^b7 (half). A double bar line follows. Then D^b7 (half) and C⁷ (half).

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Figure 9. First Piano Chorus Completed.

Chords indicated above the staff:

Fm D^ø G^[7 or ø] C⁷ F⁷ B^bm E^b7 A^b7

D^b7 C⁷ Fm D^ø G^[7 or ø] C⁷

F⁷ B^bm E^b7 A^b7 D^b7 C⁷ Fm

F⁷⁻⁹ B^bm/F F⁷⁻⁹ B^bm/F F⁷⁻⁹

B^bm/F F⁷⁻⁹ B^bm G^ø

C^[7 or ø] F⁷ B^b7 E^bm A^b7 D^b7 G^b7

D^b7 G^b7

D^b7 C⁷ (∞)

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Figure 10. Solo Progression, Four-Voice Version.

The musical score is presented in three systems, each with a four-voice setting (Soprano, Alto, Tenor, Bass) and a corresponding chord progression above the staves. The key signature is three flats (B-flat, E-flat, A-flat).

System 1:

- Chords: Fm, D^ø, G^ø, C⁷, F⁷, B^bm(7), E^b7, A^b7, D^b7, C⁷

System 2:

- Chords: D^b7, C⁷, Fm, F⁷⁻⁹, B^bm/F, F⁷⁻⁹

System 3:

- Chords: B^bm/F, F⁷⁻⁹, B^bm/F, F⁷⁻⁹

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Figure 10. con't.

The musical score for Figure 10 continues from the previous page. It is written in B-flat major (two flats) and 4/4 time. The first system contains two measures of music. The first measure has a whole note chord Bbm, and the second measure has a whole note chord Gø. The third measure has a whole note chord Cø, and the fourth measure has a whole note chord F7. The fifth measure has a whole note chord Bb7, and the sixth measure has a whole note chord Ebm. The seventh measure has a whole note chord Ab7, and the eighth measure has a whole note chord Dbb7. The ninth measure has a whole note chord Gbb7. The second system contains two measures of music. The first measure has a whole note chord Db7, and the second measure has a whole note chord Gbb7. The third system contains two measures of music. The first measure has a whole note chord Db7, and the second measure has a whole note chord C7-9. The score ends with a double bar line and 'D.C.' below it.

NOTES

¹Books with projects similar in approach to this one include John Rahn, *Basic Atonal Theory* (New York: Longman, 1980); Gary W. Wittlich and Lee Humphries, *Ear Training: An Approach Through Music Literature* (New York: Harcourt Brace Jovanovich Inc., 1974).

²See Leonard G. Feather, "Lewis, John Aaron," "Modern Jazz Quartet," "Reinhardt, Jean Baptiste (Django)," *The Encyclopedia of Jazz* (New York: Horizon Press, 1960), pp. 311-312, 336, 394-395; Ralph J. Gleason, "John Lewis and the Modern Jazz Quartet," *Celebrating the Duke* (Boston: Little Brown and Co., 1975), pp. 109-116; Martin Williams, "John Lewis and the Modern Jazz Quartet," *The Jazz Tradition* (New York: Oxford University Press, 1970), pp. 131-139; and Martin Williams,

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booklet accompanying the *Smithsonian Collection of Classic Jazz* (Washington, DC: Smithsonian Institution, 1973), p. 40.

³Some less-common chord symbols found in *Django* include:

$$F7-9 = F A C E^b G^b$$

$$B^b m6 = B^b D^b F G = G\flat 5$$

C/E = C-major triad with E bass = C triad in first inversion

Most instructors will probably not want to discuss jazz chord symbols in great depth or sort through the numerous inconsistencies. The symbols with their notational equivalents in Figures 1 and 10 of this article should suffice for most classes. On the other hand, some classes might profit from a discussion about the "idiocy of a system" (in the words of one writer) that includes the concept of "added ninths," and some instructors might wish to introduce Rameau's "double employment of dissonance" when pointing out the persistent confusion in jazz symbols between $B^b m6$ and $G\flat 7$. Interested instructors and students can find symbol/notation equivalence charts in Allen Winold, *Harmony: Patterns and Principles*, Volume II (Englewood Cliffs, N.J.: Prentice-Hall, 1986), Chapter 27; in Bruce Benward, *Music in Theory and Practice*, Volume I, third edition (Dubuque, Iowa: Wm. C. Brown Co. Publishers, 1985), Chapters 19 and 20. Numerous jazz pedagogy texts discuss symbols, and their lists exhibit inconsistencies and contradictions that exist despite attempts at standardization. *Standardized Chord Symbol Notation* by Carl Brandt and Clinton Roemer (Sherman Oaks, California: Roerick Music Co., 1976) attempts systematic standardization. The book's practical value, however, derives from the completeness of its lists of "unacceptable" symbols; a working musician can use these lists to become familiar with the variety of symbols actually in use.

⁴Traditional theory texts refer to similar decorative melodic patterns as "neighbor groups" or "changing tones." David Baker refers to these specific patterns as "enclosures" in which a chord tone's arrival is delayed by the insertion of its two "leading tones" respectively a half-step above and below the chord tone. See David N. Baker, *How to Play Bebop* (Bloomington: Frangipani Press, 1985), p. 7.

CREATIVE SIGHTSINGING

H. LEE RIGGINS

HOWARD IRVING

In his editorial in the premier issue of the *Journal of Music Theory Pedagogy* Michael R. Rogers identifies several major trends and issues that have arisen in the teaching of music theory during the past two decades.¹ Although theory teachers have embraced and, in turn, rejected a number of new approaches in recent years, very few have had any lasting effect on the way sightsinging is taught; the traditional method of reading through a series of graded melodies is still preferred, or at least practiced, by most teachers. The purpose of this article is to present a new approach to teaching sightsinging, called "creative sightsinging."² It is a performance-based method that offers an alternative to the conventional "rehearsal method" of teaching sightsinging.

In Part I, the basic procedures of creative sightsinging and examples for classroom use are presented. Part II examines one of the most important issues in teaching sightsinging that might lead the aural-skills teacher to consider an alternative method such as creative sightsinging. The intent of this discussion is not to abandon the benefits of a systematic approach to teaching sightsinging. Rather, its aim is to show how these benefits can be enhanced by the addition of procedures designed to develop creativity where it is needed most—in the classroom. Rupert Thackray underlines this need nicely in a pertinent article on "aural training" in *The Australian Journal of Music Education*:

So far as 'aural training' is concerned, I believe that most teachers would do well to develop a much broader approach than has been seen. If it has to continue to be regarded as an isolated study, at least an attempt could be made to base these activities more on 'real' music and not entirely on 'exercises'.³

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PART I

The primary activity of creative sightsinging is the elaboration by the class of melodies in increasingly complex ways as opposed to simply reading through a larger number of melodies during each class. One of the principal activities is structured “melody-based improvisation” in which the goal is to create a response to the original melody.⁴ Because this response is often a contrapuntal one, melodies that lend themselves to simple imitative procedures (e.g., canons and rounds) provide some of the best models. Other techniques include ostinati, pedal points, antiphonal and responsorial singing, descant, and textural variation in part-singing.

In the following section, several examples are presented as they might be used in class. Our purpose is to encourage teachers to see the variety of approaches available for teaching any aspect of aural skills.

Folk melodies

The vast body of American folk hymns and songs offers one of the richest sources of melodies for creative sightsinging. Because many of them are pentatonic (or hexatonic), and therefore lack the syntactical constraints of diatonic melodies, they can be sung in canon easily and ostinati can be devised quickly in class from fragments of the melody itself. For example, the American folk hymn *New Concord* (see Figure 1) might be performed by the class in the following way:

1. The melody should first be sung by the class several times in unison.
2. Next, the melody might be sung against one or more ostinato figures derived from motives of the melody (Figure 2).
3. The melody also can be sung in canon (the second voice enters where marked) against the continuing ostinati.
4. Finally, a counter melody can be sung against the original melody (Figure 3).

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Figure 1. New Concord.



Figure 2.



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Figure 3. New Concord.

$\text{♩} = 120$

The musical score is written for four staves, likely representing a piano and two voices. The key signature is one sharp (F#), and the time signature is 3/4. The tempo is marked as quarter note = 120. The score consists of two systems of four staves each. The first system shows a vocal melody in the top staff, a piano accompaniment in the second staff, and two additional staves (possibly for a second voice or piano part) in the third and fourth staves. The second system continues the piece, featuring a long melisma in the top staff. The notation includes various musical symbols such as notes, rests, and bar lines.

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Figure 3. con't.



This example illustrates many of the basic principles of creative sightsinging. First, the original melody is sung in unison until its structure is clear to the class because the melody itself is the source of all subsequent elaborations. Second, only one elaboration is added at a time to create complex textures from simple components. Third, ostinati similar to those provided in Figure 2 can be composed by the class using motives of the original melody, thus integrating aspects of analysis and composition into the aural-skills experience. The countermelody presented in Step 4—which could actually be introduced at any stage in the process—can also be composed by the class or, as in Figure 3, an existing countermelody such as the hymn tune *Foundation* can be used.

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The use of canon in Step 3 is an important aspect of creative sightsinging, since creative sightsinging is more linear than homophonic in concept and practice. The pedagogical purpose for this use of imitation is to encourage students to hear and sing independent lines. Singing in canon is not only an effective way to introduce the basic principles of counterpoint, but it also provides an important bridge from monophony to the complexities of polyphony.

Ostinati and pedal points are also simple, but effective, devices to teach part-singing. Further, they can be combined to produce an elaborate setting that is, at the same time, made up of relatively simple individual components. The ostinato figure itself can be sung by two different voices in imitation for an impressive-sounding effect.

Plainsong

Plainsong is another important, but often-overlooked, source of materials for sightsinging and provides a convenient opportunity to discuss the ecclesiastical modes (this discussion may be deferred until later for those who prefer). The limited vocal range and predominantly stepwise structure of these melodies makes them particularly useful in the early stages of teaching sightsinging. Also, the flexible rhythm of plainsong melodies provides a welcome contrast to the regular rhythmic schemes characteristic of the core of common-practice literature from which many students rarely stray.

The most effective methods for using plainsong in class are responsorial and antiphonal singing. For responsorial singing, a relatively easy plainsong such as *Divinum Mysterium* (see Figure 4) might be selected. The teacher or a member of the class sings each phrase of the melody in turn for the class to imitate. If the class is instructed to try to match every nuance of phrasing, articulation, and dynamic change, the activity becomes a valuable exercise in critical listening and singing.

For antiphonal singing the class could be divided in various ways: male and female, high and low voices, odd and even rows, etc. Each group then sings alternate phrases of the melody until the cadential Amen (rehearsal number 8 in Figure 4) is reached, at which point the entire class sings in unison. An attractive pedal effect can be created by having each group hold the last note of its phrase while the next phrase is sung. If the class is divided into high and low voices, for example, Figure 4 might be sung as follows:⁵ 1) low voices sing phrases 1, 3, and 5 holding the last note of each phrase; 2) high voices sing phrases 2, 4, and 6 holding the last note of each phrase; 3) both groups sing phrases 7 and 8.

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Figure 4. 13th-Century Plainsong



Chorales and hymns

Although not always in vogue among the trend-conscious, the collection of 371 chorale tunes harmonized by J.S. Bach is still one of the mainstays of sightsinging classes. Possibilities for creative sightsinging are often overlooked in four-part singing. A simple, but effective, procedure is textural variation achieved by combining various voice parts with the chorale tune. Rather than beginning with SATB, however, it can be effective to *end* with all four voices after singing the combination listed below:⁶

*								
S	S	S	S	T (mel.)	S (ten.)	S	S	
	B	A	T	B	T (mel.)	A	A	
		B	B		B	T	T	
							B	

The voice combination marked by the asterisk in the table above (sopranos sing the tenor part an octave higher while tenors sing the melody in their range against the bass line) results in an effective pairing of a men's duet with descant (compare Figures 5 and 6).

Figure 5. J.S. Bach: Aus meines Herzens Grunde.



Figure 6.



Improved scholarship in recent editions of hymnals now makes them an important source of melodies for creative sightsinging.⁷ The *Mennonite Hymnal* listed in the bibliography, for example, contains more than a half-dozen psalter hymns in their original settings, an equal number of chant-derived hymns, and more than twenty American hymn tunes.⁸ Reproductions and facsimiles of collections of shaped-note hymns such as *The Sacred Harp* open up a new genre for part-singing. The fugal tune *Northfield* is an excellent stylistic introduction to shaped-note hymns. *The Hymnal 1982* (Episcopal), which is also listed in the bibliography, contains a number of hymns such as *Resurrexit* (see Figure 7) by contemporary British and American composers. One of the problems facing sightsinging teachers today is how to bridge the gap between the common-practice period and the twentieth century. Melodies such as *Resurrexit* can make that transition easier. As can be seen in Figure 7, the first two phrases are a facile and easily-sung example of mode alternation: the first phrase in D major (or Ionian on D) is followed by a contrasting phrase in Dorian on D.

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Figure 7. Robert Sherwood Johnson: Ressorixit.



Choral octavos

Although many sightsinging teachers eventually accumulate their own supply of choral octavos, one of the best sources of twentieth-century materials for use in sightsinging classes is the choral library. Britten's setting of "Old Abram Brown" and The "Four Cumming Choruses" by Vincent Persichetti (listed in the bibliography) are typical of the many accessible twentieth-century examples of choral writing. "Old Abram Brown" is constructed entirely from the well-known folk song of the same name and can be sung easily by any first-term sightsinging class. "Four Cumming Choruses" is scored for two-part mixed voices, women's voices, or men's voices, and can be handled without difficulty by most sophomore sightsinging classes.⁹ Our experience using choral octavos to teach contemporary reading techniques indicates that they are infinitely more interesting and effective than the contrived examples of "twentieth-century music" contained in many sightsinging texts.

Rhythmic Reading

Developing the basic skills of rhythmic reading is normally one of the primary goals of the first term of the musicianship sequence. It is also an area in which a systematic teaching approach easily can be combined with creative activities.

First, all rhythmic exercises can be sung as well as tapped. Although tapping develops accuracy of attack, it leads to a distorted concept of duration. (Ask a class to sing a whole note in common time and invariably the "tappers" will sing a dotted half or shorter.) Unnecessary vocal tension caused by singing on the syllables "tee" or "tah" can be avoided by substituting "bah" or "bum."

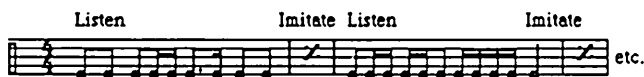
Whenever possible use examples composed by the class. Rhythmic duets can develop coordination between the hands. Combining simultaneous rhythmic and melodic reading with conducting improves coordination of mind, eye, ear, and body.¹⁰ These exercises might first involve singing

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a melody while conducting, then singing while also tapping a separate line of rhythm, and finally, by singing and tapping different lines while conducting.

Another useful creative exercise in rhythmic reading involves imitation of a solo (or soli) performance of a measure of rhythm, which is then imitated by the rest of the class. Trubitt and Hines make good use of this procedure in their book *Ear Training and Sight-Singing* (see Figure 8 below).¹¹ One way to develop confidence in weak readers is to assign the solo passages to them in advance so they will have time to prepare. Having students perform in small groups promotes independence and is less threatening than solo performance.

Figure 8.



PART II

Any decision to use a particular pedagogical approach such as creative sightsinging necessarily involves both practical and philosophical issues (e.g., literature vs. contrived exercises). Most textbook authors skirt this issue by including both types in an attempt to appeal to the largest possible market. (The obvious exceptions are literature-based sightsinging texts in which the melodies are arranged according to stylistic period.)¹² If the materials for sightsinging are arranged only according to difficulty and reflect no particular pedagogical approach, the sightsinging class can lapse into a pattern of unstructured practice unless teachers themselves impose some methodology.

Using examples taken from the literature involves certain trade-offs:¹³

1. It is difficult to assess objectively a student's progress and assign a grade at the end of the term when ungraded literature is used as the basis for sightsinging.

2. At first students may be uncomfortable when the assignment for the next period is no longer the familiar: "Look over melodies 25-50 in the

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sightsinging text for next time." In creative sightsinging, the assignment is more likely to be: "Go to the library, find three canons, and be prepared to teach them to the class."

3. It is easier for the teacher to pace a class according to a syllabus and determine when to introduce a new level of skills when graded exercises are used.

4. A literature-based approach requires more and better preparation by the teacher. Leafing through the sightsinging textbook on the way to class and making a mental note of which melodies the class sung last period is no longer adequate. For creative sightsinging, the teacher must assemble a core of materials for classroom use and be constantly on the alert for material that is suitable for "arranged singing."

Although there are conveniences to be gained from staying with exercise books, the advantages of using literature for sightsinging are significant:

1. Students, especially instrumentalists, are exposed to literature with which they might otherwise not become familiar.

2. An awareness of style is fostered and the art of interpretation becomes an integral part of the aural-skills experience.

3. Working with literature offers the class greater opportunity for musical expression, which, in turn, stimulates that elusive quality known as "musicality."

4. Students learn to use passages from the literature to develop technique and solve mechanical problems.

5. Finally, working with real music is infinitely more interesting than singing one exercise after another for fifty minutes.

Creative sightsinging is an unashamedly literature-based approach to teaching sightsinging. Some may think that only singers or choral directors have the requisite skills to use such an approach successfully because of the emphasis placed on choral singing by the class. In fact, theory teachers who are not trained singers will actually benefit most. When corrections are only made from the piano, the wrong signal is inadvertently sent to the class and the result is predictable: students avoid singing, at sight or otherwise.

Although it is not the primary objective of sightsinging classes to develop vocal quality, the acquisition of a good singing voice for the purposes of demonstration is certainly a desirable by-product. Habits of good vocal production can be integrated easily into the sightsinging class by devoting a few minutes at the beginning of each period to vocal warm-ups. For the non-vocalist, using an inexpensive monograph such as *Basic Vocal*

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Production by Ray Robinson¹⁴ or inviting a colleague or even a student to give the class a brief demonstration of the basics of singing can be invaluable.

For those teachers who are willing to incorporate elements of creative sightsinging into their classes, there are significant benefits to be realized. Devising simple accompaniments in class not only introduces basic arranging techniques but also nurtures spontaneity, an aspect of creativity that is often ignored under the pressure to develop specific skills. The emphasis placed on combining melodic lines and composing countermelodies in creative sightsinging reinforces the concept of tonal music as an inseparable combination of voice leading and harmony—a concept frequently neglected in harmony classes given the emphasis placed on Roman numerals.

Finally, creative sightsinging offers the student and the teacher a more interactive mode of learning. The most successful classroom teaching occurs when the teacher and students are actively involved in making music. If, in the process, complex skills and concepts are presented as a series of easily-learned steps, the results will be both gratifying and lasting.

It is appropriate to conclude by quoting again from Rupert Thackray's article on aural training:

The main purpose of this article . . . is a plea for a broader and more imaginative approach to aural work and to stress what has so often been said but not always borne out in practice, that aural experience is the essence of music and without it all musical skills and joys are impossible.¹⁵

CREATIVE SIGHTSINGING

NOTES

¹Michael R. Rogers, Editorial in *Journal of Music Theory Pedagogy* (Spring 1987), pp. 1-4.

²The authors are indebted to Alice Parker for suggesting this approach. Ms. Parker's summer classes in choral arranging at Westminster Choir College and her primer, *Creative Hymn-Singing* (Chapel Hill: Hinshaw Music, Inc., 1976), are the basis for many of the procedures that are described and adapted for classroom use throughout the text.

³Rupert Thackery, "Some Thoughts on Aural Training," *Australian Journal of Music Education* (October 1975), p. 27. Thackray lists a number of valuable classroom activities that belong in every ear-training teacher's tool kit (see the suggested readings for the complete citation).

⁴Susan Merritt, "Text and Tune: Back to Basics with Alice Parker," *The Choral Journal* (September 1984), p. 5.

⁵For additional examples and performance possibilities, see Alice Parker, *Creative Hymn-Singing*, pp. 8-17.

⁶After Alice Parker, *Creative Hymn-Singing*, p. 31.

⁷The authors recognize that the use of hymns, even when the text is omitted, may be problematic at some state-supported institutions.

⁸Comparisons with the original source are nonetheless imperative. The leading tone (c#⁴) added in the penultimate measure of *Vernon* (No. 322) is apparently a modern instance of *musica ficta*.

⁹For additional examples, see the set of madrigals by Berger listed in the bibliography.

¹⁰The sing and tap exercises of this type in Paul Hindemith's *Elementary Training for Musicians* are ideal for use with advanced students.

¹¹Allen R. Trubitt and Robert S. Hines, *Ear Training and Sight-Singing* (New York: Schirmer Books, 1979).

¹²See, for example, Paul Cooper, *Dimensions of Sight Singing* (New York: Longman, Inc., 1981) and Norman Lloyd, Ruth Lloyd and Jan DeGaetani, *The Complete Sightsinger: A Stylistic and Historical Approach* (New York: Harper and Row, Publishers, 1980).

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¹³For another discussion of the relative merits of using literature instead of exercises, see Michael R. Rogers, *Teaching Approaches in Music Theory* (Southern Illinois University Press, 1984), p. 136.

¹⁴Ray Robinson, *Basic Vocal Production* (Chapel Hill: Hinshaw Music, Inc., 1977).

¹⁵Thackray, "Some Thoughts on Aural Training," p. 30.

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THE GUIDE-TONE METHOD: AN APPROACH TO HARMONIC DICTATION

JAY RAHN

JAMES R. MCKAY

Harmonic dictation is a central discipline in the formal training of Western musicians—a discipline that can provide an auditory point of entry into salient aspects of concert music in the common-practice period (c. 1600-1900) and to several styles of folk music, popular music, and jazz. In various respects, harmonic dictation is an ideal skill to teach. Students and instructors alike can be highly motivated to achieve accurate results, and the results can be checked objectively. However, the potential techniques for teaching harmonic dictation are quite diverse, and vary considerably in effectiveness and efficiency.

POSSIBLE APPROACHES

At one extreme of the continuum are certain methods that might be termed *reductionist*. According to this approach, students might arrive at a conclusion about the whole (a chord or a chord progression) on the basis of its smallest, most detailed parts (the individual notes of the chord or the individual lines of the texture). Students might, for example, examine every simultaneity (every set of simultaneously sounding notes), analyze it atomistically (e.g., C3, C4, E4, and G4; cf. the second chord in Figure 1), compare these parts with the prevailing tonality (e.g., G major in Figure 1), and arrive at a functional conclusion concerning the chord in question (e.g., “IV”). Alternatively, students who adopt a reductionist approach might undertake melodic dictations of all the lines in a texture (e.g., B3, C4, A3, B3 for the tenor line of Figure 1), and on comparing the diverse lines, they might arrive at an overall conclusion concerning the chord progression (e.g., I-IV-V-I in Figure 1).

At the other extreme is a method that might be termed *holistic*. According to this approach, students might be encouraged to leap directly to a conclusion concerning a chord or chord progression merely on the basis

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of its overall sound (e.g., that the chords in Figure 1 sound like the progression I-IV-V-I without any reference to the individual notes of each chord or the individual lines).

Figure 1.



Each extreme has its pitfalls. According to a reductionist approach, more detail than necessary is sought, and an isolated mistake concerning a part might have a drastic effect on the assessment of the whole. Moreover, students who are asked to perform multiple melodic dictations might make a relatively slight slip in melodic dictation only to find they have introduced an enormous error with regard to harmonic dictation (e.g., by hearing the C4 in the second chord of Figure 1 as B3 or D4). According to the holistic approach, students might entirely miss the identity of a chord (e.g., by identifying the second chord as V rather than IV), for a “hit” might be very narrowly defined in comparison with the relatively wide definition given to a “miss.”

Clearly, a middleground between these two extremes would be desirable—a middleground in which slight mistakes are not unduly amplified and in which degrees of accuracy are acknowledged. Such a middleground is provided, we feel, by the so-called *guide-tone method* for harmonic dictation. Accordingly, the remainder of this study is largely devoted to outlining this method and to pointing out its strengths.

THE GUIDE-TONE METHOD

What follows is based on the authors’ experience in applying and refining the guide-tone method over a twenty-year period. The method seems to have circulated among various universities in North America for several decades. (The authors themselves learned the method in the 1960s through Canadian composer John Weinzweig who picked it up while he was a student at the Eastman School of Music, 1937-38). Because the method appears to have travelled largely by word of mouth, it is difficult to

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determine very precisely its origin and lines of distribution. We are aware the guide-tone method has been employed at Eastman, the University of Toronto, York University, and the University of Oklahoma, and it would be interesting to find out more about the manner and extent of its spread. But more importantly, since the method seems to have been disseminated informally and appears to have been successful wherever it has been used, we feel a published account would be valuable now.

Since there might be local variants of the method, we should emphasize the account that follows represents merely the version we have been using at York University, and we would accordingly welcome any comparative notes that others might send our way. In the meantime, we hope our account will make clear its advantages with respect to various approaches to learning. In particular, we are concerned to point out the guide-tone method is consistent with: a) the orthodox pedagogical progressions from known to unknown, from simple to complex, from the concrete to the abstract, as well as the notion of a learning spiral; b) the behaviorist view of learning as a process of operant conditioning subject to differential reinforcement; and c) the general conviction that different skills in a multifaceted subject matter (e.g., tonal music theory) are best learned according to an integrated rather than a piecemeal approach.

THE FIRST GUIDE TONES

On their first encounter with the guide-tone method, students are not even asked to identify chords as such. Instead, they are merely asked to identify whether the first degree of the scale (tonic or *do*) or the seventh degree (the leading tone or *ti*) is present in the texture. One should note that chords not including *do* or *ti* (e.g., ii or the Neapolitan triad) should be excluded at this point (see, however, below).

Harmonic progressions can be presented at the outset in block chords. In such a format, the simple texture of rhythmic unison leaves no doubt where one chord ends and another begins (cf. Figure 1), so, as far as the students are concerned, there is no ambiguity about the temporal boundaries of a given chord. At first, the students are asked to sing, as a class, *do* or *ti* for each chord. Later they are asked to sing *do* or *ti* as individuals. And ultimately, they are asked to determine, without recourse to overt singing (silently or sub-vocally), whether *do* or *ti* is present and to record the results in writing. In the later stage, it is generally valuable to let the students know ahead of time how many chords are in a given progression so they can check the number of syllables.

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ADVANTAGES OF THE FIRST STEP

There are several advantages implicit in the first step of the method. Most significantly, students are not required to make registral distinctions; recognition of the mere presence or absence of *do* or *ti* at any location in the texture is sufficient. Furthermore, from their first involvement in the guide-tone method, students are concretely and actively engaged in strong, overt behavior, namely singing, before they are asked to undertake the weaker, private activity of sub-vocalization or hearing with the inner (musical) ear. Since their responses, at the beginning, involve singing as a class, the students' consensus can be self-correcting. Often, the teacher need not indicate whether an answer is right or wrong, for the correct answer is evident from the response of the overwhelming majority. Indeed, in a typical guide-tone session, much of the communication is truly musical rather than verbal or notational.

In the earliest stages, students are encouraged to be open and extroverted in their responses to chords rather than private, reticent, and introverted. In this way, harmonic dictation can be established as a truly participatory classroom activity—an activity in which students learn to a certain extent from each other, rather than a largely private activity that merely happens in the context of a group.

The initial distinction (between *do* and *ti*) is binary, as are many of the distinctions in the method. This inherent binarism simplifies the application of the technique, for at any given point there are only two types of answers: right or wrong. All the same, the method acknowledges at later stages *degrees* of right and wrong depending on the hierarchical level of the distinction. In other words, certain answers are more correct to the extent that more of the binary distinctions involved in the answer are correct. As will become evident below, the format of a largely binary hierarchy is potentially encouraging to the students, and helps both the student and teacher to isolate the part(s) of the hierarchy where perception has gone astray.

From the outset, students are introduced to one of the central skills in harmonic dictation: hanging on to *do*. This ability becomes increasingly difficult to sustain as distractions of chromaticism and modulation are introduced (in the more complex harmonic situations that arise in relatively advanced stages of the method). But from the first, students have been gaining skill in this area of musical perception. In addition, the students are introduced, at the very earliest stage, to a central distinction in the major-minor system: the distinction between *do* and *ti*; this distinction underlies the entire traditional study of harmony from the first chord progressions

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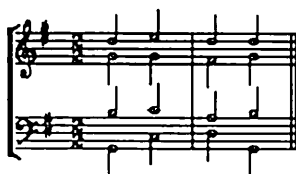
and cadences to the most advanced topics concerning modulation, elided resolution, and chromaticism. In this way, students are exposed in a concrete manner to the notion that the leading tone is a *leading* tone, for in their initial singing of *do* and *ti*, the leading tone always leads to tonic. Furthermore, a mistake is immediately evident, for not only is the singing of a wrong response (e.g., *do* instead of *ti*) not reinforced by a note or notes sounded on the keyboard instrument, but also the note sung, if it is wrong, conflicts strongly with the note being played because a semitone dissonance is formed.

In light of the wide variety of diatonic and chromatic chords that include either *do* or *ti*, students can gain an appreciation of the vast resources of harmonic coloration that await a later and more detailed study. In this way, their appetite for harmonic complexity might be whetted and their confidence in being able to handle complex situations established firmly. Moreover, if all else fails at later stages of the method's application, one can often return to the initial distinction between *do* and *ti*.

As soon as students have achieved a fairly good response rate for identifying *do* or *ti*—normally this takes only a few minutes of class time—one can make the stimulus more complex. For example, one can introduce open voicings so students will be involved in aural analysis of the chorale style they undertake in their formal part-writing exercises (see Figure 2). One can also introduce simple homophonic pieces in which the melody is played by the right hand and the accompaniment appears in simple block or broken chords in the left hand, or textures in which the left hand plays the bass of a homophonic setting and the right hand presents the melody and two middle voices, or textures in which the left hand plays a figure that has a given rhythmic and melodic profile for each chord. Such arrangements might be made of the folk songs and classical themes found in such anthologies as Tom Mainous's edition of *Melodies to Harmonize With*.¹

Employing arrangements in various strict and free styles can integrate the students' studies of harmonic dictation with their studies of keyboard harmony and writing. Other possibilities include realizations of figured basses in standard texts,² and unless the harmonic rhythm is too fast to be grasped in real time (i.e., as the music is being played), one can also introduce simple homophonic excerpts from the standard repertoire.

Figure 2.



The main restriction in the first stages of the guide-tone method is that the pieces to be described by the students should contain only chords that include *do* or *ti*, but not both (e.g., a major tonic seventh chord). This is not a great restriction, however, and students can quickly learn to recognize with a high degree of reliability the presence of *do* or *ti* in pieces that have considerable harmonic complexity. Moreover, at this point students can learn to recognize the presence of *do* or *ti* in recorded examples of such pieces by singing along to passages on tape; in this way, if the harmonic rhythm is not too fast to allow an immediate vocal or written response, students can be encouraged to have an overt, active, and real-time involvement in the harmonic structure of many styles and listening contexts. By being given some rudimentary tools for dealing with so many styles and situations, students can gain an immediate sense of confidence in their abilities to undertake harmonic dictation, and this sense of confidence can be an important foundation for a more elaborate and detailed superstructure.

THE FIRST CHORDAL PATTERNS

As soon as students distinguish between *do* or *ti* with a fair degree of reliability, they can proceed to chordal identification *per se*. At this point, it seems wise to restrict the harmonic vocabulary. In fact, at the outset, the tonic, dominant, and subdominant chords will suffice.

For the tonic chord, students are asked to listen for the other notes (beyond *do*). Invariably, if they have had some experience in using movable *do*, they respond spontaneously by singing *do*, *mi*, and *sol* in major and *do*, *me* (*ma*), and *sol* in minor. The teacher can point out that for their present purposes it is desirable to begin and end one's vocal pattern with the guide tone in question; thus, for a tonic triad in major, they are asked to sing "do-mi-sol-mi-do," thereby beginning and ending their vocal pattern with the

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guide tone, which in this case is *do*. Students can then be taught to sing “ti-re-ti-sol-ti” for the dominant triad. When these sol-fa patterns are mastered, the students can learn to respond to extended chord progressions involving only the tonic and dominant chords in various harmonic rhythms (e.g., I-V-I-V-I-V-I; and I-V-V-I-I-V-V-I). If necessary, the students can respond to a chord progression the first time through using only the guide tones *do* and *ti*, the second time through using the more extended sol-fa patterns (do-mi-sol-mi-do; and ti-re-ti-sol-ti), and thereupon identify each chord as I or V. In this way, the teacher can isolate where the problems are (i.e., in the guide tones, in the patterns, or in the chord names).

As soon as fluency is achieved, students can leave out a step or two, and proceed eventually to a direct, unmediated identification of the chord in question. An immediate, spontaneous response is desired, and with a restricted vocabulary (at this point consisting of only two chords), a quick and accurate response is possible. In essence, the students are only making a binary distinction (is the chord I or V?), and they quickly become so fast and accurate in recognizing the tonic chord that a number of intermediate steps (or crutches) can soon be removed entirely.

Thereupon, students can be introduced to the sol-fa pattern “do-la-fa-la-do” for the subdominant in major and “do-le-fa-le-do” in minor. As before, the guide tone, in this case *do*, is the first and last note of the pattern. And with this third chord, students have concrete examples of all the triadic patterns they will ever use in the method. In each case, the notes they sing form a broken triad in root position—a stack of thirds, as it were. Students try to determine whether a given member is present or not by singing in thirds—first upward, if possible, and then downward, if necessary, and returning at the end of the pattern to the initial guide tone (see Figure 3a). Because the pattern is arranged as a stack of thirds, students can readily identify the root, in each case, as the bottom note of the stack and proceed directly to identifying the chord as I, IV, or V.

Figure 3.

1)	2)	3)
		
a) doh-mi-sol-mi-doh	ti-re-ti-sol-ti	doh-la-fa-la-doh
b) 1 - 3 - 5 - 3 - 1	3 - 5 - 3 - 1 - 3	5 - 3 - 1 - 3 - 5

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Within the guide-tone method, the only patterns possible for triads are: 1) up-up-down-down (as in do-mi-sol-mi-do for the tonic triad in major); 2) up-down-down-up (as in ti-re-ti-sol-ti for the dominant triad in major and harmonic minor); and 3) down-down-up-up (as in do-la-fa-la-do for the subdominant triad in major). These patterns are outlined in Figure 3a. Moreover, particularly where students have perfect or absolute pitch (or are employing a fixed-do system in their other studies), it is often desirable at this point to restrict them to examples in C major. If students wish to use other keys, they can avoid potential confusion by singing the pitch-class content (or what might better be termed the "chord-member content") of chords that have the up-up-down-down pattern by using the following numbers: "1-3-5-3-1" to indicate the root, third, and fifth of the chord in question; similarly, students can be taught to sing "3-5-3-1-3" for the up-down-down-up pattern and "5-3-1-3-5" for the down-down-up-up pattern (cf. Figure 3b).

ADVANTAGES OF THE SECOND STEP

Advantages implicit in the second step of the guide-tone method (i.e., where chords are identified) are quite similar to those in the first step. Again, one can employ a wide variety of simple progressions and pieces, though there is a considerable, but temporary, step backwards with regard to the complexity of the harmonies that can be handled when one proceeds from merely identifying the guide tone to identifying chords as such. Students soon learn to telescope the many sub-steps. Gradually they need not identify the guide tone separately from the sol-fa pattern; also, the sol-fa pattern can soon be ignored in favor of the numerical pattern; and eventually, students can proceed directly to chordal identification of Roman numerals without any preliminary steps at all.

Once again, the essential distinctions are binary. At this point, a given chord is either a do-chord (I or IV in major; or i or iv in minor) on the one hand, or a ti-chord (i.e., V, in major or minor). And if it is a do-chord, it is either the tonic chord (I or i) or the non-tonic chord (IV or iv). In addition to the simplicity of this format, note that the singing of the sol-fa and numerical patterns is relatively easy in that the range (from low fa to high sol) is only a ninth, well within the tessituras of a classroom filled with music students exposed to singing. Because of the ease and simplicity of this second step, it generally takes only a few minutes to half an hour for students to master.

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MORE ADVANCED STAGES

In more advanced stages students can be introduced to secondary triads, particularly vi, iii, and ii in major, and VI in minor. The submediant triad in major is sung to the pattern do-mi-do-la-do (or 3-5-3-1-3 from a guide tone of *do*) and in minor, do-me-do-le-do. The mediant chord in major can be efficiently introduced by way of ti-sol-mi-sol-ti (or 5-3-1-3-5).

Generally, it seems best to introduce the ii chord by surprise. One can play a long progression asking students to identify whether *do* or *ti* is present, and then suddenly introduce a ii chord (where neither *do* or *ti* is present). After a moment of consternation, students seem spontaneously to identify *re* as the guide tone, and without any help or prompting, they produce re-fa-la-fa-re (or 1-3-5-3-1), because they have already assimilated the model implicit in previous patterns. By now, students seem to comprehend clearly the all-pervasively binary nature of the system, for as it turns out, within the set of diatonic common chords all non-do chords are either ti-chords or re-chords. An added bonus is that ii is the only re-chord at this point; accordingly, any non-do chord that does not contain *ti* has to be a re-chord in general, and at this point in particular, it has to be a ii chord. Accordingly, students learn to recognize ii very quickly and accurately, and the otherwise difficult problem of distinguishing ii from IV is largely averted.

From a solid foundation where common chords in major and minor are recognized quickly and accurately, one can proceed by various paths through traditional diatonic and chromatic harmony. We emphasize that several paths are possible depending in large measure on the teacher's preferred ordering. Indeed, it seems pedagogically desirable to move fairly freely from a sub-topic in one large area to a sub-topic in another, for such an approach produces a learning spiral (old topics are continually reviewed and amplified in new, more advanced contexts).

One should also note that throughout the study of harmony, the guide-tone method can provide a springboard for discussing topics in theory, writing, and analysis. Indeed, it seems pedagogically worthwhile in many instances to present a new topic in aural form initially, thereby allowing students time to puzzle out their auditory responses to a new harmonic resource before the teacher undertakes a more formal discussion of the problems in theory, writing, and analysis that emerge with the introduction of the added feature. In this way, one can proceed in the time-honored progression from the concrete to the abstract.

The leading-tone triad in major and minor (vii^0) can be introduced quite efficiently once the ii chord has been mastered. Generally, if this is

done, students do not confuse vii^0 with ii , even though *re* is present in both. If they do, one need only point out that one searches for *do*, *ti*, and *re* as guide tone *in that order*. This directive may have later ramifications for constructing chord progressions in general, but all that is necessary at this point is that if a chord does not include *do*, one searches first for *ti*, and only if *ti* cannot be found, does one search for *re*.

Various chromaticisms can be dealt with early on. The melodic minor scale provides a point of departure in the traditional pedagogical progression from known to unknown. The minor dominant triad in major (v) provides the occasion for a new guide tone, which students seem to identify—appropriately, and with little prodding—as *te* (or *ta*). One can deal very early with the flattened supertonic triad (bII : *ra-fa-le-fa-ra*, the Neapolitan), which introduces another guide tone (*ra*), and the V-of-V-of-V in major (*di-mi-di-la-di*, or 3-5-3-1-3), which introduces the very last guide tone students will normally need.

In a further extension of the guide-tone method, one can introduce seventh chords, inversions, and non-chord tones through listening. Seventh chords involve four-note arpeggiations like the three-note arpeggiations for triads, and depending on the voicing of the chord, students might be encouraged to determine whether certain notes of a chord (e.g., the fifth of a dominant seventh) are present in a given context. Recognition of inversions depends on which note of an already identified chord is in the bass, and seems to come easily if students have already been exposed to dictation of species counterpoint. Further, students who have already studied counterpoint seem to recognize the functions of non-chord tones when simple, unadorned examples are presented first and then elaborated. In addition, such an approach opens up the possibility of dealing fairly early in dictation with pieces such as Bach's chorales. And such an approach to dictation lays the groundwork for so-called "layer dictation" and the introduction of Schenkerian principles, which might have been anticipated by one's treatment of inversions and non-chord tones.³

Although the guide-tone method might seem relentlessly vertical and biased towards an archaic, Roman-numeral approach rather than a more modern, linear approach, we see no particular danger in using the method and no necessary conflict with a Schenkerian outlook. Indeed, Heinrich Schenker himself presupposed a knowledge of his relatively old-fashioned *Harmony* as a prerequisite to his more advanced *Free Composition*, and such followers of Schenker as Felix Salzer, Carl Schachter, Edward Aldwell, Allen Forte, and Steven Gilbert have either presupposed or explicitly

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advocated a thorough study of harmony before one undertakes a more advanced, Schenkerian approach.⁴ Moreover, the structure of the *Ursatz* is unabashedly harmonic at certain points, and it is important to recognize Roman-numeral chord functions from time to time in applying Schenker's methods.⁵ By and large, as inversions, non-chord tones, modulation, and certain chromatic resources are introduced, it seems wise to introduce Schenkerian notions, but this does necessarily mean that a vertical approach needs to be abandoned as soon as horizontal topics are broached. Instead, the two approaches can be employed in tandem and can coexist in a dialectical interplay. Indeed, insofar as we want our students to receive a higher education in music, we would argue that such an end is better achieved, not by dogmatically insisting on a single approach, but rather by allowing them to deal with situations in which two interpretations, or two styles of interpretation, can be applied to the same subject matter.

NOTES

¹Englewood Cliffs, N. J.: Prentice-Hall, 1978, esp. Chapters One and Two on tonic, dominant and subdominant triads.

²e.g., R. O. Morris, *Figured Harmony at the Keyboard* (Oxford: Oxford University Press, 1933, renewed in U.S.A., 1960).

³See Gerald Warfield and Richard Brooks, *Layer Dictation: A New Approach to the Bach Chorales* (New York: Longman, 1978).

⁴See Heinrich Schenker, *Harmony*, ed. by Oswald Jones and trans. by Elizabeth Mann Borgese (Chicago: University of Chicago Press, 1954), and the same author's *Free Composition* (*Der freie Satz*), ed. and trans. by Ernst Oster (New York: Longman and the American Musicological Society, 1979); see as well, Felix Salzer, *Structural Hearing: Tonal Coherence in Music*, 2 vols. (New York: Charles Boni, 1952); Edward Aldwell and Carl Schachter, *Harmony and Voice Leading*, 2 vols. (San Diego: Harcourt Brace Jovanovich, 1978); Allen Forte, *op. cit.*; and Allen Forte and Steven E. Gilbert, *Introduction to Schenkerian Analysis* (New York: W. W. Norton, 1982), esp. pp. 1 and 7.

⁵See, for example, Schenker's *Free Composition*, and Forte and Gilbert's *Introduction*, *passim*.

ACQUIRING AURAL INTERVAL IDENTIFICATION SKILLS: RANDOM VS. ORDERED GROUPING

ANN K. BLOMBACH

REGENA T. PARRISH

INTRODUCTION

Several previous studies have established the effectiveness of programmed instruction in student acquisition of aural interval identification skills, whether the instruction be in the form of taped materials or computer-assisted instruction (e.g., Spohn and Poland; Tarratus and Spohn; Killam and Lorton; Hofstetter, 1975; Wasserman; Killam, Lorton, and Schubert; and Humphries). In the present study, we examine the effectiveness of *ordered* presentation of intervals in student acquisition of aural identification skills. Although various researchers have developed tables of the most commonly confused intervals along with rank orderings of interval difficulty, marked differences in study length, in ages and prior musical training of subjects, and in specific type(s) of intervals included—both between studies and in relation to the present study—make detailed comparisons of their results impractical. Previous investigations that, for the purposes of the current study, provide the most relevant information are those by Spohn and Poland; Jeffries; and Hofstetter (1979). In addition, because Ortmann considered various aspects of interval acquisition in such detail and with such great insight, his landmark 1934 study is also included.

Ortmann examined the patterns of errors made by students aged ten to adult with one to ten years of previous musical training. His graphs represent a compilation of the errors these students made in first, second, and third years of drill on identifying harmonic intervals. Table 1 lists the most typical errors Ortmann found. He cautions that specific percentages of confusion for each interval would no doubt vary from study to study and, therefore, focuses his discussion on the most prevalent confusions. After examining the frequency and patterns of confusion, Ortmann placed the

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intervals in categories—*most difficult*: m3, TT (tritone), m6, m7; *less difficult*: M3, P4, P5, M6; and *least difficult*: P1, m2, M2, M7, P8.

Table 1. Ortmann: Typically Confused Intervals.

	% of total errors	In Order of Decreasing Frequency, Most Frequently Confused With						
P1	rare	P8						
m2	4%	M2	m3					
M2	3%	m2	m3	m7				
m3	15%	M3	P4	TT				
M3	6%	m3	P4	m6				
P4	9%	P5	M3	TT	m3			
TT	13%	P4	m6	m3	P5, m7	M3	M7	
P5	7%	P4	m6	M3, TT, M6				
m6	14%	M6	P5	P4	TT			
M6	8%	P5	m6	P4m, m7				
m7	15%	M7	m6	TT, M6				
M7	6%	m7	m6					
P8		rare	P1					

Table 2. Spohn and Poland: Most Common Interval Confusion.

	In Order of Decreasing Frequency, Most Frequently Confused With						
m2	M2						
M2	m2	m3					
m3	M3	M2	P4, P5				
M3	m3	P4, P5					
P4	P5	M3, TT	m3				
TT	P5	m6	m3	M6, M7			
P5	P8	M6	P4				
m6	M6	TT	m7	P5	M7		
M6	P5	P4, M7	TT				
m7	m6	TT	M6	M7	P5		
M7	m7	m6	P5				
P8	P5, M6						

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Spohn and Poland, based on the results of melodic ascending interval recognition they conducted at The Ohio State University, also determined the most common interval confusions (see Table 2) and ranked the difficulty of identifying each interval (see Table 3).

Table 3. Spohn and Poland: Ranking of Difficulty of Intervals.

From Easiest to Most Difficult

1	P8
2	M2
3	m2
4.5	M3
4.5	P4
6	P5
7	M6
8	M7
9	m3
10	TT
11	m7
12	m6

The typical confusions shown in Tables 1 and 2 are the same or similar for several intervals (approximately a 70% correspondence), although the intervals of confusion are markedly different for the P5 and P8. Spohn and Poland's order of interval difficulty, with the exception of the placement of the M7, confirms Ortmann's findings. Using the results shown in Tables 2 and 3, Spohn and Poland grouped the intervals into levels of difficulty (shown in Table 4) based, in part, on the ease with which an interval considered in isolation can be identified. In addition, they placed intervals that are easily mistaken for each other in different levels whenever possible to reduce the probability of identification errors. Using these levels of difficulty, Spohn and Poland developed a set of listening tapes for student drill on ascending melodic intervals. Students who worked with these tapes were able to identify ascending melodic intervals with a high degree of proficiency. Tarratus and Spohn verified the effectiveness of these taped drills in a follow-up study at Northwestern State College of Louisiana.

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Table 4. Spohn and Poland: Levels of Difficulty.

Level I	M2, P4, M7, P8
Level II	m2, M3, TT, M6
Level III	m3, P5, m6, m7
Level IV	m2, M2, P4, M7, P8
Level V	m3, TT, P5, M6, m7
Level VI	m2, M2, m3, M3, P4, TT, P5, m6, M6, m7, M7, P8 (all intervals)

Jeffries investigated whether students at UCLA would learn to identify intervals more effectively if they were presented in small steps of increasing difficulty rather than in random order. The rank order of difficulty Jeffries used, based on his own testing, is somewhat different from Ortmann's and from Spohn and Poland's rankings, except in the designation of the most difficult intervals. Jeffries' order, listed from least to most difficult, is: P8, M2, P5, M3, M7, m2, M6, P4, m3, A4, m7, m6. Although Jeffries labels the organization of the other series random, it should more accurately be termed *arbitrary*. Because he used taped exercises, the order of the random presentation was necessarily determined before the experiment began, and only one such random order was devised. In other words, all students who worked with tapes of the randomly ordered presentation learned to identify the intervals in exactly the same order: M3, P4, m3, m2, A4, m7, P5, P8, M2, M7, M6, m6. Jeffries found the random order superior to difficulty order. He speculates the difference in learning success resulted because the more difficult intervals were presented later in the ordered sequence, so the students practiced more on the easier intervals; thus, they had insufficient drill on the more difficult ones.

Hofstetter found competency-based learning of interval identification skills more effective, although less popular with the students, than a strictly sequential method of exercise presentation. Hofstetter speculates that the high degree of proficiency required—90%—led to high student frustration. Both groups practiced aural skills using the GUIDO computer-assisted instruction system. The test subjects were second-semester University of Delaware music students who, the first semester, had completed the levels of ascending melodic interval drill shown in Table 5. Although Hofstetter attributes these levels to Benward (Workbook in Ear Training, 1969), they are very similar to Spohn and Poland's levels. Apparently, Spohn and

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Poland, Benward, and Hofstetter would all agree the best strategy for developing interval identification skills involves: 1) presentation of intervals in a series of levels with an increased number of choices at higher levels; and 2) presentation of less easily confused intervals together in the lower levels, saving the more easily confused intervals for presentation together in the higher levels. Benward and Hofstetter interrupt the increase in number of choices at Level 6, probably to compensate for the concentration of easily confused intervals at that level.

Table 5. Hofstetter (Benward): First Semester Levels of Difficulty, Ascending Melodic Intervals.

Level I	M2, P4, M7, P8
Level II	m2, M3, TT, M6
Level III	m3, P5, m6, m7
Level IV	m2, M2, M3, P4, M7, P8
Level V	m3, TT, P5, m6, M6, m7
Level VI	m6, M6, m7, M7
Level VII	All intervals

In the second semester (the one in which Hofstetter tested the effectiveness of competency-based learning), the controlling organizational factors are different, although an increase in difficulty is still apparent (see Table 6). The order of levels again follows Benward's. Levels in which all intervals are possible choices are interspersed with levels with only six choices, but those six choices are more easily confused with each other than were those used in the earlier levels completed during the first semester. Descending melodic intervals and harmonic intervals are presented in separate sequences along with a review level (Level 4), which includes all ascending *and* descending melodic intervals, inserted after the last descending melodic interval level and before the first harmonic interval level. Yet, the overriding organizational principle appears to be unchanged: more easily confused intervals are grouped together in higher levels. Clearly, the assumption is that interval identification problems should become increasingly more difficult as students progress through an ordered sequence.

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Table 6. Hofstetter (Benward): Second Semester Levels of Difficulty.

Level I	m2, m3, P4, P5, M7, P8, descending melodic
Level II	M2, M3, TT, m6, M6, m7, descending melodic
Level III	All descending melodic intervals
Level IV	All ascending and descending medolic intervals
Level V	m2, m3, P4, P5, M7, P8, harmonic intervals
Level VI	M2, M3, TT, m6, M6, m7, harmonic intervals
Level VII	m2, M2, m3, M3, m6, M6, m7, M7, harmonic intervals
Level VIII	All harmonic intervals

Table 7. Interval Groupings Used in This Study.

Grouping I	M2, P4, P8
Grouping II	m2, M3, P5
Grouping III	TT, M6, m7
Grouping IV	m3, m6, M7
Grouping V	M2, M3, P5, P8
Grouping VI	m2, P4, M6, M7
Grouping VII	m3, TT, m6, m7
Grouping VIII	M2, M3, P4, M7, m6, P8
Grouping IX	m2, m3, TT, P5, M6, m7
Grouping X	P1, m2, M2, m3, M3, P4, TT, P5, m6, M6, m7, M7 P8 (all intervals)

METHODOLOGY

The purpose of the present investigation was to determine whether presenting interval drills in an easy-to-difficult ordered set of groupings affects student acquisition of aural identification skills. To avoid the problem Jeffries found in presenting the more difficult intervals last, all intervals were presented at each level, in groupings of increasingly larger numbers of intervals from which the student was directed to identify the correct one. Students practiced identification skills, choosing correct an-

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swers from groupings of intervals selected using one of two methods: 1) groupings of intervals were randomly chosen for each example; or 2) groupings were predetermined. The predetermined groupings were based primarily on Spohn and Poland's levels of difficulty, with their interval organization modified to make the increase in difficulty between levels more gradual and to delay, as long as possible, including easily confused intervals in the same group (see Table 7).

The groupings were then organized into the levels shown in Table 8. For each type of interval, melodic or harmonic, the lowest level consists of four groups of three intervals each, followed by a level of three groups of four intervals each, a level of two groups of six intervals each and, at the highest level, a group of all intervals.

Table 8. Contents of the Levels of Presentation.

	<u>Type of Interval Presentation</u>	<u>Number of Choices</u>
Level 1	Ascending melodic	3
Level 2	Ascending and descending melodic	4
Level 3	Ascending and descending melodic	6
Level 4	Ascending and descending melodic	12
Level 5	Ascending and descending harmonic	3
Level 6	Ascending and descending harmonic	4
Level 7	Ascending and descending melodic, quality and size entered separately	13
Level 8	Ascending and descending harmonic	6
Level 9	Ascending and descending harmonic	12
Level 10	Ascending and descending harmonic, quality and size entered separately	13
Level 11	Ascending and descending melodic and harmonic, quality and size entered separately	13

Since harmonic intervals are commonly considered more difficult than melodic, the melodic intervals were presented in lower levels than the corresponding groups of harmonic intervals. In addition, descending melodic intervals, which are generally considered more difficult than ascending melodic intervals, were not introduced until Level 2.

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In the random presentation strategy, the answer pool contained a different randomly chosen group of intervals for each example. In the predetermined presentation, the group was chosen randomly from one of the predetermined groupings of intervals shown in Table 7. For both groups, the number of intervals was determined according to the current level specifications. The correct answer for each example was randomly selected from the intervals in the chosen group.

The subjects used in this study were students enrolled in Aural Training I at Ohio State University in Autumn Quarter 1986. To eliminate possible teacher bias, students were selected from two sections taught by different teachers, and each method of presentation was used by a different subset of the subjects from each class. Based on the results of an interval pretest and on an evaluation of their past theory study, aural training, and years of instrumental/vocal performance study, pairs of students with similar backgrounds and knowledge were randomly assigned to different groups. The melodic and harmonic interval portion of the final examination was used as a posttest to measure student achievement. Eighteen students in the random group and twelve in the predetermined group completed all aspects of the study.

The instructional materials consisted of an Apple Macintosh micro-computer equipped with headphones and custom-designed interval dictation software. Extensive records kept for each student included section, presentation group, and level information; interval played; the student's response; the length of time the student worked on each example; number of sessions; and time and date information for each session. The program is mastery-based, with the student required to identify and notate 80% of the examples correctly before advancing to the next level. For each student, the goal was to reach Level 6 by the end of the quarter.

In addition to two hours of class time each week, all students enrolled in Aural Training I are routinely required to practice aural identification and dictation skills in the Aural Training Lab a minimum of one hour a week. Because of the course structure, most dictation practice necessarily takes place in the Aural Training Lab. The participants in this study spent a portion of that time using the interval dictation program on the Macintosh. Taped drill was also available, but the students were instructed not to use the tapes for aural interval identification practice.

Students controlled their own progress in working through the program, and all student communication with the Macintosh was accomplished via the mouse. Students determined when they were ready to hear the interval, to have an interval checked, to continue to the next example, or to end a session. Current level and mastery information remained on the screen throughout each session. For each interval example, the student was

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given a beginning pitch, which appeared in traditional music notation on the screen. In addition, for each harmonic interval example, an arrow on the staff indicated whether the second pitch was higher or lower than the beginning pitch. Students were expected to identify and notate the interval correctly. They could hear each interval played twice. For melodic (and harmonic) intervals, the duration of each pitch (or pair) was approximately one and one-half seconds.

Students could have each answer checked twice. They received credit toward mastery, however, only if they both identified and notated the interval correctly the first time. If they simply forgot either to identify or notate the interval, they were prompted to supply the missing portion of the answer before it was checked. If they entered a wrong answer, the computer responded with specific information: for example, "Hint: check the accidental again"; "You have notated the interval in the wrong direction"; "Your notation and identification match, but both are wrong"; and so on. If the student missed an interval notation or identification twice, the computer gave the correct notation and identification. Students could then click the mouse on the appropriate box to hear and/or see the correct interval and their own wrong answer(s).

The posttest consisted of eight melodic and eight harmonic intervals, which the student was asked to identify and notate. All intervals, except the unison, were randomly divided into two groups, and each of these groups of six intervals served as the choices for half the problems on the melodic interval section. The choices on the harmonic interval section were randomly divided into groups of four intervals, and one group of four interval choices was given for each set of four problems. Each example was played twice, and each problem was worth two points: one each for identification and notation. The posttest scores were recorded as percentages of correct answers.

RESULTS AND DISCUSSION

The results from the posttests were evaluated using the Statistical Package for the Social Sciences (SPSS-X), run at Ohio State's Instruction and Research Computer Center. To determine if a statistically significant difference existed between the interval identification skills of the two groups as a result of the study, a t-test based on a division of the posttest scores by presentation group was performed. To check for possible teacher bias, a second t-test was used to compare the performances of the two sections.

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Although the mean score of the random presentation group is higher than the mean score of the predetermined presentation group, the results of the t-test on posttest scores divided by method of presentation (Table 9) show there is no significant difference at the .05 level. In other words, the method of presentation seems to have little effect on student acquisition of aural interval identification skills.

Table 9. Results from the T-test Performed on the Posttest Scores of the Two Presentation Types.

Variable	Number of Cases	Mean	Standard Deviation	T-Value	Degrees of Freedom	Probability
Random	18	81.6111	12.985	1.15	28	0.258
Prede- termined	12	75.5833	15.448			

The results of the t-test performed on the posttest scores divided by section (Table 10) show no significant difference at the .05 level. Teacher bias was not a factor in the results of the study.

Table 10. Results from the T-test Performed on the Posttest Scores of the Two Sections.

Variable	Number of Cases	Mean	Standard Deviation	T-Value	Degrees of Freedom	Probability
Section 1	13	80.0000	14.866	.27	28	0.791
Section 2	17	78.5882	13.888			

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Since the ability to distinguish any interval in an arbitrary context is a fundamental goal, all of the answer choices for the posttest were randomly chosen. These random choices could perhaps have influenced the outcome in relation to the harmonic portion of the test because the random group was, presumably, already accustomed to this arrangement of choices. Very few students, however, reached Level 6 (the four harmonic interval choices) prior to the posttest. Moreover, even fewer of the random presentation group reached Level 5 (the first harmonic interval level). As a result, the effect of random selection (in the answer pool for the harmonic interval portion) on the results of the posttest was probably negligible. The random selection should have had no effect on the outcome of the melodic-interval portion of the test since most students in both groups had already mastered Level 4 (all twelve intervals). Choosing from just six melodic intervals should, therefore, have been a relatively easy task, regardless of which presentation group the student had been assigned to.

Although the posttest required both identification and notation of intervals for mastery, there was very little difference in the students' performance of these two tasks. There was also little difference between performance on the melodic and harmonic portions of the posttest.

In addition to the t-tests, Spitbol programs were used to extract information from the student data files kept by the interval-dictation program. One Spitbol program developed confusion tables that show the percentages of error for every interval combination within each of the three types (melodic ascending, melodic descending, and harmonic). Another program produced statistics for each group as a whole for the entire quarter. These data included the average number of sessions, the average time per session, the total time spent, and the average level achieved.

Very few students reached the harmonic interval levels, and they completed so few examples the resulting confusion tables are of doubtful validity. The confusion tables for melodic intervals, however, are informative. Four of these matrices are shown in Table 11.

Regardless of how the confusion tables are considered—individually or in various combinations—correspondences to either Spohn and Poland's or Ortmann's findings are, at best, approximate. For melodic intervals in the random group, the most typical errors correspond only about half the time to Ortmann's findings, even when the results in both studies are considered rather generally as *trends* rather than as specific orders of confusion. The correspondence between ascending melodic interval errors and Spohn and Poland's table of ascending melodic interval confusions (approximately two-thirds) is somewhat closer.

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Table 11. Confusion Tables of Melodic Intervals.

(All numbers in the confusion tables are percentages)

Table 11a. Melodic Ascending, Random Presentation:

		Student's Answer													
		P1	m2	M2	m3	M3	P4	TT	P5	m6	M6	m7	M7	P8	
Correct Answer	P1	100													
	m2		85	4	5			3	2	1		1			
	M2		5	90		2	3	1							
	m3		2	3	78	4	2	3	3		1	1	2		
	M3		2	1	6	69	6	6	5	2	2	2	1	1	
	P4				4	2	86		4		1	1	2	1	
	TT			1	1	1	6	63	5	6	5	7	3	2	
	P5		1		3	1	4	3	80	2	3	2	1	2	
	m6				4	1	1	10	9	43	14	10	7		
	M6		1				2	2	6	10	7	56	6	8	3
	m7								2	7	8	9	63	8	3
	M7					2	2	5	1	9	7	11	62	2	
	P8										3	2	2	2	91

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Table 11b. Melodic Ascending, Predetermined Presentation.

		Student's Answer												
		P1	m2	M2	m3	M3	P4	TT	P5	m6	M6	m7	M7	P8
Correct	P1	100												
Answer	m2		93		2	2			1				1	
	M2		1	94		2	1		1					
	m3		1		79	1	1	8	1	8				
	M3		5	3	1	82	3		6					
	P4			3		3	85			1	1			7
	TT				2	1	1	60	4	5	7	19		1
	P5				2	11	3	2	74	1	3			4
	m6				2	2	5	4		60	1	8	17	1
	M6					1	2	2			86	5	2	1
	m7							12		16	11	61		1
	M7						3	3		27	10	3	51	5
	P8						4		7	1			4	84

Table 11c. Melodic Descending, Random Presentation:

		Student's Answer												
		P1	m2	M2	m3	M3	P4	TT	P5	m6	M6	m7	M7	P8
Correct	P1	100												
Answer	m2		82	13				2		2			2	
	M2		3	69	7	5	5	7	2		2	2		
	m3			3	60	22	7	1	6			1		
	M3			2	8	67	2	6	6	3	3	5	2	2
	P4				4	7	69	4	11		4	2		
	TT		1	1	3	4	7	58	3	4	7	8	5	
	P5					2	2	12	75		2	2	2	5
	m6				3		2	9	13	42	7	7	4	13
	M6				3		5	3	14	8	57	8	3	
	m7							13	7	4	16	44	7	9
	M7					2	2	7	11	5	18	9	36	9
	P8						6	4	6	8	4		2	70

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Table 11d. Melodic Descending, Predetermined Presentation:

		Student's Answer													
		P1	m2	M2	m3	M3	P4	TT	P5	m6	M6	m7	M7	P8	
Correct Answer	P1	100													
	m2		90		10										
	M2		2	73	2	20			2	2					
	m3			2	60	10	6	14	2	4		4			
	M3					70	6	4	23						
	P4			2		10	74	2		2	4		4	2	
	TT				12	2	8	39	8	12	6	14	2		
	P5					13	2	4	60		8	2		11	
	m6				4	4	6	23	11	30		13	6	2	
	M6						9	2	11		45	11	23		
	m7							16	12	27	8	31	4	2	
	M7						7	4		7	20	11	40	11	
	P8			2			4	2	16	2			4	70	

Comparisons with the predetermined group's typical melodic interval confusions show even less correlation: all are within the 30% to 40% range except for the extremely low (12.5%) correspondence between Ortmann's findings and the predetermined group's typical confusions of ascending melodic intervals. Of course, errors made by students in the predetermined groups would not be expected to correspond to errors by students who were able to choose their answers from all possible intervals since the less easily confused intervals were purposely grouped together as much as possible. Indeed, the typical patterns of confusion in the predetermined groups do seem to be quite different from any of the other findings. Students were still easily able to identify intervals incorrectly with some regularity; instead of identifying intervals with the most typical wrong answers, however, they confused them with whatever incorrect choices they had available.

The rank ordering of interval difficulty for each combination of melodic interval direction and presentation type is shown in Table 12. None of these orders matches Ortmann's or Spohn and Poland's, although there is some agreement as to which intervals are most difficult: TT, m6, and m7 were most often missed in their studies and in this one. Instead of their

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problematic m3, however, the M6 and M7 were the additional members of this study's most difficult intervals, with just one exception: the M6 does not appear to have been particularly difficult for students in the predetermined presentation group when they practiced identifying ascending melodic intervals.

Table 12. Rank Ordering of Interval Difficulty, Separated by Melodic Interval Direction and Presentation Group.

From easiest to most difficult:

Melodic Ascending:		Melodic Descending:	
Random	Predetermined	Random	Preetermined
P1	P1	P1	P1
P8	M2	m2	m2
M2	m2	P5	P4
P4	M6	P8	M2
m2	P4	M2, P4	M3, P8
P5	P8	M3	m3, P5
m3	M3	m3	M6
M3	m3	TT	M7
TT, m7	P5	M6	TT
M7	m7	m7	m7
M6	TT, m6	m6	m6
m6	M7	M7	

The percentage of correct intervals for each presentation group and each melodic interval type is shown in Table 13 (harmonic intervals omitted because of small sample).

The average percentages correct for each group working on the same kind of melodic interval (ascending and descending) are very similar. For ascending melodic intervals, the predetermined group fared slightly better, while the random group's percentage is slightly higher for descending melodic intervals. Given that the predetermined group, except in Level 4, worked on groups of intervals that should have been relatively easy to distinguish, it would seem the predetermined group's percentages of correct answers should be substantially higher. Instead, it appears students continued to choose a wrong answer about the same percentage of time,

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even when the “best” wrong answers were removed from their consideration. As might be expected, students in both groups had fewer correct responses for descending melodic intervals.

Table 13. Percentage of Correct Intervals.

<u>Type of Interval</u>	<u>Type of Presentation</u>	<u>Average Correct %</u>
Melodic Ascending	Random	74%
	Predetermined	78%
Melodic Descending	Random	64%
	Predetermined	59%

The errors shown in the confusion matrices in Table 11 are more scattered in the random groups (i.e., show a wider range of errors) because the students had a wider range of wrong choices in most of the levels. (The random confusion tables have approximately 25% more entries than the corresponding predetermined confusion tables.) Yet, as shown in Table 11, the total percentage of errors remains about the same in both groups.

Additional data concerning time spent and level achieved are shown in Table 14. The time spent on each question and the total time spent during each session are very similar. The predetermined group, however, worked an average of almost two more sessions during the quarter and achieved an average of almost one level higher. On average, neither group reached the goal of Level 6: the average student in the random group did not reach even the lowest harmonic dictation level, while the average predetermined student barely reached the first harmonic interval level.

In addition to reaching a higher level, the students in the predetermined group also spent more time working on the computer, even though they did not score significantly better on the posttest and their mean score was, in fact, somewhat lower. Apparently, the random-group students were able to acquire at least as much skill—and more efficiently.

INTERVAL IDENTIFICATION

Table 14. Time, Session, and Level Results.

	Random Presentation	Predetermined Presentation
Average Time Spent Per Question	51 seconds	48 seconds
Average Time Spent Per Session	21.05 minutes	20.13 minutes
Average Number of Sessions	4.94	6.67
Average Total Time	1.73 hours	2.24 hours
Average Level Achieved	4.22	5.0

CONCLUSIONS AND QUESTIONS

The results of this study raise questions about what many aural-training teachers consider to be common knowledge. Placing less easily confused intervals together in small groups for beginning student practice, with a gradual increase in both the size of the groups and the difficulty of distinguishing between intervals in the groups, would seem to be a more effective means of acquiring aural interval identification skills than using groups of randomly chosen intervals. Yet, the random grouping strategy appears to have been at least as effective and was, apparently, more efficient in helping students acquire these skills. In addition, regardless of whether the groupings consisted of randomly selected intervals or intervals that are not easily confused, each group averaged about the same. These unexpected findings raise a number of questions concerning our usual ways of teaching aural interval identification skills. If random groupings work as well as carefully chosen groupings based on patterns of errors documented in previous research, it would appear we still know relatively little about how students acquire these skills.

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If supposedly easily distinguishable *distractors* do not result in more accuracy, then perhaps the content of the groupings does not matter. Of course, since there is not complete agreement as to which intervals are most easily confused, perhaps the wrong *easy* intervals were grouped together. It is also possible the wrong principle was used for grouping intervals together in the lower levels. Perhaps we are not really helping by making the beginning tasks easier. Perhaps the *most* easily confused intervals should be grouped together so students can learn to differentiate from the beginning. Perhaps the groupings are not even necessary; or perhaps gradually increasing the size of the groups is not the best procedure. Considering the similarity between melodic and harmonic interval identification success on the posttest, perhaps separating melodic intervals from harmonic intervals is also unnecessary.

Before we all change our accustomed methods of teaching, more research is also necessary to determine whether the findings of this study are broadly applicable or are peculiar (for some, as yet, unknown reason) to this specific population of students. To begin, the same experiment should be repeated with larger groups, perhaps over a longer time, so more reliable statistics for harmonic intervals could be included as well. In addition, other methods of groupings (e.g., beginning with easily confused intervals) and other sizes of groups (if, indeed, intervals should be grouped together at all) should be examined. More research into which intervals are most easily confused, in terms of interval type (melodic ascending, melodic descending, and harmonic), is also needed.

The results of this study challenge the validity of some of our most basic aural-training assumptions and raise a question that most musician-teachers have not even considered. If an apparently logical and reasonable pedagogical organization, even one with some possible imperfections, is no more effective than a random organization, what do we really know about how students acquire aural interval identification skills? Perhaps, regardless of how we present intervals, students create their own individual learning structures to acquire these skills. If so, a random order that makes no assumptions concerning what we as teachers might perceive to be best, would probably work as well for a diverse population of students as any—and might work better than most. The random groupings may be just as effective, and perhaps more efficient, because they are likely to coincide more often with a miscellaneous collection of individual learning styles. Clearly, we still have a great deal to learn. Hopefully, this study is only the first in a series of investigations that will eventually answer the essential question: how can students most effectively and efficiently acquire aural interval identification skills?

INTERVAL IDENTIFICATION

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MUSIC THEORY SOFTWARE FOR THE MACINTOSH

BRUCE B. CAMPBELL

REVIEW FORMAT

This review departs from the usual format in that several products, intended for quite different groups, are under consideration. Five are for ear training, and in keeping with the theme of this issue, they will receive the most comment. Two each deal with writing skills and "note processing." One product illustrates a new approach that has the potential for wide uses in higher education. The common element is the Apple Macintosh micro-computer. Therefore the review is more an overview of "repertoire for an instrument" (or attachments for an appliance, if you will) than a survey unified by topic. It is the author's hope that this review will help orient the present owner of a Macintosh in search of musical products, and also provide some insight to the person who owns another computer, or no computer, as to the special suitability of the Macintosh for musical applications. Finally, the information may aid a person or committee in charge of recommending to a college administration the purchase of microcomputers for a computer "laboratory" associated with a music department.

Despite its abrasion of literary sensibility, the review will make frequent use of the computer jargon that, for better or worse, has entered everyday speech.

ITEMS REVIEWED

A. Ear Training

1. *Listen* (version 2.0)

Resonate
P.O. Box 966
Menlo Park, CA 94026
(415) 323-5022
\$99

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2. *Practica Musica* (version 1.51)

Ars Nova Software
P.O. Box 40629
Santa Barbara, CA 93140
(805) 564-2518
\$129

3. *Ear-Training Expert* (version 3.0)

Techno-Arts
28 Daniel Street
Newton Center, MA 02159
(617) 964-0519
\$150 single copy; \$35 each in sets of ten

4. *MacGAMUT*

Mayfield Publishing Company
1240 Villa Street
Mountain View, CA 94041
(415) 960-3222
\$15 (estimated)

5. *Melodic Dictator* (version 1.1)

Center for Performing Arts and Technology
The University of Michigan School of Music
1100 Baits Drive
Ann Arbor, MI 48109-2085
(313) 747-2020
\$65
university "site license" available for \$200

B. Part-Writing

1. *MacVoice* (version 2.0)

Kinko's Academic Courseware Exchange
4141 State Street
Santa Barbara, CA 93110
(800) 235-6919
\$25.50

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2. *Palestrina* (version 2.0)

pre-release version: will be available through
Kinko's Academic Courseware Exchange.
\$20 (estimated)

C. Other

1. *Parsifal*

Jay Martin Anderson
807 West Lynn Street #201
Austin, TX 78703
(512) 476-3807
FREE (supply disk and SASE)

2. *Deluxe Music Construction Set* (version 2.0)

Electronic Arts
1820 Gateway Drive
San Mateo, CA 94404
(415) 572-2787
\$ 99

3. *Professional Composer* (version 2.2)

Mark of the Unicorn
222 Third Street
Cambridge, MA 02142
(617) 576-2760
\$495

ABOUT THE APPLE MACINTOSH

One of the important judgments a reviewer must make pertains to the idiomatic construction of the program, and its ease of use. To those of us who obtained the first incarnation of the Macintosh in early 1984, it seemed truly to be the computer "for the rest of us," especially for scholars in the arts or humanities who had earlier struggled with mandarin mainframes and mountains of punchcards in pursuit of relatively modest ends. The "bit-mapped" technology popularized by the Macintosh can be understood by

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thinking of the computer screen as a very fine piece of graph paper. Each dot on the screen (or pixel—a contraction of “picture elements”), approximately $1/72$ of an inch square, can be addressed by Cartesian coordinates. With its relatively fine resolution, the screen can represent graphical objects, including musical symbols, as easily as typescript. The dot-matrix Apple printer faithfully translated the pixels into ink dots on a page: the resulting WYSIWYG (“what you see is what you get”) screen format soon became an industry standard.

The imaging is only one of many revolutionary attributes that the Macintosh brought to the consciousness of the casual public. Fundamental to its philosophy was the observation that human beings rarely operate in “modes,” as computer interfaces have often demanded. In everyday life, when confronted with a decision that requires a “yes/no” answer, we may elect to put off the decision for awhile and do something else. (So-called “modeless dialogs” do exist in the Macintosh world, of course, but they present themselves in a distinctive double-framed rectangle that overlays the screen image as if on a separate plane.) The “mouse,” a control device about the size of a bar of soap and equipped with a single button, permitted the operator access to any pixel simply by moving it around on a nearby flat surface. It gave the user a sense of ease, and more importantly, control over the machine—early advertisements stressed its “point-and-click” simplicity.

A frequent complaint from beginning users of more traditional computers was a lack of consistent behavior among programs. The letter “q” universally signals “quit” (exit the program), but many other letters have meanings unique to a particular program. To quite a few potential computer users, a “q” taken to mean anything besides “the letter q” results in confusion, and soon after, frustration. Actions that one wished the Macintosh to take were chosen from a visually isolated “menu bar” at the top of the screen in virtually every program. From the menu a list of actions, in simple English, could be made visible by clicking the mouse. One moved the mouse down the list to the desired action and released the button. This arrangement replaced the “command line” of earlier personal computers and prevented the kind of confusion mentioned above, for it structured the screen environment unmistakably.

The metaphor of a “desktop” encapsulated much of the design strategy of the machine. Referential terms with concrete, imaginative associations allowed the user to navigate relatively easily—for example, the “Clipboard” was a temporary storage location for data, the “Scrapbook” a more permanent disk-based one. In theory, at least, both could store any kind of data from any application and import it into another. Thus one could mix pictures among the text in a word processor, and instantly see

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how the result would look on the page. A few years later, this principle led to “desktop publishing” (desktop is now used in its literal sense: one could devise publication-quality materials electronically and print them with the aid of a laser printer from atop one’s own desk)—this journal is an example. The notion of “windows,” or separate workspace modules devoted to components of a program lent additional visual orientation. One needed to make a window “active” by clicking the mouse button while the cursor was located on it before a particular set of responses could be invoked, a clever workaround the issue of “modes.” The Macintosh even reversed the appearance of type on the screen, so that it is seen as black print on a white page.

To enforce consistency in appearance among commercial programs, the designers placed more than 500 computer instructions, or subroutines in “ROM” (“read only” memory) and promulgated “Human Interface Guidelines” in booklet form. Both encouraged program developers to adopt a similar “look and feel,” so that the user could, as much as possible, employ the program “intuitively” (meaning, work with it successfully without bothering to read the accompanying manual). That two in-house products, MacWrite, a word processor, and MacPaint, a graphics application, were virtually the only reliable programs available for almost a year after the introduction of the machine contributed to the expectation of a “Maclike” way of doing things. (MacWrite is now often scorned by cognoscenti as “light duty” but it embodies the WYSIWYG, intuitive, and user-friendly criteria of the machine’s fundamental philosophy better than most subsequent replacements to date. In setting up a computer lab in a college, one might keep in mind that a decision to provide the latest in complex software gadgetry may be self-defeating, because of the steep learning curve required to master it. By analogy, teenagers taking drivers’ examinations for the first time will probably feel more comfortable with an automatic transmission than a stick shift.)

Very quickly, computer programmers discovered the “Law of the Conservation of Complexity”: in essence, the easier the program is to use, the harder it is to write. This resulted in a delay in new products, and a fear among the “flannel-shirt crowd” that the Macintosh might be orphaned as had earlier pioneering machines. New memory chips and a rapid outpouring of new programs (called “applications” for the Macintosh) in 1985 helped narrow the gap between the original vision and its realization. The public and corporate America ceased to regard it as a toy and the rest, as they say, is history.

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ABOUT EAR TRAINING

Before considering the programs themselves, and the place they may be given in an educational setting, we might consider what place ear-training itself has in the university curriculum and the education of a musician. One gets widely different answers, depending on whether one asks the performance instructor or the "music theory professional." To the performing musician, music theory is largely a means to an end—that end is simply, to hear better. This "outsider's" view of music theory might be summed up in a quotation from a recent review by Andrew Porter in the *New Yorker* magazine: "Elaborate analysis provides no certain help to musical understanding. Slogging through the *Journal of Music Theory* articles . . . will enhance . . . enjoyment . . . about as much as contemplating the circuit diagram of hi-fi equipment will enhance enjoyment of music proceeding from the loudspeakers."¹

But many sensitive performers of contemporary music know and seem to care little about the technical compositional bases of the music they interpret. What is necessary is to play in tune, and to have some sense of how the music fits together as a whole. Formal analysis is shunned by scholars as "garden variety": detailed diagrams showing how phrases interrelate and work together, presented in a manner understandable to the interested performer, is rarely attempted by the music theory professoriate, and hardly a staple of "research" journals.

Porter goes on to say: "But technical knowledge in some degree is always helpful. At the least, [one] should know how to adjust the controls of his machine so as to yield the best result."

The knowledge needed to adjust the controls correctly, of course, is not gathered from technical manuals but from an attuned and alert ear. Of all those musical techniques for too long now condescendingly referred to as "skills" that are present in some degree in the undergraduate curriculum, ear training is the most important.

The interests of that student constituency known as "music majors" that the university curriculum must address at present goes well beyond the traditions and repertoire of 18th- and 19th-century Europe. Amidst competing partisanships and the resulting compromises, one might think the one common need of all musicians, be they aspiring educators, composers, popular performers, and even scholars—a sensitive and comprehending ear, would be the single objective best met by the university.

Rather, it is the most haphazardly approached of all musical subjects and the one of least status! The neglect of developing sensitive hearing has not been reversed by the establishment of Ph.D. programs in music theory.

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These have erected artificial divisions between “pure” theory (hypothesis, actually), which is assigned formidable prestige, and the teaching of musical skills, deemed musicianship and regarded as unsystematic or unscholarly, and often relegated to persons lacking much formal training in theory. Many graduate students enter such programs with scanty systematic exposure to ear training, and as Teaching Assistants are only assigned to teach it (and presumably, learn it on the job) if they are deemed unfit to manage a section of lower-division theory. These students may never develop true expertise in musicianship, counterpoint, and voice-leading, prompting their faculty colleagues in performance later on to wonder what music theory really is, if it doesn’t include musicianship.

The refusal to acknowledge the bifurcated nature of the discipline does considerable damage to the professional world of music theory. The field fails to give convincing evidence that the teaching of music theory requires special training, and so the myth is perpetuated that theory belongs on the lowest rung of the academic musical ladder, for anyone can teach it.

It is ironic that ear training is most successfully done in a traditional conservatory whose aim is clearly fixed on the European heritage, such as The Juilliard School. In the educational continuum between university on one side and conservatory on the other, the closer the curriculum gets to the former, the less effective is its ear-training program, quite often.

The ability to hear and to communicate what one has heard is hardly a vague skill. It can easily be tested, and such tests in other fields are the grist of standardization, and very often, “research” tools. This is where the computer comes in, of course. Where are the comprehensive data, compiled upon entrance and exit, of decades of university music majors? Where is the “reality-testing” applied to theories of perception and cognition, as is common in the social sciences?

Ear training is an extremely labor-intensive task. Like the learning of harmony or counterpoint itself, it is best done on the same one-to-one basis as a private lesson in an instrument or voice. It was a questionable curricular victory for “applied” music (the tapestry of meaning that the use of this formerly widespread term has is simply too rich and fascinating to explore further here) to debase music theory by consigning it to the classroom, often to a large lecture hall. No one can reverse the decision to offer theory instruction in colleges only in classrooms. But the thoughtful computer program can reclaim in some small way the calm patience and alert adjustment to the individual’s need that mastery of the skill requires for many students.

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ABOUT MIDI

Several programs permit the sending and receiving of data by means of the Musical Instrument Digital Interface. A synthesizer attached to the computer (along with additional hardware, a "MIDI interface") will play the examples and the user is free to choose whatever timbres the synthesizer affords. The programs permit a response to be sent to the computer from the keyboard as well. Those programs that have been on the market for a year or so have been retro-fitted with "MIDI capability" in response to the popularity of such hook-ups. A computer "lab" in a university should be directed and established by theorists, with pedagogical values foremost, and convenience (computers as musical typewriters) second.

It is too early to tell what impact computer-controlled synthesizers will have on "academic" composition. One thing is clear: the impetus for their recent development has come mainly from popular music. Before universities equate a "computer music studio" with a collection of commercial synthesizers and micro-computers (and make a large financial commitment), the question of just how it fits in with the education of musicians might be addressed. Universities have never done a very good job of teaching popular skills (such as, how to write greeting card verse) nor should they necessarily try.²

In many cases, the technological gleam and electronic puffery of the synthesizer leads to courses (even at the graduate level!) culturally comparable to beginning instruction in accordion or electric guitar. (Do we see English Departments offering courses in "word processing?") And where does the with-it music school find its funds for such a "computer music studio?" Why, through cutting back undergraduate ear-training and part-writing courses, naturally!

LISTEN

Sets of exercises from beginning to advanced levels in melodic dictation as well as interval and chord recognition are provided by this program. A unique feature is both a piano keyboard and guitar fretboard on which to input notes. The user can experiment with either on startup or by selecting "No Exercise." These are visible in Figure 1 (see end of article). The middle window that runs the length of the screen is the "Progress and Evaluation" window. It has three "pushbuttons" on the left (Start, Next, Repeat—keyboard equivalents are provided) that control the exercise, and a sentence or two of instruction. The elapsed time counter ("stopwatch") below them may be removed: it shows how long the current set of exercises has been

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active. The squares over to the right from the stopwatch give information about progress of the current exercise. Each represents one note of the exercise. After the user has entered a note, the square corresponding to that note will change from the question mark to a check (correct) or "X" (incorrect). The two squares underneath the stopwatch provide reportage about the current set of exercises. The gray bars grow to the right as the number of correct or incorrect responses are tallied. (Outside of these bar graphs, incidentally, the program has no reporting capabilities.) There is no penalty for repeating the current exercise.

Communication to the user is also provided by the cursor, which takes on the shape of an ear (see Figure 1) when the user is to listen. It changes to a pointing hand when the user is to enter notes, and after the complete response, changes to a "happy" or "oops" face. The cursors are small, but they give a direct visual response and do not require the user to look away from the keyboard or fretboard.

The "Notation" window shows all the notes of the current exercise. This feature is of limited usefulness, because it displays the entire answer before one begins to respond. If kept hidden most of the time, however, it is useful as a reference if one gets stumped. The "Control" window allows the user to set four parameters: varying the "pace" and "duration" will result in legato or staccato notes. A group of twenty different timbres may be selected (most with fanciful titles): the current one is identified on the bottom line. The timbral choice is welcome in a long session, but as they are all produced by Macintosh software, they have a monotonous "electronic" similarity.

The sound output for the program is through the Macintosh speaker, or a pair of headphones. The program will also send and receive MIDI data so that an external synthesizer may be attached. Typical of the nice touches of this program, the three pushbuttons in the "Progress and Evaluation" window may be assigned to notes on the MIDI keyboard, so a set of exercises may be run conveniently without having to return to the mouse.

Separate sets of exercises exist for interval spelling and name, the latter by multiple-choice. Similarly, seventh chords may be identified by quality or may be spelled. Inversions of chords may be identified by multiple choice. Ninth, eleventh, and thirteenth chords (four notes, root position only) are also available, so the program has a special appeal for jazz and popular musicians. Further exercises include "random atonal chords" (unfortunately, never displayed in the "Notation" window) and "Growing Melody." This type of exercise begins with one note and grows as the user correctly identifies additions. If one makes an error, the melody is repeated, and only grows in length again after a correct response.

A menu item provides five levels of difficulty that apply to the

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subsequent choice of any type of exercise. Also, a "User-Defined Level" causes the program to save to disk the parameter settings preferred by the user. This is a very useful feature. One can use the program at a later date, beginning exactly where one left off.

The user is given a very wide choice in defining the limits of the exercises. One can choose the range within which the pitches will fall, the starting note, the set of pitches available (for example, for "melodies," from one pitch class to the total chromatic) and whether intervals or chords will be "locked" (anchored by a user-specified pitch as top or bottom note) or appear anywhere in the chosen range. An "Auto-Select Materials" option will cause the program to cycle through a set of "dialog boxes" that permit adjustment of the content of each set of exercises. The option of "Sounding Answers" may be turned off, so instead of hearing the note of each key as it is clicked by the mouse (the only way to enter notes), one must wait until the entire melody has been entered before the program responds. This is similar to the classroom technique of dictation, where the student must take down a complete melody before receiving comment.

Listen is packaged with an excellent 86-page professionally written manual that explains the operation and features of the program in exemplary fashion.

From the music displayed in Figure 1, the reader can readily discern that this is primarily a pitch-recognition program. The "melodies" devised by the program appear to be at random from within the specified parameters. As was mentioned earlier, the durations of all notes are the same. These factors might appear to be inartistic limitations, but they strengthen the basic premise (identification and naming of simple musical phenomena) by excluding other considerations.

Listen fulfills its purpose admirably. It can be recommended to a motivated individual for valuable practice—for example, a graduate student who failed an incoming ear-training examination. Numerous copies in an ear-training "lab" should tempt diligent and persevering students to make significant progress.

PRACTICA MUSICA

This program is closer to emulating the experience of a college student than the preceding product because it contains a considerable amount of practice in what is often called the "basics" of music theory—spelling intervals and chords. Notes are entered primarily from the keyboard: the ingenious solution to enharmonic spelling is shown in Figure 2. For the sets of exercises in harmony, one may also click notes onto a staff.

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An interesting feature is the possibility of hearing any exercise in one of nine different tuning systems. Another is digitized sound—the timbres of piano, organ, and harpsichord are astonishingly well reproduced. A consequent drawback is that the tempo cannot be altered except in the exercises in melodic dictation. Also, thanks to digitizing technology, rousing applause signals the successful completion of a level. MIDI data can be transmitted, and the user can input notes from a keyboard. The program has a “practice” mode that enables the user to experiment with the tuning systems and with notation. As notes are entered, they are classified immediately as to interval or chord, so the program functions analytically in a rudimentary fashion.

The activities available are divided into “Theory” and “Ear-training.” In “Theory,” one practices the spelling (and hearing) of intervals or chords. The user is free to indicate the notes in open or close position, and in any order. For example, faced with a request for a half-diminished chord on G in second inversion, the beginning student could write the chord in root position and then go on to interpret the “second-inversion” part of the question by removing the B-flat in close position and clicking a lower one. If the answer is partially correct, the program will “analyze” it as to root, type, and inversion, comment on which of these were correct, and show an acceptable solution in musical notation placed on the screen next to the student’s response so they may be compared. Menu choices provide “Help” screens containing thumbnail synopses, and half of the manual (17 pages) is an “Introduction to Harmony.” About these, however, the less said the better, insofar as current thought in music theory is concerned (“the triad . . . [is] two thirds stacked together”)—they are on the same lamentably³ obsolete level as, say, Paul Harder’s *Harmonic Materials in Tonal Music*.

“Ear-training” provides six levels of difficulty in identifying intervals. One must identify the interval by name (multiple choice) and then click its second note on the keyboard. The beginning levels provide two choices of related intervals (fourths and fifths, for example) and proceed to add new ones as the user is successful. This tutorial approach is very effective.

Some of the algorithms that create the exercises could use refinement. In interval practice, this reviewer encountered the repetition of certain intervals with the same notes, even if they were answered correctly before. In the higher levels, very easy questions are found among the more advanced skills—frequently a waste of time.

The Melodic Dictation portion offers four levels of ten tunes each, ranging from “My Country, ‘Tis of Thee” to Stravinsky’s *Symphony of Psalms*. The program only checks for pitch accuracy—the correct note values are automatically made visible. A drawback is that there is no “authoring” capability for new melodies to be added to the pool. There are

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also four levels of computer-generated melodies. These are not completely random, but center around the tonic as specified by the user (except in chromatic exercises). The user may select key signature, scale (pentatonic through the total chromatic, including the church modes and the octotonic scale) and meter (including 5/4 and 7/8). Unfortunately, the melodies are played in a rhythmically expressionless manner. A useful feature is the "play first part" pushbutton (shown in Figure 2). Just a few of the notes are given when this option is selected. As one's notation of the melody progresses, the amount played is lengthened accordingly. The number of new notes beyond the notated portion may be easily changed. As the pushbuttons in Figure 2 indicate, the user can hear the entire melody at once, or hear a notated version of it.

Practica Musica has limited reporting capabilities. It will state the highest levels achieved in various categories and the number of melodies successfully entered. The several sets of exercises are called "games" and are scored in a possibly frustrating fashion: one must accumulate a certain number of points to complete a certain level. One cannot even try out a higher level until all lower ones have been successfully completed. In scoring, the program requires a certain number of consecutive correct answers, and it will subtract about half of the current score for a mistake. Pity the person who has gotten 29 points (out of a needed 30) for the "master level," only to be busted down to 15 after a false slip of the mouse! The decision to force the user along a single pedagogical path reminds one of fascistic "programmed texts": at least in a textbook, one can skip ahead! Adventurous users often try to find their own level through experimentation—only settling down to learn a program well after they have toyed with it, quite in the manner of a film composer acquaintance of the reviewer's, who, upon receiving the recording of Schoenberg's *Moses und Aron* and having never heard or seen it, turned straight to the "Orgy" scene.

Practica Musica can be very helpful in drilling students in the rudiments of chord spelling, and in gaining familiarity with the piano keyboard. The advantage that the computer has over any workbook is that the student can hear the notes when clicked, can hear the entire sonority, and if in error, can compare the answer both aurally and visually to the correct one. The ear-training melodies are well chosen and useful for students who have already mastered rudiments. Many of them will challenge a member of a second-year ear-training class. The computer-generated melodies are, if not really musical, at least conformant to many expectations of a coherent statement.

Lastly, it must be observed that seemingly no pains have been spared to make the product attractive and comfortable: a set of headphones is included; a practice pad of staff paper for dictation exercises; a short, but

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complete, manual; and a handy "quick reference" card of intervals and chords. [Editor's note: I might add that the distributor for this product is unusually cooperative in responding to communication, providing update information, etc.]

EAR-TRAINING EXPERT

This package consists of two disks, a manual describing the programs and a textbook/workbook. Outwardly, it seems to have been designed with the college undergraduate in mind. This explains the pricing structure, which encourages purchases in quantity by a bookstore or other student outlet. The authors use the term "softtext" as a combination of "software" and "textbook."

The organization of the textbook portion is problematic. Chapter 1, "The Nature of Music," discusses the physical properties of sound with reference to sine wave, amplitude, frequency, and period. This material is irrelevant to beginning ear training, and could be left out or placed in an appendix. The chapter introduces three small programs on Disk 2 that demonstrate manipulations of waveforms. These seem to have been written by the authors to learn Macintosh programming. The programs do not conform to elementary expectations of the Macintosh Interface and they do not even stand alone—they require a BASIC run-time module. They reminded this reviewer of the "freeware" widely circulated among users' groups back in 1984-85; they appear embarrassingly unsophisticated today and should be rewritten into a single program or discarded. An irritating quirk is the pompous term "End Session" instead of the universal "Quit."

That the technicalities of the first chapter seem misplaced is evident by turning to the second, which introduces terms such as "the staff," and what a clef is. All the C clefs are described before the treble and bass are mentioned. Subsequent chapters are devoted to meter, scales, key signatures, intervals, triads, and chords. These read as if the authors simply sat down at the word processor and hastily typed in their recollections, grouping things in the laziest way, by topic. A few useful tips are included, such as those mnemonic gimmicks a Teaching Assistant might give out. In a college situation, all such material would be covered in the first semester of elementary theory.

These examples point up the difficulty of trying to determine for whom the book is intended. The textbook portion is so rudimentary that it seems aimed at the "teach-yourself" market, but the workbook portion implies an organized classroom approach. The workbook is roughly equal in length to the textbook portion, and contains questions reminiscent of

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those "programmed texts" that exist mostly for the sake of multiple choice tests, such as "what is melody?" to which the following should be regurgitated: "melody is a succession of pitches which is perceived by the mind as a unity." This is hardly something that anyone can consider meaningful music theory any more. The workbook also contains notation and identification exercises for the topics in the textbook portion. These would have to be corrected by an instructor. One of the advantages of computer-based learning is that students can "hop around": they can acquire confidence in the consonances and then proceed to triads and their inversions, rather than trying to master all the intervals before continuing on to triads and chords. In fact, many student can differentiate major and minor chords and yet have trouble identifying their intervals.

The authors could have dispensed with the "softext" idea altogether if they had used much of the workbook as a blueprint for additional features in their computer programs. For instance, there is a worksheet devoted to clef practice: "Transpose the following notes to the various clefs." (One questions whether "transposition" is the correct term for rewriting a passage in another clef—such sloppy usage is not isolated.) The computer is very good at this type of simple drill, and students benefit from immediate response. Besides, it is terribly tedious to correct such exercises—ask any Teaching Assistant!

The main pedagogical material is found in two separate programs, "Tutor" and "Drills." Neither offer musical notation, a serious flaw, nor any grouping of exercises by level of difficulty. The former offers ear-training exercises in major and minor scales; church modes; the pentatonic, whole-tone, and chromatic scales. The user can choose the length of the excerpt (1 to 100 notes) and the tempo. Also, one can select a key, or let the computer choose. (It must be noted that many of these segments stretch extravagantly the authors' definition of melody cited above.) The user must click keys on the screen representation of a keyboard to enter notes. All notes are equal in duration. The program will only determine if the user clicked notes in the same sequence as they were played by the program. The process of entering longer segments can be quite confusing. Curiously, the textbook offers little advice in how to use the program. It would be this reviewer's recommendation that the student take down the dictation on music paper completely before proceeding to the separate task of entering the response, which may be trickier. A pushbutton, "Display My Response," will play back the student's answer as the corresponding keys flash. This implementation appears to be inconsistent with the textbook, which emphasizes notation.

"Drills" is an identification program for scales, intervals, triads, and seventh chords (arpeggiated or simultaneous). The user can select how many different kinds of each type should be included. There is no way to

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mix in the same set of exercises, say, intervals that ascend or descend from the first pitch given. Lacking perfect pitch, the user has no way of knowing what notes are being played—the program tests for interval or chord “quality” only. (While there are probably still some instructors left who teach in a likewise fashion, the program should be enriched with the possibility of knowing what notes are played, to help develop the student’s relative pitch.) The user responds by multiple-choice pushbuttons. Unfortunately, those types the user has left unselected are not dimmed or removed. The program suffers from a cumbersome interface: one can’t even use the menu bar when a specific set of exercises is active.

Both programs provide very detailed reports. These could serve to prove to an instructor that a student had really done the homework, by practicing an assigned drill. (The crafty student, however, could save a report on disk, and modify it.) If there were a statement by the authors of how the report might be used, the data, which tracks nearly every click of the mouse, might be more pertinent.

Ear-Training Expert seems to be a rough draft. The programs are so slight that the product probably couldn’t be taken seriously without the accompanying book, which contains an unimaginative rehash of what might have passed for basic theory 30 years ago—the bad old days when music “theory” was music “fact.” Programming gaucheries aside, the authors lack a fresh perspective on the materials they present. Especially telling is the lack of insightful organization about how human beings actually learn and process what they hear. This could signify an insufficient background in contemporary music theory, the corrosive effect of programming in BASIC, or both.

MacGAMUT

This product was furnished to the reviewer in an unfinished state (“beta-test,” in the jargon). Therefore some of the deficiencies mentioned below may have been corrected by the time commercial distribution is in place.

This program (an acronym for Graded Aural MUsic Training on the Macintosh) drills beginning students on basic musical materials (intervals, scales, chords). It was developed at The Ohio State University, where it has been tested on more than 300 students. Some of its idiosyncrasies stem from the constraints under which it was originally written. An administrative decision resulted in Macintoshes being set up in a lab without keyboards, so the program is entirely “mouse-driven.”

The product actually consists of six parts: “MacGAMUT start,” which

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is a kind of traffic controller; separate programs entitled, "Intervals," "Scales," and "Chords"; and two others. If one double-clicks directly on one of the last three named programs, a message will appear telling the user to click on "MacGAMUT start" to begin work. This is eyebrow-raising, to say the least, for anyone used to the "look and feel" of commercial programs. A much tidier solution would be a single program icon that would later branch into the three areas of drill. "Get Stats" and "Set Params" are programs whose separate existence is justified. The former will provide statistical information on a student file: current level, total numbers correct, the number tried, and the total time spent on each of the three drills. The information could be made available in a visually less demanding format, but the idea is a good one. (It is easy to imagine the following scenario: each student submits a disk at the beginning of class and a Teaching Assistant processes each one with a revised form of this program designed to accumulate data for the entire class, and display it in charts and bar graphs. This kind of rapid analysis would provide valuable information in setting up the next ear-training class session.) "Set Params" need not appear on a student's disk at all. It will adjust the options available to the student in the drill programs. The instructor can set the number of correct answers needed for "mastery" of a particular level, how many chances the student will have to answer correctly, whether the student can choose the tempo, and what clefs will be used for display. One hopes that a revised form of "Set Params" will be forthcoming that will automate this task, so that a Teaching Assistant could feed rapidly an entire class's worth of disks into the computer, setting each disk's parameters identically. Figure 3 is a screen shot from "Set Params," and Figure 4 is a sample of the dialog window presented to the student. (Unavailable choices are dimmed.) The care with which the learning structure has been devised is evident. It should be noted that the instructor is free to rearrange the order of levels present in Figure 4 to meet particular needs.

Each module (intervals, scales, chords) combines listening and notation. For example, in "Scales," at first the student is asked to enter the entire scale (including accidentals) by clicking and "dragging" (moving the mouse while simultaneously depressing its button.) Higher levels present the scale already on the screen, and ask for the accidentals to be provided. The module tests for the major scale and the three forms of the minor scale. The "choices" mentioned in Figure 4 refer to the number of multiple choices offered. For instance, level one (intervals) asks the student to choose among "m3, m6, M7." This will build confidence with beginners. In the more advanced levels, the program will accept different answers when the range of choices make it possible; for instance, an interval of 4 semitones can be labeled as a "d4" or a "M3." If the student has responded incorrectly after

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the specified number of attempts, the correctly notated solution appears on the screen alongside the student's effort, along with three additional push-buttons: "Play Notes" (those that the student entered), "Play I.D." (the name that the student chose) and "Play Correct." Incidentally, it is pleasing to note that for questions about triads, the user is asked to click " $5/3, 6/3$ or $6/4$ " rather than "root, first inversion, second inversion" thus underlining the intervallic constituency of the triad.

Reservations this reviewer has about *MacGAMUT* deal mostly with its appearance and operation. After all, a person used to driving a car expects the accelerator pedal and gearshift to be in fairly standardized locations. For a motorcyclist, the positions are different, so it is less a matter of logic than habit and the safety and convenience that accompanies it. The standard "Apple," "File," and "Edit" menus are not supported (see the menubar of Figures 3 and 4). The music notation is large and exceptionally clear, but the pushbuttons are occasionally uncomfortably close together. Sometimes these buttons are inoperative without a visual cue and occasionally they disappear (dimmed buttons is the expectation in both cases). An on-screen tutorial appears in reverse video if one has selected "Get Instructions" from Figure 4. It has the slight advantage of permitting the user to try out some of the buttons while in this mode, but it is bewildering and "anti-Mac" in its layout. Instructions should be available as a menu item, and the text should appear in a separate scrollable window. The program fulfills its purpose admirably, but lacks panache. It is somewhat fragile, too: this reviewer encountered numerous system errors.

The pedagogical basis of the program, however, is excellent. It could be integrated very smoothly into a standard college course in beginning ear training. It has the advantage of teaching notation at the same time. Certainly it is foolish to separate written and aural skills at beginning stages, and *MacGAMUT* encourages a unified classroom approach. An instructor might want even more flexibility in arranging the levels, however. Usually the higher levels incorporate materials already mastered. For example, one may wish that "major-minor" and "major-major" chords could be left out of a level so there would be more drill in differentiating "minor-minor," "diminished-minor," and "diminished-diminished" chords. Similarly, it is a waste of time to be presented with a unison or a perfect octave at a high-numbered level. There is no MIDI capability as yet, but it is promised soon.

MELODIC DICTATOR

In August 1987, Apple Computer introduced a new software package called *HyperCard* written by Bill Atkinson, the programming whiz who

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developed *MacPaint*, the revolutionary graphics program that came bundled with the original Macintosh in 1984. The company has thought highly enough of *HyperCard* to have it included with all Macintosh computers sold since then, encouraging its acceptance as system software. Attempts to define this new product have stymied the popular press: Atkinson himself is reputed to have referred to it as a "software erector set." Perhaps "unstructured information management program" is as close as any other definition. Central to the concept of the software is the possible customization by the user through levels of program control ("authoring" and "scripting") in its own interpreted language, HyperTalk. In this way, the terrifying steep learning curve for mastery of Macintosh programming is circumvented to a considerable degree: HyperTalk becomes the software equivalent of the Macintosh itself as the programming language "for the rest of us." Speaking generally, herein lies its main drawback: persons with no background in programming can assemble a visually attractive format in much the same manner that a person with no musicality can draw many varied sounds from a "state-of-the-art" (the irony!) synthesizer. *HyperCard* lowers the barriers to programming, but, as Ansel Adams was reported to have said, the ability to operate a camera does not necessarily make one a photographer.

Melodic Dictator appears to be the first example of a pedagogical program in music developed with *HyperCard*. The version furnished for review was an advanced "beta-test" copy. It is accompanied by MIDI *Dictator*, a variant that will play the exercise on a MIDI device and will accept input from a MIDI keyboard. They were written by David Gregory, director of the Center for Performing Arts and Technology at the University of Michigan. The program has a template file (files are called "stacks" in HyperTalk, a metaphor deriving from a stack of cards, as used in a Rolodex file) for use by an "author" to create "student stacks." These stacks can then be distributed without the component of the program that authored them. Therefore a consideration of the program must have two viewpoints: one of the instructor responsible for putting the student stack together, and another of the student, or "end-user."

Melodic Dictator is designed to be used in a university setting, for some individual (a professor or Teaching Assistant, more likely) must devise a set of 24 single-line dictation exercises (no more, no less) and enter them into the computer. Each line may have up to a maximum of 15 notes. Various note values may be used. The premise is admirable—the instructor has control over what students hear. As instructors entering notes progress from melody to melody, they can build on the earlier ones by adding, changing, or inserting notes (provided that the clef is not changed). This feature makes *Melodic Dictator* an actual teaching tool, not just a repetitive testing machine.

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One could establish certain structural intervals (e.g., the perfect fifth) and lead the student to hear others, such as a minor sixth, as the structural interval plus a semitone, rather than as something in-and-of-itself, which it rarely is in tonal music.

However, tedious is too kind a word for the editorially inflexible and dreadfully slow process of entering the notes for the exercises (this reviewer used a Macintosh SE with an internal hard disk). The combination of the "pointing finger" cursor (see Figure 5) and the narrow spacing of the staff lines (five pixels) results in frequent input errors. This reviewer found on several occasions that a situation arose that required quitting the program in the midst of assembling a student stack. Without a detailed knowledge of *HyperCard* programming, such misfortunes mean starting all over again. Since it takes at least an hour to enter 24 melodies of respectable phrase length, the tedium quickly reaches maddening proportions. Here is clearly a case where an attempt visually to mimic a real application in *HyperCard* defeats the intent of the Macintosh (ease of use). As the authoring component is not meant to be seen by the student, it could be altered to accept and translate a simple text file. Then, using a simple input code (for the range is limited to two octaves, and the note values to 10), the instructor could employ any word processor to edit an input file, which would remain in a convenient form for future modification. A small subset of DARMS would be appropriate.⁴

Students are presented with a screen similar to that in Figure 5. After listening to the example played by a digitized instrument (no limit to the number of times), students must click on a note value, and then click on the line or space of the staff to enter the answer. They cannot change the tempo, and the program cannot play the students' response so they may compare it with the correct solution. Entering notes is just as slow and tedious for them as for the instructor-author. There are no reporting capabilities. Obviously, the notation is confusing and unclear—notes are not centered squarely on lines or spaces, and stems always point upwards. These are not habits we wish to encourage among undergraduates. Numerous "bugs" still afflict the program: one had the effect of turning the cursor into a "drawing tool"; another turned on "text insertion" when the user hoped to enter additional notes; and a click on the "Help" button while the answer was present (obtained by click "Check") found the answer floating disconcertingly on top of the "Help window."

MIDI *Dictator* is a more successful and flexible program. The notation is much faster and clearer. One can range over the entire grand staff. The instructor can determine in advance how many exercises will be in a student stack, and how many opportunities the student may have to hear the melody. After it is sounded from the synthesizer, the program goes

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immediately into "record" mode so students may play it back without delay. Unfortunately, the program does not test for rhythm: it permits the quarter note value only. When students select "check," the response appears on the screen along with a comment telling how many of the notes were played correctly. At the end of a set of exercises, a cumulative score will be given. The program will not recognize as partially correct an instance where the student played back the exercise intact, but added or omitted a note at the beginning. A more sophisticated checking algorithm would place the intervals of the exercise into an array, and make several comparisons with the student's response. As the classroom instructor knows, frequently a student will get one interval wrong in a dictation, but most of them correct. At a glance, the instructor can see that one misapprehended interval might cause the remainder of a student's melody to lack the correct pitches. However, most of the exercise might be correct if viewed as a string of intervals. More attention to the pedagogy of ear training as a "research" field might result in programs that assist the student in such ways.

Both programs are valuable in that they give the instructor the capacity to design all the exercises. They point in the direction that useful ear-training programs might go, for they allow instructors to make many of the same choices they would make in choosing exercises for a Teaching Assistant to use for drill in a lab session. *Melodic Dictator* may be summed up as a tempting prototype. *HyperCard* is too clumsy a choice for its realization: a re-working as a compiled program with flexible editing and input facilities is needed before its widespread acceptance can be foreseen. One can envision ready-made student stacks that would be accompanied by a printed copy of the melodies present in each, for selection by the instructor. While this would reduce the unacceptable level of boredom that putting together a stack presently takes, it would vitiate the most valuable feature of the program's design, the opportunity for customized authorship.

PARSIFAL

This program was not designed as a pedagogical tool, but it is included for review because it shows the ways in which *HyperCard* may be used as a database that can branch effortlessly in many directions. It is in "continuous development" by its author, an amateur opera lover. While in its current form it displays opportunities for further refinement, it is nevertheless a good and imaginative introduction to the way in which *HyperCard* might be used as an undergraduate instructional aid. A "home screen" for the stack presents eight topics (Characters, Interpretations, Leitmotifs,

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Production, Sources, the Story, Recordings, and References). The stack builds on the inherent strengths of *HyperCard* to link data through multiple cross-referencing. For instance, "Characters" presents the user with a list: by clicking on keywords (prefixed by "•") within "cards" assigned to the various personages one can hear an associated leitmotiv by means of digitized sound, see a digitized picture of an opera singer costumed as the character, and so on. "Production" links commentary to pictures of stage sets.

The nature of *HyperCard* is evolutionary: any user can easily add bibliographic data or update various parts of the program with additional text, pictures, and sound. While the concept can be compared with a set of class handouts, the stack can be much more easily modified and enriched, and simple animation could demonstrate, for example, stage blocking in a way impossible on paper. Seeing or hearing similarity in seemingly dissimilar passages—the creation of links and references—is an important goal of music analysis, and a well thought out *HyperCard* can help tremendously. One can foresee the widespread distribution of such electronic "handouts" in the near future.

MacVoice

This program offers assistance in part-writing: four-part chorale-style exercises, the basis of much elementary study. Figure 6 shows the basic layout of the program. Up to 50 chords may be presented in a scrolling (left-to-right) window. Entry of notes is very fast, and editing is straightforward by means of special cursor shapes. The staff lines are seven pixels apart. Voice crossing is possible. A roman-numeral analysis is instantaneously made below the bass staff. All chords are interpreted in terms of the scale degrees of the tonic key, which is determined by the key signature as selected from the "Settings" menu, so a modulating passage will not be analyzed as such. An example can be heard through the Macintosh speaker, and it may be saved as a file.

MacVoice is very well written, from a programming standpoint, but weaknesses abound in the domain of music theory. Some questionable errors can be seen in Figure 6. The program will cite the progression of scales degrees 8-7-6 harmonized with I-iii-IV as incorrect ("leading tone doesn't go up to tonic . . ."). The pattern 6-7-8 harmonized as IV-vii°-I is incorrect if the augmented fourth in the middle chord ascends to a perfect fourth. In a root-position dominant-seventh chord, it is wrong to leave out the fifth, even if the root is doubled. In some instances, the program did not spot a root-position dominant-seventh chord whose seventh was led upward to

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the fifth of a tonic chord in 6-3 position. So-called "stationary octaves" (between two perfect intervals, one pitch stays the same and the other leaps an octave) are found to be "parallel octaves or unisons." This reviewer found that every case of a triad with a doubled third was considered incorrect. No rhythmic advice is offered, even as to the alternation of strong and weak beats (which could be rather simply accomplished, as chords are numbered odd/even), and so abused cadential 6-4 chords will not be caught.

The concept is excellent: the program is analogous to a "spell checker," which is a feature of many word processing programs. But *MacVoice* is disgracefully simplistic. It exhibits far too many of the faults associated with unimaginative teaching of part-writing: too much reliance upon too few and over-generalized rules, and ignorance of the practice of musical literature. It is a rule-based rather than a conceptual approach, and it seems to ignore the strides that have been made in basic harmony textbooks of the past 15 years, let alone the "research" side of the profession. The program could help a student achieve a very narrowly cast kind of correctness, one unconnected with the practice of most music. Its appeal seems limited to the dull, methodical student who might later become the kind of theory teacher who finds satisfaction—even pleasure—in placing a roman numeral below every verticality (be it Bach, Beethoven, Debussy, or George Crumb).

Programs of this type hold great promise, however, as in many cases the part-writing component of basic harmony classes has been diminished due to the labor-intensive nature of correcting student papers. The areas of artificial intelligence and "expert systems" offer significant opportunities for research topics.

PALESTRINA

This program was developed by David Evan Jones at Dartmouth College, a member of the "Apple University Consortium." Dartmouth is the source of many interesting and high-quality programs for undergraduate use in a variety of fields. *Palestrina* checks voice leading in the area of sixteenth-century sacred vocal polyphony (the "Palestrina style"), as understood by Knud Jeppesen.⁵ The program will examine two-part exercises in first, second, and fourth species. Up to 12 notes are permitted in the Cantus Firmus. The user may choose from a variety of clefs. The screen allows one to enter a line both above and below a given cantus, and although they are understood to be independent of each other, the program will play them simultaneously if the checkboxes above and to the left of each clef are activated. Errors in the line are marked with an "X" above the staff. When

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one clicks the "X," it is then surrounded by a square, and a comment appears in the message rectangle near the bottom of the screen. A comprehensive series of "help screens" is available at all times from the menu item "Rules" (see Figure 7): an error comment is preceded by a number so the student may then proceed to the appropriate screen for further guidance.

Use of this program permits the student to turn in virtually error-free counterpoints so that class time can concentrate on aesthetic refinements. The printed copy will be welcome to the instructor who has become weary of sloppy assignments. The program comes with seven files of cantus firmi and 12 fully worked out exercises, so the student may become familiar aurally with the expectations of the style. The ability to add barlines (*Mensurstrich*) is a nice feature, although a global on/off for barlines would be more elegant and useful.

Jeppesen's observations about "the striking difference in the treatment of ascending and descending movement"⁶ is an important point of style that the program does not address well. Nevertheless, *Palestrina* is a very fine program and should make counterpoint study more productive and efficient. One looks forward to future programs from the author for third and fifth species, and for counterpoint in three and four parts.

Ironically, students and many instructors unburdened with a sense of the history of music theory have come to believe that "traditional" music theory study is basically the study of harmony from a book such as Piston's.⁷ With programs like *Palestrina*, species counterpoint may regain, in the pedagogy of tonal music, the former noble position it held in the eighteenth and nineteenth centuries. Eclipsing the conceptually bankrupt "direct approach" would be an added plus.

MUSICAL GRAPHICS

Space does not permit detailed comment about "note processors" but the interested reader is directed to two for further investigation. Provided that one does not need a system with more than eight staves, *Deluxe Music Construction Set* is a good choice. It permits a more flexible approach to editing than its expensive cousin, *Professional Composer*. As it is graphically based, it is better generally for piano music than *Professional Composer*. Its staves are 20% further apart, too (five pixels; *Composer*: four), so for brief examples and handouts, the instructor need go no further. It will also handle large compositions. It provides direct MIDI output, and it supports the "Sonata" musical font developed by Adobe Systems for high resolution printing on the Apple LaserWriter and related printers.⁸

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Professional Composer will handle very complex scores, and is best suited to music for instruments that perform one note at a time. Complicated piano music requires each line with a different rhythm to be entered on a separate staff, then merged. In theory, at least, the program will make a piano reduction from a large score, and also extract and transpose parts. Meticulous musicians will find that the program does not quite live up to its claims. For instance, the program controls how many measures appear per system: overriding its preferences must be done as a system-by-system workaround. The latest version of the program supports the "Sonata" font. A related product from the same company, *Professional Performer*, is a sequencing MIDI program. A feature that will be of interest to readers of this journal is its ability to export files to *Composer*. Therefore, one may play a piece at the MIDI keyboard under *Performer*, then switch to *Composer* and have it appear in musical notation, where it can be refined—clefs changed, lines transposed, or note values altered. For someone with keyboard proficiency, this is the fastest way to enter a score. A host of pedagogical tasks can be made easier thereby, from the preparation of worksheets for freshman theory to the making of performance editions in a graduate seminar.

GENERAL OBSERVATIONS

Several of the programs use a "random" method of generating pitches or for choosing intervals, or chords. Some sort of "memory" should be built into the programs so that one doesn't get the same type of example too often, especially easy ones. For example, in the hardest level of a "chord-quality" identification program, this reviewer was presented with three major root position chords in a row! Many of the programs employ some form of copy protection, which can be a headache for the user of a hard disk. More sophisticated algorithms need to be written, especially to handle rhythm, and systematic "research" needs to be done in learning theory, perception, and cognition.

It is the music theory component of many of these programs that is weakest or obsolete. That is not completely surprising, as only a few first-rate institutions seem to recognize the connection between the latest "research" and the classroom (as is taken for granted in many other fields) and demand trained theorists. "Research" as would impinge upon ear training is not forthcoming due to the low esteem in which it is held, and even at such places ear training is often taught at a level far below that of musical analysis. It is not surprising to learn that several programs reviewed here are the work of former graduate students in music who applied their

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programming knowledge to the chore after a year or so in the classroom. Sometimes one felt that an author had an urge to program something musical, cast about for topics, and not too surprisingly landed on elementary ear training. When as much (or more!) effort goes into the central task of *what* to program as has gone into mastering the complexities of the Macintosh interface, then we can expect products that will take computer-assisted instruction to a new plateau.

Above all, trained music theorists should become engaged in program design, and in the study of perception. The field of music theory should award a new dignity to such studies: presently it still confers pariah status on topics remotely pedagogical. There should be much more dialog about the goals of ear training, and more knowledge needs to be gained about the "mind training" that is so crucial a part of sensitive hearing.

SUMMARY

Computer-assisted instruction is still in its infancy. Much of it is automated routine testing. But when one compares most of the programs reviewed above to such a simple program as *Melodious Dictator* for the Apple II[®] (still available, and for \$150), one sees just how far things have come in a very short time. These programs afford the motivated student an opportunity to attain a level of proficiency that most courses cannot match. They point to a future of increasingly powerful products that will truly enrich the study of basic musicianship, and thereby lay the foundations for increased musical sensitivity.

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Figure 1. Listen.

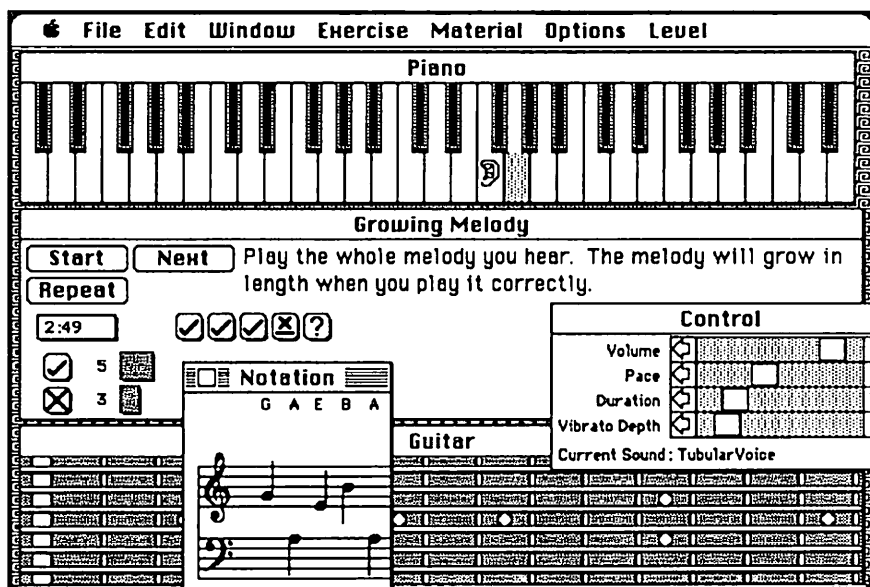
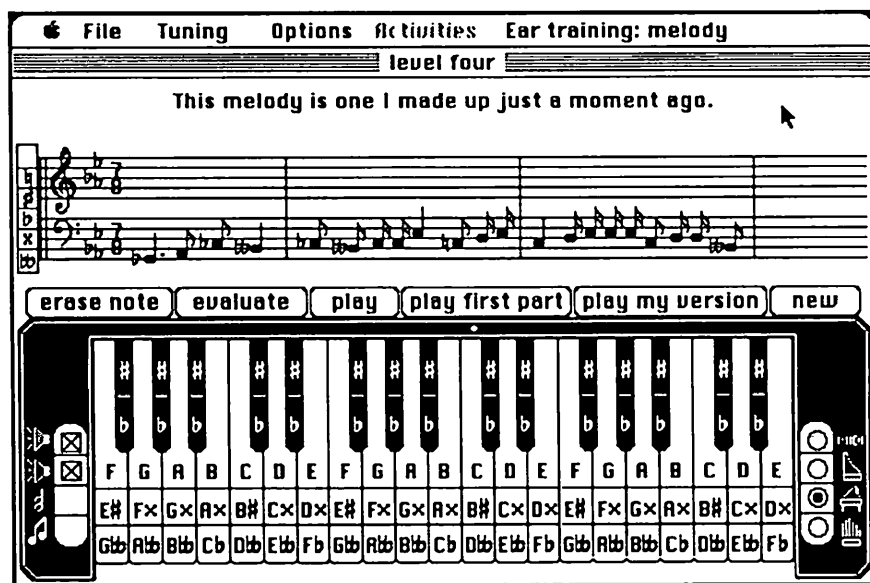


Figure 2. Practica Musica.



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Figure 3. MacGAMUT.

Please set the parameters for "MacGAMUT:Intervals":

Clefs to be used		Each example will be played 2 time(s).
in lower levels	in higher levels	
☒ treble	☒ treble	Answers will be checked 2 time(s) for each example.
☒ bass	☒ bass	The student must answer 8 of the last 10 examples correctly to achieve mastery on each level.
☐ alto	☐ alto	
☐ tenor	☒ tenor	

The use of double sharps and double flats will be minimized

☐ in early levels	☒ Student may choose starting level.
☐ in all levels	☒ Student may change tempo.
	☒ Choices will be randomly selected.

Figure 4. MacGAMUT.

Tempo

MacGAMUT: Interval Dictation

Please choose the level you want to work on by clicking in the circle next to the level description. When you are ready to continue, click OK. Click CANCEL to return to wherever you were before.

☐ Get instructions	☐ Harmonic, 6 choices
☐ Melodic ascending, 3 choices	☐ Harmonic, all choices listed
☐ Melodic, 4 choices	☐ Harmonic, all choices
☐ Melodic, 6 choices	☐ Everything possible!
☐ Melodic, all choices listed	
☐ Harmonic, 3 choices	
☐ Harmonic, 4 choices	
☒ Melodic, all choices	

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Figure 5. Melodic Dictator.

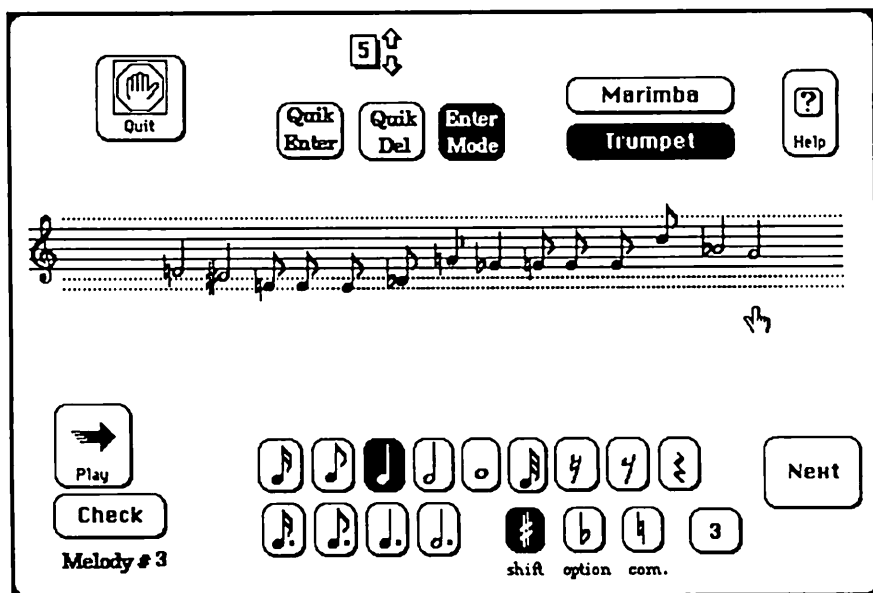
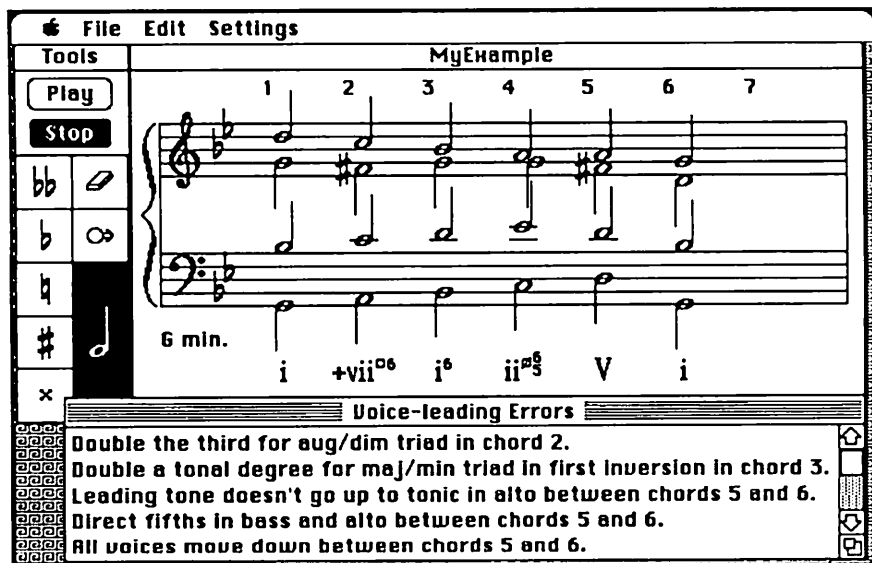
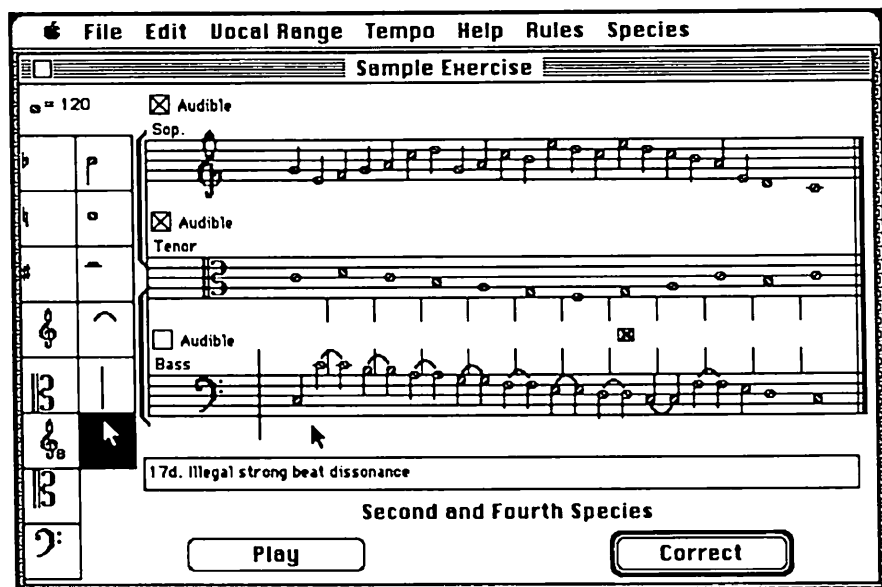


Figure 6. MacVoice.



SOFTWARE FOR THE MACINTOSH

Figure 7. Palestrina.



NOTES

¹Porter, Andrew. Musical Events. *The New Yorker*, Vol. LXIII, No.12, 11 May 1987, p. 101. This is not to disparage the intellectual ferment that the *Journal of Music Theory* represents. That publication has been a standard-bearer in the struggle to have music theory recognized as a serious academic discipline. Without it, Paul Harder, Walter Piston and other such "cookbook writers" might still be considered insightful theorists.

²Two highly interesting papers appeared in *College Music Symposium*, 17/1, addressing similar issues. One is by Allen Forte, "Music Theory in Re-Transition: Centripetal Signs" (pp. 156-162) and the other, by Carl Schachter, "Diversity and the Decline of Literacy in Music Theory" (pp.150-153).

³Harder, Paul. *Harmonic Materials in Tonal Music*, Fifth Edition, Parts One and Two. Allyn and Bacon, 1985. Although this work went through numerous editions, their differences are remarkably slight. An example of its musical (not to mention intellectual) softheadedness can be gained from this (sadly typical) extract: "Borrowed chords have the same harmonic function as their unaltered counterparts. A

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subdominant triad, for example, tends to progress to the dominant, tonic, or supertonic chords regardless of whether it is major or minor in quality. Since the use of borrowed chords does not affect harmonic function, what is the reason for using them? (Answer:) For greater tonal variety or color." (Part Two. Frame 380, p. 152.)

Ironically, the notion of programmed texts, a vogue of the 1960s, arose from the rudimentary "teaching machines," ancestors of the "educational" computer, then being widely discussed. It is a credit to the maturity of much computer-based instruction that it has progressed far beyond the mere automation of programmed texts to the point of discarding their approach.

⁴The interested reader is referred to an excellent article by Alexander R. Brinkman, "Representing Music Scores For Computer Analysis" in the *Journal of Music Theory*, 30/2 (Fall 1986), pp. 225-273.

⁵Jeppesen, Knud. *Counterpoint*. Translated by Glenn Haydon. Prentice-Hall, 1939.

⁶Jeppesen, p. 138.

⁷Piston, Walter and Mark DeVoto. *Harmony*. Fifth edition. W. W. Norton, 1986.

⁸The downloadable "Sonata" font is available from Adobe Systems, Mountain View, CA 94039, (415)-962-2100. The reader is directed to Vol. 2, No. 7 (16 February 1988) of *MacWEEK*, a weekly trade magazine devoted to the Macintosh, pp. 34-39 for a discussion of it and for a general introduction to the Musical Instrument Digital Interface on the Macintosh.

⁹*Melodious Dictator*, designed by David B. Williams. Available from Temporal Acuity Products, Inc., Bellevue, WA 98005. (206)-746-2790.

JOHN A. SLOBODA, *THE MUSICAL MIND:
THE COGNITIVE PSYCHOLOGY OF MUSIC*
(Clarendon Press, 1985)

ELIZABETH WEST MARVIN

John A. Sloboda states in his preface to *The Musical Mind: The Cognitive Psychology of Music* that his purpose is to bridge the gap between psychological research and the needs of musicians. To a great extent, the author succeeds in this mission. The book is a well-written introduction to the field Sloboda prefers to call "psychomusicology"; it avoids the undefined technical terms that make reading in a field other than one's own daunting, and addresses many issues of interest to performing musicians and music theorists alike. To the author's credit, the *The Musical Mind* abounds with suggestions for further reading and contains an excellent bibliography. Sloboda, a lecturer in psychology at the University of Keele, is also a pianist, choir director, and composer; thus his knowledge and experience as both psychologist and musician serve him in good stead as he attempts to bridge the two fields.

The author's work stands apart from much of the psychological mainstream due to his focus on such musical skills as performance and composition. To use his words, "I address myself to the real-life behaviour of musicians, rather than to their behaviour in artificially constricted laboratory situations. I try to give as much prominence to output skill (e.g., performing) and higher cognitive functioning (e.g., composition) as I do to input skill (e.g., listening)" (p. 9). Thus, although one of his stated aims is to describe the main achievements in the field since circa 1982, his book differs markedly in content, organization, and tone from other overviews, such as Deutch's *Psychology of Music* or Dowling and Harwood's *Music Cognition*,¹ which devote more attention to the ways in which listeners structure musical input. Unfortunately, those sections of Sloboda's book that deal with output skills, particularly composition and improvisation, are by far the weakest. The ad hoc methodology of these chapters and the lack of clear-cut conclusions make them less useful to music theorists and pedagogues than their subject matter promises.

Each chapter of *The Musical Mind* can stand alone to some extent, since each explores a different facet of the field. If there is one unifying factor, it is the systematic examination, in diverse contexts, of the abstract mental

representation of musical structure. Chapter 1 ("Music as a Cognitive Skill") defines cognition in terms of the internal representation of music. Chapter 2 ("Music, Language, and Meaning") is a detailed comparison of the structure of music and language; further, it examines the implications of this structure for memory of verbal and musical content. Chapter 3 ("The Performance of Music") discusses ways in which abstract structures govern aspects of skilled performance. Chapter 4 ("Composition and Improvisation") explores the composer's or improviser's ability to work out small details within the context of large-scale structure. Chapter 5 ("Listening to Music") discusses the aural perception of musical structure and posits possible internal representations by which this structure is retained in memory. Chapter 6 ("Musical Learning and Development") is an examination of the learning process involved in acquiring the mental structures used to represent music. Finally, Chapter 7 ("The Musical Mind in Context: Culture and Biology") relates the cognitive principles of Western music to those underlying music of other cultures and to human physiology.

Among these diverse chapters, three relate closely to the concerns of those who teach music theory. The first of these, the chapter entitled "Music, Language, and Meaning," parallels Chomsky's deep structures with Schenker's *Ursatz*. Although he makes some apt comparisons, Sloboda's discussion of Schenker's ideas is extremely superficial and the sources he cites are not well chosen. According to the author, "a difficulty with approaching the work of Schenker is that good English translations of all his major writings are not yet available. The major English-speaking musicologists to employ Schenkerian concepts are Salzer (1952) and Forte (1962)." Why he chooses Salzer's *Structural Hearing* and Forte's *Tonal Harmony in Concept and Practice*,² over Schenker's *Harmony*, *Free Composition*, and *Five Graphic Analyses* or Oswald Jonas's *Introduction to the Theory of Heinrich Schenker*³—all available in English translation at the time of Sloboda's publication—is a mystery. Further, why he chooses to cite Forte (1962) rather than Forte and Gilbert's *Introduction to Schenkerian Analysis*⁴ (1982) is also unclear, unless he is simply unaware of these resources. Most curious is the author's attempt at several points in the book to link Schenker's theories with Leonard Meyer's work. Sloboda describes the dominant (in the bass arpeggiation of the *Ursatz*), for example, as the tension-inducing element that

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...operates by attempting to set up a 'rival' triad. In the final chord of the *Ursatz* we witness the 'defeat' of this rival system. Let us, then, hypothesize that one appropriate 'deep' universal for musical thought is to be summarized in the phrases 'creation and resolution of motivated tension'. This notion has a family resemblance to the 'implicative' theory of L.B. Meyer... (p. 22).

To Sloboda's credit, however, is his awareness of Schenker's ideas and their importance in relation to music cognition. All too often, it is Piston⁵ who is cited by psychologists as their primary source of information about tonal harmony, leading to an extremely vertical rather than linear understanding of harmony. This may contribute to experimental designs that seem flawed from a musicians' perspective, such as those that test relationships among triads in a key with little consideration of the way those triads function in musical contexts or of voice-leading patterns that might lead listeners to hear the same triad as a stable goal in one context and a passing harmony in another.

Following the Chomsky-Schenker discussion, Sloboda discusses other parallels between language and music. For any teacher who has compared phrase structure or cadence types to punctuation, subordinate harmonic progressions to subordinate clauses, etc. this discussion may prove to be of interest. Certainly an engaging classroom discussion could be built around the parallels Sloboda suggests. He notes, for example, that both language and music are capable of generating an unlimited number of novel sequences; that both may be seen as comprising phonology, syntax, and semantics; that children have natural ability to deduce rules of language and music simply from exposure to examples; and that, although the forms taken by natural language and music differ across cultures, some universal features may be cross-cultural. His discussion of the phonology, syntax, and semantics of music is largely a report on current experimentation in perception of absolute pitch frequency and duration (phonology), of underlying musical structure and experimentally derived grammars (syntax), and of musical meaning (semantics). The discussion is flawed, however, by omission of some important publications. In his examination of musical syntax, Sloboda discusses at length the generative grammar developed by Sundberg and Lindblom (1976)⁶ for a group of nineteenth-century Swedish nursery tunes. He describes in general terms Lerdahl and

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Jackendoff's important contributions to this field, but notes that their generative theory of tonal music⁷ was published too recently for inclusion in this book. Yet the fruits of Lerdahl and Jackendoff's collaboration have been in print since 1977, with a series of articles published since then,⁸ providing a wealth of information upon which Sloboda could have drawn. Further, considering the author's interest in cross-cultural universals, an examination of Becker and Becker's⁹ 1979 grammar for the musical genre *srepegan* might have been in order. Finally, this chapter's discussion of scale degree and key relationships neglects the work of Krumhansl and her colleagues,¹⁰ while the rhythm portion contains mostly the author's own speculations with very little support from the wealth of experimental data that exists on rhythmic perception.¹¹ Although Sloboda states at the outset that he cannot hope to provide a complete survey of all publications in the field, his choices sometimes leave key areas untouched and important ideas unsupported.

The fifth chapter, "Listening to Music," opens with a number of apt cautionary remarks about problems with current experimental research.¹² Sloboda is concerned that this flourishing area of music psychology seems to be "characterized by a relative insensitivity to the problems of relating research findings to normal music listening" (p. 153). In this regard, he notes that testing perception of small relationships may not tell us much about higher cognitive processing. Further, testing with novel musical materials tells us little about how perception changes over time with repeated exposure to a given musical passage. Sloboda concludes these remarks with a warning about the possible "halo effect" that surrounds the research of certain experimenters and the scientific paradigms that they posit:

A paradigm is signalled by the existence of a set of agreed research problems, a methodology capable of solving them and generating new, but similar, problems, and a group of scientists who interact around these problems. When, as often happens, such a group 'captures' prestigious communication channels, in journals and elsewhere, generating a continuous series of co-ordinated and logically connected research articles, it is tempting to accord the research a significance which is not necessarily justified by its long-term achievements. The history of psychology is littered with forgotten paradigms (p. 153).

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The remainder of this chapter on music listening deals with grouping mechanisms, attention, and memory, and serves for the most part as a good overview of current work in these areas. Those involved in aural-skills instruction may find some direct implications for teaching among these experimental results. For example, Sloboda speaks of "focal listening," that is, the listener's ability to attend selectively to certain aspects of musical input. He hypothesizes, with some experimental support,¹³ that listeners can only hear one line at a time in counterpoint; that they can choose to attend to one or the other, or may alternate between the two. He believes that the other voice or voices are heard as harmonization; thus, when an error is placed in some voice other than that which is being attended to, listeners can tell something is wrong in the "background harmony" but cannot identify in which voice it occurred. In his discussion of musical memory, the author weighs the advantages and disadvantages of perfect pitch, and cites some experimental evidence that perfect pitch can be taught. Generally, however, listeners do not rely on retention in memory of exact pitch information, but on memory of scale type and contour. (For this reason subjects often confuse fugue subjects with their tonal answers, since, in spite of one or more intervallic change, their contours and scale type are identical.) Sloboda discusses a number of experiments in which subjects are asked to identify alterations of musical materials given first in one key, then presented with alterations in another.¹⁴ From these, various conclusions about the representation of scale-step information in memory are drawn. For example, experimentation has shown that subjects are able to identify alterations far more easily in diatonic tonal contexts than non-diatonic or non-tonal contexts; in these latter contexts, listeners make their determinations from contour information alone, rather than from scale-step or interval information. One experiment¹⁵ asked listeners to identify contour and pitch changes upon diatonic tonal melodies of varying lengths, and discovered that listeners were most successful identifying contour changes in shorter melodies, but pitch changes in longer melodies. From this result, the author concludes that listeners retain and use contour information only until the tonal context becomes clear; as melody length increases, scale step information becomes increasingly important. Finally, Sloboda discusses a group of experiments which show that memory for melodies with internal hierarchical patterning is better than memory for those without.¹⁶ The implications of these studies for music theory pedagogy are clear. Psychological research generally supports a pedagogy based on scale-degree information rather than absolute-pitch frequency (moveable-do rather than fixed-do). These studies further show that most listeners perceive music by recognizing musical patterns and relationships among repeated or transformed patterns. Thus, it is the task of the theory pedagogue to give

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students a repertoire of common patterns—arpeggiated triad, ornamentation by neighbor tone, melodic sequence, half cadence, 3-2-1 descent, etc.—from which they may draw in forming mental representations of music as it is heard.

Although Sloboda's sixth chapter, "Musical Learning and Development," promises much of interest to instructors of music theory, it focuses mainly on musical development in early childhood.¹⁷ The two portions of this chapter most applicable to collegiate teaching are his general discussion of skill acquisition and his evaluation of tests of musical ability. As most teachers intuitively know, but Sloboda explicitly states, skills development involves: 1) acquiring habits that are automatic, with little or no mental activity involved; 2) passing from factual knowledge to procedural knowledge (from knowing that, to knowing how); and 3) setting realistic goals for achievement. He also specifies three general conditions for successful skill acquisition: motivation, repetition, and feedback. The chapter concludes with a section on musical ability assessment. Sloboda notes that there are 24 tests of musical ability documented in recent literature,¹⁸ but his discussion focuses on the Wing and Seashore tests. Because some of the tasks required in the Seashore test—like discrimination between degrees of loudness and microtonal frequency—seem little related to musical success, Sloboda concludes that the Wing test is to be preferred to the Seashore, although both tests are somewhat dated and need reworking.

Finally, Sloboda's "output" discussions of musical performance, composition, and improvisation are of uneven calibre and usefulness. In Chapter 2, the performance chapter, the author describes a number of experiments on sight reading that may have important implications for teachers of applied music. He considers the mental structures and techniques that facilitate good sight reading and memorization, discusses the issue of performers who unconsciously "correct" errors in the score while sight reading, and hypothesizes a procedure by which performers make expressive decisions. On the other hand, Chapter 6, on musical learning, contains a lengthy and tedious discussion of the method by which a pianist (Sloboda himself) learns to play clarinet. This type of ad hoc "procedural" self-study appears also in Chapter 4, on composition. Here, the author, details at great length his thought process in composing a choral composition. For example, he asks himself

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How am I to continue at bar 29? The next verse is going to be quieter and slower. A theme is needed for 'From all eternity'. The tentative one where composition broke down before didn't seem right. . . . I decide to progress the accompaniment so that it slows down. It occurs to me that the word 'eternity' can be represented by a circular motif. . . . Now I leave the accompaniment and return to the voices. . . . (pp. 126-127)

He continues in this vein for some thirteen pages, complete with numerous musical examples. (All examples are, incidentally, reproduced in the author's manuscript without benefit of straight-edge; thus they are unattractive and often difficult to read.) In sum, these "output" sections completely lose the sense of scholarly investigation that so consistently characterize the other chapters. Likewise, Sloboda's final chapter seems not to be an objective overview of the literature on culture and biology, but rather primarily a vehicle for the author's own philosophical musings on the relation of music notation to cognition, on possible cross-cultural musical universals, music and evolution, and the role of music in society.

To summarize, *The Musical Mind* is a good general introduction to the cognitive psychology of music. To Sloboda's credit, the book covers a broad spectrum of issues within the field and, where it cannot hope to give a complete overview, refers the interested reader to other sources for additional reading. Further, the author does not merely summarize work in the field, but provides a critical view, and repeatedly suggests avenues for future experimentation and research. Although he does not directly address the issue of music theory pedagogy, the conclusions that may be drawn from experiments reported here certainly have implications for those who teach theory. The book's primary weakness is the lack of sophistication with which it sometimes approaches music-theoretical concepts. In addition, the author's knowledge of current publications and developments in the field of music theory lags far behind his awareness of current psychological research. Sloboda, like others in his field, would profit from more direct collaboration with music theorists, and as a result both fields would be enriched.

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NOTES

¹Diana Deutsch, ed., *Psychology of Music* (New York: Academic Press, 1982); W. Jay Dowling and Dane L. Harwood, *Music Cognition* (New York: Academic Press, 1986).

²Felix Salzer, *Structural Hearing* (New York: Charles Boni, 1952); Allen Forte, *Tonal Harmony in Theory and Practice* (NY: Holt Rinehart and Winson, 1962).

³Heinrich Schenker, *Harmony*, ed. by Oswald Jonas, trans. by Elisabeth Mann Borgese (Cambridge: MIT Press, 1954), paperback reprint, 1973; *Free Composition*, trans. Ernst Oster (NY: Longman Inc., 1979); *Five Graphic Music Analyses* (NY: Dover Publications, Inc., 1969); and Oswald Jonas, *Introduction to the Theory of Heinrich Schenker*, ed. and trans. John Rothgeb (NY: Longman Inc., 1982). Sloboda does indeed cite Schenker's *Free Composition* in his bibliography, but fails to mention this important source in the discussion cited here.

⁴Allen Forte and Steven E. Gilbert, *Introduction to Schenkerian Analysis* (NY: W.W. Norton and Co., 1982).

⁵Walter Piston, *Harmony*, 4th ed., rev. and enl. by Mark DeVoto (NY: W. W. Norton, 1978).

⁶J. Sundberg and B. Lindblom, "Generative Theories in Language and Music Descriptions," *Cognition* 4 (1976), pp. 99-122.

⁷Fred Lerdahl and Ray Jackendoff, *A Generative Theory of Tonal Music* (Cambridge: MIT Press, 1983).

⁸Fred Lerdahl and Ray Jackendoff, "Toward a Formal Theory of Tonal Music," *Journal of Music Theory* 21/1 (1977), pp. 111-171; "On the Theory of Grouping and Meter," *The Musical Quarterly* 67/4 (1981), pp. 479-506; Ray Jackendoff and Fred Lerdahl, "Discovery Procedures vs. Rules of Musical Grammar in a Generative Music Theory," *Perspectives of New Music* 18/2 (1980), pp. 503-510; "Generative Music Theory and its Relation to Psychology," *Journal of Music Theory* 25/1 (1981), pp. 45-90.

⁹Judith Becker and Alton Becker, "A Grammar of the Musical Genre *Srepegan*," *Journal of Music Theory* 23/1 (1979), pp. 1-44.

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¹⁰ Carol L. Krumhansl, "The Psychological Representation of Musical Pitch in a Tonal Context," *Cognitive Psychology* 11 (1979), pp. 346-374; C. L. Krumhansl and F. C. Keil, "Acquisition of the Hierarchy of Tonal Functions in Music," *Memory & Cognition* 10 (1982), pp. 243-251; C. L. Krumhansl and R. N. Shepard, "Quantification of the Hierarchy of Tonal Functions within a Diatonic Context," *Journal of Experimental Psychology: Human Perception & Performance* 5 (1979), pp. 579-594.

¹¹ See, for example, Eric F. Clarke, "Structure and Expression in Rhythmic Performance," in *Musical Structure and Cognition*, eds. Peter Howell, Ian Cross, and Robert West (London: Academic Press, 1985), pp. 209-236; Peter J. Essens and Dirk-Jan Povel, "Metrical and Nonmetrical Representations of Temporal Patterns," *Perception & Psychophysics* 37/1 (1985), pp. 1-7 and "Perception of Temporal Patterns," *Music Perception* 2/4 (1985), pp. 411-440; and Jeffery J. Summers, Simon R. Hawkins, and Helen Mayers, "Imitation and Production of Interval Ratios," *Perception & Psychophysics* 39/6 (1986), pp. 437-444.

¹² Other recent critiques of experimental research methods may be found in Edwin Hantz's "Studies in Musical Cognition: Comments from a Music Theorist," *Music Perception* 2/2 (1984), pp. 245-264; and Mary Louise Serafine's *Music as Cognition: The Development of Thought in Sound* (New York: Columbia University Press, 1988), particularly pp. 52 and following.

¹³ John A. Sloboda and Judy Edworthy, "Attending to Two Melodies at Once: The Effect of Key Relatedness," *Psychology of Music* 9 (1981), pp. 39-43.

¹⁴ Among these are L. L. Cuddy, A. J. Cohen, and J. Miller, "Melody Recognition: The Experimental Application of Musical Rules," *Canadian Journal of Psychology* 33 (1979), pp. 148-157; W. J. Dowling, "Scale and Contour: Two Components of a Theory of Memory for Melodies," *Psychological Review* 85 (1978), pp. 341-354; W. J. Dowling and J. C. Bartlett, "The Importance of Interval Information in Long-Term Memory for Melodies," *Psychomusicology* 1 (1981), pp. 30-49; and J. Edworthy, "Towards a Pitch-Contour Continuum Theory of Memory for Melodies, in *Acquisition of Symbolic Skills*, ed. by D. Rogers and J. A. Sloboda (NY: Plenum, 1983).

¹⁵ Edworthy (1983) cited above.

¹⁶ See Diana Deutsch, "The Processing of Structured and Unstructured Tonal Sequences," *Perception & Psychophysics* 28 (1980), pp. 381-389; D. Deutsch and J. Feroe, "The Internal Representation of Pitch Sequences in Tonal Music," *Psychological Review* 86 (1981), pp. 503-522.

¹⁷ It is surprising that Sloboda neglects the work of Mary Louise Serafine in his discussion of the application of Piaget's theories to the realm of music. See, for example, her "A Measure of Meter Conservation in Music, Based on Piaget's Theory," in *Genetic Psychology Monographs* 99 (1979), pp. 185-229.

¹⁸ Sloboda refers the reader to Shuter-Dyson and Gabriel's *The Psychology of Musical Ability*, 2nd ed. (London: Methuen, 1981) for a comprehensive description and discussion of these tests.

WILLIAM TOUTANT, *FUNCTIONAL HARMONY*
(Wadsworth, 1985)

JOSEPH RIVERS

The publication of yet another harmony text reflects this very active period for the music theory teaching profession. While the study of harmony usually constitutes the nucleus of courses in introductory music theory, the mastery of harmony involves the development of many skills: the ability to spell and identify chords and to recognize them in the context of various textures; an understanding of the interaction of harmony and counterpoint; the contribution of harmony to extended tonal structures; and the important skills of keyboard fluency and aural perception.

The two volumes of William Toutant's *Functional Harmony* address some, but not all, of these pedagogical issues. Volume One covers partwriting of triads in all positions, cadences, the dominant and supertonic seventh chords, nonharmonic tones, harmonic function, harmonization in chorale and instrumental styles, and tonal melody. Four appendices at the end of Volume One comprise a succinct review of fundamentals, figured bass, music notation, and instrumental transposition. Volume Two consists of two chapters on diatonic seventh chords and chapters on chromatic nonharmonic tones and borrowed chords (modal borrowing from parallel keys), secondary dominants, modulation to closely related keys, harmonic sequence, the Neapolitan chord, augmented-sixth chords, altered dominants and further uses of the diminished-seventh chords, extended tertian chords, modulation to distant keys, and a final chapter that considers the dissolution of functional harmony. In both volumes there is an abundance of music examples taken from a variety of textures, programmed exercises interspersing the main body of the text, nonprogrammed exercises, and the more creative listening/literature and composition assignments. In the aural exercises that follow each chapter Toutant confronts an area more often relegated to a separate text. Toutant omits discussion of twentieth-century techniques; his view, quite justifiable, is that twentieth-century materials warrant a separate text. Toutant does not adopt a historical/stylistic organization, but he does interject occasional references to the historical context of harmonic materials under discussion. Besides harmony, therefore, melody and texture (and to a lesser extent, timbre) receive

the most detailed treatment, and even these topics are developed chiefly according to their impact on harmony.

Toutant states one important premise behind *Functional Harmony*: "The combination of programmed material, technical drill, and examples for analysis precludes the need for a supplementary workbook and for an anthology" (Vol. I, p. xii). This self-containment is a strong selling point for this text. (Additionally, the wire binding makes the volumes easy to lay open on a keyboard for playing music examples, and their small size facilitates transport by students.) The degree that *Functional Harmony* is really self-contained depends on the nature of each curriculum. For instance, there are numerous music excerpts for analysis in both the programmed and nonprogrammed exercises, and these include close to thirty-five pages of orchestral and chamber music scores. Thus, there is more than enough music to alleviate the need for an anthology unless a class syllabus calls for the study of form. Toutant has no chapter on form, except in regard to period structure (where he, curiously enough, omits any mention of the double period). It would seem that Toutant could have easily included an appendix on at least small forms at the end of Volume Two, since that volume is almost eighty pages shorter than Volume One and contains no appendices. Otherwise, the instructor is forced to use a separate anthology.

Toutant says of his aural exercises: "While not intended to teach ear-training, these exercises help students integrate aural and written concepts of tonal harmony" (Vol. I, p. xii). The exercises are mostly in the form of suggestions and drills dealing with the harmonic vocabulary discussed in each chapter. Toutant directs the instructor and the student how to reuse the music examples and programmed exercises for ear-training so they can function as keyed dictation material. In many of the aural exercises Toutant suggests that student drill partners work together; in others he designates harmonic pattern drills for students to sing or proposes keyboard activities. The exercises are flexible: the instructor does the choosing and may augment them with his or her own material or use another dictation text along with them. A major problem is that one must be wary about the pacing of the material. Written and aural skills seldom progress at the same rate. Instructors must also clearly delineate testing expectations to students. Students cannot always be expected to be self-motivated to work on ear training. The aural exercises lack dictation material for melodies, rhythms, and contrapuntal textures. In addition, it is apparent that Toutant does not intend to preempt the use of a separate sightsinging text.

A separate fundamentals text might also be necessary. The appendix on fundamentals provides a good review, but more is needed if students' backgrounds are weak. The first two chapters of Volume One, however,

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embody a thorough explanation of triads. *Functional Harmony*, therefore, is not self-contained in the context of all curricula (which no textbook presently on the market can claim to be), but Toutant performs an admirable job of integrating many facets of music theory study into his two volumes.

The most evident influences on Toutant's text are those of Paul Harder and Walter Piston.¹ Considering first Harder's influence, one of the most striking features of *Functional Harmony* is the inclusion of programmed exercises. While Harder uses an entirely programmed format in his text, Toutant's text is only partially programmed. Toutant discusses topics in a prose format and follows each section with a number of programmed frames for students to work through on their own if needed. These can serve other purposes: they may be discussed in class or excerpted for quiz or test material. (The publisher has graciously given adopters of this text permission to photocopy examples for this purpose.) There is a wide range of exercises: questions and answers reviewing main ideas or definitions of terms, harmonic analysis and nonharmonic-tone identification in a variety of music excerpts and textures, melodic analysis, chord spelling, and partwriting. These exercises actively involve the students in the text itself. The text is also, for that reason, appropriate for self-learning situations without any instructor.

The value of a programmed format is such that two recent texts have incorporated exercises that are keyed in the appendices.² In Harder's and Toutant's exercises, however, there is no need to flip to the back of the book for the answers; students need only cover one side of the page. Toutant also avoids some of the drawbacks inherent in a fully programmed format (e.g., the appearance of the textual matter on the page). It is more difficult to scan for important points when all textual matter is divided into programmed frames. Being locked into an entirely programmed format also limits one's flexibility. Some students do not require so much drilling but only need to study main points. With Toutant's partial programming an instructor can stress important concepts and music examples in the prose sections and allow those students who need more reinforcement to complete the programmed material. Students can also more readily review the text later in their scholastic career.

Still, there is a deeper problem with programmed exercises, and this applies to some degree to all texts that make use of them. A steady programmed diet can condition students into believing that music analysis consists merely of pat answers or only one way of looking at things. In many cases, there are multiple ways of viewing a musical passage. We musicians must beware of becoming shackled by musical dogmas that prevent us from seeing the validity of other points of view. The avoidance of this pitfall must begin in the classroom. An instructor should be prepared to balance

axiomatic learning with a more imaginative quest for understanding that will encourage students to increase their musical perspective and retain a desire to continue to do so when they leave the classroom. I should, of course, qualify these statements by saying that not all programmed exercises pose this problem; many of them are specific enough that there is indeed only one correct answer, and in other instances a number of possibilities are allowed.

Toutant's organization of chord vocabulary owes something to Harder, and like Harder, he uses lower-case Roman numerals and other appropriate symbols to help indicate specific chord qualities. He follows McHose, Harder, and others in classifying nonharmonic tones according to "approach-departure," although he does mention the alternative method based on rhythmic placement that Piston uses. Toutant adopts certain concepts from Piston, such as the doubling of tonal degrees in first-inversion triads. Much of Toutant's approach to partwriting is similar to Piston's, including copious examples showing the resolutions of chords. Toutant's text, however, is less convoluted with peripheral ruminations than DeVoto's expansion of Piston's volume (not to disparage that marvelous harmony book). Toutant makes no mention of direct (hidden) fifths or octaves, intending that his guidelines will automatically exclude these perilous phenomena. Toutant identifies the leading-tone seventh chord as vii^{o}_7 or vii^{o}_7 instead of V^{o}_9 , but he follows Piston (and Harder) in classifying non-dominant (embellishing) diminished-seventh chords as supertonic and submediant chords with raised root and third. Toutant does not divide secondary dominants and secondary leading-tone chords into separate chapters or sections, instead discussing them together (Vol. II, Ch. 4). These two groups of chords, while similar in function, might be less confusing to students if presented separately.

Toutant, like Harder, operates under a methodology I will term a *category* approach. This pedagogical viewpoint first entails introducing the partwriting of all root-position triads. Toutant then follows with all the first-inversion triads, the four basic types of six-four chords, the dominant-seventh chord in all positions (with an introduction to the supertonic seventh), other diatonic-seventh chords, and the chromatic-chord vocabulary, all in their respective categories. A different strategy taken by some recent texts is the *pattern* approach. This consists of introducing harmonic patterns together with their functional/contrapuntal meanings, gradually increasing in scope as expansions from the tonic triad.³ (By contrast, Piston and DeVoto use a combination of the two approaches, encompassing patterns or formulae within each chord-position category.)

In a pure category approach, triads are presented in terms of chordal structure and connections; harmonic function and harmonization are post-

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poned until later. In a pattern approach, voice leading and harmonic function are treated together. One difficulty with delaying the topic of chord selection until later is that students can be overwhelmed when they have so many chords from which to choose all at once. It certainly helps that Toutant defines harmonic movements as either *progressive* or *retrogressive*; students can be told to use primarily progressive movements to avoid sinking in a morass of chords, or they may be instructed to tie chord selections to the circle-of-fifths progression. Nevertheless, I do not think that students really come to understand harmonic function until they begin to comprehend chords as they coalesce into patterns, much in the same way that letters group into words—or, better yet, words into phrases. (Concurrent keyboard work is valuable in reinforcing this.) Instructors can perhaps avoid the hazards of a category ordering by emphasizing harmonic function long before melody harmonization is formally presented and devising simple harmonization exercises along the way in conjunction with each new voice-leading problem.

In Toutant's defense, I must admit he does occasionally refer to harmonic function prior to the chapter on harmonization, especially in regard to cadences (Vol. I, Ch. 7), second-inversion triads (Ch. 8), and the dominant-seventh chord (Ch. 9). The summary of typical uses of diatonic functions (Vol. I, pp. 327-29) is particularly practicable. An instructor might use this as a springboard for introducing harmonic patterns at this point in the text, or might examine programmed exercises earlier in the text carefully with reference to the summary. Toutant gracefully details melody harmonization with great clarity and an edifying assemblage of illustrations. He discusses chorale instrumentation first (Vol. I, Ch. 11) and instrumental harmonization two chapters later. This enables students to observe the application of voice-leading tendencies in instrumental textures. Far too often, voice leading goes out the window in students' compositional work in these textures!

Toutant, for that matter, manages the important topic of instrumental textures very effectively, first introducing it early in Volume One (Ch. 5), where he also makes first mention of passing and neighboring tones. I would suggest that instructors and students make harmonic reductions of some of the instrumental textures to demonstrate voice leading and to impart insights for composition in instrumental styles and perhaps later study in Schenkerian analysis. Toutant calls for this in a few simple exercises and frequently suggests creating instrumental textures from harmonic outlines in his composition exercises.

Although *Functional Harmony* is not a counterpoint text, one should keep in mind that counterpoint should actually be taught in every introduc-

tory music theory course, even where harmony is the primary focus. A good rule of thumb is: when teaching harmony, teach counterpoint; when teaching counterpoint, teach harmony. Toutant shows much sensitivity to voice leading and an astute instructor has ample opportunities to emphasize the importance of the contrapuntal tendencies of chords. Toutant does not list the consonant and dissonant intervals, but he does make periodic reference to them and to scale-degree tendencies in discussing chord resolutions. For instance, Toutant notes the dissonant nature of the cadential six-four chord and the contrapuntal origin and resolution propensity inherent in the dominant-seventh chord. His chapter on nonharmonic tones is extremely lucid and the section on suspensions is admirably complete, with an excellent selection of music examples. There is a multitude of Bach chorale excerpts throughout the text, and the fifteen chorale passages on pages 341-46 of Volume One not only provide useful models for chorale harmonization, but also afford the opportunity to observe where chord doublings arise more from Bach's consideration of voice leading or concern for chord sonority.

Functional Harmony, nevertheless, does not stress voice leading on larger levels, although many of the music examples would allow an instructor to do this. The text, instead, takes a more traditional approach, with voice leading more a matter of consecutive chord connections. Toutant uses the term *functional harmony* in one sense, to mean viewing every vertical alignment of notes, exclusive of nonharmonic tones, as a chord bearing a specific scale-degree symbol based on root inversion (Vol I, pp. 16; 29-30). In a broader sense, Toutant also means the harmonic language of the common-practice period, and by implication, *functional* is used to describe how chords act.

Two ways of perceiving how harmony works can be distinguished. One way ("inside looking out") starts from individual lines and discerns how chords are generated from those lines as they form consonant and dissonant intervals (particularly with the bass) and move toward harmonic goals. The other way ("outside looking in"), which Toutant follows, begins with the identification of each vertical sonority and observes how chords are connected through voice-leading proclivities. This, no doubt, opens up a virtual Pandora's Box of arguments for and against Toutant's orientation, but either approach should work as long as both the harmonic and contrapuntal aspects are adequately explained. More important is that the labeling of a certain chord is absolutely secondary to explaining *what it does*. Whether one calls a cadential six-four a $V_6/4-5/3$ or, as Toutant does, a $I_6/4$, while explaining its contrapuntal nature and metrical placement, should we say that one label is all right and the other all wrong? Both views are to be commended for their consistency. (Toutant, in fact, states that the

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cadential six-four is a "tonic chord that is dominant in function" Vol. I, p. 208). The danger comes not so much in claiming that a chord has a certain vertical formation, but rather in failing to describe accurately how the chord syntactically operates in the context of an entire passage. One must beware that the mere labeling of Roman numerals falls short in describing the contrapuntal/functional nature of harmony.

I do not think that Toutant is guilty of some harmonic sin because he has adhered throughout to the principle of root inversion; I believe in harmonic toleration. Toutant seems to be aware of the limitations of Roman numerals, and he is careful to provide plentiful illustrations and thorough explanations of how chords appear in context. Still, the contrapuntal aspect could be strengthened even more in Toutant's text to balance his orientation to root inversion. This can be observed in the example of consecutive first-inversion triads (Vol. I, p. 156, Ex. 6.12). I would not say that assigning each chord a Roman numeral is an unforgivable error; the mistake would be in failing to explain fully the contrapuntal (rather than functional) nature of these six-three chords. Toutant only hints at this with the statement: "Observe how Mozart creates a very melodic bass line consisting of step-wise movement, until the last two chords" (p. 155). Another relevant example is the chapter on "Harmonic Sequence" (Vol. II, Ch. 6). There, harmonic sequences are explained according to root movement, which is certainly plausible and logical. Toutant could improve his presentation by showing skeletons of linear movements. For instance, an explanation of the sequential harmonic root pattern in the excerpt from Bach's Gavotte from French Suite No. 5 (Vol. II, p. 172, Ex. 6.12) could be amplified by demonstrating how it exemplifies descending 5-6 technique. This would provide the contrapuntal justification for what Bach is doing.

Related to the foregoing points is the matter of figured bass. Toutant briefly introduces the concept in the chapter on first inversion and summarizes it in a three-page appendix that contains one lengthy realization and three brief exercises. Toutant omits figured bass from the main body of his text and exercises, perhaps in the interests of simplicity and directness. I believe, however, that figured bass should be incorporated into the exercises and a little more in the text since this better explains the voice leading and maintains a historical link with those composers who thought in terms of figured bass. Toutant would further increase the appeal of his text were he, at least, to attach an appendix to each volume containing figured-bass exercises. Yet, it should be no great problem for instructors to devise their own or recast some of Toutant's exercises as figured-bass lines. Again, any shortfalls in Toutant's discussion of voice leading can be remedied by thoughtful instruction, capitalizing on the profusion of valuable music examples.

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Among the most interesting activities suggested in *Functional Harmony* are the Listening/Literature Assignments. These are designed to give students greater familiarity with music literature and to apply what they are learning to what they see and hear. Using them in classroom presentations or including them on homework assignments would give the study of harmony a gratifying change of pace and help create in students the spirit of romance that should characterize introductory levels of college music study.

I recommend that instructors using *Functional Harmony* obtain an Instructor's Manual from the publisher. Toutant gives many helpful suggestions for utilizing the assignments and exercises in each chapter. It is obvious that Toutant draws his ideas from much practical experience teaching music theory.

If I have tarried on some of the implications of Toutant's pedagogical stance, I do not mean to detract from the high quality of his text. Toutant's prose is clear and direct without needlessly sacrificing the completeness of his explanations or adopting an oversimplified writing style. His intention is to stir up students' interest and love for music literature and active involvement in musical activities and I feel that his text is very successful in accomplishing these aims. Over the long term, however, it is the instructor, more than the textbook, that should lead to high quality music theory instruction. Used by an effective instructor, *Functional Harmony* can give students the preparation they need to spend the rest of their lives really coming to understand the nature of our multifarious art, while reaping rewards through a lifetime of both listening to and making music.

NOTES

¹Paul O. Harder, *Harmonic Materials in Tonal Music: A Programmed Course*, fifth edition, 2 vols. (Boston: Allyn and Bacon, 1984), and Walter Piston, *Harmony*, fifth ed., rev. and enl. by Mark DeVoto (New York and London: W. W. Norton & Co., 1987).

²Stefan Kostka and Dorothy Payne, *Tonal Harmony, With an Introduction to Twentieth-Century Music* (New York: Alfred A. Knopf, 1894); and Allen Winold, *Harmony: Patterns and Principles*, 2 vols., *Workbook*, 2 vols. (Englewood Cliffs, N.J.: Prentice-Hall, 1986).

³The most recent example is Allen Winold's *Harmony: Patterns and Principles*. A pattern approach is laid out in a more Schenkerian orientation by Edward Aldwell's and Carl Schachter's *Harmony and Voice Leading*, 2 vols. (New York: Harcourt Brace Jovanovich, 1978 and 1979). Another text adaptable to this approach is Thomas Benjamin, et al., *Techniques and Materials of Tonal Music, with an Introduction to Twentieth-Century Techniques*, third edition (Boston: Houghton Mifflin Co., 1986).

CONTRIBUTORS

Ann K. Blombach

Ann K. Blombach is Chairperson of Music Theory and Composition and Associate Professor in the School of Music at The Ohio State University. She has served as Vice President of the Association for Technology in Music Instruction (and will become President in the Fall 1988) and is a member of the editorial boards of the *Journal of Music Theory Pedagogy* and the special music issue of the *Journal of Computer-Based Instruction*. Her primary research areas include computer-assisted music instruction and analysis, music theory pedagogy, and music terminology and nomenclature. She has written several aural training programs for the Macintosh as part of her MacGAMUT courseware series. Dr. Blombach is currently completing a more generalized computer-assisted music instruction software development system that will provide other programmers with the basic tools for writing their own Macintosh music courseware.

Bruce B. Campbell

Bruce B. Campbell is presently Associate Professor in the School of Music, Michigan State University. He has degrees from Brandeis University, The Juilliard School (organ), and Yale University (music theory). Private study has been with Ernst Oster, Oswald Jonas, Anthony Newman, and Ralph Kirkpatrick. His articles and reviews have appeared in *Music Theory Spectrum*, *Journal of Music Theory* and the *Journal of Performance Practice*. His research interests include counterpoint, the relationship of analysis to performance, Schenkerian analysis, the compositional language of Beethoven, and computer applications. He has numerous instrumental compositions in print and is an active organist and choral director.

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Lyle Davidson

Lyle Davidson is a research associate at Harvard Project Zero and chairman of the Undergraduate Theory Department at the New England Conservatory of Music where he teaches solfege and sixteenth-century counterpoint. A composer, he has also been a University Scholar at Boston University, where he worked in developmental psychology. Active in basic and applied research, he is currently studying musical and cognitive development. Publications have appeared in *Music Perception*, *Sonus*, *Music and Child Development*, *Journal of Aesthetic Education*, and *Generative Processes of Music* (Oxford Science Series). With Larry Scripp, he is currently writing a sight-singing textbook based on the psychological model presented in this volume.

Howard Irving

Howard Irving is a graduate of Louisiana State University in musicology and currently teaches music history at the University of Alabama at Birmingham. His recent publications include articles in *Current Musicology* and *Studies in Music* (the University of Western Australia) on wit and humor in the music of Haydn.

Elizabeth West Marvin

Elizabeth West Marvin is Instructor of Music Theory and Director of Aural Skills at the Eastman School of Music of the University of Rochester, where she is completing a Ph.D. in music theory. She taught previously on the faculties of Immaculate Heart College and Marymount Palos Verdes College in the Los Angeles area, and has taught summers at the Sewanee Summer Music Center of the University of the South (Sewanee, TN). In 1985, she was the recipient of two teaching awards at the University of Rochester: the Edward Peck Curtis Award for Excellence in Teaching by a Graduate Student, and the Eastman Graduate Teaching Assistant Prize. Her current research focuses on music cognition as related to non-tonal music and music theories; her publications appear in *Music Theory Spectrum*, *Theoria*, and the *Journal of Music Theory*. She is currently Vice President of the Music Theory Society of New York State.

CONTRIBUTORS

James R. McKay

James R. McKay is Chairman of the Music Department, York University and Director of DACARY (Decoustics/Acoustical Control System Centre for Acoustical Research at York). He has written a study on the *Traité* of Rameau. He has employed the guide-tone method for more than a decade in his theory and musicianship courses at York.

Joan Meygaard

Joan Meygaard holds a master's degree in Theoretical Studies from the New England Conservatory of Music. As a member of the research team at Harvard Project Zero, she is engaged in research across a wide range of topics including the study of musical perception, musical representation, and the development of computer supported curricula for the arts and sciences. Her work has appeared in the *Journal of Aesthetic Education*. She puts theory into practice in her role as part of the teaching faculty at the University of Massachusetts at Boston's "Urban Scholars" program where she also investigates the computer as a means of heightening the musical problem solving skills of novices.

Regena Turner Parrish

Regena Turner Parrish received the B.M.M.E. degree from The University of Tennessee, Martin, Tennessee in 1984 and the M.A. degree from The Ohio State University, Columbus, Ohio in 1987. From 1985 to 1986 she was an Ohio State University Graduate Fellow, and also held a Phi Kappa Phi Honor Society National Fellowship. From 1986 to 1987, she served as a Graduate Teaching and Research Associate at Ohio State.

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Gary Potter

Gary Potter is Assistant Professor and Coordinator of Undergraduate Studies in Music Theory at Indiana University School of Music, Bloomington. He holds degrees from Oberlin and Indiana and has taught at several California colleges and universities including San Francisco State University and The University of California at Santa Cruz. His extensive background in jazz and commercial music as composer, arranger, and performer on several instruments includes a period as first trombonist with Woody Herman. His current research interests include skill pedagogy, perception, and jazz analysis and pedagogy.

Jay Rahn

Jay Rahn is a Canada Research Fellow in the Music Department, York University, Canada. He has written extensively on the history of early music theory and on the foundations of music theory—in particular a book titled *A Theory for All Music*. He has employed the guide-tone method for more than a decade in his theory and musicianship courses at York.

H. Lee Riggins

H. Lee Riggins is Associate Professor of Music and Chairman of the Theory Division at the Conservatory of Music, University of Missouri-Kansas City. He received his undergraduate training at Emory University and Humboldt State University. His graduate work was taken at Arizona State University (M.M., 1973) and at the University of Texas at Austin where he received his Ph.D. in Music Theory in 1981. While at the University of Texas, he specialized in the theories of Heinrich Schenker under the tutelage of Gregory Proctor. More recently, Proctor and Riggins co-authored "Levels and the Reordering of Chapters in Schenker's *Free Composition*" for Volume 10 (1988) of *Music Theory Spectrum*.

CONTRIBUTORS

Joseph Rivers

Joseph Rivers is Assistant Professor of Music at the University of Tulsa in Oklahoma. He attended the University of South Carolina, where he completed his B.M. degree in composition and M.M. in theory. He obtained a Ph.D. in Music Theory from the University of Arizona in 1982. In 1986 he received a fellowship from the National Endowment for the Humanities to study with Allen Forte at Yale University and in 1987 he received a fellowship from the University of Tulsa to pursue his research interests in twentieth-century British music. Dr. Rivers recently won first prize in a competition sponsored by the Institute for Studies in American Music for his choral composition, "Psalm of Thanksgiving." In addition he participated as a panel member on the Ear Training Program of SMT (Fall 87) and presented a paper on Bax at "Symposium on British Studies" (N.C. State; Fall 87).

Larry Scripp

Larry Scripp is currently an instructor of solfege at the New England Conservatory of Music where he also chairs the committee for "Technology and Music Education." The concentration of his graduate studies at Harvard University include human development, interactive technology, language reading, and music reading research. Active in basic and applied research at Harvard Project Zero, he has investigated young children's musical development, music reading and transcription, and computers in music composition. His articles have appeared in *Journal of Aesthetic Education*, *Generative Processes of Music* (Oxford Science Series). With Lyle Davidson, he is currently writing a sightsinging textbook based on the psychological model presented in this volume.

VOICE LEADING IN MOZART'S FIGURED BASSES FOR ATTWOOD

ROSALIE ATHOL SCHELLHOUŠ

Since their publication in the *New Ausgabe sämtlicher Werke* in 1965, Mozart's figured basses composed for Thomas Attwood, as part of his course in composition, have gone without the close examination they merit.¹ These lessons, which were probably undertaken first in Attwood's course of study, contain more work in Mozart's hand than any other part of the instruction, and because they are nearly complete, they offer an unparalleled opportunity to explore some of Mozart's working principles as a teacher and a composer. Yet the editors have given them substantially less attention in the "Kritische Berichte" than the exercises in counterpoint and free composition, and the few studies done so far have focused for the most part on the preliminary instructions on scales, intervals, and chords.² The realized and corrected figured-bass exercises have yet to be interpreted.³

The lessons differ from those found in thoroughbass manuals of the time, and they are exceptional among the extant documents of Mozart's teaching.⁴ Although the rules for realization are familiar, they do not correspond, taken together, to any instruction in a single treatise or by a single theorist (Federhofer 1971). The presentation, in figured-bass instruction, of only two chord types—the common chord and the seventh chord—and the derivation of all other chord structures from these is unusual. The earliest descriptions of the Attwood studies recognized the novelty, among Viennese theories, of this way of teaching figured bass, and Hertzmann's (1959) identification of an influence from Rameau, as received through Kirnberger, has been accepted without question. However, the association with Rameau's and Kirnberger's theories should not be assumed to extend to the rest of the instruction.

Although the main purpose of the figured basses is to provide efficient practice in realization, as exercises in composition apart from performance,⁵ the problems they pose are cast in a form that exceeds this aim and merits study in itself. The design of the exercises, taken in sequence as an ongoing course of study, is the object of investigation here.

The following observations are, of course, determined in part by a knowledge of later theory, but the author has made a sustained effort, in accordance with historical method, to base the argument on eighteenth-

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century principles. Only by comparing these lessons to contemporary treatises and analyzing the exercises using harmonic principles that were a part of that milieu, can the significance of the instruction as an aspect of Mozart's thought or as corroboration for later speculations be rightly understood.⁶

These lessons do not constitute a theory of music—they lack sufficient explication—and they are not intended for the education of a broad public of music lovers or for the speculation of scholars, as are most published theories. They are a product of the composer's workshop. Consequently, they are free to exceed the limits imposed by the marketplace and free to transcend the separation into distinct styles. It will be shown here that the sequence of instruction, the harmonic designs of the exercises, and the annotations and corrections by Mozart reach across the boundaries that separate the pedagogical styles of his time to unify the principles of harmony, counterpoint, and form with an insight into the tonal system and a pedagogical economy that have no parallel in the published theories.

The lessons are organized into sets, much as they are in practical figured-bass manuals where chord structures are introduced one at a time. Included among the extant pages (some sheets have been taken from the manuscript but the instruction in figured bass appears to be complete) are five exercises limited to root-position triads, followed by five that introduce the sixth chord, six that add the six-four, four that have the seventh chord, and three with ninth chords. Each set is preceded by instructions in Mozart's hand on the structure of the featured chord and how it is realized in a context. It should be noted that while the inversions of the common chord are presented separately, the inversions of the seventh chord are not.

Unlike the figured basses in manuals, the exercises here do not take the form of little pieces.⁷ They are free of rhythmic detail and their harmonic designs are too proportionately unbalanced to be considered reductions or parts of compositions. They also lack the regular phrase patterns and motivic interplay that typify composition instruction of the time, including Mozart's own, further on in this manuscript and elsewhere.⁸ There are no exercises in minor keys, although minor is a prominent internal element. All begin with a C-major triad, but final cadences appear, sometimes abruptly, on every degree of the C-major scale except B and also on E-flat, C-sharp, and G-sharp, often with the effect of a conclusion on a new dominant. The exclusion of rhythmic detail in exercises as long and complex as these makes for a highly economical pedagogy.

Attwood's work probably began with the realization of two basses (AS 8 and 9), which are set apart by the nature of their harmonic progressions.⁹

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Both feature repeated interval patterns that give systematic practice in connecting all possible root progressions. They are preliminary exercises of limited musical interest. The first has no figures or accidentals. It is the only exercise that contains the diminished triad in the set limited to root position. The second incorporates all twelve tones of the octave (including F-sharp, C-sharp, G-sharp, D-sharp, B-flat, and E-flat) and includes a succession of four whole notes moving through the fifths, each figured with a change from a minor to a major third (Figure 1, AS9). The realization of this exercise was difficult for Attwood. There are eighteen stepwise progressions in 31 bars, eight involving altered tones. He wrote, "I don't know how it is possible to put the 5th here,"¹⁰ and marked five of them.

Figure 1.



His revision is realized correctly—but at the cost of a directionless melodic line (mm. 20-24, just below the uppermost part). Mozart's corrections show how the melody may be given shape and significance within the whole (mm. 20-24, uppermost part). The F, emphasized by a chromatic stepwise approach, creates a climax for the line and secures a strong melodic drive to the tonic by the half-step descent to E (which is repeated to support a crucial harmonic change) and the continuation to the leading tone. By using both semitones of the scale to re-establish the tonic C after the chromatic passage over the fifths, Mozart's corrections add an element of secure melodic support to the harmonic progression.

Although the whole-note sequence is common in pedagogy of the period, it has an extra significance here. The inclusion of the flat third over G and C, two triads that can serve as dominants in a chain without

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alteration, not only makes an elegant sequence and gives Attwood repeated practice, but provides consistent melodic reinforcement to the emergence of each new dominant without recourse to dissonance.

From this point on, the exercises having only root-position triads are limited to consonant harmony—that is, they contain only triads having the perfect fifth. In this regard, the exercises do not correspond to most contemporary figured-bass pedagogy, where the diminished triad is introduced freely.

Furthermore, nearly all the final cadences in the figured-bass exercises, even those featuring the seventh chord, are entirely consonant—they use a major triad on the final dominant—whereas to use the seventh chord to create a final dominant was nearly universal in contemporary theories of harmony (Mitchell 1963). Only two of the exercises call for the seventh in a final cadence (AS 23 and 24) and in one of these it is only a passing tone left unrealized and uncorrected.

The implication is that tonic definition is a function of consonant tonal relationships. A dominant emerges from a context of harmonic and melodic relationships rather than the addition of dissonance to a perfect chord. The most cogent support for this conclusion can be found in the way the seventh chords are introduced in the exercises. Rather than singling out the root position to show perfect cadences, Mozart presents all inversions at once. The instructions on the seventh emphasize its role in the creation of obligatory stepwise motion. The seventh is added to a harmony for the sake of voice leading. As a pedagogical device, the limitation to consonance in these early lessons forces the student to hear and understand in terms of larger contexts rather than the chord-to-chord level most often found in descriptions of the time.

Having begun with consonant triads alone, the lessons expose and differentiate certain techniques for long- and short-term voice leading clearly and systematically, because they inhere in the step-by-step introduction of inversions of the common chord and chords requiring specific resolutions in the parts. The basic principles of this system appear in rudimentary form within the structure of Mozart's preliminary demonstration of chord progressions (Figure 2, AS 5).

Figure 2.



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The demonstration begins with an example of root movement down a fifth and up a second, involving the tonic, dominant, and submediant harmonies. The next two examples include the stepwise progression after a fifth upward. Each time the stepwise progression occurs, the soprano is in a different position and doubling must involve different parts.

The concepts represented by these two progressions—the fifth and the step—are fundamental to the treatment of harmony in the figured-bass instruction. These examples arrange the dominant and submediant, the most important relationships to the tonic, so as to contrast the *natural* or consonant progression of the fifth with the *unnatural*, diatonic progression of the step. The distinction was an important one in eighteenth-century musical philosophy, where the highest value was placed on relationships of sounds that were smooth to the ear—those with the simplest ratios—the fifth and third. This value applies not only to the sounding intervals but to the progressions of chords. The idea appears in a diagram on one of Attwood's fair copies (AS 29), which shows the fifths and thirds above and below C. It bears the comment, "By the above rule one easily sees what modulations are best and most natural."

Mozart's teaching is consistent in its treatment of this distinction. It is supported by the priority he gives to the subdominant. The inclusion of the subdominant among the natural relationships (as a fifth below the tonic) was not universal in theories of the time, where the fourth degree was sometimes placed among the distant relationships within the key.¹¹ Throughout these lessons, the fourth is consistently treated as one of the most important natural relationships. Even when it appears as an interval over the bass, it is not required to resolve downward unless it is accompanied by a fifth.

In some harmonic theories, progressions having the most complex ratios—the tone and semitone progressions—were given a significance subordinate to the natural progressions. They were regarded as extensions within a passage—a way of delaying and providing interest or elaboration for a natural progression. This function was recognized by Kirnberger and described by his pupil J. A. P. Schulz ([1783] 1979, 192):

In harmony there are passing chords that are not based on any fundamental harmony. They are to be considered in the same manner as melodic passing notes, from which they arise when various voices progress in a passing fashion . . . passing chords are intermediate chords that are formed by the stepwise and mostly consonant progression of one or more voices from the preceding to

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the following fundamental chord. They always stand between two fundamental chords that are either the same or at least follow one another very naturally Passing chords can be further recognized by their unnatural harmonic progressions. These progressions are unnatural either because some dissonance is left unresolved or because the passing chords, even when they appear as regularly treated fundamental chords, would nevertheless *inhibit the natural progression of the fundamental harmony* [my italics].

The examples that illustrate this text use inversions of seventh chords for the passing harmonies, but since there are no such chords in Mozart's first set of exercises, the idea will be extended here to apply to the stepwise progression of root-position triads. The following analysis of the exercises will be founded in the different implications of the fifth- and step-progressions and the special function of the third as a natural progression but one not capable, in itself, of tonic definition.

The longer central example in Mozart's demonstration of the chords shows the harmonies related to C successively from closest to most remote, a subject included in many treatises. Mozart's order, G-A-F-E-D, is evident in the first appearance of each new harmony. Note the placement of the subdominant early in the succession, in recognition of its priority as a natural fifth relationship to the tonic. He closes with a cadence to the dominant that relates the D to G (a natural relationship) rather than C (an unnatural relationship) while completing the order of tones.

In the context of the lessons that follow, the example is the first indication of a conception of key not limited to the notes of the individual scale, but incorporating the elements that place that scale within the system of all scales. To be sure, conclusions on the dominant are common in instruction from that time, but what is not common is the extension of the idea to its limits in the subsequent exercises, where cadences appear on other chords as well, including the most remote harmonic relationships.

The example also shows in brief form the basic harmonic design of the exercises. Into the succession of harmonies described above, tonic and dominant notes are interspersed so as to show the relationships of each harmony within the key. After the first appearance of the dominant, A replaces C to divide the progression from C to the subdominant, F; F steps to G, to show the whole-tone progression created by the fifths in harmonic

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opposition from C (as it is done in some of the most venerable theoretical writings); and E extends from G to divide the fifth to the tonic. The design of the example is related to Attwood's diagram of natural modulations. It places those relationships in context. They create a structure that becomes a prototype for the exercises that follow.

An analysis of voice leading based on the contrasting functions of the natural fifth and third and the unnatural step progressions, shows the following: 1) once the dominant has been reached, two chords in stepwise relation to it delay the natural progression away from it; 2) a progression from G back to C moves through the mediant so that the fifth is interrupted and its significance as a dominant is weakened; and 3) a new dominant is introduced abruptly to close on G. The melody does not begin on C, as it will in the exercises, where the design is more extensive. Here the E at the beginning calls for a descent that unites the melodic progression smoothly with that of the harmony. The delay of the natural progression from the dominant, the weakening of the dominant, the comparatively abrupt appearance of a final dominant-to-tonic progression, and the attention to smooth voice leading in the uppermost part are all characteristic of the subsequent exercises.

The last three exercises in root position have a more concise and balanced form than the first two, and each moves away from the original key. Two of them present the dominant melodically in the bass in a way that extends its appearance in time and enhances its formal significance.

In the first of these (Figure 3, AS 5), the initial C chord becomes a dominant to F, but it returns as a tonic at the end of the exercise. Mozart constructs the modulation not merely by going to the new key and supplying its primary chords to confirm it but by progressing to the note that will effect the change and lingering there by means of stepwise progressions that delay the natural progression to the next chord tone. I will call this technique *harmonic elaboration* in preference to Schulz's too-specific designation *passing harmony*, which precludes any expansion of the idea of passing to include more than one chord.

Figure 3.

a.

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B-natural appears for the first time in measure 4, where it is the third of the G chord. From this point it would be a simple matter to proceed to C and confirm that key and be done with it, but that would be unconvincing, especially in a context that admits no dissonance. Instead, the bass line moves to D (m. 6), the fifth of the new dominant, and on to B-natural, now the root of a chord, and after a brief delay using neighboring harmonies, continues to G. Although there is one natural progression between the two B chords, it is approached and left by step. There is no harmonic progression that advances to a tonic. Although a tonic of E minor is suggested, by the time an E chord appears, it is subordinated to the new dominant, G.

The pattern of chords between the two B-major harmonies is an extension of a familiar melodic diminution to the progression of the harmony. It momentarily suspends the directionality of the modulation and gives greater significance to the B. In addition, the progression in measure 6, from a major harmony downward by third to another major harmony, contributes a melodic element to the brief suspension of natural progression by forcing a chromatic line. The motion of the soprano in both Attwood's and Mozart's realizations from D to D-sharp to E points away from F but not toward the final key, C.

The harmonic progression of this exercise extends the appearance of the new dominant in time so as to highlight the melodic motion that creates a dominant—the chromatic change from B-flat to B-natural. The technique can be related to principles first evident in the second exercise in the change of thirds over the progression of whole notes. The chromatic change is now applied to the bass line and elaborated.

The techniques for delay of the natural progression will be expanded systematically as the lessons proceed and the dominant will be succeeded by longer and longer suspensions of natural or key-defining activity.

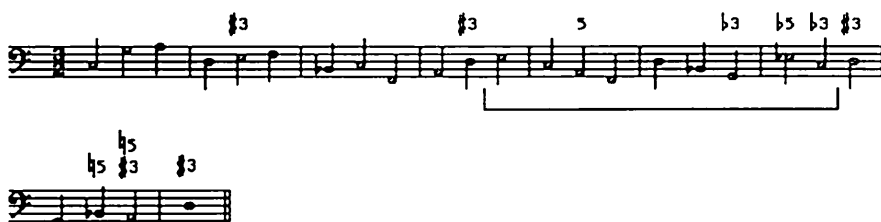
It might be noted, too, that this exercise is in duple meter but the harmonic progression does not outline a regular phrase pattern. Sometimes the bar line contradicts the harmonic significance of a progression. For example, it fails to support the confirmation of F in measure 3. On the other hand, it allows the significance of the B-natural harmony to grow as it moves from an unaccented to an accented position. In addition, the appearance of the new dominant on the accented part of the bar in measures 11 and 12 adds conviction to the approach to the new key. In the absence of clear phrase structure, the importance of meter as an adjunct to harmony in the treatment of key, to help establish a key or to weaken it as need be, becomes clear.¹²

The next exercise (Figure 4, AS 5) features a progression of downward thirds extending from E/C major (m. 5) and ending with E-flat/c-minor (m. 7). This long succession is reminiscent of the order of scales in the preliminary instruction. There the succession also moves toward the

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subdominant through the circle of fifths, dividing each fifth with the relative minor.¹³ The progression through the thirds shows the usefulness of that natural progression in moving continuously through a harmonic distance without making a cadence; and because it stops on the parallel minor, it continues to treat the change of the third of the chord, which appeared in other aspects in the earlier exercises, by showing the harmonic distance covered by the alteration and justifying it as an elision.

Figure 4.



Once again, the final cadence does not have the force of a new tonal center. Most of these exercises do not conclude on what Kirnberger ([1771 and 1776] 1982, 135) would have called a new “main tonic.” There is no confirmation of a new tonal center. However, the confirmation of key, implemented by time spent modulating within a key or by repetition of a cadential progression, is one of the rhetorical elements that have been excluded in this pedagogy. Conclusions on harmonies other than the original tonic need not imply a change of the principal tonal center. They only show how different kinds of modulations may be made. In fact, one exercise has been given twice, with alternative conclusions (AS 20 and 22). The first version ends on E-flat while the second averts that cadence and returns to C.

The last exercise in root-position chords (Figure 5, AS 12) concludes on E and has a more thoroughly worked-out harmonic structure than any other. After the bass outlines a G-minor triad (m. 8), a melodic sequence incorporates an alteration of the third to restore G as a dominant. Three triads appear, outlined within an adjusted circle of fifths that runs from A to D to G, on through B-natural, and around to G once again (mm. 7-15). Three of the fifths in the circle are divided by thirds so as to make each tone of the G-major dominant the root of a melodically outlined triad: D/B-flat/G, F/D/B-natural, and A/F/D (mm. 10-15). The harmony then moves from G to C minor.

Figure 5.

The passage remains in the new mode until it moves again to G (m. 20). The following progression from E-flat to A-flat (m. 21) introduces five bars that contain only unnatural progressions along with a pair of downward thirds and an upward fifth. Here the unnatural progressions are augmented by the third and the upward fifth progressions to create an evasion of key definition. This evasion is reinforced by the three foreign tones (outside C minor) of the A-major triad (m. 23), which is approached and left by step.

To momentarily lose the sense of the tonic in the course of a piece was acknowledged practice in late eighteenth-century theories, but the technique was usually described only as a series of modulations through other keys, such as the progression through the circle described above.¹⁴ As Kirnberger says (p. 138):

. . . experienced harmonists are not always satisfied with such a timid way of modulating [to keys with fundamentals in the original scale]. They digress into more remote keys where the ear sometimes loses the main key entirely, yet know how to direct the modulation back to it at just the right moment.

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Kirnberger (pp. 149-50) points out that while quicker modulations can be made by enharmonic shift, the most powerful way to achieve surprise is by using simple triads to go to remote harmonies. However, like most theorists of the time, he does not describe how key definition may be suspended or how a tonic emerges from tonal relations beyond its own local dominant, except for the use of an intermediate modulation to reach a remote key. Nor do his examples include progressions that suspend key definition on a scale comparable to Mozart's. His only suggestions regarding the establishment of a new "main key" are to remain in that key for sufficient time for the ear to become accustomed to it or to introduce the principal theme in it (p. 135). The appeal to duration and reminiscence would be inappropriate to a consideration of Mozart's exercises, where tonal structure results entirely from tonal relations. In the eighteenth-century theories, modulation, in the sense of a progression of harmony and melody either within a key or to a new key (Rousseau 1768), is described, for the most part, as a local occurrence. There is little discussion of long-term harmonic relationships, and when it occurs, it employs a different set of terms (see the discussion of digression below).

However, progressions of perfect chords that avoid key definition had been described earlier in the century by the French theorist Jean Laurent de Béthizy (1764, 160-67), who had called them "sensed tonics." He had included in this category progressions up a fifth, down a third, through the circle either up or down, and stepwise and had briefly explained that these can serve to obscure the sense of key, especially if they occur at the beginning of a piece. However, Béthizy, like Rameau, held that true dominants are the result of dissonance as well as the downward fifth progression. Passages of this kind must be distinguished from what Kirnberger calls a *digression*. These pass through the keys, but sensed tonics do not, unless they take the form of a succession of downward fifths. (However, in this analysis the word *digression* will be used to designate the section of an exercise that departs from the original key, whatever form it takes.)

The appearance of the parallel minor in a section of this exercise has an effect similar to the shift to the minor third within a single triad. The change calls for a continuation whether it occurs as an alteration of a single triad or as an extended passage.¹⁵ The introduction of B-flat in the dominant triad initiates an extended digression that moves not only from the original key but from key definition itself. Used in this way, the parallel mode can not be regarded as a new key but as a way of introducing new tones that will allow smooth departures to remote harmonies. Nearly all the figured basses introduce the minor form of the dominant before moving through

the key-suspending progressions. The role of the flatted seventh is to replace the leading tone, which demands a resolution to the original tonic. However, even though it can initiate a departure from the key, the flatted seventh is regarded as belonging within the key. In the second figured bass, already considered, which introduced the twelve tones of the octave, B-flat is the only chromatic tone to appear in the bass. All others are altered thirds or fifths.¹⁶

Here the passage in C minor initiates the motion away from the original key, beginning with the minor dominant harmony. However, the change of mode does not move toward the final key but away from it. The modulation to a new key is effected not by pivot or sudden chromatic or enharmonic shift but by a three-stage process that begins with a gradual escape from the limits of the original key, in which the progression first moves away from the original tonic (mm. 16-21) and then suspends the definition of key (mm. 21-25). The cadence to a new key is approached only after this escape has been made. The two-part digression is characteristic of many of the figured basses and it is expanded there by a variety of techniques.

Although the final harmony in this exercise belongs within the original scale, it must be noted that any new key can be established smoothly and with integrity by using this procedure. It need not be limited to the degrees of the original scale.¹⁷

In this exercise, the bar line once again adds reinforcement to the treatment of key. This is one of very few exercises that have a clear phrase structure. For the first 20 bars, every second measure is approached either by a fifth down or a fourth up or through the notes of a triad. By measure 21, the expectation of the two-bar phrase has been established, but the harmonic progression does not again match this pattern until the final key is approached in measure 26. The use of successive unnatural and non-key-defining progressions suspends both the definition of key and the regular pattern of phrases. By showing the emergence of rhythmic organization in the coincidence of natural harmonic progression with metrical stress, but especially in also showing the suppression of rhythmic pattern by a succession of sensed-tonic progressions, the exercise confirms that in this system the conceptual origins of rhythm lie within the harmonic process.¹⁸

As might be expected, the exercises using inversions of the perfect chord show a greater concern with stepwise motion of the parts than those limited to root position. Among its possible uses, the sixth chord is an alternative way to harmonize a stepwise bass—a way that enhances the continuity of a progression by introducing an element of instability. Kirnberger recognized this function of the consonant sixth chord (p. 117):

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. . . it is also necessary to employ the second means of bringing chords into close association—using the inversions of chords instead of their root position. Since the former do not harmonize as perfectly as the latter, they create the expectation of chords that are even more consonant. The most beautiful harmonic connection occurs when the ear is kept in a state of constant expectation of a more perfect harmony, which comes only at the end of the entire period. . .

In the same work (p. 117) he also recommends the use of tied suspensions as an “even better means of weaving chords together.” Mozart introduces ties with increasing frequency in the lessons that follow. The ties in the basses are associated with a proliferation of ties, both in suspensions and between consonant common tones, in the upper parts of Mozart’s corrections. The enhancement of contrapuntal effect created by the tie, especially in the soprano part, is the focus of several corrections or realizations that were disappointing but not incorrect in Attwood’s original.

It is in this set of lessons that Mozart introduces the diminished triad. The first sixth chord to challenge Attwood is an inverted diminished triad that appears in passing motion over the bass (Figure 6, AS 14). The sharp reinforces the stepwise melodic motion from the chord by making it obligatory. The rest of the sixth-chord exercises present the diminished triad in all its positions and possible resolutions. The root position is introduced separately, after the sixth chord, and allowed to progress by step or by fifth. However, there is no commentary to set the diminished triad apart from the consonant triads already presented. Only the limited choice of resolutions, evident not in the preliminary instructions but in the realizations, distinguishes it from the perfect chord. If Mozart regarded this chord as a consonance, his position would be consistent with some theories of the time—Schulz ([1773] 1979, 169) classifies this chord among the consonant harmonies—but its banishment from the root-position exercises gives it a special status.

Figure 6.



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Apparently Mozart did not regard the diminished triad as a dominant seventh chord without a root, as did Rameau. Some evidence for his view can be found in his corrections of a free-composition exercise (Figure 7, AS 197), which indicate that his notion of chord roots was limited to the tones actually sounding. Here he shows the sounding root consistently in spite of the appearance of a diminished third or fifth over it. Attwood's fair copy of the first two examples has the comment, "the same chord" (AS 36).

Figure 7.



The fundamental bass did not have the same significance for Mozart that it had for Rameau. By using the sounding roots, Mozart admits a leading tone, with its half-step progression, into what for Rameau was to consist only of natural progressions. Rameau's system required the interpolation of an unheard root or harmony, to be regarded as elided, to resolve the problem of diatonic progressions. Mozart's fundamental bass is not an interpretation of harmonic progression; it is a melodic line, subject to melodic rules. It retains a relation to counterpoint that Rameau's had abandoned. In the free-composition exercises, the fundamental bass allows Attwood to control the harmonic progression while creating a good bass melody, a task not required in the figured-bass lessons. Even so, the fundamental bass is useful only in the beginning of study and is soon abandoned. The way Mozart uses it shows that it would be inappropriate to interpret any unnatural progressions or key-suspending passages created by the use of inversions as elided natural progressions.

In this set of exercises, the sixth chords are interpolated into sensed tonic progressions through the circle of fifths or the scale. Because they are less stable, they serve to embellish these progressions and extend them in time. All the sixth chords function in this way. However, the sharp on the first sixth forces the stepwise motion of a part. The change in the quality of the sixth limits the possibilities for motion away from the chord and deprives it of its autonomy. It is not subject to elaboration. In this regard it is subordinate to the more natural harmonies. The term embellishment

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will be used here to distinguish elaborations such as this, which only occur at a chord-to-chord level, from those that are themselves subject to elaboration, such as horizontizations of a harmony or sensed tonic progressions.

The ways a sixth chord may be used to embellish are shown most concisely in the third sixth-chord exercise (Figure 8a, AS 16), where a progression through the fifths is marked by root-position chords while sixth chords intervene. From B in measure 4, the progression descends and ascends again through the circle. The chords on the circle are separated by sixth chords that form embellishment patterns. The embellishment is made in three ways (Figure 8b): a root-position harmony may be extended by its own inversion (marked a in the example), which may occur either before or after the root position chord; or it may be embellished by a preceding dominant or leading-tone chord—either in root position or inverted (marked b); or by a combination of the two (marked c). These patterns occur frequently in the exercises that follow.

The shortsightedness of Kirnberger's theory of passing harmonies, as expressed by Schulz ([1783] 1979), is evident in a comparison to this passage. Schulz says that passing chords normally occur only on weak beats because every chord on a strong beat will be heard as a fundamental chord. Here these harmonies appear in both accented and unaccented positions. The principal chord appears on the weak beat when the fifth moves downward and on the strong beat when it moves upward, so as to reinforce the escape from tonic definition in each instance.

The sixth-chord exercise in example 8a also shows how the evasion of key definition is enhanced in an embellished progression. At the beginning the major third is made minor repeatedly over a progression of long notes through the fifths. In the latter part of the exercise, from the progression A to E in measure 8 until the final cadence, all root-position triads are changed from major to minor or have a five-to-six progression that creates a minor harmony. The avoidance of major prevents any ambiguity as to which chord is the final dominant, but it also reinforces the evasion of key definition carried in the motion through the circle.

The evasion of cadences is treated by both Kirnberger and Rameau, but neither applies it to an extended progression. Rameau ([1722] 1971, 82-3) separates the technique into two categories, imitation (*l'imitation*) and avoidance (*l'éviter*) but says of the first, "To imitate cadences only in part is already to avoid them." Imitation is effected by using inversions. Avoidance is a term he reserves for the alteration of chords. However, alteration is inseparable from dissonance in Rameau's theory. To alter a consonant chord, one adds a third to create a dissonant seventh over the root. To alter a dissonant chord one changes the major third to minor.

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Figure 8a.

The musical score for Figure 8a consists of four systems of piano accompaniment in 3/4 time. The notation includes chords, accidentals, and fingering numbers. The first system has a key signature of one flat and a common time signature. The second system has a key signature of two flats and a common time signature. The third system has a key signature of two flats and a common time signature. The fourth system has a key signature of two flats and a common time signature. The score is divided into four systems by horizontal lines. The first system has a key signature of one flat and a common time signature. The second system has a key signature of two flats and a common time signature. The third system has a key signature of two flats and a common time signature. The fourth system has a key signature of two flats and a common time signature. The score includes various musical notations such as chords, accidentals, and fingering numbers. The first system has a key signature of one flat and a common time signature. The second system has a key signature of two flats and a common time signature. The third system has a key signature of two flats and a common time signature. The fourth system has a key signature of two flats and a common time signature.

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Figure 8b.



Kirnberger (p. 117) points out that the addition of the seventh “prevents the dominant harmony from being heard as a place of rest,” and suggests that “if one wants to keep the full cadence and yet prevent its effect of repose, the seventh need only be added to the tonic triad, whereby it becomes the dominant of a new key.” If dominance is understood in terms of the harmonic instability that results from dissonance, it can only be seen as a local function. In both Rameau’s and Kirnberger’s explanations, the word *cadence* refers to any progression by perfect fifth, whether it occurs in the middle or at the end of the phrase.

Mozart achieves repose by using the major third in both triads in a cadence—in keeping with a time-honored rule of counterpoint. He avoids it by a variety of techniques, the simplest of which is to change the third of one of the triads to minor. However, a point of repose is not necessarily a true closure, although theorists of the time did not make the distinction using that term (cf. Kirnberger’s description of the *new key* already cited), and Mozart’s exercises do not always end in closure. The consonant chromatic alternation that creates a pair of major triads in fifth relation is sufficient for closure only when it is supported by the rest of the harmonic progression.

Mozart’s corrections of this exercise reveal more about the melodic aspect of his conception of key. Three comments by Attwood appear in connection with the corrections: regarding the unison doubling he writes, “Tis always better if possible to have all the parts full,” implying a more contrapuntal orientation to the art of realization than one would find in many thoroughbass manuals where ease of reach on the keyboard is more important; in regard to the melodic augmented second he writes, “this does not sing well,” calling for the smooth progression of the melodic line—a point constantly evident in his corrections and frequently reiterated in his comments¹⁹; and regarding the position of the soprano in the final chord, he writes, “Tis always better to finish with the octave uppermost,” emphasizing the need to make the final cadence as clear and unequivocal as possible within the consonant context. Mozart treats the motion to the final note strictly, regardless which tone of the chord is in the soprano, by requiring

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that a final third be approached by the half-step descent from the fourth,²⁰ and that a final fifth be approached from the sixth.²¹

A realization by Mozart of part of the exercise begins by avoiding the unison doubling referred to in the comment and resolving the melodic problem created by Attwood's augmented second (Figure 8c, AS 16). Mozart also takes the melody to E, whereas Attwood had not gone higher than D. The higher note not only creates a melodic climax for the exercise, but it establishes a turning point within the original tonic harmony from which to descend chromatically to G, the final tonic. The long notes E and D divide the melodic line into two parallel descending segments that allow a G-sharp to be reinterpreted as an A-flat before the final progression to G (compare Figures 8c and 8a).

Figure 8c.

The musical score for Figure 8c is presented in two systems. The first system contains two measures. The first measure has a treble staff with a half note G4 and a bass staff with a half note G2, with figured bass symbols 6 and 6 below. The second measure has a treble staff with a half note A4, a half note G4, and a half note F#4, with a box containing the number 10 above the A4; the bass staff has a half note G2, a half note F#2, and a half note E2, with figured bass symbols b6, 6, b5, and b3 below. The second system also contains two measures. The first measure has a treble staff with a half note E4, a half note D4, and a half note C#4, with a circle containing a cross above the E4; the bass staff has a half note G2, a half note F#2, and a half note E2, with figured bass symbols 5, 6, and b6 below. The second measure has a treble staff with a half note B3, a half note A3, and a half note G3, with a circle containing a cross above the B3; the bass staff has a half note G2, a half note F#2, and a half note E2, with figured bass symbols b3 and b3 below. The score concludes with a measure marked [sic].

The last exercise in sixth chords embellishes a progression through the scale, this time downward (Figure 9, AS 18). This is the only figured bass to indicate a repeated pattern of quarter notes. Here every chord in the scale pattern is harmonized with a major triad and is in root position. The tones of the scale pattern appear in unaccented positions where they function as points of rest after the activity over the long notes. The motion down the

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scale progresses to F (m. 9), which appears within a suspension of key defining extending from the dominant G. The progression through the fifths from B-flat in measure 3 to D in measure 5 shows each member of the fifth pattern represented by its first inversion and preceded by its own leading-tone triad, also inverted. This digression is also in two sections, the second an intensification that suspends the key defining progressions.

Figure 9.

Figure 9 displays three staves of musical notation, likely representing a figured bass exercise. The notation includes various figures (e.g., #5, 6, b6, 5, #5, 6, b6, 5, #5, 5, 6, b6, b6, 6, 5, #6, 6) and notes, indicating a progression through fifths and inversions. The first staff shows a sequence of figures and notes, followed by a second staff with more figures and notes, and a third staff with a few more figures and notes, ending with a double bar line and an asterisk.

In a reversal of the functions so clearly presented before, the root-position chords are not a part of the pattern of fifths but serve as an initial position from which to introduce the diminished triad in a stepwise progression. The device adds considerably to the continuity of the progression. The exercise concludes with a progression through the circle from F-sharp through the enharmonic shift and back to C. Thus the return to C extends from the most remote harmony.

The F in measure 9 stands out as one of only two unfigured whole notes in the lessons. The relationship of F to the dominant is prefigured in the tied notes of measures 2 and 3 as if to signal that this is an important structural idea. The principle of reversal that originates in the harmonic opposition of F and G with respect to C may be the key to the structure of this exercise. Here reversal is extended beyond pitch relations to the metrical position of the chords in the embellished circle and the respective functions of the root and inverted positions. Once again, a further enhancement of continuation is the result.

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The six-four chord, like the sixth chord, is a means of continuation or embellishment. As an arpeggiation, it extends a harmony; as a passing chord, it embellishes a harmony; as a suspension, it delays a harmony (cf. Attwood's explanation of the ninth as "a kind of lagging note," AS 38). Mozart calls the second inversion a "consonant fourth chord" and explains, "The sixth is needed in this chord, and it is consonant because it can enter by itself without being prepared, and the fourth can resolve in every way."²² However, in the exercises it invariably resolves downward. Of particular interest is the way the fundamental basses interpret the six-four according to its function in the continuation or closure of the period. They show the root of the chord when it is part of a perfect cadence (AS 167, top, m. 7; 168, m. 5; 169, top, m. 7; and 173, m. 15) and the bass tone when it is part of a half cadence (AS 168, m. 4; 169, top, m. 4; 169, bottom, m. 4; and 173, m. 12). There is only one exception (AS 170, m. 15), and it appears uncorrected in a fundamental bass by Attwood that is part of an exercise having more serious problems for Mozart to address. Although this treatment would support a differentiation comparable to Kirnberger's *essential* and *non-essential* functions, it does not correspond to his explanation (pp. 71-79). The difference lies in Kirnberger's classification of the six-four into dissonant and consonant categories. Nevertheless, both theories require the root of the six-four to be determined retrospectively, in the context of what follows.

The five-four suspension is contrasted to the six-four and described as the "dissonant fourth chord":

The difference between these two chords is that in the first it is the sixth and in the second, the fifth. Because it is not possible to enter by itself, the fourth should always be prepared. And the fourth can only resolve downward. In this chord, the figures other than the fourth are not shown; the fifth is always understood.²³

This treatment of the fourth was somewhat controversial, since there is no harmonic principle to justify the transformation of a consonance into a dissonance, or vice versa, by means of its accompaniment. The qualification of this chord as dissonant is anomalous. The instructions require the fourth to behave as a suspension, yet other suspensions, such as the ninth and the nine-four double suspension, are not called dissonances. However, the idea is consistent with the theories of Sorge, Albrechtsberger, and the Salzburg theorists (Federhofer 1971, 102-105).²⁴

The instructions on the seventh chord do not identify it as a disso-

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nance, either, but repeatedly specify its melodic resolution. The demonstration of seventh chords shows all inversions and their figures, along with a caution against doubling the third and a *nota bene* that the seventh must always resolve downward. Attwood's fair copy (AS 36) adds, "in case of necessity *neither* the seventh nor any of those chords derived from it are obliged to be prepared. Yet, 'tis always better when they are." This emphasis on the conduct of lines, along with the inconsistent use of the term *dissonant*, are further indication that Mozart was more concerned with the contrapuntal aspect of the realizations than with the chord as such.

Like the sixth chord and the six-four-chord lessons, the exercises using the seventh are based, at least in part, on a pattern of fifths or steps. However, what appears to be the first seventh-chord exercise is a "rule of the octave"—an unembellished harmonization of major and minor scales with an extended cadence (Figure 10, AS 23). The rule of the octave is common to most treatises and manuals.²⁵ The dominant seventh appears in all inversions in this exercise. In the scale harmonizations it relates only to the tonic or the dominant. The pattern of whole notes shows the seventh as a passing tone and resembles the pattern in the second exercise that altered a minor third to major over the same bass note.

Figure 10.



In addition to the dominant form, the exercise includes a diminished seventh (m. 11). Like the diminished triad, it appears without any accompanying commentary regarding its different interval structure. This chord follows another seventh, a four-two, by means of an exceptional resolution.

To find a chromatic progression of this kind in the first seventh-chord exercise, especially one otherwise constructed on a conservative plan, raises a question.

The editor has suggested that a sheet from this part of the study may be missing—one that would have presented Attwood with the sevenths more systematically (KB 20). The fair copy by Attwood of the resolution of the various inversions has no corresponding instruction in Mozart's hand. However, the lessons seem quite complete otherwise. In the course of this set of exercises, Mozart systematically introduces all types of seventh chords in common use. The first exercise features dominant sevenths and introduces one diminished form. The second uses dominant and diminished sevenths and introduces one major seventh (m. 4), the only one to appear in the exercises, and one half-diminished form (m. 6). The third continues this cumulative pattern by introducing one minor seventh along with the other forms. The fourth uses all forms. At least in this aspect, the lessons that remain are systematic and complete. And they imply a classification of the different types of seventh-chords that augment the verbal instruction. Although these chords are derived from the dominant form, they are separately distinguished as problems in realization. In addition, the notion that the augmented-sixth chords originate in the inversions of the seventh is further supported in the second exercise, where an augmented six-four-three results from a chromatic alteration to a half-diminished six-four-three (Figure 11, m. 8, AS 23).

In this set of lessons the seventh is used repeatedly within a harmonization of scales and all genera are represented. The second exercise features a harmonization of a chromatic scale passage and an intensely chromatic digression that includes a prolonged enharmonic change (Figure 11, AS 23).²⁶ Between measures 11 and 13, the bass moves within a constrained area, first from G to F-sharp to E-sharp and back the same way, then on to G, G-sharp, and back to G before the final cadence. All these bass tones belong to seventh chords or have fourths above. None are roots. At the cadence the E-sharp is reinterpreted as an F to unravel the tonal knot created by the progression. The passage embellishes the dominant by compounding the use of leading tones. (It should be noted that the F-sharp does not take a leading tone until it has become part of a consonant harmony). There is a sense of accumulating weight in this progression, an aural effect of distortion, as the harmonies are bent away from a natural path. The final cadence emerges as a lightening and a straightening of the progression. The enharmonic reinterpretation has been prolonged to create the effect of harmonic distortion in the absence of a temperament that would have allowed an audible difference of pitch.²⁷

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Figure 11.



Despite its antiquity, the idea of the genera, like that of the hexachord, was still viable in some theories of the late eighteenth century, where it was most often associated with the recitative. The persistence of Pythagorean tunings as well as Zarlino's system of temperament account for some debate on the subject. But in practice, an enharmonic progression would not have been audible within the types of well-temperament commonly in use. As Kirnberger says (p. 28), it requires some skill at harmony to create such an effect:

It is possible to get even smaller progressions than the minor semitone, called *enharmonic*, by deceiving the ear . . . Even though enharmonic intervals do not actually exist in our system, they can be made audible by the correct treatment of harmony. It is a known fact, and every ear perceives it, that such enharmonic changes create the most pleasant harmonic effects.

However, he shows the enharmonic progression only as a local progression.

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This figured bass calls for many irregular resolutions of sevenths, including direct resolutions to other sevenths. The fluidity of motion, especially in bars 9-14, results not only from the intense chromaticism, but from the ties that syncopate the bass and the placement of comparatively consonant harmonies in metrically weak positions. The dense chromaticism severely restricts the motion of the lines and Attwood must think far ahead wherever he has a free choice. He has fewer and fewer opportunities for choice as the lessons progress. Like the second exercise, this one was too challenging for him. He made five attempts at the last part of this realization.

Yet the overall design is simple. The harmony moves from C to G, a digression moves down an octave where G is embellished, and a final cadence returns to C. The final cadence is the only progression of its kind in this exercise. The digression from C occurs in two sections, as it did in the earlier exercises. Here key definition is suspended through both sections but the second is an intensification of the techniques of the first. The fluidity of motion, especially in bars 9-14, results not only from the obligatory motion required by the chords and the intensity of the chromaticism but from the ties that syncopate the bass and the placement of comparatively stable harmonies in metrically weak positions.

The two exercises on the *verso* of this sheet (AS 24) have the greatest conceptual simplicity of any in the set, but they too are not easily realized. The first bass line is entirely stepwise until the final cadence. Attwood's realization is also constantly stepwise in all the parts up to the same point. Although it may have been invented in a certain tongue-in-cheek spirit, which would not be uncharacteristic of Mozart, it also appears to be a focal point in the progression of exercises. The continuous stepwise progression of all parts culminates the systematic introduction of elaboration and embellishment patterns.

The second exercise on this page moves in somewhat perfunctory fashion through the circle to G-sharp, beginning with a repeated embellishment pattern but elaborating each subsequent fifth in a different way. Each chord on the circle is embellished by its own dominant in one shape or another and sometimes by the fifth of the dominant as well. The conclusion on G-sharp is no more logical than a conclusion at any other point on the circle. However, it is the limit to which the progression can extend without making an enharmonic change to the flats.

Mozart's instructions on the ninth chord (AS 25) are concerned with the rhythmic nature of the suspended tone rather than its dissonant quality. He gives Attwood only two examples, one a nine-five and the other a nine-four, but the nine-seven is included in an exercise. On the *verso* of Attwood's fair copy is written, "The ninth has no fundamental but is a kind of lagging

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note belonging to the octave" (AS 38). Mozart's corrections ensure that the ninth is suspended in every appearance. Only two exercises add the ninth to the figures already studied and both are reviews of structural principles already made clear. The ninth only adds another means of binding harmonies and enhancing the continuation of lines.

Attwood's example of the seven-four-two and the five-four-two (AS 38) accommodate these chords in the absence of inversions of the ninth. He shows the seven-four-two over a tonic pedal with and without the root, and analyzes both as sevenths with exceptional accompaniments, an explanation common among Viennese theories. The five-four-two, which is created by a suspension of the bass, is contrasted with the six-four-two, which results in a fifth to the dominant in the same circumstances. Nowhere are any of these chords called dissonant, and their description as accompanied intervals preserves a characteristic of earlier figured-bass teaching.

Throughout the entire course for Attwood, beginning with the figured basses and extending through the counterpoint and free composition as well, Mozart's teaching exposes the basic principles of long-term voice leading. In the figured-bass exercises, their appearance is the outcome of a pedagogy of harmony founded in natural relationships and developed by a systematic presentation of the rules governing the motion to and from each chord structure. The exercises successively show: 1) the prolongation of a harmony by horizontalization, that is, by presenting its tones in the bass progression one at a time; 2) the delay of a natural progression by elaboration, that is, by surrounding it with other harmonies in unnatural relationships to it; 3) the extension of the process of delay into digression from the key and even further, from key definition, by means of sensed tonic progressions; and 4) the embellishment of harmonies within all these progressions by less stable harmonies and harmonies requiring specific resolutions. The presentation is strictly controlled and is unified from the first demonstration of the chords throughout the entire composition course. Although the design of this instruction is exceptional for Mozart's time, the idea of long-term harmonic and melodic significance did have a place in the contemporary aesthetic. At the end of the century, the theorist Francesco Galeazzi ([1796] 1968) asserted that art is to be found in the "grand line of a composition."

Although Heinrich Schenker probably was not aware of this document,²⁸ the exercises corroborate certain aspects of his theory (1906, 1910 and 1922, 1935),²⁹ and it is instructive to make a comparison. Because they are founded in consonance, the figured basses distinguish the dominant of the key, which is subject to elaboration, from the dominant that embel-

lishes—a distinction in keeping with Schenker's notion of the scale step. The delay of natural progressions by unnatural progressions and sensed tonics and the addition of embellishing chords exposes a system of harmonic subordination, and although it was not recognized in eighteenth-century theories, harmonic subordination creates structural levels. The progressions described here as elaborations would belong to a middle-ground level while the embellishment patterns are characteristic of the foreground.³⁰

Also consistent with Schenker is the way the harmonic progression of an exercise is clarified and supported by the strict contrapuntal control of the uppermost line. Without rhythmic detail, there is no conventional melody here, only voice leading. In the exercises, if not in all the preliminary instructions, Mozart requires all dissonant tones to resolve downward. His realizations place ties in the soprano part to enhance its continuity, and they expand the line so that it has a clear arch that turns at a point within the tonic harmony. His comments and instructions call for a singing line—the *cantilena*—which moves smoothly within clearly defined harmonic limits and incorporates the correct resolutions of the active tones of the scale. Although the progression of melody is the first consideration, he asks for the preservation of the four-part structure to the extent possible.

In their avoidance of rhythmic pattern and the intensity of their voice-leading demands, as well as the strictness of realization required by the master, these exercises resemble species counterpoint according to Fux ([1725] 1966). They are not only problems in realization but essays in voice leading. They embody the fundamental principles of tonal organization in a way that is pure—freed of the elements of rhythmic or motivic interplay or melodic embellishment. They are abstractions from the practice of free composition in the same way that Fux's species exercises are abstractions from the learned style (Rothgeb 1975). Both cast out whatever belongs to musical rhetoric to expose a foundation of long- and short-term tonal relationships.

The contrapuntal orientation evident in the figured basses also characterizes the course in composition as a whole. More than half the extant pages of the manuscript contain counterpoint exercises and the characteristic patterns of the species continue to appear well into the lessons in free composition. Mozart's altered versions of Fux's, as well as his own, newly composed *cantus firmi* show a more conjunct and symmetrical progression than Fux's originals and are more clearly directed toward the fifth of the mode.³¹ Alfred Mann, who edited the lessons in strict counterpoint, points out that the changes Mozart makes bring Fux's exercises more into conformity with the newer style (KB 27), but Mozart's choices are legitimate alternatives within Fux's own scheme. They proceed with clearer harmonic

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direction without violating the rules of the mode. There is a leveling process at work in these lessons, to make the harmony instruction more contrapuntal and the counterpoint more compatible with the tonal style. However, in no case has it been necessary to depart from the rules for either style.

The shift to what has been designated "free composition" by the editors, appears to be a step backward. The first lessons continue ideas presented in the figured basses, including the sectional digression, and seem unrelated to the lessons in canon and fugue that preceded them in the edition. An examination of the manuscript shows a similarity of handwriting and ink at the beginning of each of the large segments of the course in composition, which suggests that these segments may not have been completed one at a time, but undertaken by alternating units or sets of lessons from each group. If this is the case, it would be consistent with the exceptional degree of conceptual unity among the three pedagogical styles.

However, the step to a fully worked-out composition is carefully extended from strict counterpoint into the later free-composition instruction. Within the counterpoint lessons there is no introduction of "free" writing. Instead, Mozart presents the florid style by giving Attwood a set of patterns for the melodic embellishment of suspensions (AS 68-69). Free writing is to emerge only gradually from embellishment techniques. Among the free-composition exercises, a series of lessons appear that relate to the counterpoint teaching. A set of harmonizations of a little march tune apply the principles of strict writing to the accompaniment (AS 175-180). Attwood is required to maintain continuous motion in eighth notes or sixteenth notes in a single part, against slower-moving lines in the other parts. Mozart's corrections are directed to the incorporation of suspensions and the enhancement of a progression from the dominant by using more inversions and more chromatic alterations to the harmony.

The harmonizations of the march tune, combined with the examples by Mozart, instruct Attwood in the rhythmic differentiation of parts, the pairing of parts, and the exchange of melody and accompaniment among the parts. They form a link from the canons and fugues in the strict counterpoint to the free composition to follow. The integration of all segments of the course of instruction is in keeping with Schenker's insistence that free composition, at the conceptual level, is an elaboration of a strict underlying voice-leading structure. The liaison from instruction in counterpoint to that in free composition is one he called for expressly in the second part of *Counterpoint* ([1922] 1987).

Further application of the principles shown in the figured basses will produce longer progressions, suitable for a composition. However, not all the patterns are directly applicable and, of course, the subordination of minor in the lessons does not apply in the same way to compositions. An

extended form of the suspension of key shown in the root-position exercises, created out of a combination of stepwise root progressions and progressions of downward thirds, will make only a partial appearance in a composition. The root-position exercises show the suspension of key definition in more abstract form than the later ones. As the exercises incorporate more elaboration techniques, more progressions associated with the familiar foregrounds of compositions appear. The sequence from an abstract form to one more in keeping with familiar practice is similar to the progressions of strict counterpoint through the species.

Some of the progressions in the figured basses are common in eighteenth-century music and are reproduced in the same form in Mozart's compositions. Their occurrences are too numerous and familiar to list here, but they include motion through the circle of fifths, either ascending or descending, descending motion through the thirds, as well as modulation supported by a continuous stepwise bass line, either diatonic or chromatic.³²

Also familiar, especially in Mozart's works, is the reliance on a shift to the minor tonic or dominant in a modulatory section. Mozart's first-movement forms in major keys use a shift to the minor dominant at the beginning of the development in the majority of cases. The replacement of the leading tone is an essential step in moving out of the key.

Even the sudden conclusion of an exercise in a distantly related key has its parallel in Mozart's music, in the sudden changes of key that mark some transitions and development sections. These changes are an essential part of the dramatic tension of a work. And the digression to a remote key is also evident in his compositions. In his study of Mozart's modulations, Hans David (1963) points out that in moving to a new key, Mozart's music will establish a conflict between the key of departure and the key in which the music will come to rest, and those conflicts sometimes include the furthest relationships on the circle of fifths.³³

The Attwood studies were not designed for a beginner. Attwood had already studied composition in England with Ayrton and Nares and in Naples with Cinque and Latilla. He was also an accomplished organist, and his musicianship had attracted the attention of the Prince of Wales, who had sponsored Attwood's trip to the Continent. The lessons were constructed in a way well suited to his experience and seriousness of purpose.

However, there is no way to know whether Attwood understood them as they have been described here. It is possible that their form was not intended for his immediate instruction but to yield some insight at a later time. Their design could be the result of a rigorous musical integrity, and their invention may have been undertaken out of the sheer joy of the intellectual exercise. Attwood had appeared shortly after the completion of the last of the six string quartets dedicated to Haydn. In these works

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Mozart's technique had reached maturity. They were followed, during Attwood's residence in Vienna, by a succession of masterpieces including *The Marriage of Figaro*, the "Prague" Symphony, and the "Hoffmeister" Quartet. It does not seem unlikely that at this point in his development as a composer, Mozart would seek to define his basic assumptions, and the course of study for Attwood, who was his first serious composition student, offered an opportunity to do so.

If a dual purpose informs these exercises, it would be consistent with what we know of Mozart's artistic aims. Believing, as did his contemporaries, that his work should provide pleasure for both *Kenner* and *Liebhaber*, he wrote to his father regarding some new concertos: ". . . here and there connoisseurs alone can take satisfaction, yet so that the non-connoisseur can be pleased without knowing why."³⁴ To conceal his learning beneath a simple exterior was consistent with the aesthetic of the time. As applied to a pedagogy, it would also have been consistent with certain aspects of Freemasonry, into which he had been initiated only a few months before Attwood's arrival. The transparent symbol, the hidden meaning that becomes evident only after the observer has acquired through hardship, trial, and error, the capacity to understand, is characteristic of the Masonic way to knowledge and perfection of soul and craft.

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NOTES

¹London: British Museum, MS 3-3505. Listed as "Attwood MS" in Köchel (1964), item 506a (485a). The complete manuscript, which dates from August 1785 to February 1787, consists of 141 leaves with 267 inscribed sides and includes lessons on the elements of music, figured bass, counterpoint in the manner of Fux, and free composition; as well as some limited study of orchestration and text underlay. These lessons as they appear in the published edition (1965) will be cited as AS. The "Kritische Berichte" to the edition (1969) will be abbreviated KB. All biographical commentary is based on the introduction to the AS. General descriptions of the manuscript and its contents were published by Bridge (1891); Oldman (1925); and Hertzmann (1959). The latter also appears in the introduction to the AS.

²Federhofer (1971) pointed out correspondences to other theories and found that the instruction took place first in the chronology of Mozart's composition teaching. Chesnut (1976) made a study of doublings in the figured-bass lessons and a computerized examination of chord-to-chord modulations, the results of which are dissociated from musical ideas of the time. Chesnut (1977) also identified a variety of well temperament implicit in the interval exercises in the first part of the lessons.

³Some of the modulation techniques were described in my dissertation (1978). The present study substantially revises and extends that work.

⁴A survey of all extant sources and the techniques for identification of the handwriting is provided by Chesnut (1976).

⁵Since there is no mention of fingerings or embellishments and there are no repetitions in alternative keys or exercises in minor keys, they do not appear to be designed to develop keyboard competency.

⁶It should be understood that no attempt will be made here to argue for an influence or to show that a particular theory is a component of Mozart's thought. The theories referred to are the yardsticks by which Mozart's theory is measured. Therefore, it will not be necessary to prove that he was familiar with them. However, it may be safely assumed that as a result of his travels and his professional dialog with his father, documented in their correspondence, Mozart had a cosmopolitan awareness of the theory of his time.

⁷Mozart's lessons differ from those of Handel (1978) and J. S. Bach (Spitta [1889] 1951, 3:315-47), which begin in a rhythmically simple way but soon take on the character of pieces.

⁸The lessons in composition given to the niece of the Abbé Stadler are limited to instruction in counterpoint and free composition comparable to that in other parts of the Attwood manuscript. Cf. Lach (1918).

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⁹The edition does not show the lessons in the most likely sequence of instruction. It would not be in the nature of common human behavior for the lessons to have been written in strict sequence from the top to the bottom of a sheet or from one side to the other, but from time to time put down on whatever paper or space was handy. The exercises on pages 8 and 9 appear to have preceded the others. Both are written on sheets having instructions in intervals on one side or the other, which would indicate an early origin. The second exercise had to be resubmitted and appears again on page 13.

¹⁰Spelling is regularized in this study.

¹¹For example, Kirnberger places the fourth next to the last in the hierarchy of relationships to the tonic ([1771 and 1776] 1982, 127), while Sorge ([1747] 1980, 277-79), C. P. E. Bach ([1753 and 1762] 1949, 434), and Albrechtsberger ([1826 and 1837] 1855, 1:58) place it last. Heinrich Christoph Koch omits the fourth altogether ([1787 and 1793] 1983, 200).

¹²The use of incongruence of harmonic and metrical stress and the resultant condition of tonal instability was treated by the Abbé Vogler ([1778-81] 1974, 1:12). Grave (1980) associates this idea with passages in Mozart's compositions.

¹³The D-major, B-minor, and G-major scales are missing but may be assumed to have been included in the instruction.

¹⁴The notion of chord progression carried in this kind of description is attributed to the influence of Rameau by Wason (1985, 14).

¹⁵A survey of the use of minor interpolations in Mozart's music is included in Longyear (1971).

¹⁶The inclusion of B-flat in the system of C is a persistence of much older theory. Its classification as *musica recta* is discussed by Bent (1972).

¹⁷The restriction of modulations to tonics having perfect chords within the octave of the original key was common among the Viennese theorists. It was also advocated by Rameau ([1722] 1971, 268). However, Abbé Vogler's theory (1802) corresponds to Mozart's usage in this respect.

¹⁸The notion that rhythm is inherent in the long-term harmonic progress of a piece is taken up by Putnam Aldrich (1970) in his interpretation of Kirnberger's writings. The appearance of the idea in the theories of Kirnberger, Vogler, Riepel, and Koch is discussed by Grave (1980). Although some of the possible processes for continuation are evident in the examples in these theories, the discussion does not focus on them but on the techniques for the achievement of repose. A focus on continuation will become more common after the turn of the nineteenth century.

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¹⁹Below one of his own *rovescio* canons (AS 15), Mozart has shown a unison doubling as preferable to the octave, "Better yet for singing." (*Meglio ancora per la cantilena.*) The *cantilena* takes precedence over full voicing.

²⁰Also see the similar corrections on AS 7 and 19.

²¹See the correction on AS 25.

²²*Ci vuol la sesta in questo accordo ed è consonante, perchè puol entrare da se stesso senza che sia preparato, e la quarto può risolversi in ogni maniera* (AS 21).

²³*La differenza di questi due accordi è, che nel primo ci è la sesta, e nel 2do la quinta. Perchè non può entrare da se stesso, ma la quarta si deve essere già preparata—e che la quarta no può che risolversi in gui—in questo accordo non mettano altri zifferch' una quarta, la quinta già si suppone* (AS 21).

²⁴Sorge ([1747] 1980, 394-421) argues extensively for the consonance of the fourth. See also the commentary by Wason (1985, 7). Federhofer was able to show the spuriousity of the thoroughbass books published under Mozart's name (1809, 1822) by comparing the treatment of the fourth with the AS.

²⁵Most of the published sources give alternative harmonizations. Compared to the first presentations of the rule in Bach's ([1753 and 1762] 1949, 432) and Rameau's ([1722] 1971, 396) treatises, Mozart's shows more regard for the subdominant (which he treats as a perfect harmony rather than using the added sixth) and makes fuller use of the dominant seventh in place of the leading-tone chord.

²⁶An illustration of the three genera (AS 257), along with the four divisions of the octave: harmonic, arithmetic, geometric, and mathematic, is in the appendix to the edition. The page is in Attwood's hand and its purely theoretical nature places it among the studies brought from Naples.

²⁷Despite what may be inferred from the preliminary instruction in intervals (Chesnut 1977), the question of what temperament Mozart preferred is left unresolved in the lessons in figured bass. Since it is associated with performance, it would be out of place in lessons not directed to keyboard playing. However, an empirical test shows that the abandonment of an exercise on C-sharp or G-sharp, in a system of well temperament, has an effect slightly suggestive of a conclusion on a dissonance, and the progression from G minor to A-flat major in one of the root-position exercises is so jarring it creates a hiatus in the modulation. I am indebted to Professor Owen Jorgensen of the Michigan State University School of Music for this demonstration. A discussion of similar enharmonic transformations in Mozart's compositions can be found in Roger Kamien (1986).

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²⁸Conversations with Oswald Jonas at Riverside, California, ca. 1975.

²⁹The precedents to Schenker in eighteenth-century diminution theory are treated by Morgan (1978).

³⁰However, a description on this kind of model has not been made because it would not be in keeping with the eighteenth-century awareness of musical structure of assumptions regarding progress in time (Teggart ([1918] 1977, 82-98). The value of these lessons lies in the documentation they provide for an eighteenth-century pedagogy and any corroboration for Schenker must begin there.

³¹The counterpoint instruction, which is related to the lessons in the "Salzburger Studienheft" and the set for Stadler's niece published by Lach (1918), is of considerable interest, but a thorough treatment would be beyond the scope of this essay.

³²An interesting and controversial treatment of Mozart's expressive use of these figures can be found in Born (1985).

³³A survey of the scholarship and a summary treatment of the harmonic techniques in Mozart's development sections is provided by Bushler (1986).

³⁴*Briefe und Aufzeichnungen* (1962-63, 3:245-46). . . . *hie und da—können auch kenner allein satisfaction erhalten—doch so—dass die nichtkenner damit zufrieden seyn müssen, ohne zu wissen warum*

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TEACHING VOICE LEADING IN TONAL MUSIC

LISA HANFORD HALASZ

When we teach our students about tonal music we generally concentrate on two fundamental aspects: in harmony courses we teach about the structure of chords, and in counterpoint courses we talk about the structure of lines. Although harmony and counterpoint are mutually dependent in tonal music, we separate them to focus on their individual structures and tendencies. We are right to do so, up to a point. But unfortunately, this unnatural separation often leaves students with a distorted view of tonal music. To correct this, it is necessary to teach students about the combination of harmony and counterpoint, for only then can they begin to understand the intricacies of musical structure.

When we describe the combination of harmony and counterpoint, we describe voice leading. Studying voice leading, however, is not considered to be a glamorous pursuit. All too often we present voice leading as a mindless task performed merely to connect chords in a chorale harmonization. We readily give advice about the process of selecting interesting chords, but neglect the process of connecting them to form beautiful lines. As a result, students think of voice leading as a mechanical task, rather than as a creative art.

This limited view of voice leading is both unfortunate and inaccurate. Voice leading principles do not merely govern chorale harmonization, they shape all tonal music. Because every pitch in a piece performs both a harmonic and contrapuntal role, voice-leading considerations influence its path. Voice leading is the realization of a composer's melodic and harmonic ideas within the confines of the tonal system. In this way voice leading is much more than the skill of moving smoothly from one chord to the next; it is at the heart of the compositional process.

Given that voice leading is such a fundamental aspect of music, how can we best present the topic to our students? For while methodologies for teaching harmony and counterpoint as separate disciplines are well established, techniques for the analysis and implementation of voice-leading principles are comparatively neglected. We have not been able to focus on local voice-leading techniques because we have lacked a systematic way of doing so. Instead, we have been limited to warning students against certain parallel intervals and giving them vague advice on doublings and voicing.

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To understand compositional choices at the foreground level, however, we must teach our students that pitches play a dual role in music, and function both as a member of a chord and as a member of a line. To do so, we require a system that enables us to interpret a pitches' contrapuntal and harmonic functions simultaneously.

Unfortunately, such a system is not readily available. For one thing, we have not yet fully determined how harmony and counterpoint combine in music. Even a basic component of this combination, namely the relative role that each force plays, is still controversial; indeed, theorists have disagreed for centuries about which of the two forces impels musical progression. Theorists in the tradition of Rameau favor a harmonic explanation for musical progression, while Schenkerians, whose antecedents are in figured-bass practice, emphasize contrapuntal forces.

In the effort to explain how these forces motivate music, all theorists have looked for similarities that transcend apparent differences in individual pieces. To do this, they have overlooked foreground connections and have concentrated instead on abstract theoretical relationships. Their methodologies include reductive techniques designed to omit certain foreground events and to reveal a common background set of pitch relationships. Once established, background relationships become the basis upon which interpretation of foreground pitches depends.

Whether or not these methodologies are sufficient for describing foreground voice leading is not at issue here; more to the point is whether they can help students to understand tonal procedures. While these methodologies do provide students with a general outlook on music, they do not provide a systematic procedure that is easily accessible to them. This is because the type of reductive analysis crucial to these systems requires that a student make sophisticated choices—choices that beginning students are not yet ready to make.

Because it is important to introduce students to the combination of harmony and counterpoint early on in their studies, we must describe pitch relationships in familiar, rather than abstract terms. In this paper I propose a methodology that makes it possible to assign voice-leading roles to pitches based on their dual harmonic and contrapuntal function. The methodology, which does not require any advanced reductive techniques, is simple to employ and thus suitable to students at any level. While I will concentrate here on the specific ways that the methodology helps students in chorale harmonization, I will also suggest some of its more advanced applications for analysis and free composition.

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THE METHODOLOGY

The focal point of my methodology is a model designed to describe foreground voice leading. To do so, the model must take into account the way harmonic and contrapuntal forces combine at the local level. In my view, chord progression is the necessary point of departure for such a model. It is not mere chance that certain recognizable chords appear at specific places in tonal music, and it is not the accidental concurrence of independently conceived lines that makes this happen.

I have decided to read the voice leading of a passage in terms of its fundamental bass line. Another more obvious option is to use the actual bass line of a passage to establish the voice-leading model. I discarded this option because actual bass lines are specific to a single passage and it is rare that the same bass line will appear in many musical passages. Since the actual bass line determines voice leading for that passage, any observations about that voice leading are only relevant for one particular bass line and thus not directly comparable with other passages. More useful for this task is an abstract *cantus firmus* used as a reference for all compositional lines, including the bass line. The fundamental bass line, or the succession of functional roots, works well in this regard for classical music because functional progressions are fairly limited. While there may be few passages based on the same melodic line or on the same bass line, there will be many passages in music of this period based on standard root successions, and thus many more possibilities for comparison.

The model is based on the premise that most passages in music from the Classical Period can be reduced to a series of chords that are related by standard functional norms. Once established as members of a model chord progression, individual pitches can be viewed in terms of their harmonic roles. Then, by connecting each pitch in one chord with a pitch in the next, lines can be formed. These theoretical lines provide pitches with a contrapuntal role that may be different from the one they play in the passage under consideration.

Unfortunately, forming these theoretical lines is not a straightforward procedure. While it is standard to identify a pitch as a member of its parent chord, it is not clear how pitches from these chords should connect with one another to form lines. In actual music, of course, chords are connected in countless ways. But there are no model pitch connections for standard chord progressions; even within the confines of chorale-style harmonization there is rarely only one possible voice-leading connection between any two chords. While dissonant tones have prescribed destinations, consonant pitches can go anywhere in free composition, limited only by the restrictions

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on parallels. Thus, while we can determine norms of progression for dissonant tones, it is necessary to define similar norms of progression for consonant pitches.

For consonant pitch connections to become norms, they must be relevant in all musical textures. For this reason, we base the connections on basic voice-leading principles that hold for all harmonic and intervallic progressions. In this way we can provide each pitch with a theoretical contrapuntal role that has relevance beyond its specific setting in any particular texture.

Thus, we connect consonant pitches from one chord to the next according to three familiar principles. First, we hold the common tone. Second, we move the pitch by step. And finally, if no stepwise connection is possible, the pitch leaps by third.

When we apply these three principles we find that only two operations are necessary to generate all functional chord progressions. Operation #1, which is shown in Figure 1a, applies to progressions of chords whose roots are separated by rising intervals of a second, third, and fourth. In this case the norm of progression is from the octave above the root in the first chord to the fifth in the second, from the fifth in the first chord to the third of the second, and from the third in the first chord to the octave in the second. Operation #2, shown in Figure 1b, applies to progressions of chords whose roots are separated by rising intervals of a fifth, sixth, and seventh. In this case the fifth of the first chord moves to the octave of the second, the third of the first chord moves to the fifth of the second, and the octave of the first chord moves to the third of the second. These two operations, when applied as described, are the simplest motions that will result in complete triads, work in any inversion without causing forbidden parallels, and produce a model that is not dependent on specific octave placement and inversion.

Figure 1.

a. Operation 1



b. Operation 2



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Thus the two operations provide a self-sufficient model for consonant pitch motion. Dissonant pitches then elaborate this model. The seventh, the first dissonance that students meet, shall serve as our example of dissonance treatment.

In my view, dissonant tones do not redefine the harmonic structure of a passage, but serve instead to intensify a particular melodic motion. Thus, because dissonance serves to alter the contrapuntal, rather than the harmonic motion of a passage, it has a secondary place in the model. The seventh, for example, is not an essential part of the V-I progression, for without the seventh, the *harmonic* function of the V and I chords remains the same. The seventh is added, instead, to intensify a specific *contrapuntal* motion within the progression from V to I.

Because sevenths are not considered an indispensable part of harmonic progression, they do not alter, but are added to the existing model. For this reason, they do not inhabit an independent strand, but instead, share a strand with another essential pitch. In general, a seventh joins the strand occupied by the tone of its resolution, thus the seventh in a V7-I progression shares the same strand as the fifth, which progresses to the third of I in the model progression. When the seventh is added, then, both pitches progress to the third, as we see in Figure 2.

Figure 2.



The model itself consists of three individual contrapuntal lines called *voice-leading strands*. These three strands flow above a fundamental bass line that reflects the harmonic succession of a passage; the strands intersect with the fundamental bass tones to form a series of triads and seventh chords that I shall refer to as states, after William Benjamin.¹ Figure 3 shows the foreground events that make up individual states. In Figure 3a we find a collection of pitch classes that occur at the same attack point and together form a recognizable chord. In Figure 3b we find a collection of pitches that occur at adjacent attack points and that together also form a recognizable chord. Each one of these chords is represented in the model in terms of its

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root, and occupies a single state. Every functional harmony in a passage is represented in the model, which is irreducible after this point. Beginning students can perform this reductive procedure easily, as all that is required of them is to distinguish chord tones from non-chord tones.

Figure 3.

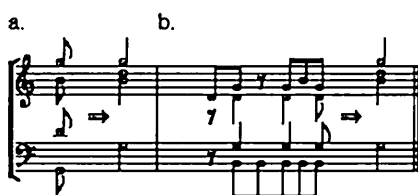


Figure 4a contains a setting of the chorale tune, "Wachet auf," which will serve as a basis for a sample voice-leading model. This particular setting appeared in the Bennett/Goldschmidt *Chorale Book* and was reprinted by Mary Wennerstrom in her *Anthology of Musical Structure*.²

The first step is to determine a fundamental bass line that reflects the harmonic succession for the passage; Figure 4b shows the fundamental bass for the opening phrase of this chorale. Once a fundamental bass line has been determined for a passage, our next task is to devise the voice-leading strands. These strands consist of the root, third, or fifth of the triads represented by the fundamental bass. No pitch will appear in more than one voice-leading strand at any one state, so the strands are completely independent and each pitch has only one contrapuntal norm of motion.

Although the harmonic succession of the passage determines the fundamental bass line in the model, the passage itself cannot determine the manner in which the pitches are connected to form the voice-leading strands. This is where the operations of motion discussed earlier, come in. First, we choose an opening position for the first chord in the series. This decision is purely arbitrary, for, as we have seen, the operations produce contrapuntal lines that are completely invertible. Then, we apply either Operation #1 or #2 for each change of fundamental bass, depending on the nature of that motion. For example, because the first bass change in this phrase is up a sixth from E-flat to C, we apply Operation #2, so the octave in the first chord moves to the third of the next, the fifth of the first chord moves to the octave of the next, and the third of the first chord moves to the fifth of the next. We then continue this process until we arrive at a model for the entire passage, such as the one we find in Figure 4c.

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To use our newly derived model as a basis of analysis we now do two things. First, we represent the model in its intervallic form. Each pitch in the model can be shown as a simple interval above the fundamental bass tone, written in capital letters below it, as we see in Figure 4d.

Second, we construct a voice-leading graph, which is designed to combine the theoretical voice leading from the model with the actual voice leading in the passage. To do this we represent each harmonically supported pitch in the passage as a simple interval above the fundamental bass tone, which is again shown in capital letters at the bottom of the graph. In this example, the passage under examination is a four-voice chorale setting; so we show each vocal voice on a separate line. Then, to complete the comparison of the model and the passage, we superimpose the theoretical voice-leading connections on the actual texture. We do so by drawing three lines that trace the path of each of the strands in the model, as shown in Figure 4e. The pattern that results is very useful in analysis of this passage and also in comparison with graphs of other passages.

Figure 4. "Wachet auf" Harmonization: Bennett/Goldschmidt *Chorale Book*.

The figure displays a musical score and a corresponding voice-leading graph for a four-voice chorale setting. The score consists of three systems of staves, labeled 'a.', 'b.', and 'c.'. System 'a.' shows a four-voice texture with a treble and bass staff. Systems 'b.' and 'c.' show the same texture with different voicings. Below the staves, a voice-leading graph is shown, consisting of a single staff with notes connected by lines. The graph is divided into five measures, each labeled with an interval: 16th, 17th, 14th, 14th, and 15th. Below the graph, the 'Operation' is listed for each measure: 2, 2, 1, 1, and 2.

Operation: 2 2 1 1 2

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d. Model

Measures:	1	2	3	4	5	
	8	3	5	3	8	3
	5	8	3	8	5	8
	3	5	8	5	3	5
	E ^b	C	B ^b	E ^b	A ^b	E ^b

e. Foreground

Measures:	1	2	3	4	5
Soprano	8	5—8—8—5—3—5			
Alto	5	3—5—5—3—8—3			
Tenor	3	8	3—3—8—5—8		
Bass	-8-	-8-	8—8—8-	-8-	-3- 8
F.B.	E ^b	C	B ^b B ^b	E ^b A ^b	E ^b

To interpret the pattern of lines found in the voice-leading graph, it is helpful to identify some basic techniques that composers use. The first of these, called a *linear pair*, and shown in Figure 5, refers to two pitches in a texture that we can connect theoretically because they are adjacent members of the same voice-leading strand in the model. An *exchange* occurs when two voices in a texture trade members from different strands of the model. There are two types of exchanges; the more basic type occurs when actual pitch-classes are exchanged, as in Figure 6a. Figure 6b demonstrates

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a *strand-exchange*. Here, the same pitch classes are not traded; instead, we find that different members of the same voice-leading strands are exchanged. One final technique remains to be discussed. This technique, which is called *cyclic rotation*, involves a systematic shifting of pitches among three or more voices, as in Figure 7a. Strands can also be traded systematically in this way, as in Figure 7b.

Figure 5. Linear Pairs.

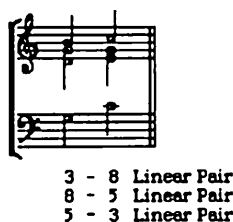


Figure 6. Exchanges.

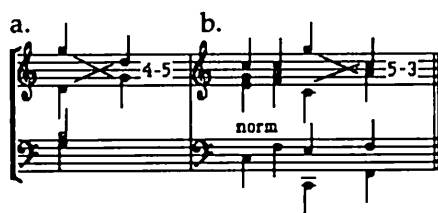
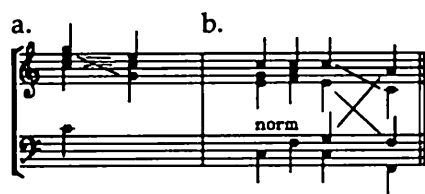


Figure 7. Cyclic Rotation.



Thus, the voice-leading model helps to define normative contrapuntal motion in a harmonic setting, and provides a standard against which we can measure compositional choices. Through study in these terms students learn to appreciate composers' solutions and accumulate techniques for their own writing.

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But the voice-leading model helps students in another important way. We all know that the leap from the rigors of four-part writing to the relative liberties of free composition is often a difficult one for students to make. We generally advise them to apply the principles they learned in chorale harmonization, but the correspondence is often uncertain. Because the model defines the voice-leading function for pitches in any texture, comparison of chorale setting and free composition becomes easier. Students then find that the same techniques that were familiar to them in chorales serve an important role in free composition as well.

BASIC COMPOSITIONAL TECHNIQUES

The final section of this paper offers a few brief examples of the ways in which the voice-leading model can aid students. We will now examine each of the voice-leading techniques explained above, the linear pair, the exchange, and cyclic rotation, in chorale settings and in free composition.

1. Linear Pair

We return to the opening measures of the Bennett/Goldschmidt harmonization of "Wachet auf" for a good example of how linear pairs can structure music. The voice-leading graph for the phrase, shown in Figure 4e, consists of three straight lines that stretch from the second half of the first measure to the plagal cadence in measure 5. The appearance of these straight lines in the top three parts suggests that each chord in the phrase is connected in the most basic way possible, with stepwise and common-tone linear pairs. These standard connections, which are well-represented in the literature, become second nature to students of voice-leading norms.

The next example shows how theoretical linear pairs derived from chorale harmonization can help students in free composition. Figure 8a consists of the score and voice-leading graph for Mozart's Piano Sonata in C Major, K. 545. Here I have divided the left hand part into three separate lines, as if Mozart had chosen block chords instead of arpeggiations. Examination of this left-hand part reveals that Mozart voices the chords to express smooth linear pairs; we also notice in Figure 8b that he structures each voice to form a neighbor-note pattern. Particularly striking is Mozart's avoidance of root progression in the bass; in fact, he inverts the chords to produce the neighbor-note figure in the lowest voice as well.

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While it may be simple to recognize voice-leading relationships in chordally derived textures, these same relationships are not so easily defined in a single melodic line. The norms of progression, because they identify each pitch as part of a theoretical voice-leading structure, make this possible. Thus we can compare the melodic line with our already familiar linear pairs; when we do, we find some striking correspondences with the left-hand part. Most notable, is the long-range neighbor-note motion that Mozart uses to structure the climax of the phrase. We see in Figure 8c that the opening arpeggiation of the tonic chord leads up to 5, or G. 6, A, then enters to start the second half of the phrase in measure 3. The harmonic progression from I to IV reinforces the aural connection from 5 to 6 in the same register, because 5 and 6 form a linear pair in the progression from I to IV. Thus Mozart weaves the 5-6 linear pair through the melodic texture, and in so doing, insures that the neighbor-note figure is a chief component of the melodic line.

This short example suggest two important points: first, that linear pairs serve to structure free composition as well as chorale settings, and second, that understanding the voice-leading role that melodic tones play is essential to analysis and composition. The voice-leading model is particularly useful in this regard, for it helps to determine the harmonic implications of pitches whose obvious role is contrapuntal.

The voice-leading model is useful in one other way, too. The concept of referential linear pairs does more than provide students with a set of basic voice-leading solutions; it turns their attention from the process of choosing chords, to the process of forming lines. By thinking of tones as members of linear pairs rather than only as members of chords, students address the contrapuntal as well as the harmonic aspect of composition.

We noted in the above example how Mozart avoids a root-progression bass line and chooses instead a specific set of chord inversions designed to express the neighbor-note pattern. Because the neighbor note is an important motive in the piece, the particular inversions that Mozart chooses are not arbitrary ones.³ Our students should not invert chords arbitrarily, either. Students too often choose to invert individual, isolated chords for variety. The system I propose addresses this problem. By stressing linear pairs, we teach students to think of note-to-note connections and ultimately, of lines. Thus when they choose to invert a chord, they do so to effect certain linear connections in the bass line. Hopefully, they can then construct bass patterns that reinforce other aspects of the piece, just as Mozart does in the opening phrase of K. 545.

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Figure 8. Mozart Piano Sonata in C Major, K. 545, Allegro.
(mm. 1-4)



a. Model

Measures:	1	2	3	4			
	8	3	8	5	8	3	8
	5	8	5	3	5	8	5
	3	$\frac{7}{5}$	3	8	3	$\frac{7}{5}$	3
	C	G	C	F	C	G	C

Foreground

Measures:	1	2	3	4
R. Hand	8	3 5 3 5	8 3-5	8 8 7-3
L. Hand	5	8	5-3-5	8-5-
	3	7	3-8-3	5-3-
	8-	5	8-5-8	3-8-
F. B.	C	G	C F C	G C

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2. Exchanges

Certainly there are times when the smooth connections produced by linear pairs are not possible, nor even desirable. Once students have mastered the basic progressions and linear pairs, they are ready to manipulate these pairs in artistic ways. The most common occurs in the chorale-style setting of a leaping melodic line. When a melodic line leaps from one chord tone to another, it is necessary to alter the voice-leading path of at least one other part to insure that the second chord is complete. Because this other part is altered to complement the motion of the melodic line, an exchange of the pitch classes involved in the leap results, as we see in Figure 9.

Figure 9.



The pitch-class exchange serves not only as an isolated voice-leading event, but becomes an integral part of a piece; such is the case in the Allegretto movement of Beethoven's "Moonlight" Sonata, Opus 27, no. 2, shown in Figure 10. The opening idea consists of, among other things, an outer voice exchange of the pitch classes C and E-flat. As we see in the score, Beethoven then repeats the melodic motive sequentially in measures 5 and 6 to form the consequent portion of the phrase where the pitches F and A-flat are exchanged.

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Figure 10. Beethoven Piano Sonata, Opus 27, no. 2., "Moonlight"

Allegretto
La prima parte senza ripetizione.

5

6 - 10

6 - 10

6 - 10

6 - 10

cresc.

6 - 10

B

p

TEACHING VOICE LEADING

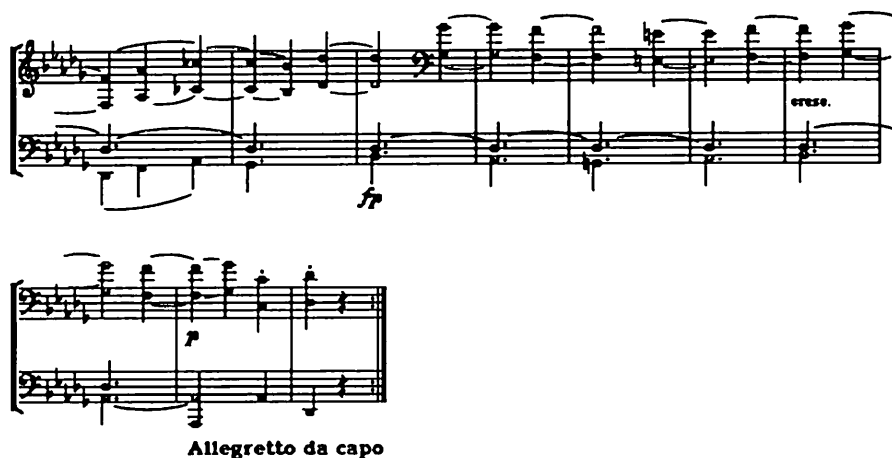
Figure 10. con't.

The image displays four staves of musical notation, likely for piano and voice, arranged vertically. The notation includes various dynamics and articulations:

- Staff 1:** Features a series of chords and single notes in both hands, with a melodic line in the upper voice. Dynamics include *pp* (pianissimo) and *f* (forte).
- Staff 2:** Continues the melodic and harmonic development. It includes the instruction *cresc.* (crescendo) and *sf* (sforzando). The section concludes with a **Trio** marking and a change in time signature to 3/4.
- Staff 3:** Shows complex rhythmic patterns and overlapping lines. It includes markings for *sf* and *f*. There are also numerical markings (10, 6) above the staff, possibly indicating fingerings or measures.
- Staff 4:** Features a melodic line in the upper voice and a more active bass line. Dynamics include *pp* and *f*.

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Figure 10. con't.



The “B” section opens with outer-voice 10ths that descend until Beethoven reverses the trend to complete the phrase in measure 21. Particularly interesting from our point of view is the way he accomplishes this, for the very same outer-voice exchange of pitch classes C and E-flat appears here as well.

A quick glance at the opening of the Trio reveals that Beethoven again uses this technique to structure the opening material. The first four measures prolong the tonic chord, again by way of an outer-voice exchange, this time of the pitches D-flat and F. Meanwhile, we find a second outer-voice exchange imbedded in the first. This one, in which the pitches E-flat and C are traded, serves to prolong V7.

Thus we can see that a simple voice-leading technique, the exchange, becomes a distinctive part of the texture of the movement, just as the neighbor-note linear pair did in Mozart’s K. 545.

The technique of exchange, while commonly used to harmonize tones of a single chord, can also be used to harmonize tones from different chords. The concept of linear pairs allows us to employ exchanges that do not literally involve the same pitch classes. This concept is very useful in teaching, for once students think of leaping pitches as a combination of voices from different voice-leading strands, they can better perform the voice-leading manipulations that must occur.

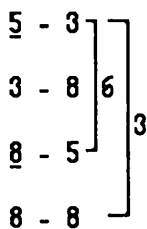
We all know that whenever voices leap, students are tempted to write

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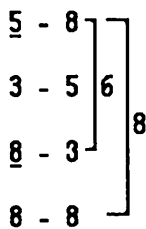
awkward or even forbidden progressions, simply because they often have difficulty recognizing the stepwise connections that are possible beneath the leaping melody. By teaching chord progressions in terms of linear pairs, however, we can combat this problem directly. The technique of strand exchange requires that one voice leap to offset the leaping melody, while the linear pairs in the other two parts are maintained. And because of the nature of the pairs, it is impossible to produce a forbidden parallel when the tones of any two strands are exchanged.⁴

For example, the only fifth in a triad occurs between the root and the fifth. If one triad progresses to another, parallel fifths will result only if the fifth of one triad moves to the fifth of the other over the root progression. Clearly then, the linear pair 5-5 cannot be used as a norm of progression. Instead, as we have seen, the fifth must progress either to the third of the next chord, as it does in Operation #1, or to the octave, as it does in Operation #2. This third or octave will never form a fifth with the tone that the octave in the original chord progresses to, nor will it form a fourth:

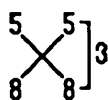
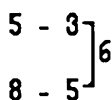
Operation #1



Operation #2



And, because no fourth can be formed in this way, no progression of parallel fifths is possible if one interval is inverted by exchange:



A phrase from J.S. Bach's setting of "Wachet auf," shown in Figure 11, demonstrates the procedure of strand exchange. Here Bach chooses to harmonize each tone of the leaping melodic line with a new chord. The voice-leading graph shows that Bach selects harmonies that maintain linear pairs when the melody moves by step in measures 13-14, and 14-15. And

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yet, he cannot do the same when the melody leaps, simply because each note of the melody is in a different strand. We see that in these cases the voicing Bach chooses results in outer-voice strand exchanges, while the inner parts hold linear pairs. For example, because Bach harmonizes the opening three chords of the phrase as (V7)-IV-(V7), the melodic pitch in each chord is the fifth. To avoid parallel fifths between this melody and bass, Bach cannot use simple root progressions in the bass, but must use a voice-leading pair there instead. For this reason we find the 7-3 linear pair in the bass for the progression from measure 12 into 13. This produces an outer-voice strand exchange. And because the third of the A-flat chord comes about through exchange, the inner parts can hold their own linear pairs, and each chord will be complete.

Figure 11. "Wachet auf" Harmonization: J. S. Bach. (mm 12-16)

Model

Measures:	12	13	14	15	16
	7 5	3	7 5	3	8
	3	8	3	8	5
	8	5	8	5	3
	E ^b	A ^b	E ^b	A ^b	C

Foreground

Measures:	12	13	14	15	16
Soprano	5	5	5	3	5
Alto	3	8	3	5	3
Tenor	8	5	8	7	3
Bass	8	7	3	8	8
F.B.	E ^b	A ^b	E ^b	A ^b	C

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Figure 11. con't.

b. 12

In measure 13, Bach again adds a seventh to the E-flat chord, thus producing a doubled third in the A-flat chord on the downbeat of measure 14. In this case a strand exchange is again necessary to complete the A-flat chord; because the seventh takes the place of the doubled root, no 8-5 or common-tone linear pair is possible. Thus the third of the E-flat chord must leap away from its linear pair, the octave, and moves instead to supply the fifth.

Bach repeats the voice-leading procedure from measure 13 to harmonize the leaping melodic line in measure 14. Although the harmonic motion is different, the concept of voice-leading strands allows us to compare the two measures. In both cases we find that Bach maintains inner-voice linear pairs, while the roots in the bass produce another strand exchange with the leaping melody.

The exchange of standard linear pairs is a particularly useful compositional technique. Although in these examples we see exchanges that concern the outer voices, exchanges between any two parts are possible. For example, measure 13 could have been voiced as

$$\begin{array}{c} 5 \times 5 \\ 3 \quad 8 \\ 5 - 8 \\ 8 - 3 \end{array}$$

by presenting leaps as potential strand exchanges, students see that smooth linear pairs are still possible if desired.

3. Cyclic Rotation

We have seen how the technique of exchange provides for two complementary leaping voices that trade either pitches or strands. There are times, however, when it is desirable for more than two voices to take an active melodic role. Such is the case in Figure 12, which is taken from the

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opening of Mozart's "Hunt" Quartet, K. 458. Here the top three parts all participate in non-unison arpeggiation of the B-flat tonic chord. Each part starts and ends on a different chord tone, so that the complete triad sounds throughout.

Figure 12. Mozart String Quartet in B-flat Major, K. 458.
Allegro vivace assai



Figure 13. "Wachet auf" J. S. Bach and Bennett/Goldschmidt. (mm. 1-2)

a) Bach

Measures	1	2
Soprano	8 — 3 — 5 — 8	
Alto	5 — 8 — 3 — 5	
Tenor	3 — 5 — 8 — 3	
Bass	8	8 3 8 7
F. B.	E ^b	E ^b B ^b



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Figure 13. con't.

b) Bennett/Goldschmidt

Measures	1	2
Soprano	8	5 — 8 — 8
Alto	5	3 — 5 — 5
Tenor	3	8 — 3 — 3
Bass	8	8 8 8
F.B.	E ^b C B ^b B ^b	



This systematic transferring of tones, or cyclic rotation, is commonly used for the literal prolongation of a single chord. Such is the case in the opening measures of Bach's setting of "Wachet auf." In Figure 13a we see how each of the top three voices arpeggiates the tonic triad simultaneously.

The same voice-leading technique can be used to harmonize leaping melodic lines— even if the same harmonization is not desirable for each pitch. We see how this works when we compare the Bennett/Goldschmidt setting of these opening pitches, for we find that, despite substitution of VI for I here, the technique of cyclic rotation still governs the voice leading. This cycle in the Bennett/Goldschmidt version serves to arrange the strands for the progression from VI to V over the barline.

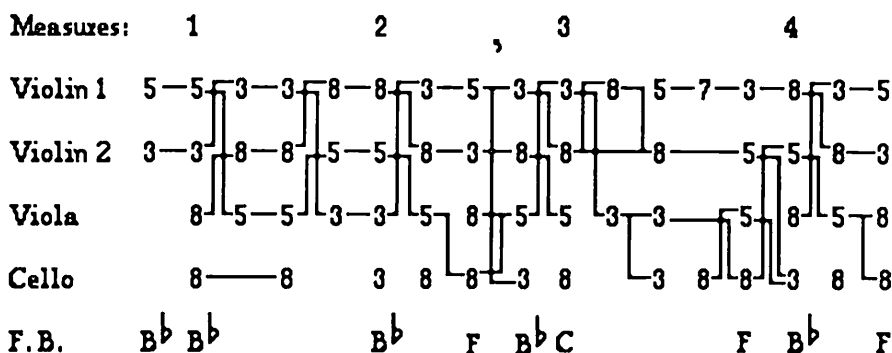
4. Mozart: String Quartet in B-flat, K. 458

We are now ready to examine a passage that embodies all of the compositional techniques that have been discussed; Figure 14 provides a

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score and voice-leading graph for the first four measures of Mozart's String Quartet in B-flat, K. 458, *Allegro vivace assai*. We have already noticed the cyclic rotation that results as the top three parts simultaneously arpeggiate the tonic triad. Meanwhile the bass holds the tonic pitch until measure 2, where it enters the voice-leading texture to punctuate the cadence. Mozart complements the melodic motion from 1 to 3, by an outer voice exchange of these tones. Thus, while the top three parts cycle back to begin measure 2, the first violin and cello trade pitches. In this way the tonic pitch, B-flat, returns to the cello. All of these motions then combine to prepare the half cadence on the second beat of that measure, for we see that Mozart connects I to V by standard linear pairs (which appear as straight lines in the graph).

Figure 14. Mozart String Quartet in B-flat Major, K. 458.
Allegro vivace assai



Mozart then uses these same linear connections to start the second half of the phrase at the end of measure 2. That he chooses to return to 3 in the bass instead of the root is interesting here, but we can understand this choice when we examine the voice leading of the next progression. On the downbeat of measure 3 we find that Mozart harmonizes 4 with a ii chord

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and we notice that I and ii are connected by cyclic rotation. This results as the top three parts move in parallel motion. Clearly, the bass cannot duplicate any one of these connections without causing parallels, so it is necessary for Mozart to use the 3-8 linear pair.

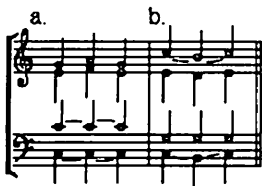
The manner in which Mozart prolongs ii throughout the third measure is interesting in light of his procedures in the rest of the phrase. Despite the melodic line arpeggiation of ii, we do not find the cyclic rotation that Mozart used in the opening measures, but we find instead an exchange of the third and fifth of the triad between the first violin and viola.

The common linear pairs hold for the progression from ii-V at the end of measure 3 in the top two parts only. Meanwhile, the lower two voices participate in a strand exchange, similar to the ones we examined earlier in the Bach excerpt. Here the exchange results because of the leap in the viola, which Mozart presumably chooses because of its motivic quality. That is, instead of moving to its linear pair, the root of the V chord, the third in the viola leaps to the fifth of V instead. Thus we find the strand exchange in the graph when we connect the third in the viola with the octave in the cello, and the octave in the cello (of ii) with the fifth in the viola. In this way the 8-5 linear pair is present in two ways in this progression: first, in the second violin, and then as an exchanged strand between the cello and the viola.

In general, the technique of strand exchange makes it possible to duplicate strands without danger of parallel octaves. This particular strand, 8-5, is not a good example, for (because it is the common-tone strand and thus holds the same pitch in the progression from one chord to the next), it could be doubled in a texture, as we see in Figure 15a.

This is not the case with other strands in which the pitches do change; for example, 3-8 cannot be used in more than one part. Figure 15b shows the parallel octaves that result when a changing note pair is doubled. If a strand is exchanged, however, it is split up in two different parts, so that no parallels result. What this means in practice is that particular pitches can be doubled in a chord without danger of octaves by strand exchange. Thus the notion of exchange allows us to understand these doublings, which result from certain melodic or motivic gestures, in systematic voice-leading terms.

Figure 15.



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The strand exchange in the Mozart example results in a doubled fifth in V, which leads to an interesting voice-leading situation in the progression back to I in measure 4. Most noticeable is the large leap that the second violin takes from the fifth of V to the fifth of I. It might seem an unusual move here. We would perhaps expect, especially in light of Mozart's choice of linear pairs in other V-I progressions in this phrase, that he would choose simply to move to the third of I, thus expressing the 5-3 linear pair. Instead, the cello brings in the third, so that we get another strand exchange, this one between the second violin and the cello.

By looking at the voice-leading situation immediately ahead, however, we see the reason for this leap. In measure 4, Mozart offers a half cadence that is very similar to the one he used in measure 2. We noted in that case the way he complements the melodic leap from 3 to 1 with a cello leap from 1 to 3. This relationship appears on the voice-leading graph as an outer-voice exchange. By placing the third in the cello, instead of the second violin in measure 4, Mozart can repeat the same gesture.

Close comparison of the second and fourth measures reveals one important difference, however: instead of a third in the viola at the downbeat of measure 4, we find an octave. We wonder about this, particularly since the fifth of V in measure 3 would lead naturally to the third of I in measure 4. My guess is that Mozart is giving the viola a particularly important melodic role here; in fact, the viola alone arpeggiates the entire tonic triad. The voice leading that results forms a pattern that is very typical for Mozart—namely the double exchange. In this case we see that the outer voices exchange the root and third, as already noted, while the inner voices also exchange—this time trading the fifth and the root. In essence then, Mozart replaces the cycle, which occurred in the top three parts in measure 2, with an exchange.

This passage offers a good example of a texture dominated by sophisticated contrapuntal procedures. This active voice-leading texture results when Mozart gives each voice an important melodic role. Because the harmonic progression of the passage is a standard one, students can focus on the voice-leading manipulations that make the passage distinctive. Studies of this type can thus serve to reinforce the important role that voice-leading techniques play in composition.

CONCLUDING REMARKS

In closing, I wish to address what may be a major objection to the methodology I propose. Some may feel that establishing norms of progression turns an artistic process into a mechanical one. By reducing pieces to

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patterns of numbers and lines, notes may lose their musical quality and become objects of mathematical manipulation. And, by providing students with a basic set of techniques, we are in danger of limiting their creativity.

We all confront charges like these each time we attempt to explain the creative process in systematic terms. Certainly it is not necessary for me to defend systematic methods for describing music here. But because my methodology is admittedly more technical than many, let me respond briefly to the particular problem it raises.

The methodology is used to introduce beginning students to the intricacies of musical structure. The norms of progression are a focal point in this inquiry, but serve merely as a basis of comparison and nothing more. Despite their representation in music of the Classical period, the norms were not intended to be a mechanical set of voice-leading solutions. Instead, the norms and techniques of manipulation become a point of departure and a way for students to explore the compositional process. By providing a systematic procedure with which to study the combination of contrapuntal and harmonic forces, students can focus on fundamental compositional choices on the foreground level of structure. Ultimately, the method will help them to understand and employ foreground voice-leading techniques in artistic ways. At the very least, it will help them to appreciate how these and other techniques shape masterworks of music.

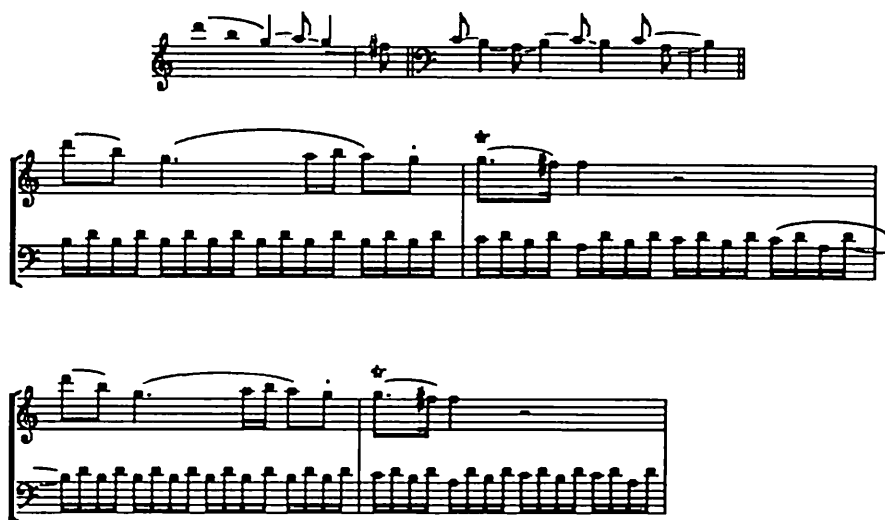
NOTES

¹William Benjamin, "Pitch-Class Counterpoint in Tonal Music," *Music Theory, Special Topics*, ed. by Richmond Browne (New York: Academic Press, 1981), pp. 3-32.

²Mary Wennerstrom, ed., *Anthology of Musical Structure* (New Jersey: Prentice-Hall, 1983), pp. 141-145.

³There are many manifestations of the neighbor-note figure throughout the piece; particularly notable are the neighbor notes which help structure the second theme. As in the first theme, both the melodic line and the accompaniment feature striking neighbor-note relationships. We can see in the example below the double-neighbor note elaboration of the primary harmonic tones in both tones:

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The procedure of strand exchange has limited usefulness in situations where a root progression bass line is desired because it often produces a line with consecutive 8s or 5s. The theory of linear pairs allows us to see this danger clearly. In general, parallel fifths or octaves will occur in one voice against the bass whenever an exchange is made between a linear pair that comes from 5 or 8 and one that goes to the same 5 or 8. (Clearly there is no problem when the bass itself participates in the exchange, as we will soon see in measure 14 of Bach's setting of "Wachet auf".) For example, in progressions where Operation #1 norms are in effect, an exchange between 3-8 and 8-5 produces parallel octaves with the bass, because it places the two octaves in the same voice: 3×5 . Similarly, an exchange between 8-5 and 5-3 will produce parallel fifths: 8×3 . In progressions that follow Operation #2 the

same restrictions hold, only in reverse order. That is, an exchange of 8-3 and 5-8 will produce parallel octaves with the bass, while a 5-8 and 3-5 exchange will produce parallel fifths. In all of these cases, the technique of cyclic rotation can be used instead.

While it may seem cumbersome for students to remember these exact prohibitions, they can easily avoid exchanging pairs that both begin and end in 5 or 8 above a root progression bass. And, even if this fails, the process of thinking of notes as 5s and 8s brings problematic parallels to their attention.

SOLMIZATION WITH THE GUIDONIAN HAND: A HISTORICAL INTRODUCTION TO MODAL COUNTERPOINT

ROSEMARY KILLAM

BACKGROUND

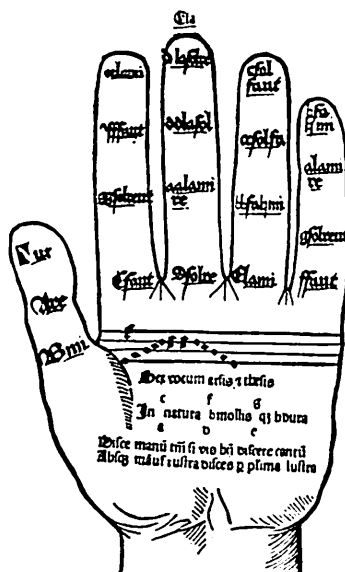
The music of the Renaissance and Middle Ages has become an increasing part of contemporary repertoire. Nearly all music departments have ensembles devoted to the performance of early music; vocal groups devoted to the singing of madrigals and pre-tonal sacred music are not uncommon at the high school level. Modal counterpoint serves as the traditional introduction to this style for undergraduate music students, and provides unique challenges and benefits to those who will undertake its study. Undergraduates often have little experience in or appreciation of the musical aesthetics of the sixteenth century. Most undergraduates have difficulty relating to Renaissance modality; many seem first to regard it as incomplete tonality. On the other hand, as the tide of contemporary music carries us ever farther from the common-practice period, modal counterpoint offers students the opportunity to experience and manipulate a style that is the culmination of an extensive development of many centuries, yet not cast in the mold of tonality. In addition, late Renaissance sacred music, as characterized by Palestrina, is accessible to students through their own vocal performance.

What form of solfege should be used for modal literature? All of us have vague memories from music history of the Guidonian hand, as illustrated in Figure 1. Most of us have attempted the principles expounded by Morley in his *A Plain and Easy Introduction to Practical Music*, only to decide that his method of solmizing is neither plain nor easy at this point of historical remove.

The texts explaining solmization are primarily in Latin, although increasingly available in translation, and are far from clear at first encounter. However, it is the premise of this study that solmization is not impossibly difficult, indeed not at all beyond the grasp of an undergraduate modal counterpoint class, if the techniques are presented in an appropriate sequence. When one considers that solmization and the Guidonian hand

were central teaching devices from the eleventh through the sixteenth centuries, the effort seems worthwhile. Allaire's view (p. 43) is that, "Solmization was to both the medieval and the renaissance musician what solfeggio is to the modern: a means to an end—more specifically, technique for the development of accuracy in reading and singing music." Certainly, if choirboys were taught to solmize and to use the hand, the techniques cannot be so difficult; there is little evidence that the attention span of young boys has changed across the centuries.

Figure 1. Guidonian Hand.



Another aspect of these techniques that will become more apparent with their study is how inextricably compositional styles of the Renaissance were interwoven with them. Brown (p. 135) points out how Josquin's *Missa Hercules Dux Ferrariae* is built on the vowels of the title, transferred to pitch through solmization syllables. Determination of the appropriate hexachord for solmization solves many of the problems of *musica ficta*, and clarifies phrasing. The composers of the period were nearly all first trained as choirboys. The method by which they, as choirboys, were taught to read and sing music may have influenced the way in which they dealt with compositional materials.

SOLMIZATION

Just what was the level of skill developed through solmization? Guido, himself, left a graphic account of a specific instance of the success of his methods in his "Epistola de ignoto cantu" of c. 1030:

. . . I will set forth the situation in full. John, holder of the most high apostolic seat, who now governs the Roman Church, hearing of the fame of our school and greatly wondering how, by means of our Antiphoner, boys could know songs which they had never heard, invited me through three emissaries to come to him. . . . The Pope, accordingly, was greatly pleased by my arrival, conversing much with me and inquiring of many matters. After repeatedly looking through our Antiphoner as if it were some prodigy, and reflecting on the rules prefixed to it, he did not dismiss the subject or leave the place where he sat until he had satisfied his desire by himself learning to sing a verse without hearing it beforehand, thus quickly finding true in his own case what he could hardly believe of others (trans. Strunk, *Source Readings in Antiquity and the Middle Ages*, p. 122).

Other writings of Guido imply that the real advantages in his methods involve students learning music without having heard it first, sparing them the necessity of learning by rote.

Solmization and use of the hand provide this independence to twentieth-century musicians. I have found that development of a proficiency level at which music can be solmized, after a preliminary scan for points of mutation, is sufficient to add greatly to students' understanding of the contrapuntal techniques employed in the music.

The actual system of interlocking hexachords and assignment of pitch sequence to a position on the palm of the hand seem unnecessarily complex in the twentieth century; some consideration of the development of music may help demonstrate the logic of the solmization system.

We of the twentieth century are used to reliable constants, such as tuning forks, metronomes, the ever present visualization of scales on a keyboard—indeed the standardization of the five-line staff and notation printed on it. We need to bear in mind that Guido was of the period of heightened neumes and that he advocated the staff as a way to determine the pitch of notes. He lived more than a century before the work of Leonin and Perotin. Indeed, there is good reason to question whether Guido

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himself originated the hand and the solmization system. Certainly some of the elements were developed later by others. However, writers for the next 500 years attributed these developments to him. If his authorship is not historical, it was an accepted historical fact for many theorists who followed him.

Given the ambitus of Gregorian chant, the octave was not an essential interval. Octaves were rather the result of changed and unchanged voices singing the same music, or an interval compounded from modally defining fourths and fifths. What was of the utmost importance was specifying the location of the half-step: the intervals encompassed by chant could be compounded of whole tones and semitones, but their relationship was of prime importance so that the larger intervals could be accurately specified. What was needed was some constant arrangement of semitones and whole tones, at least in some partial pattern, and this was not supplied by the intervals encompassed in the modal fourths and fifths. Given the state of affairs, does not the identical interval pattern of G up to E and C up to A look helpful? The hexachords with a lowest pitch of C were known as "natural"; those with a lowest pitch of G were known as "hard." With the addition of the "soft" hexachord on F, the system was complete. The "hard" and "soft" hexachords were named for the shapes of B-flat (round = soft) and B (square = hard). The hexachords in the gamut are illustrated in Figure 2. Successive generations of theorists proposed and discarded additional transposed hexachords, but the F, G, and C hexachords were those most generally accepted. Hughes (p. 46) comments:

Medieval practice, as well as theory, used the recta gamut with its hexachords and syllables as the basis for learning and teaching music; the pronunciation of the syllables was a means, perhaps the only one of insuring that the correct notes were sung. If the accidental serves to indicate where mi and fa lie, then in a broader sense it serves to show which of the hexachords is in use

Figure 2. Hexachords in Gamut



SOLMIZATION

Nearly 500 years after Guido, Tinctoris in his *Expositio Manus*, began Chapter One with an extremely detailed justification for the Guidonian hand. One is tempted to discern in his explanation the controlled annoyance of an experienced teacher at having to explain, once again, why such an obvious aid is useful, and his grim determination to make such a thorough justification as to obviate any subsequent discussion of the matter:

The hand is a short and useful lesson, fully showing the characteristics of sounds in music. The term "hand," however, is used as the container for the contained, for any hand, that extreme member placed at the end of the arm on the human body according to physiologists, contains that lesson in the tips and joints of its fingers.

(There follows a paragraph naming and describing each finger and the number of joints it has.)

Although this lesson can be taught in either hand, it is taught rightly, however, in the left by everyone, for the reason that the places in the left hand are more easily indicated by the index finger on the right, even though some people most aptly indicate the places on the thumb of the left hand with the index finger of the same hand and the places on the other fingers similarly by the thumb of the same hand; wherefore they may use only one hand, that is, the left, in the instruction of this particular kind of lesson (Seay, "The *Expositio manus* of Johannes Tinctoris").

Although it is possible to learn to solmize without use of the Guidonian hand, my experience has shown the hand to be a valuable learning aid. Beginners can get lost in the overlapping hexachords; the hand provides a constant location and reference point.

RENAISSANCE TREATISES ON SOLMIZATION

Solmization with the Guidonian hand was a central method of learning for over 500 years. Tinctoris ended his *Expositio Manus* with this

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statement: “. . . it is evident that no one outstanding in music escapes without a knowledge of the hand.” Naturally, the technique of solmization varied somewhat in its description from one treatise to another. The three treatises chosen as the basis for this study were selected for their clarity in translation, their historical position, and their influence on sixteenth-century music.

Johannes Tinctoris was born c. 1435 near Nivelles, and died c. 1511. He served at various Italian courts and was known for both his compositions and twelve treatises, of which *Expositio Manus* is the second, published originally sometime after 1477. Franchinus Gaffurius was born in 1451 and died 1522. He, too, served at a number of Italian courts, having been ordained a priest in 1474. His *Practica Musicae* was first published in 1496. Andreas Ornithoparchus was born in Meiningen, c. 1490, and studied at a number of European universities in the early part of the sixteenth century. His *Musicae Activae Micrologus* was published in 1517 and went through a number of editions. John Dowland's translation of it appeared in 1609.

Tinctoris is generally described as a conservative writer. Both Gaffurius and Tinctoris were in Naples during the period 1478-80 and are presumed to have become acquainted. Tinctoris' writing is thought to have influenced the younger Gaffurius. Gaffurius' writings were extremely widespread throughout Europe, being printed in five editions between 1496 and 1512. Gaffurius undertook a ten-year-long study of theory at various centers in Italy (1472-1482) before settling in Milan. He was acquainted with a wide range of theoretical writings, including that of Plato and other Greek writers, whose works he had translated for his own use. He was acknowledged by contemporaries as an erudite theorist. The work of Ornithoparchus is included because it shows a basic agreement from a later source with the work of Gaffurius and Tinctoris, inasmuch as he acknowledged both Gaffurius and Tinctoris in a long list of influential writers. Ornithoparchus was known not only through the multiple editions of his work, but also through the incisive translation by Dowland, published nearly a century after its first appearance. Dowland's translation of a section on the use of the monochord is biting even at this historical distance:

The monochord was chiefly invented for this purpose, to be judge of musical voices and intervals: as also to try whether the song be true or false, furthermore, to shew haire-braind false musitians their errors, and the way of attaining the truth When therefore thou wilt learne a Song, even the deepest, of thy seite

SOLMIZATION

by the helpe of thy Monochord, set thy Monochord
before thee on the table, and make in what Key the
first Note of that Song is, which thou desirest to know
(Ch. 9, p. 23).

Given that this work was considered worthy of translation and publication at the beginning of the seventeenth century, small wonder that solmization was taught as a shortcut to setting “thy Monochord before thee!”

INTRODUCTORY LESSONS IN SOLMIZATION

The twentieth-century development of the felt-tip pen eases the initial study of the hand. Students should be advised to bring a felt-tip of dark color to class on the day this study is initiated. After being given copies of Figure 1, they need to label their left hand with pitches only, starting from low G on the tip of the thumb. If pitches are labelled a few at a time in ascending order, the counter-clockwise spiral of the pitches unrolls itself.

Next, students need to review pitches in ascending sequence, finding all Gs, As, etc., on the hand. The fact that all Ds reside on the middle finger should be stressed, although students will probably discover this for themselves with considerable joy.

The next classwork should be on hexachords. The interval patterns of hexachords on F, C, and G should be established. Then, all possible hexachords built on these three notes should be illustrated on the blackboard, building up from Gamma Ut. A handout of these (such as Figure 2) might be helpful, but students may achieve a better understanding of hexachords by copying them in class. Once students have covered the hexachord system in pitch names, they need to sing them using syllables “ut-la.” The first singing is most easily done from the board; the next step is to sing the hexachords, pointing to the hand. Herein lies some of the advantage of felt-tip pens; only the most diligently clean of undergraduates will have removed all traces of the indelible felt-tip from their palms in the space of one class to the next, even if they have forgotten to study and renew it. The varying and multiple syllable names for each pitch should be explained in detail, with reference to the written hexachords.

At this point, the hymn, “Ut queant laxis,” (found in Appendix A) can be solmized. Students thus learn the music through which Guido derived the solmization syllables. Also, this is an easy chant with which to begin solmization, since it stays within one hexachord. If students have some

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familiarity with the Latin words, they have the possibility of relocating themselves at the beginning of each phrase of text, should they have become lost in the solmization syllables.

The importance of "mi-fa" as the location of the half step in the hexachord should be re-emphasized at this point, since it will become critical in solmizing mutations and ficta. When one note only above the hexachord is sung and the hexachord is returned to immediately, that note is solmized as "fa," and sung a half step above "la." "Fa" is used to indicate the location of a note with a half step below it, and "mi" is used to indicate a note with a half step above it.

Additional solmization of literature will require the principles listed above, as well as use of musica ficta for cadences and mutation, so these items need to be considered before more singing is done.

The use of musica ficta is still a controversial topic. Allaire has made a case for musica ficta being used primarily to indicate "fictitious" hexachords. Certainly, the practice of singing one note above "la" as "fa" and making it a half step higher introduces E-flat at the top of the soft hexachord built on F. Musica ficta can be justified to avoid tritones, although Tinctoris allowed the tritone in a horizontal line, if necessary, to avoid the vertical tritone.

Cadential ficta, as in the Burgundian cadence, are solmized by the rule that "mi-fa" names the half step. Thus, a ficta that creates a half step below a note in one of the hexachords is solmized as "mi" and that which creates a half step above a hexachord note is solmized as "fa." The hexachord is returned to immediately following the ficta.

PRINCIPLES FOR MUTATION

Since most melodies have a wider ambitus than that of one hexachord only, some method must be used to transfer from one hexachord to another while solmizing. This is a point of variance in treatises of the time. However, Gaffurius, Tinctoris, and Ornithoparchus were in considerable agreement, as the following excerpts show:

Tinctoris:

... mutations have been invented to change one propriety into another. Hence, after we have entered into any propriety, we ought never to mutate before the final syllable (of that propriety); and thus, it is understood that mutations must take place as rarely and as tardily as possible (p. 223).

Gaffurius:

Furthermore, churchmen acknowledge many kinds of pitch mutations. According to Bacchius, mutation is the exchange of substitutes, or the transposition of something similar into a dissimilar place. Hence in his *MORALS* Gregory says that to change is to go from one thing into another and not to be stable in respect to one's essential self, for each thing tends to move toward another, by as many steps, so to speak, as its distance requires. Martianus calls such mutation transposition, and he explains this as the variation of a pitch into another form of the pitch. Briennius, however, said that mutation was the transference of a substitute system and a vocable.

There is also another aspect of mutation in pitch and sound: for when these vocables are in motion and are only coming into existence, they are believed to be of the genus of successive entities. The Interpreter explained this in the Twenty-seventh Problem. According to him, the generation of pitch and sound itself consists of a certain coming into being and changing. Such a system, according to the writing of Marchettus, results in definite mutation. He says: "Mutation is the change of one vocable into another on the same pitch." For if these syllables which are assigned to sounds and pitches—to their notes, that is—stand on one and the same line or space, they are called equal in quantity but different in quality or propriety.

Hence, when mutation occurs, the quality of one hexachord is transferred into the quality of another hexachord, the quantity of the sound remaining the same, as Anselm testifies in Book III of his *Musica*. Hence, I call mutation the alternative displacement of one vocable into another taken on an identical pitch. I understand sounds to be the syllables of the hexachords. Therefore, no sound is changed into another sound by raising or lowering; rather a syllable is changed into another syllable and a propriety or

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quality is changed into another quality. Thus, when in a musical passage, we articulate syllables only, mutation will fit exactly. The alphabetical letters that are used in the system, however, are neither introduced nor changed. Moreover, a syllable which occupies either a line or a space all by itself is not suitable for mutation. Thus on Gut, A re, B mi, and e la mutation never occurs, because if it should happen to come about by necessity, you would repeat the original order of the interlocked hexachords (Young, Ed., p. 28-30).

Gaffurius then illustrates mutations. It should be noted that he allows mutation from soft to hard hexachord and vice versa. Gaffurius interjects the following statement:

Most authorities agree that on b fa and b mi no mutation is possible since the syllables do not both have the same pitch and since they are a major semitone apart from one another. This is because b fa is a minor semitone higher than the mi of a la mi re; and since a whole tone is larger than a minor semitone by a major semitone, it is clear that b mi is higher than b fa by a major semitone. When, therefore, we produce that b fa-l-b mi mutation out of necessity, a mutation both of quality and of quantity will result. I speak (1) of quality, that is, of the propriety of B-molle into B-durum by changing fa into mi in order to ascend, or conversely, in order to descend, and (2) of quantity, that is, passing from a lower to a higher sound by means of fa into mi at the distance of this apotome, or conversely, mi into fa, descending from a higher to a lower pitch. Since this progression is difficult and highly dissonant, the schools of music have advised that it be avoided with every ingenuity (p. 33)

Gaffurius concludes his discussion of mutation as follows:

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Many mutations can also occur indirectly and irregularly, as everybody can readily figure out by himself. Further, they say that a plurality of mutations is to be avoided when one comes to the conclusion that the melodic progression has been suitably arranged in a single mutation. It is said too that mutation ought to be managed slowly and over as long a time as possible. Occasionally a disjunct passage of mutations occurs in singing when a progression takes place beyond the range of the hexachord, ascending or descending—for example, through seven, eight, or even more pitches. This is more frequently encountered in mensural composition. Many mutations could be executed through conjunctions if the syllables of the hexachords were arranged in whole tone intervals and these whole tones were divided into unequal semitones. But since this coincides very closely with the chromatic or mixed genus, the present discussion, concerned only with the Guidonian diatonic system, rejects it

Ornithoparchus' detailed rules for solmizing and mutation cannot be understood without a summary of some of his preceding definitions. His definition of voices included the following statements:

Therefore, a musical Voyce, is a certain syllable expressing a tenor of Notes. Now Notes is that by which the highnes, or lownes of a Song is expressed. Therefore of Voyces,

Some are $\left\{ \begin{array}{l} \text{flat Mols} \\ \text{Naturals} \\ \text{natural Sharps} \end{array} \right\}$ Viz. $\left\{ \begin{array}{l} \text{Ut Fa} \\ \text{Re Sol} \\ \text{Mi La} \end{array} \right\}$

because they { Flat
Make a { Meane
Sharpe } sound

Besides of Voyces some be superiours: viz. Fa, Sol, La. Others be Inferiors: as Ut, Re, Mi (p. 6).

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The meaning of this definition seems to be that "Voyce" is roughly equivalent to a hexachord, as expressed by solmization syllables. His table shown above illustrates that some voices are called flat Mols, which contain the "ut-fa" fourth and make a "Flat sound," that is a lower sound than the others. The term "meane" is used to define a "Natural" voice in that it lies in the middle of "Flat" and "Sharpe" hexachords, not that the sound is unpleasant.

Ornithoparchus' translation used "Keys" as a term roughly equivalent to our meaning of clef combined with a key signature: "Or more formally, a Key is the opening of a Song, because like as a Key opens a dore, so doth it the Song."

His use of "scale" was not so encompassing as our definition:

Therefore, generally a Scale is nothing else, but the knowledge of mi and fa, in flat fa natural mi, and his Eights. The scale natural Durall is a Progression of Musicall Voyces, rising from A to natural sharpely, that is, by the Voyce mi. But the scale flat Moll is a progression of Musically Voyces, rising from a to b flatly, that is by the Voyce fa (p.14).

With these definitions in mind the rules of Solfaing and Mutations of Ornithoparchus are presented:

Rules of Solfaing

1. He that will Solfa any Song, must above all things have an eye to the Tone. For the knowledge of the Tone is the invention of the Scale, under which it runnes.
2. All the Tones runne under the Scale of natural Dure, excepting fift and sixt. [Lydian and Hypolydian]
3. To have a Song runne under natural Dure, is notheing else, but to sing Mi in flat fa natural mi, and fa in a flat Scale.
4. When a Song runnes under a Scale natural Dure, the lowermost Notes that kinde are to be sung; but under a Scale of flat Moll, the uppermost Notes.

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5. Every Solfaer must needs looke, whether the Song be regular, or no; for the transposition of a Song is oft times an occasion of changing the Scale.

6. Every Song ending in the Finals, is regular, and not transposed, saith Saint Bernard in his Dialogue.

7. Whensoever a Song ascends from D sol re to A la mi re by a fifth, mediately, or immediately, and further only to a second, you must sing fa in flat fa natural mi in every Tone, till the song do again touch D sol re, whether it be marked or no. But this Rule falles, when a song doth not straightways fall to F fa ut, as in the Hymne, Ave maris stella, you may see.

8. In flat fa natural mi, and his eights, you may not sing mi for fa nor contrariwise; because, they are discording and repugnant voyces, saith Franchinus lib. 1 pract. cap. 4.

9. Flat in places where he is marked contrary to his nature, doth note Mutation.

10. The Scale being varied, the Mutations are also with it varied, both in the whole and in part. In the whole, as in transposed Songs; in part, as in conjoynd Songs.

11. As often as fa or mi is marked contrary to their nature, the Solfaer must follow the marke so long as it lasts.

12. Seeing there is one and the selvesame judgement of eights, the same solfaing of Voyces must be (p. 15-16).

Rules for Mutations

1. As often as the Progression of sixe Musically Voyces wants, there must necessarily be Mutation.

2. No Mutation can be in a Key which hath but one Voyce, because there one Voyce is not changed into it selfe, although it may well be repeated.

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3. In Keyes which have two Voyces, there be two Mutations, the first is from the lower to the upper; the second contrarily. From this Rule are excepted Keyes which have Voyces of one kinde, as cc sol fa and dd la sol.

4. A Key having three Voyces, admitteth sixe Mutations, although therein you must needs varie the Scale.

5. Let there be no Mutation, unlesse necessitie force you to it.

6. The flat m 11 Voyces cannot be changed into natural square, no contrarily; because they are discords.

7. Naturall Voyces are changed both into natural Dures, and into flat mols, because they are doubtfull: excepting mi and sol, re and fa, which are not changed one into another; because they are never found dwelling in one Key.

8. In the falling of a Song, let the lower be changed into the higher, in the rising contrarily.

9. In a Key which hath one Voyce, there may be so many Mutations, as there may be in his eight, because of them there is the same judgement.

10. You must make a mentall, not a vocall Mutation, unless two of three Notes be put in the same place that receives Mutation (p. 17).

SUMMARY OF SOLMIZATION AND MUTATION PRACTICES

The quotations of the previous pages show that, at the time they were written, solmization was a living practice. The writers grappled with the application of rules to a diverse body of musical literature, giving exceptions for differing forms of compositions. Also, they showed that solmization and mutation were not mechanical processes, but involved application of analytic skills and knowledge. The hexachords implied a musical identity relative to each other, and were in some instances related to certain modes. The rules can be summarized as follows:

1. The hexachord in which one begins a piece should be chosen in relation to the mode of a piece, for the mode will give some general indication of its ambitus.

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2. Any passage involving essential use of B-flat, not just its use at the top of the natural hexachord, should be solmized in the soft hexachord. Since the concept of a note a step or a half-step below the hexachord was not used by the writers quoted, any b-flat will require the use of the hard hexachord. The passage "F-E-F" will require the natural hexachord. However, "G-F-G" can be solmized in either the natural or soft hexachord, depending on its context. Compositions need not necessarily begin and end in the same hexachord. A one-note extension above any hexachord, when the hexachord is returned to immediately, is solmized "fa" and sung a half-step above "la."

3. Mutation from one hexachord to another should take place only when actually necessary, as opposed to whenever possible. Good examples of this will be found when the melodic line of a composition in the hard hexachord contains a passage C-E, which can be solmized in the natural hexachord, but is not required. Where a passage can be solmized in different ways, the one requiring the least mutation is preferred.

4. When mutation is necessary, it should take place as late as possible, retaining the old hexachord for as long as possible.

5. Tinctoris did not write of the hard-soft hexachord mutation, Gaffutuis allowed it and gave examples thereof, and Ornithoparchus seemed to have two contradictory rules (Rules 4 and 6). On closer inspection, the contradiction appears to resolve: according to Rule 4, any key having three voices allows six mutations. Inspection of the gamut reveals that any note that is present in three hexachords involves all three differing hexachords, and that to obtain six mutations, hard-soft and vice-versa must be allowed. Rule 6 would seem to apply more to an actual mutation on the note B, which would require its chromatic inflection. Gaffurius treated this in some detail, deeming it possible as a solution to avoid worse problems.

6. None of these writers forbade mutation on "ut," a rule quoted in our own time, and Gaffurius specified it in some of his examples. Considering the detail in which these writers specified mutation, its practice on "ut," particularly when suggested in a descending passage, does not appear to be forbidden.

7. Solmization of ficta is governed by the "mi-fa" identification of the half-step.

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STUDENT PRACTICE OF SOLMIZATION WITH THE HAND

With these basic principles in mind, students should proceed to the collection of melodies presented in Appendix A. As in modulation in tonal music, the exact point of mutation in some passages will admit of several differing analyses. Fluent solmization requires that the singer read ahead and perform analysis both as to mode and hexachord. Use of the hand can be gradually discontinued as singers acquire a firmer sense of hexachordal relationships. I suggest that students be allowed to use the hand as long as they wish. Some students will find the added "sense modality" of touch as they point to the appropriate spot on their left hand with their right, to be a mnemonic aid in compositions that must be learned thoroughly, as for performance.

I have found that modal chorale melodies are a good first assignment, since they do not present new problems in both pitch and rhythmic organization. The first four melodies of Appendix A contain a representative selection of modal chorale melodies that were harmonized by J. S. Bach. The subsequent examples of Appendix A present representative melodies chosen with respect to their importance in history and literature. The stemless style of transcription is the preference of colleagues; all melodies are transcribed from the 1947 edition of the *Liber Usualis*. Following these preliminary assignments, any sixteenth-century contrapuntal literature to be studied in class is first assigned for solmization and class performance.

After a few weeks of solmization and use of the hand, students can hear and sense the organization imposed on Gregorian chant by the two factors. Students then have a framework on which to place their new learnings in modal counterpoint. Moreover, they have a historically appropriate methodology for approaching modal counterpoint through its melodic lines.

SUMMARY AND CONCLUSIONS

Solmization offers a historically appropriate approach to the sixteenth-century sacred music on which most undergraduate study of modal counterpoint is based. Solmization gives students assistance in the performance practice of the music and insight into the solution of some of the problems of *ficta*. I combine this approach with reading in the twentieth-century modal counterpoint texts, student group reports on representative music literature, and student writing in the style. All of this activity fills a three-hour one-semester course, the final exam of which is student performance of their final writing projects, which are four-voice imitative works.

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In "An Approach to the Analysis of Renaissance Music," Aldrich wrote,

In learning new compositions all performers—instrumentalists as well as singers—solmized their parts
Present-day musicians would be well advised to follow the precedent of the earlier performers

Also, Allaire commented, "In short, solmization was to the medieval and renaissance musician what spelling is to a reader."

Solmization provides students with a method to engage in independent study, and integrates them into a tradition that is fast approaching the beginning of its second millennium.

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APPENDIX

Chorale no. 267. Vater unser in Himmelreich.



Chorale no. 10. Aus tiefer Not schrei' ich zu Dir.



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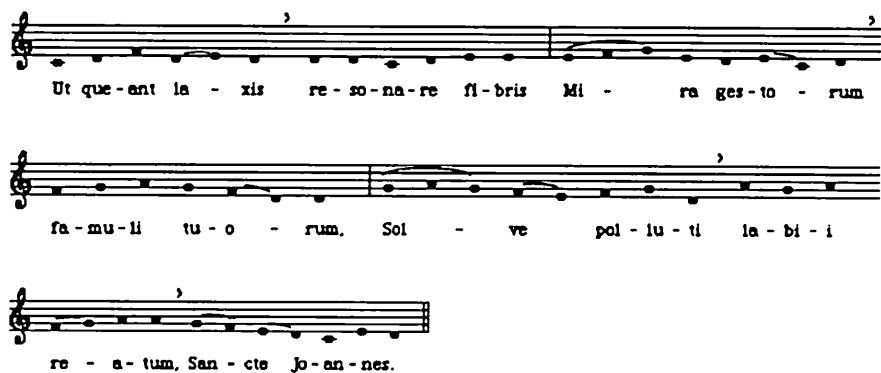
Chorale no. 21. Befiehl Du Deine Wege. (Melody by Hans Leo Hassler)



Chorale no.160. Gelobet seist Du, Jesu Christ.

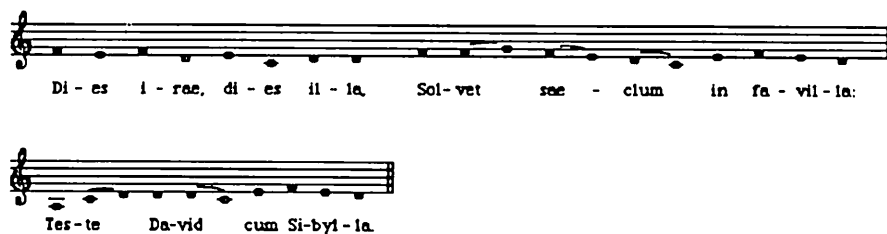


Hymn: Ut queant laxis (Vs. 1). Liber Usualis p. 1384.



SOLMIZATION

Sequence: Dies irae (Vs. 1). L. U. p. 1168.



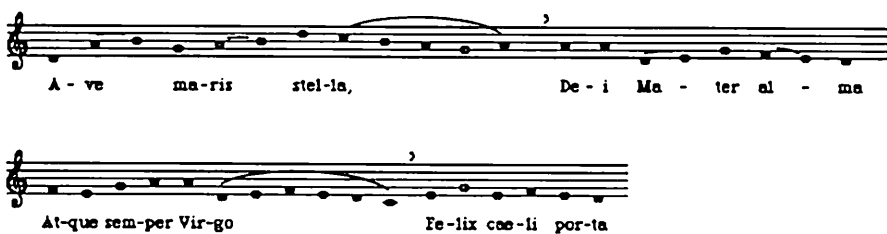
Di - es i - rae, di - es il - la, Sol - vet see - clum in fa - vi - la:
 Tes - te Da - vid cum Si - byl - la.

Sequence: Veni Sancte Spiritus (Vs. 1). L. U. p. 750.



Ve - ni, Sancte Spi - ri - tus, Et e - mitt - te cœ - li - tus
 Lu - cis tu - æ ra - di - um.

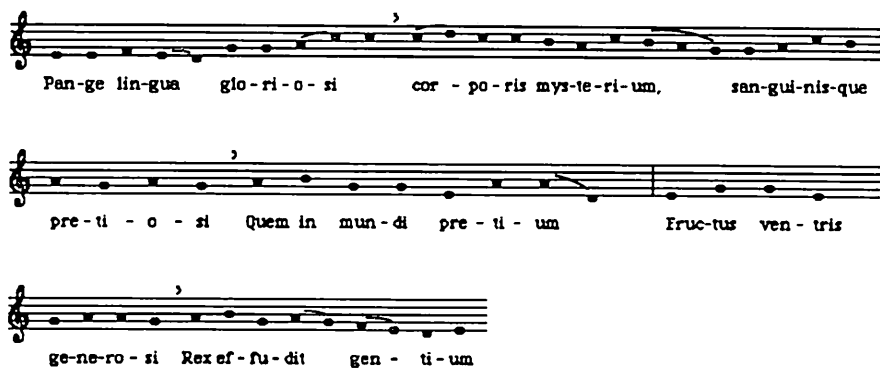
Hymn: Ave maris stella (Vs. 1). L. U. p. 1074.



A - ve ma - ris stel - la, De - i Ma - ter al - ma
 At - que sem - per Vir - go Fe - lix cœ - li por - ta

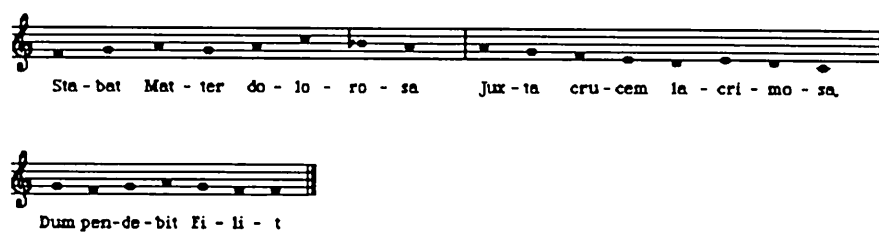
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Hymn: Pange lingua (Vs. 1). L. U. p. 811



Pan-ge lin-gua glo-ri-o-si cor-po-ris mys-te-ri-um, san-gui-nis-que
 pre-ti-o-si Quem in mun-di pre-ti-um Fruc-tus ven-tris
 ge-ne-ro-si Rex ef-fu-dit gen-ti-um

Sequence: Stabat Mater (Vs. 1). L. U. p. 1644.



Sta-bat Mat-ter do-lo-ro-sa Jux-ta cru-cem la-cri-mo-sa,
 Dum pen-de-bit Fi-li-t

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Antiphon: Ave Regina caelorum. L. U. p. 244.

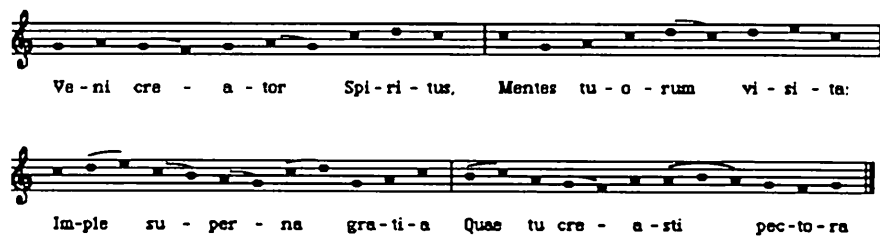


Sequence: Lauda Sion (Vs. 1). L. U. p. 793.



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Hymn: Veni Creator spiritus (Vs. 1) L. U. p. 756.



The image displays two staves of musical notation for the hymn 'Veni Creator spiritus'. The first staff begins with a treble clef and a key signature of one flat (B-flat). The melody consists of quarter and eighth notes, with a repeat sign at the end. The lyrics 'Ve - ni cre - a - tor Spi - ri - tus, Men - tes tu - o - rum vi - si - ta:' are written below the staff. The second staff continues the melody with a repeat sign at the end. The lyrics 'Im - ple su - per - na gra - ti - a Quae tu cre - a - sti pec - to - ra' are written below the staff.

Ve - ni cre - a - tor Spi - ri - tus, Men - tes tu - o - rum vi - si - ta:

Im - ple su - per - na gra - ti - a Quae tu cre - a - sti pec - to - ra

FIVE RECENT SIGHTSINGING TEXTS ¹

GARY S. KARPINSKI

A sightsinging textbook can serve many different purposes. It may provide materials for students to prepare or sing at sight, may guide students and teachers through levels of skill development, and can offer guidelines and suggestions for practice and performance. In selecting a sightsinging text, instructors will want to consider how many of these purposes a book fulfills and how specifically it does so.

Some teachers seek curricular guidance from a sightsinging text, and do best to choose from what might be called "firm" texts, those that clearly subscribe to specific methods and levels of development. At the other end of the spectrum are teachers committed to a particular sightsinging curriculum and to the specific types of materials used in that curriculum. These teachers have two choices when it comes to texts: 1) a "firm" text that closely adheres to that curriculum (if this is possible); or 2) a more adaptable text that is flexible enough to allow the reordering and perhaps reinterpretation of its materials.

These two choices represent opposite poles of a continuum. At one end, a teacher may use a sightsinging text in much the same manner as a theory teacher uses a traditional harmony text: the book will lay down rules, and it will order and schedule events during the course. At the other end of the continuum lie sightsinging texts that are analogous to anthologies for analysis used in theory classes: with them, a teacher must determine the sequence and pace at which the materials will be presented.

Most texts fall somewhere between these two poles. In each of their many features, they exhibit certain amounts of prescription or mere presentation, rigidity or malleability. Similarly, sightsinging teachers' styles usually fall between the two styles described above. In an effort to help teachers decide how each text might fit into their plans, I will point out where the many features of five recent sightsinging texts² lie on this continuum.

The five sightsinging texts investigated in this article are: the third edition of *A New Approach to Sight Singing* by Sol Berkowitz, Gabriel Fontrier, and Leo Kraft; the third edition of *Music for Sight Singing* by Robert Ottman; the fourth edition of *Sightsinging Complete* by Bruce Benward; *Music for Sight Singing* by Thomas Benjamin, Michael Horvit, and Robert

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Nelson; and *Sight Singing Through Melodic Analysis* by Leland D. Bland. All of these books have been published since 1985. The three that have been re-issued in new editions during that period are all well-ensconced in theory classrooms across the country; the two newcomers have yet to be fully tried and tested.

All five assume a similar degree of musical knowledge, in Robert Ottman's words, "some of the simplest aspects of music theory: knowledge of the staff, clef signs, major and minor scales and key signatures, and in rhythm, knowledge of note values and time signatures."³

In discussing the purposes of sightsinging, all of the authors cite its application to performance. As Benjamin, Horvit, and Nelson put it, sightsinging instruction enables the student "to translate symbol into sound with speed and precision."⁴ Bland more vaguely refers to how "this instruction somehow improves musical performance and listening skills."⁵ Ottman, Benward, and Berkowitz/Fontrier/Kraft also emphasize the importance of sightsinging in a broader sense: its contribution to what Ottman calls "the ability to 'hear mentally,' that is, to know how a given piece of music sounds without recourse to an instrument."⁶ Benward refers to the ability to sing unfamiliar melodies at first sight as "only a means to an end." He feels that the ultimate goal is "to look at a score of music (any music) and be able to hear it in your mind without having to sing or play it outloud [sic]."⁷ By promoting sightsinging as a means to an end and not an end in itself, Benward places the discipline in its proper perspective. Berkowitz, Fontrier, and Kraft perhaps say it most elegantly: "Music does not live on paper. To bring it to life there must be an instrument that can sing, an ear that can hear, and a sensitive musical mind that can sing and hear in the silence of thought."⁸

BERKOWITZ

The third edition of *A New Approach to Sight Singing* by Sol Berkowitz, Gabriel Fontrier, and Leo Kraft is divided into five chapters: "Melodies"; "Sing and Play"; "Duets"; "Themes and Variations (Unaccompanied)"; and "Themes and Variations for Voice and Piano." These are followed by a group of Supplementary Exercises that "focus upon various technical problems" (p. 292). The order of chapters has been slightly rearranged from the revised edition, and the chapter for themes and variations with piano has replaced a chapter entitled "Improvisation Studies" in the previous edition. The Melodies chapter occupies more than one-third the book, and the authors feel "the bulk of class time will probably be devoted to it" (p. x).

Each chapter is divided into four sections: "Elementary"; "Intermediate I"; "Intermediate II"; and "Advanced." The idea behind this division is

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that one semester of a four-semester sightsinging sequence should cover the material found in the corresponding sections of all the chapters.

The exercises are carefully graded according to difficulties of pitch and rhythm. This gradation calls for special attention. In Section I, the pitch materials progress from stepwise motion through skips contained in the I, IV, and finally V chords. Major and minor modes are introduced early in this section, and so is the alto clef. The metric material in Section I begins with simple duple, triple, and quadruple meters, with quarter or half notes as beat units; compound meters are represented by six-eight meter only. The rhythms include duple and quadruple division of the beat, the dotted beat, rests, and one-beat anacruses.

Section II begins with skips to tones in the V7 chord, quickly followed by "skips of all diatonic intervals" (p. 31). Chromatic neighboring and passing tones are included, as are modulations to the relative major and dominant. The section ends with a number of melodies in Dorian, Phrygian, Mixolydian, and Aeolian modes. The metric and rhythmic materials introduced in this section are compound triple and compound quadruple meters (with only one meter sign—six-four meter in number 85—containing a lower number other than eight), triplets dividing one beat, ties, half-beat anacruses, and half-beat and quarter-beat syncopations.

Section III introduces some more difficult skips: those larger than an octave and those to chromatic pitches. Some melodies in this section outline or imply secondary dominants and the V9 chord, and the flatted sixth scale degree is included in the major mode. Quintuple meter makes its first appearance here, as do the dotted quarter-beat and triplets dividing one-half of a beat.

In the final section, the tenor clef appears. In addition, various pitch configurations involving the flatted supertonic and mixed major and minor modes as well as quartal, octotonic, whole-tone and augmented-triad pitch collections are presented. Rhythms in this section include octuple division of the beat and double dotting. Changing and complex meters are introduced here, as are simple septuple and compound quintuple meters.

The supplementary exercises are designed to emphasize specific musical figures taken from other contexts. They are built around individual scales, modes, chords, or chromatics and offer extra work for students with specific difficulties.

There is certainly enough material in Berkowitz/Fontrier/Kraft to keep a sightsinging class busy for four semesters, and the balance among the four sections seems to map appropriately onto those semesters. Although some teachers may disagree with the order of presentation of certain skills or concepts (e.g., the introduction of the tenor clef as late as the fourth section), the book follows a logical path that is not unduly far from that

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traveled by many sightsinging books or theory texts. However, the order of presentation is fixed and there is no provision for introducing materials out of sequence, so instructors bothered by the order outlined above might consider adopting another text.

The authors are frequently careful to signal the introduction of new materials. They write: "To facilitate an orderly sequence of learning, the Third Edition introduces a number of topic headings. Each is followed by a short group of melodies focussed on a single topic. Immediately after, there is a longer group of melodies in which all topics presented up to that point are reviewed" (p. x). These topic headings amount to individual sentences, such as "the following three melodies include triplets" (p. 30), which are inserted before exercises that contain new material. The headings are helpful to the student who likes to know what's going on, and to the teacher who may use them to coordinate sightsinging lessons with the teaching of theoretical concepts.

Occasionally, however, new concepts are introduced without topic headings. For example, the dotted quarter-beat (i.e., a dotted sixteenth note in four-four meter) is first included in number 323; triplets dividing one-half a beat (i.e., sixteenth-note triplets in four-four meter) appear first in number 370; octuple division of the beat (i.e., thirty-second notes in two-four meter) is included in number 465; double dotting appears in number 514; compound quintuple meter is used in number 531; alternating simple and compound meters are first included in number 564; the complex meter $3+3+2/8$ is used in number 569; the double meter signature $4/4 + 3/4$ is used for number 591, and $2/4 + 3/4$ is used for variation 5 of theme and variation number 13; melody number 585 focuses on the augmented triad.

In addition to instances where concepts appear without topic headings, in at least one case a concept appears before its topic heading: changing meters are heralded by a heading at number 519, but this device first appears in number 470.

While every minute detail need not be spelled out in a sightsinging manual, I wonder why authors who are generally so careful to introduce new challenges in a didactic manner do not do so in certain cases. To make matters worse, the table of contents is quite taciturn regarding these subject headings, forcing the reader to thumb through the book in search of particular musical figures. No subject headings appear in any part of the book except for the "Melodies" chapter, making the search for specific materials even more difficult in those areas.

Two other omissions warrant discussion. First, this text exhibits a clear prejudice towards certain meter signatures. In simple meters, the quarter note is used almost exclusively as a beat unit; in compound meters, the bottom number of the meter sign is almost always eight. A smaller number

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of examples use the half note as a beat unit, usually in *alla breve* context, and the authors restrict the *alla breve* symbol, C , to its modern usage representing only two-two meter (p. 3), although it can also represent four-two meter.⁹ Of the 593 exercises in the *Melodies* chapter, fewer than 50 use meters other than those just described, and many of those occur in the context of complex or changing meters. My concern here is that students should understand rhythm and meter as systems of proportions that may be represented by many beat units. For example, they should not read four-eight meter as a crippled, smaller version of four-four; they should see all quadruple meter signs as ways of representing a single condition.

The second significant omission is that of the Lydian mode. It appears only once: in the form of a scale in the supplementary exercises. Its absence from a text that includes Dorian, Phrygian, Mixolydian, and Aeolian melodies is puzzling.

Every exercise in the book has been composed by the authors. They explain: "We find that we are able to strike a particular level of difficulty and focus on specific problems more effectively by writing material to meet the students' needs than by using melodies drawn from the literature" (p. ix). While this seems like a sound argument, I am troubled by any approach to music that does not include a single note of "real" music in it. Certainly, those of us who teach sightsinging find it necessary at times to invent exercises that focus on specific musical figures. However, it seems reasonable to expect a sightsinging text to include actual literature containing such figures. These figures must exist in the literature, else why are we drilling them? I can find only one valid reason for inventing melodies in such a text: if the concept we are trying to teach is contained in literature that is at first too difficult, then perhaps specifically composed exercises might progressively lead up to such literature. However, I believe that an entire manual of more than 300 pages spanning at least two years of a college education should not be a prelude to all of music literature itself.

Nonetheless, the music in Berkowitz/Fontrier/Kraft contains many features of real music. Performance indications are included in every exercise, and phrasing, articulation, tempi, and dynamics are indicated.

Musical terms appear in Italian, German, French, and English. Each page contains a number of such terms, which appear without translation. Appendix I provides a glossary of more than two hundred terms found in the text; this encourages students to look up (and remember) these terms. Similarly, Appendix II contains brief explanations of fourteen musical symbols.

A few guidelines for performance are laid down in Chapter I. The first is to establish the key: "The tonic note of the key (rather than the first note of the melody) should be played on the piano or the pitch pipe and sung by

the student" (p. 3). It is certainly crucial for a sightsinging student to learn how to establish a key, but there is no reason for restricting this skill to occur always from the tonic pitch. Musicians must be able to establish a new key from any scale degree, especially, besides the tonic, the third and fifth. Obvious applications of this ability include a vocal audition in which only the starting pitch is given, and singing the so-called "distant" modulations found particularly in Romantic and Neo-Classical music (e.g., C major to A-flat major). A survey of the literature will reveal that starting notes in the former and pivot tones in the latter fall frequently on scale degrees other than the tonic. Perhaps the next edition of *A New Approach to Sight Singing* might include some exercises specifically composed to teach this skill.

Another guideline for performance involves establishing the tempo. The authors suggest beating time "as a conductor does" (p. 3): a useful technique for maintaining a strong sense of both tempo and meter.

Regarding solmization, the book explicitly endorses no particular method but advises the student to "sing some definite syllable for every note the better to control quality and intonation" (p. 3). Implicit endorsement of the movable do system might be gleaned from the four texted exercises in the book. Two of these four employ solmization in their texts using the movable-do system. However, the authors do briefly describe the use of fixed do, movable do, numbers, and the neutral syllable "la." They state: "A musician is expected to know the system in common use wherever he may be; therefore, the student should master more than one of these techniques" (p. 4). But in what period of time? Students at the level of this book are in dire need of a system—a means of interpreting the sounds and symbols they are dealing with. To ask such a student to switch between (let alone master) two truly different systems courts disaster. Changing from movable do to numbers is a manageable and profitable exercise; changing from movable do to fixed do—which use the the same labels to mean quite different things—will confound even the best of students. Perhaps when students have achieved a proficiency level equal to the challenges of the fourth section, earlier material might be reinterpreted through a different system, but at the earlier stages a unified method of approach is warranted. Indeed, none of the texts reviewed here endorses a particular system. This places them all closer to the role of anthology than text, since a sightsinging text subscribing to neither fixed nor to movable do is similar to a harmony text not recommending the use of Roman numerals over lead-sheet type chord symbols.

In summation, *A New Approach to Sight Singing* consists of examples composed by the authors and ordered in a rigid sequence.

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OTTOMAN

The sequence of events in Robert Ottoman's *Music for Sight Singing* is similar to that in Berkowitz/Fontrier/Kraft. The twenty-one chapters of musical excerpts are grouped into four parts, "each corresponding to one semester of the usual four-semester theory sequence" (p. xi). Those four parts are titled as follows: I. Diatonic Intervals as Used in Scale Lines and in the Tonic and Dominant Triads; II. Other Uses of Diatonic Intervals, The C Clefs, The Dominant Seventh Chord; III. Chromatic Lines and Modulation, Syncopation, The Medieval Modes; IV. More Difficult Rhythmic and Melodic Patterns, Twentieth Century Materials. At the outset, the treble and bass clefs are used. The alto and tenor clefs are introduced early in the text and occur frequently thereafter. The melodic material moves from scalar to chordal, and from diatonic to chromatic. Diatonic skips to members of the tonic chord are introduced first, then to the tones of dominant, subdominant, and supertonic triads. Skips are then included that have "other intervallic implications" (p. 93). These are skips to non-harmonic tones and from one chordal implication to another. The diatonic material ends with skips to tones of the dominant seventh chord. Chromatics are first introduced as passing and neighboring tones. The V of V is then introduced, as is modulation to the dominant in the major mode, followed by a number of other secondary dominant chords and modulations to closely related keys. Subsequent melodic materials include modality, other chromatic intervals, remote modulation, and a few pantonal and atonal melodies. The progression of rhythmic materials is similarly straightforward: from simple to compound to complex meters, and from duple to quadruple to other divisions of the beat, including syncopation and hemiola. New rhythmic and metric configurations are first introduced in special rhythmic exercises. Ottoman suggests that the single-line variety of these exercises should be performed on rhythmic syllables, and he offers two-part exercises that may include hand-tapping of one or both parts.

The above rhythmic and melodic materials are interleaved in the text, yet there is an independence of these materials that allows instructors to reorder their presentation to a certain degree. Thus, for example, even though quadruple division of the beat is introduced in chapter 8 and the dominant seventh chord is first fully presented in chapter 10, the first thirty-six melodies in chapter 10 contain no quadruple division, and are clearly labeled as such. Indeed, many new materials are first introduced in simple contexts, followed by the re-introduction of previously-learned materials. There is much truth in Ottoman's claim that "the student will be able to study one problem, rhythmic or melodic, at a time and progress steadily from the easiest material to the most complex" (p. xi). This feature allows many

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different instructors with various ideas about the sequence of learning to use Ottman as a source for sightsinging materials. On the other hand, an instructor seeking guidance from this text in terms of designing a syllabus or a curriculum might be disappointed by its flexibility.

The second edition of *Music for Sight Singing* declared, like the first, that "none of the material has been written expressly for sight singing" (p. v). The third edition has maintained this orientation towards the literature of composed and folk music, with the exception of the aforementioned rhythmic exercises and thirty-two examples composed by the author for a new first chapter containing entirely stepwise music. Some instructors will find this chapter helpful, particularly in acclimating students to the discipline of solmization. All subsequent chapters contain actual music literature drawn from a wide variety of sources. A majority of the excerpts in the first half of the text are folk melodies, whereas the later chapters include a majority of pieces written by Western art composers. Any instructor preferring either folk or Western art music should find enough useful material in the text's 1096 examples.

Symbols and terms are included in the music that indicate phrasing, articulation, tempi, and dynamics. The third edition has added a final chapter entitled "Foreign Words and Musical Terms," a glossary of more than one hundred Italian, German, and French words found in the text. This is a welcome addition; as with Berkowitz/Fontrier/Kraft, an instructor may require students to refer to this glossary so that they may thereby retain more of these terms.

Ottman, too, offers some brief guidelines for performance. He cautions observance of meter and key signatures, and—like Berkowitz, Fontrier, and Kraft—tells the reader to "play the tonic note, but no other, immediately before singing" (p. xviii). Once again, it seems unnecessarily restrictive to develop in students the ability to establish a key from only the tonic note. Indeed, *Music for Sight Singing* itself contains a section entitled "Remote Modulation," in which some subsequent key areas are reached through tones other than the new tonic.¹⁰ Certainly, some preparation for the skill of establishing a tonic from other tones would be welcome before this point. Other guidelines spelled out by Ottman include scanning the melody for melodic figures, especially the scales and intervals under current study; attention to phrase markings, with an eye and ear towards cadence points; and the use of conducting to foster steady, continuous performance and the ability to read through mistakes. He cautions: "When stopping and repeating, your performance is not sight singing!" (p. xviii). Certain chapters are preceded by short discussions of some other techniques that may aid in sightsinging. For example, Ottman points out that students should locate on the staff the tones of particular chords (especially

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those of the chord under current study) before beginning to sing. Other brief discussions cover secondary dominants, the C clefs, and metric changes to name a few. These discussions are only long enough to serve as indications of what type of material is to follow; on several occasions, the author refers readers to his *Elementary Harmony: Theory and Practice*¹¹ for further information. However, due to the flexible nature of the material contained in *Music for Sight Singing*, correlation with most theory texts is easily possible.

Ottman also suggests a number of methods of solmization, although he endorses no single one. In the first chapter, which contains melodies only in the major mode, he briefly describes the use of movable do, numbers, letter names, and the neutral syllable "la." He relegates the mentioning of fixed do (a system conceptually equivalent to singing letter names) to a footnote. When the minor mode is introduced in chapter four, he lists the advantages and disadvantages of the la-based and do-based minor systems, once again indicating no preference.

Readers familiar with the previous editions of *Music for Sight Singing* will find several major additions to this one. More than two hundred rhythmic exercises have been added to aid in the introduction of new rhythmic configurations. In addition, more than two hundred other melodies have been added throughout the text, expanding the amount and scope of the material. The aforementioned first chapter is now included, offering a number of stepwise melodies. Other new sections focus on chromatic harmony and twentieth-century techniques. One typographical error is apparent in this new edition: melody #781 (p. 216) is attributed to "Vivardi."

So, in contrast to Berkowitz/Fontrier/Kraft, Robert Ottman's *Music for Sight Singing* consists largely of actual musical excerpts, and these excerpts are chosen in such a way that they may be used in various sequences.

BENWARD

Bruce Benward has taken a somewhat different approach in dividing up the materials in *Sightsinging Complete*. Benward offers sixteen units, each consisting of six sections. The sections, A through F, each contain a particular type of material, so that, for example, Section C in any unit will always contain intervallic drills. This organization is markedly different from that found in the third edition,¹² where the number and sequence of sections varied from unit to unit. In the current edition, the headings for the six sections are as follows: (A) Shorter and Easier Melodies to be Sung at Performance Tempo; (B) Tonal Melodies for More Comprehensive Study;

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(C) Intervals; (D) Melodies for Interval Singing; (E) Two-, Three- and Four-Voice Excerpts; and (F) Rhythm. This concentration of materials into sections allows instructors to focus class time on or to de-emphasize certain aspects of the text—a valuable feature. In addition, individual students who need extra work on a particular topic may concentrate on that section in various units. Sections A, B, and E contain exercises and excerpts similar to those found in all of the texts discussed above. Section F consists of rhythmic “modules” that may be practiced in an atomistic fashion or strung together to form longer rhythmic exercises similar to those in Benjamin/Horvit/Nelson or the new edition of the Ottman. There are, however, no two-part rhythmic exercises. Sections C and D are unique in this group of texts in that they emphasize an intervallic approach to sightsinging. By virtue of the book’s design, these non-tonal, intervallic exercises are interlaced with what some instructors may feel is more easily grasped tonal material. This design also allows an instructor who does not subscribe to combining these two types of materials to eliminate the intervallic exercises or delay their study until later in the curriculum.

However, the intervallic approach of Sections C and D creeps into Sections A, B, and E. These three sections, which consist of tonal materials, progress at first in a fashion similar to the other texts already discussed. In the first two units, Benward presents stepwise melodies, then introduces skips to members of the tonic triad. In Units 3 through 7, he departs from this approach, which is oriented towards scale degrees and harmonic function, and instead restricts the materials by interval type (i.e., only skips of P5, P4, M3, and m3 are included). This hybrid approach may have some validity, but Benward himself admits that “a descending perfect 4th from scale degrees four to one is easier than from six to three . . .” (p. x). Why, then, use intervals as a means of grading these materials? Benward tells the student: “When you learn that from C to E is the same distance as from F to A or G to B your problem is diminished considerably. Learning to sing intervals . . . is an absolute must” (p. ix). While this example may carry a certain amount of force in C major, what about its appearance in, say, F major? The interval from G to B natural in this context carries with it a function—and therefore a “feel”—quite different from the other two; for proof of this, ask any student working hard to complete Unit 3 of this book to sing these three intervals in the context of F major. *Sightsinging Complete* contains tacit acceptance of this fact: the raised fourth scale degree is not presented in any tonal context until Unit 8. But even in their diatonic context, the above intervals are each imbued with their own tonal functions that set them apart from each other. While I agree with Benward that “the disciplined identification of intervals in a melodic context will pay handsome dividends in an enhanced grasp of tonal music and an even greater

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reward when music of the twentieth century is encountered" (p. x), I also wonder whether this is the most efficient manner in which to present such study. Interval size is not a crucial factor in determining difficulty of perception or audiation in a tonal context. One might assume that this extends to sightsinging as well. A number of studies point to the conclusion that context determines the difficulty of a melodic skip.¹³ Merton Shatzkin writes: "This suggests that difficulty with intervals may be more than a matter of just their width," among other things.¹⁴ He questions those ear-training methods that "still concentrate on interval perception outside, rather than inside, a context."¹⁵ A much more important factor is the scale degree of the pitch skipped to. As a simple example, singing or identifying skips to the tonic pitch would be relatively simple, regardless of the size of the skip, when compared with skips to, say, the fourth scale degree or to chromatic pitches. Benward himself makes this point in cautioning that a student "should be able to pause anywhere in a melody and sing the tonic . . . pitch immediately" (p. ix). Harmonic context is also important: skips within chordal configurations, once taught and understood, are usually easier than skips to non-harmonic tones. As for the value of interval study as applied to non-tonal music, the benefits are obvious. Sections C and D are good as a means of leading up to such music; however, other texts might do the job better in one specialized volume, and with an emphasis on real music literature.¹⁶

The isolation of musical parameters into Sections A through F is not, and cannot be, complete. Any book that might purport to contain completely independent tracks of tonal, intervallic, and rhythmic figures could not contain any music in which these elements were combined. Thus, Sections A, B, and E in each unit of *Sightsinging Complete* assume a certain mastery of the rhythmic materials from previous units. This eliminates much of the freedom seemingly gained by separating the book into individual parameters. Occasionally, rhythmic materials appear that have yet to be introduced in the text. Two examples of this include (1) half-beat values, which are introduced in Section F of Unit 3, but appear before that, in Section B of Unit 2, and (2) the triplet, which is introduced in Section F of Unit 5, but is used in Section B of Unit 3. Benward freely admits that he "has yet to discover a purely objective rating system for determining the difficulty level of a melody" (p. x). This is, however, no excuse for not introducing new melodic and rhythmic configurations in a gradual and obvious manner.

Sections A, B, and E are comprised mostly of music literature, with a lesser number of examples composed by the author in the early units, which distill the musical figures under study at those points. As in Ottman, the excerpts are drawn from both folk and Western art musics. Although Benward claims that some of the melodies in the later units of Section D are

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not contrived (p. x), I could find no examples of actual literature in any units of that section. The materials for Sections C and F are necessarily contrived, being atomistic and isolated drills. Here, then, is a generally sensible combination of artificial and actual music: composed by the author only when necessary and leading directly into the study of real music literature. In *Sightsinging Complete*, this method breaks down only in the failure of Sections C and D to progress into actual music.

Many, but not all, of the melodies in Sections A and B and the later units of Section D are printed with performance indications. Phrase markings appear over many of the melodies, but marks of articulation are practically nonexistent. The inclusion of dynamic indications is sporadic, and there seems to be no logical reason for their exclusion from some examples, such as Romantic excerpts, and inclusion in others, such as folk songs. In general, more of them would be welcome. Tempo indications are given either in the form of metronome markings or as foreign terms. A brief glossary, new in this edition, contains the definitions of these terms, which number fewer than 100. For no apparent reason, Section E is nearly devoid of performance indications. In occasional cases where appropriate, reference is made to peculiarities of style or notation.

Benward discusses some guidelines for study and performance under the heading "Helpful Strategies" (p. ix). Aside from the usual suggestions, he recommends isolation of "reference tones" (scale degrees 1, 3, and 5), the ability to sing the tonic pitch at any time during an exercise, and the practice of "mind singing" (i.e. audiation). He suggests conducting only if the instructor recommends it.

With regard to solmization, Benward discusses the features, advantages, and disadvantages of fixed and movable do and number systems, each with and without chromatic inflections. This discussion (p. xi) is well-balanced and clear, but his presentation of the actual systems themselves (p. xii) is at times incomplete (e.g., there is no mention of la-based vs. do-based minor) and at other times obscure (e.g., the inclusion of "12 tone fixed" and "12 tone moveable" numbers—does anyone really use these systems in sight singing?). He is right on target, however, in stating that "only a positive rationale or system, clearly understood by all students, and enforced at all times will suffice" (p. xi). He leaves the choice of a particular system up to the instructor (p. xii), but seems to orient himself towards a movable-do type of approach in telling the student that syllables or numbers are useful because "it is important to 'know' the scale degree of all melody notes and communicate that information to your instructor—as well as to yourself" (p. ix). Only moveable do or moveable numbers will do this directly.

A special feature of this book is the addition of chord symbols (e.g.,

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Am, F#dim., B7) above some of the melodies. While Benward claims that using these symbols should foster a "sensitivity to harmonic backgrounds" (p. xi), some instructors may feel that it should ultimately be the reader's responsibility to determine the harmonic implications of a melody, and that including these chord symbols does this work for the reader. Others may find the use of a symbology associated with popular music inappropriate when connected with the literature of Western art music. Still, the inclusion of these symbols may at least serve as a starting point for the discussion and implementation of some form of harmonic thinking.

Sightsinging Complete is more flexible than Berkowitz/Fontrier/Kraft, but not as flexible as Ottman, and consists of a combination of actual and contrived musical examples.

BENJAMIN

Yet another form of division is found in Benjamin, Horvit, and Nelson's *Music for Sight Singing*. It is divided into three units: 1) Common Practice Techniques: Diatonic; 2) Common Practice Techniques: Chromatic; and 3) Twentieth-Century Techniques. The authors suggest that this material may be spread over a two- or three-year curriculum, depending on whether a separate course is provided for twentieth-century materials (p. ix). The units are divided into parts, each of which introduces new materials. These materials are clearly identified in headings of one or a few sentences. The exercises consist of three types: unpitched rhythmic exercises, pitched preliminary exercises, and melodies. The rhythmic exercises focus on specific rhythmic and metric configurations; the pitched preliminary exercises focus on melodic and harmonic figures. These preliminary exercises are quite rigorous, being somewhat analogous to those mechanical exercises found in so many instrumental methods books.

The exercises are graded in a fashion similar to Ottman and Berkowitz/Fontrier/Kraft, with a notable difference in the gradual introduction of rhythmic complexity. The first few pages consist of "unmetered" (perhaps more accurately, "unbarred") exercises. For the first 26 pages, only notes of one or more beats are employed. The next section introduces duple division of the beat, followed shortly by quadruple division (the authors refer to these as "2:1 and 4:1 subdivision"). It takes one-third of Unit I to reach this point; clearly the authors have found it useful to present rhythmic division in such a careful manner. Like Ottman and Berkowitz/Fontrier/Kraft, the first melodies are entirely stepwise, but before progressing to skips among members of the tonic triad the text introduces skips of thirds and fourths to all scale degrees in sequential contexts.

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The subsequent tonal materials are introduced in a traditional sequence: chordal follows melodic, chromatic follows diatonic, and so on. However, the book continues beyond the traditional into twentieth-century materials. Unit 3 is unique and valuable in its careful gradation of modern musical elements. A few of the techniques introduced here include pandiatonicism, polytonality, quartal harmony, serialism, syncopation, complex division of the beat, complex or irregular meter, and polymeter. The authors have composed nearly one hundred pages of exercises that present these techniques. In addition, twentieth-century notational innovations are included, such as Haupt- and Nebenstimme indications, cut-out staves, time-line and proportional notation, and fan-like beams indicating an accelerando or ritardando. Sadly, not one excerpt from the established literature is included as a *raison d'être* for these materials.

The order of presentation for the entire book is considered fixed by the authors. They write: "It is important that some material from each section of each unit be covered, and in the proper order" (p. xi). This is in contrast to the Ottman, which allows a certain amount of reordering when presenting new concepts. Nonetheless, the authors state that their book "may be used with a wide variety of theory texts currently available" (p. xii). For this purpose, they understandably suggest their own *Techniques and Materials of Tonal Music*.¹⁷ While there is nothing startlingly unusual about the order of presentation in *Music for Sight Singing*, its strict sequence of materials might make it difficult to integrate with certain theory texts. For example, Allen Forte's *Tonal Harmony in Concept and Practice*¹⁸ introduces the concept of the secondary dominant before that of the seventh chord (on pp. 99 and 136 respectively) whereas Benjamin/Horvit/Nelson introduces the dominant seventh chord on page 31, well before secondary dominants are presented on page 135. This should not necessarily be perceived as a flaw on the part of either book; one should merely be careful in selecting a companion volume for Benjamin/Horvit/Nelson.

Benjamin, Horvit, and Nelson confront a problem encountered in the texts discussed above: which are better, specifically composed exercises or actual examples of music literature? They write: "In those texts that consist primarily of music from the literature, the examples are neither consistent in quality nor are they carefully graded. Students frequently find themselves confronted by material too difficult for their skills at a given point. Those books that consist primarily of original exercises are often lacking in musicality and stylistic variety and aptness" (p. ix). Those statements notwithstanding, Benjamin/Horvit/Nelson consists mostly of exercises written by the authors. Music literature is presented in the form of part music that appears in special sections spaced throughout the text. These excerpts comprise less than one-fifth of the book's music and are taken

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almost exclusively from the genre of vocal music. Instructors wishing to use actual music literature will still find it necessary to supplement this text with more “real” music, especially from instrumental works.

None of the unpitched rhythmic exercises or the pitched preliminary exercises contains any performance indications. However, the contrived melodies and the excerpts from the literature are provided with many indications for tempi, dynamics, articulation, and phrasing. Any terms that appear in foreign languages also appear in the glossary, which contains nearly 200 entries.

The authors feel their book “does not depend on any particular singing system” (p. xvi). They list, as options, the use of numbers, a neutral syllable, or fixed or movable do. The only system about which they give any detail is movable do, listing major, minor (1a-based only), and chromatic scales using this system (p. xvi). They briefly discuss its merits and weaknesses, saying that “tonally oriented systems, such as movable do and numbers, work very well in primarily diatonic contexts; however, they lose their efficacy in highly modulatory materials and most twentieth-century idioms” (p. xi). They do suggest the singing of letter names in studying an unfamiliar clef—one valuable application of the fixed do system.

Other guidelines for performance include the use of conducting while singing, a steady tempo and rhythmic accuracy, the isolation of rhythmic and pitch difficulties, reading ahead, analysis (motivic, harmonic, etc.), and attention to intonation, performance markings, style, continuity, and phrasing. Indeed, the four pages of “Suggestions to the Student” (pp. xiii-xvi) are crammed full of such recommendations. These pages discuss many of the skills we hope to develop in our students; there are dozens more. Yet, seeing merely these enumerated on paper makes learning to sight sing seem impossibly daunting. Perhaps what is needed are exercises that isolate and drill each of these skills.

In conclusion, Benjamin, Horvit, and Nelson’s *Music for Sight Singing*, like Berkowitz/Fontrier/Kraft, is fixed in its sequence of presentation. It includes some actual literature in the form of part music, but consists mostly of contrived musical exercises.

BLAND

Among all of the books reviewed here, Leland D. Bland’s *Sight Singing Through Melodic Analysis* takes the boldest approach to the study of sight-singing. The book’s main contributions lie in two areas: the constant distinction between structural and embellishing tones, and an awareness of horizontal connections between temporally separated pitches. Both of

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these contributions are made with the intention of facilitating the task of sightsinging. Many of us who teach sightsinging would agree that attention to harmonic tones and delayed resolutions plays an integral role in the discipline. Indeed, it seems that Leland Bland has systematized what we often tell our students in an informal way. Making these ideas part of the main focus of the text aims at maintaining their level of importance throughout an ear-training course.

Bland makes his distinctions between structural and nonharmonic tones in the form of “reductions” written on staves below the melodies. These reductions are a central part of each chapter’s discussions. At times, readers are then asked to write out their own reductions as an aid to sightsinging; at others, the process is implicit. The reductions are intended to be sung, and this makes me regret that they are all unrhythmicized. For a student’s performance to benefit from the underlying structure of a melody, that student should feel the rhythmic placement of the structural tones. For example, on page 53, Bland presents melody #13:



which he reduces as:



This reduction might be better presented to the student as:



The book’s material appears in the form of examples, exercises, and melodies. The examples are often clear illustrations of the ideas discussed above. For instance, after the sounds of the members of the tonic triad have been established in the students’ ears, Bland suggests approaching an example that contains a leap from D up to B in D major by thinking of the

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B as "a whole step above the fifth of the D major triad, rather than as the interval of a sixth above the preceding note D" (pp. 68-69). The reduction below this example shows the D and A as structural tones with the B as an embellishing tone.

Similar to the other books' authors, Bland states that "aside from fundamentals, the use of this book requires no special background or training for either the student or the instructor" (p. vi). But which fundamentals are assumed? A certain amount of knowledge is necessary for students to recognize the harmonic outlines and structural goals in the melodies. My guess is that the phrase "no special background or training for either the student or the instructor" refers to no special training in Schenkerian analysis, which this book certainly does not require. In fact, training in strict Schenkerian analysis might, at times, hinder reception of the book's message; at the very least, the sight of so many open note heads (see p. 110, for example) is enough to disturb most Schenkerians. Bland does, however, clearly explain his use of open and closed notes: "The notation in the reductions in this book is adapted from analytical techniques associated with Heinrich Schenker. Open notes indicate harmonic tones. Beginning with the section on passing tones, closed notes will designate nonharmonic tones, or embellishing tones" (p. 48, footnote). Beyond that, there is something distinctly non-Schenkerian about reduction at the foreground level without reference to a background structure. Bland's version of reduction is more a mere combination of Fux and Rameau than a derivation from Schenker. This is not necessarily a flaw. As a technique for approaching the accurate sightsinging of certain melodies, it succeeds. However, its claim of direct connection with the theories of Heinrich Schenker might tend to misrepresent that theorist's important contributions in the minds of students studying this book.

The book is divided into fourteen chapters. The first, "Rhythmic Organization in Music," spans forty-six pages and presents all of the rhythmic and metric concepts needed for the entire book. This chapter contains several hundred rhythmic exercises that advance from the beat and its simple division to such complexities as syncopation and asymmetrical and changing meters. Although all of this is presented in the first chapter, Bland clearly intends this chapter to serve as a reference and extra drill during the study of the subsequent chapters. Chapters 2-12 all carry headings that refer only to pitch (e.g., Chapter Six: "Chromatic Variables in the Major Mode"), but each of chapters 2-8 also introduces specific new rhythmic configurations. Thus, even though at first glance chapter one seems to isolate the parameter of rhythm, the text is locked into a specific progression of pitch and rhythmic material. Bland recognizes this inflexibility, stating that "the material is designed to be taken in sequence from

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chapters 2 through 14" (p. vi). He does allow some latitude: "The order of some of the later chapters may be rearranged to suit individual needs" (p. vi). This presumably refers to chapters 9 through 12, which introduce no new rhythmic materials. An instructor considering this text for a sight-singing course would do well to give some thought to the order of its materials. That order is fixed, and the course must follow it.

The pitch material progresses through melodies that contain the primary triads (chapters 2-5), chromatics (chapters 6-7), the dominant seventh chord (chapter 8), and modulation and modality (chapters 11 and 12). Chapters 9 and 10 discuss melodic contours in an attempt to help students see and hear connections between tones separated by as much as several measures. Chapters 13 and 14 contain melodies with "complex" tonal and rhythmic figures, such as large leaps, enharmonicism, and changing meters.

The rate and manner of progression through these materials warrants some discussion. Skips to members of the primary triads in the major mode are introduced in a careful and gradual fashion over the span of 80 pages. In contrast, only 24 pages are then allotted for the presentation of chromatics in the major mode, which are categorized as being only neighbor tones, passing tones, or appoggiaturas. There is no discussion of functional, non-modulatory chromatics such as those found in applied dominants, and no melodies that contain such figures are included. The minor mode is not introduced until after this point, at chapter 7, more than one-third of the way through the book. Its introduction is unceremonious—rather surprising considering its conspicuous absence up to this point—and emphasis is instead placed on the functions of chromatics in the upper tetrachord. Immediately following are melodies that incorporate unannounced rhythmic complexities, chromatics, and skips among chords that have not even been discussed in the context of the minor mode. Considering the fixed order of materials in this text, these omissions alone might cause an instructor to reject the book. But even more peculiarities of sequence follow. The dominant seventh chord is withheld until chapter 8, long after the introduction of some difficult chromaticism, such as the lowered sixth scale degree in the major mode, and after some advanced rhythmic figures, such as syncopation and triplets. Again, some instructors will find the delay problematic when coupled with the book's strict ordering. In addition, the alto and tenor clefs don't make their first appearances until chapter 10; instructors wishing to include them earlier would be forced to supplement the text.

To sum up the ordering of pitch materials in *Sight Singing Through Melodic Analysis*: at first they are restricted to the primary triads in the major mode, chromatics are then introduced, followed by the minor mode,

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dominant-seventh chord, c-clefs, modulation, and then modality. Instructors preferring that sequence of presentation and looking for a text that offers a structural view of sightsinging might consider *Sight Singing through Melodic Analysis*. For those seeking a structural view with another succession of events, this book is not likely to be adaptable enough to fill the bill.

Despite Bland's claim that "it may be coordinated effectively with a number of theory texts or approaches" (p. vi), the issues raised above bear heavily on the choice of text and approach. Certainly, a structural approach to harmony would parallel *Sight Singing through Melodic Analysis* most closely. Even so, consider the order of events in one structurally oriented text, Edward Aldwell and Carl Schachter's *Harmony and Voice Leading*.¹⁹ Aldwell and Schachter include fairly little chromaticism until long after the introduction of seventh chords, and the minor mode is presented almost immediately after the introduction of the major mode. Instructors might wonder how effectively Bland's sequence would coordinate with *Harmony and Voice Leading*.

Every example, exercise, and melody in *Sight Singing through Melodic Analysis* has been composed by the author. Bland gives no reasons for not including literature—strange behavior in a book claiming to associate itself with Heinrich Schenker. Indeed, Schenker himself railed against a contemporary harmony text for just such reasons: "What he [the student] is yearning to see, the confirmation of theoretical propositions in examples from the works of the great masters, he looks for in vain in this book."²⁰ Schenker could just as easily have been writing about *Sight Singing Through Melodic Analysis*.

Bland suggests no methods of solmization, but includes the usual list of guidelines for performance (i.e., attention to clef, key signature, tonic, etc.). Phrasing, tempi, and dynamics are indicated for every melody, but no glossary is included for the translation of foreign terms.

Although Leland D. Bland's *Sight Singing Through Melodic Analysis* follows a rather rigid sequence of events and contains exercises composed only by the author, its primary contribution lies in its unique emphasis on a structural approach to the discipline.

SUMMARY

Some other issues must be addressed with regard to sightsinging texts. One of these concerns binding. Berkowitz/Fontrier/Kraft, Ottman, and Benward all employ a comb binding, which allows a book to lie flat on a desk, music stand, or piano, and even permits the reader to fold it so that only one page is exposed. Benjamin/Horvit/Nelson is paperbound, whereas

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Bland is hardbound, and both of these books lie reasonably flat, although they are not as flexible as the other three. Benjamin/Horvit/Nelson's paper binding will probably not last as long as the others'. Certainly, Bland's hard cover will far outlast the others', but this may not be an issue for an undergraduate text; the hard cover thus seems excessive in terms of inflexibility and weight.

Another issue worth discussing is clarity of printing. In general, all of the publishers are to be commended for their clear, sharp printing of the music in these texts. Only Benward is slightly flawed in this area. The book is printed on somewhat shiny paper that tends to reflect under overhead lighting, and the symbols (especially accidentals) in some of the melodies are blurred to a small degree.

Still another issue involves the style of printing. Each of these texts uses its own consistent style of musical print. Even though this consistency is predictable and economically practical, it is probably not the best pedagogy at the college level. It would be a better idea to expose students to many styles of music printing during sightsinging. I have seen good students who have become comfortable with a particular sightsinging text crumble when presented with, for example, an older Breitkopf & Haertel part. I would therefore like to argue for inconsistency in the publication of sightsinging texts; a variety of typefaces would allow for the overt discussion of notational discrepancies and the covert acclimation to these various styles.

Instructors must also consider the inclusion of multiple-voice exercises in each of these texts. Bland is entirely monophonic. This restriction results from the author's emphasis on melodic reduction, but it eliminates the possibility of ensemble singing. Berkowitz/Fontrier/Kraft and Ottman include duets, but no larger ensembles (although the Ottman does include some three- and four-voice canons). Benward and Benjamin/Horvit/Nelson contain excerpts with up to four voices. Only Ottman and Benjamin/Horvit/Nelson include text to be sung with some of their excerpts (discounting the four exercises texted by the authors in Berkowitz/Fontrier/Kraft).

In conclusion, all of the texts seem to follow a similar sequence of events. Bland is perhaps the least flexible in that it prescribes and details a structural approach to sightsinging, and is thus appropriate for only those who subscribe to this approach. The others don't adopt any particular approach, and thus allow teachers to use these texts like anthologies, drawing from them to supply examples and exercises to fit their own approaches. However, only Ottman and Benward allow a certain amount of freedom to reorder their materials in order to meet the needs of various curricula.

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NOTES

¹I wish to express my gratitude to Robert Hurwitz and Robert Trotter (University of Oregon) and to Stephanie Hollick (Pennsylvania State University) for their valuable suggestions concerning this article.

²Benjamin, Thomas, Horvit, Michael and Nelson, Robert. *Music for Sight Singing* (Boston: Houghton Mifflin, 1984); Benward, Bruce. *Sightsinging Complete*, fourth edition (Dubuque: Wm. C. Brown, 1986); Berkowitz, Sol, Fontrier, Gabriel and Kraft, Leo. *A New Approach to Sight Singing*, third edition (New York: W. W. Norton, 1986); Bland, Leland D. *Sight Singing Through Melodic Analysis* (Chicago: Nelson-Hall, 1984); and Ottman, Robert. *Music for Sight Singing*, third edition (Englewood Cliffs: Prentice-Hall, 1986).

³Ottman, p. xvii.

⁴Benjamin, Horvit, and Nelson, p. xiii.

⁵Bland, p. v.

⁶Ottman, p. xvii.

⁷Benward, p. ix. This process, which Benward refers to as “aural imagery”, has been dubbed “audiation” by Edwin Gordon in *Learning Sequence and Patterns in Music*, revised edition (Chicago: GIA Publications, 1977), pp. 1-4. Gordon makes a strong case against the former term. His reservations include the lack of a verb form for “aural imagery”, and the implication that somehow images are involved. In its purest form, audiation is a completely aural experience: the mental creation or recall of sounds need not be tied to any visual images such as notation, or even shape. Indeed, audiation must at first take place separately from such visual clues in the process of music perception; in taking dictation, for example, one must be able to audiate musical material (remember it without regard to notation) before one may understand and finally notate it.

⁸Berkowitz, Fontrier, and Kraft, p. xi.

⁹Cf. Ottman, pp. 239-41.

¹⁰See, for example, melodies #1043 and #1047.

¹¹3rd edition, Englewood Cliffs, NJ: Prentice-Hall, 1983.

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¹²Benward, Bruce. *Sightsinging Complete*, third edition (Dubuque: Wm. C. Brown, 1980).

¹³See, for example, Shatzkin Merton, "Interval and Pitch Recognition In and Out of Immediate Context," *Journal of Research in Music Education* 29 (1981): 111-123; and Killam Rosemary N., Lorton, Paul V. Jr., and Schubert, Earl D. "Interval Recognition: Identification of Harmonic and Melodic Intervals," *Journal of Music Theory* 19 (1975): 212-234.

¹⁴Shatzkin, Merton. "Interval Recognition in Minimal Context," *Journal of Research in Music Education* 32 (1984): 6.

¹⁵Shatzkin, "Interval and Pitch Recognition," p. 112

¹⁶See, for example, Edlund, Lars. *Modus Novus* (Stockholm: AB Nordiska Musikforlaget/Edition Wilhelm Hansen, 1963).

¹⁷(Boston: Houghton Mifflin, 1979).

¹⁸3rd edition (New York: Holt, Rinehart and Winston, 1979).

¹⁹2 volumes (New York: Harcourt, Brace, Jovanovich, 1979).

²⁰Schenker, Heinrich. *Harmony*, translated by Elisabeth Mann Borgese, edited by Oswald Jonas (Chicago: The University of Chicago Press, 1954), p. 176.

COMPARATIVE ANALYTICAL SYSTEMS: A REVIEW OF THREE BOOKS

MICHAEL R. ROGERS

A long tradition of objective scrutiny of competing methodological approaches has existed in various disciplines such as literature and religion. The usual procedure has been to set contrasting (or sometimes merely distinct) value systems side by side for discussion of similarities and differences, strengths and weaknesses. Such a trend has recently evolved in music theory, too, among the current generation of British-trained theorists—particularly with regard to techniques and philosophies of music analysis.

Curiously, this trend does not yet appear to be widespread in this country. The fashion in the United States, instead, has taken a more partisan approach to analysis, often taking the form of strong—or even strident—advocacy of specific analytical procedures or biases while frequently ignoring alternate possibilities for dealing with particular compositions. This difference in the British and American attitude toward analysis can be seen in comparing representative theory journals from each continent. *Music Analysis*, the new (1982) publication from England, generally displays, in my opinion, a wider variety of topics and viewpoints and a greater tolerance for diversity of approach than corresponding journals from this country (e.g., *Journal of Music Theory* or *Music Theory Spectrum*).

This catholicity in attitude has been recently revealed in three new books dealing with comparative analytical systems, written in each case (not surprisingly) by British or British-trained theorists:

Nicholas Cook, *A Guide to Musical Analysis*, George Braziller, 1987.

Jonathan Dunsby and Arnold Whittall, *Music Analysis in Theory and Practice*, Yale University Press, 1988.

Ian Bent with William Drabkin, *Analysis*, W. W. Norton, 1987.

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Each book includes discussion of a broad array of varying approaches to musical analysis. In addition, each book sets up its comparisons in different ways, emphasizes (or downplays) particular topics in different combinations, and presents its material with a distinctive style and slant. In short, each book—in comparison to the others—displays its own biases and strengths and weaknesses much like individual analytical systems themselves.

COOK

I should express my own partiality at the outset for the “Cook book.” I like to call it that for two reasons. First, it has a winsome ring as a shorthand nickname and, more importantly, it symbolizes perhaps the book’s most conspicuous feature: it is cooking—bubbling, percolating, fermenting—with the interaction of ideas about analysis. The Cook book is, in fact, the product of an inventive mind and is a rich source of recipes for thinking about music.

The Cook book is divided into two large sections. Part One on “Analytical Methods” discusses and compares a variety of differing methods of musical analysis. Cook does not simply describe the approaches but examines the belief systems upon which they are based—those underlying tacit assumptions that color our notion of what analysis is and why we do it. The book, then, in a larger sense, is not just about different ways to do analysis but about what analysis itself can consist of. Changing analytical frameworks activates different motivations and imposes different filters on our cognitive and perceptual apparatus so that the goals and results of different systems can become drastically altered. Cook is interested—almost spellbound—by these deeper, more fundamental kinds of differences built into possible definitions of musical analysis. Various systems, according to Cook, are not necessarily better or worse, stronger or weaker, right or wrong, similar or contrasting, but are distinct and unique modes of thought and communication that call into play and grow out of particular attitudes toward the benefits and aims of listening, performing, thinking, composing, researching—and teaching.

The specific systems covered in Part One include traditional methods (of form and Roman-numeral analysis); Schenkerian analysis; psychological approaches (Reti and Meyer); set theory; semiotics; stylistic and ethnomusicological approaches; and a final perceptive summary called “What does musical analysis tell us?” It is in such large sections of probing introspection—a whole chapter on the topic—that the Cook book distinguishes itself from its rivals.

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Part Two ("Worked Examples of Analysis") is in effect practically all this type of reflective journeying as Cook leads the reader through a series of analytical stages (a chapter on "Starting an Analysis" including Schumann, "Auf einer Burg" from *Liederkreis*; Canticle: Song of Simeon; and Britten, "Pan" from *Six Metamorphoses after Ovid*) and then through particular kinds of pieces: sonata form (Beethoven, Piano Sonata, Op. 49, No 2, first movement; String Quartet, Op. 18, No. 2, first movement; Symphony No. 5, first movement; Berlioz, *Symphonie Fantastique*, first movement); serial works (Webern, Piano Piece, Op. posth.; Piano Variations, first movement; Stravinsky, *Movements* for piano and orchestra, No. 4; Schoenberg, Piano Piece, Op. 33a); and finally some problem compositions (ones that don't reveal coherence easily through any specific unified analytical approach such as Chopin, *Polonaise-Fantasia*; Schoenberg, *Six Little Pieces*, Op. 19, No. 3; Stockhausen, *Klavierstück III, Stimmung*). The effect of reading this material in Part Two, for me, was one of overhearing the thinking process of a master teacher sharing the harvest of his sensitive musical mind and ear. What Cook stresses are not necessarily just final results but the interpretive filters through which sounds and ideas need to be passed for a meaningful analysis to be possible. We learn from his approach not just about the piece under inspection, but about how to apply similar principles to other compositions; this, of course, is exactly what good teaching consists of.

Just what are Cook's suppositions, beliefs, and insights about analysis itself and about the actions that produce it? Cook's strongest prejudice is against "the tendency for analysis to turn into a quasi-scientific discipline in its own right, essentially independent of the practical concerns of musical performance, composition or education" (p. 3). Cook's interest in analysis is not just in describing the technical activity but also in bringing to light the communicative power of music—its ability to move people profoundly through manipulation of precise pitches, durations, timbres, and dynamics. Cook believes that "when you analyze a piece of music you are in effect recreating it for yourself; you end up with the same sense of possession that a composer feels for a piece he has written . . . you develop a kind of intimacy . . . a vivid sense of communicating directly with the masters of the past, which can be one of the most exhilarating experiences that music has to offer" (p. 1).

Cook says that analysis is best done by asking apt questions, dividing a piece into appropriate constituent components, judging the importance of the various relationships between and among components, and deriving the musical effect of all this in varying contexts. Analysis, then, should discover how a piece works. The challenge, of course, is not simply to do the required work for these steps but to properly interpret the significance

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and appropriateness of the various options and results along the way. Cook continues by saying:

It's difficult to imagine that there could be an analytical method that didn't ask questions about these things—about division into sections, about the importance of different relationships, and about the influence of context. But in spite of such unity of purpose, the various methods of analysis are frequently pursued in isolation from each other or, what is worse, in acrimonious rivalry with each other. As often as not an analyst will adopt one method and ignore or denigrate the others: so that you get the motivic analyst, the Schenkerian analyst, the semiotic analyst and so forth. Each applies his particular method to whatever music comes his way, and at its worst the result is the musical equivalent of a sausage machine: whatever goes in comes out neatly packaged and looking just the same. This especially happens when the analyst has come to believe that the purpose of a piece of music is to prove the validity of his analytical method, rather than the purpose of the analytical method being to illuminate the music: in other words, when he has become more interested in the theory than in its practical application. . . . you only have to look through today's specialist analytical journals to realize what a high premium is generally put on the formulation of increasingly precise and sophisticated analytical methods more or less as an end in itself. Over the last twenty years musical analysis has become professionalized: it has become to a large degree the preserve of music analysts rather than, simply, of musicians who happen to analyze (pp. 2-3).

The importance of the practical application of analysis—relevance to composition, performance, listening, teaching—runs like a thread throughout the book. Cook's awareness of the pitfalls and difficulties of the analytical process is in evidence throughout as well:

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... you can't fully understand... music just in terms of how it is heard. You also have to understand... the musical thinking that gave rise to it, and of course it is the job of analysis to uncover what this musical thinking was. This means that music as it appears to the listener and music as it appears to the analyst may not necessarily be quite the same thing. The relationship between the two is one of the most problematic issues in the whole business of musical analysis... (pp. 15-16).

Sometimes the problem is not that a methodology is too weak, but that it's too powerful under certain conditions. The over-precision of Roman-numeral analysis, for example, is acknowledged for passages where tonality is ambiguous or may not have emerged yet: "To assign them [Roman numerals] you already need to have decided on the key, whereas the listener may have made no such decision. This is an example of one of the dangers of Roman letters, which is that they tempt you to say more about the music than you actually mean to" (p. 22).

Schenkerian analysis, for Cook, is one of the most potent analytical tools available for producing *musical* results because when done correctly (i.e., carefully taking into account the significance and relationship of harmonic and rhythmic events), it forces one to think and listen *musically*. Cook's presentation of this system, though, is a balanced one since he is quite willing to share his concerns about grandiose and inexact claims that are sometimes made by fervent advocates and also willing to share his own personal frustrations about paradoxical loops of meaning and definition that often emerge when sorting out one's own thinking:

These are psychological questions [about whether a given pitch is structural or embellishing]: that is, they have to be answered by deciding what one hears in the music and not by staring hard at the score. But the whole idea of deciding 'what one hears' is problematical. After all, I can 'hear' the most preposterous analytical relationships if I choose to; it is a question of deciding what I want to hear. Certainly, I *do* hear the music as directed—it sounds quite different played backwards!—but I *can* hear bars 8-11 as either prolonging a 4 or a 3; I can even alternate between the two. Hence the claim Schenkerian analysts tend to make that their analyses explain in detail just how listeners do, in fact, hear music is really rather dubious. There are two

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points here. First, if Schenkerian analysis explained how people normally hear music, why would it be necessary to learn a new way of hearing music in order to do Schenkerian analysis? (Ever since the publication of Felix Salzer's *Structural Hearing* there has been a lot of emphasis on Schenkerian analysis being a 'way of hearing', a type of analysis that can be done directly from musical sound, given sufficient training). Second, there are a number of difficulties which Eugene Narmour has emphasized and which have to do with the perceptibility of the fundamental structure. I said earlier that you cannot determine what the primary tone is at the beginning of a piece (or even if there is a primary tone at the beginning of it) by considering the beginning in isolation: it is a matter of its relation to the piece as a whole and particularly to the end—that is why I recommended working backwards. But listeners do not work backwards. They cannot know the answer to this question except in retrospect; and the same applies to obligatory register too. In these ways, and more generally in its tendency to ignore ambiguities whereby a given foreground event might be interpreted in different ways, Schenkerian analysis is not a truly credible model of the way listeners normally experience music (p. 57).

In another section Cook defines formal approaches to musical analysis as "any kind of analysis that involves coding music into symbols and deducing the musical structure from the pattern these symbols make" (p. 116). In describing formal approaches Cook says:

. . . whereas Schenkerian analysis uses the *experience* of music as its raw material, formal analysis quite literally analyzes the score. It does so for what formal analysts consider a very good reason, which is that we can make precise and objective statements about musical scores whereas we can only talk about our experience of music in an imprecise and subjective manner. (Boretz makes fun of analytical methods based on concepts such as expectation and surprise by asking what reason we have for considering these reactions more significant than those of another listener who goes to sleep.) (p. 123).

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Cook is fond of making subtle distinctions between analytical activities that are often confused, blurred together, or simply never distinguished because the differences are not noticed; for example, contrasts between: a) intuitive judgements vs. techniques that look very scientific and objective (but may not be); b) structures within individual pieces vs. relations between different pieces (i.e., analysis of musical style); c) discovery *about* music (e.g., historical style) vs. *musical* discovery (something that makes us hear the music differently); d) compositional process (ciphers and secret codes) vs. attending to what you hear; e) using a composition to illuminate a theory vs. using a theory to illuminate a composition (Cook's clear preference).

Some particularly revelatory points are made in the chapter on what analysis can tell us—points that remind us of the frailty of our knowledge and assumptions about the most basic building blocks of music composition, music notation, performance, and listening:

All the principal types of musical analysis . . . are expressed primarily in terms of interval classes such as minor seconds and perfect fifths, whether these are coded graphically, verbally or numerically. But do these interval classes have any psychological reality for the listener? It appears not. This is because, psychologically speaking, there are far more intervallic categories than musical analysts have terms for. Every half decent violinist or singer bends or stretches his minor seconds to different sizes according to the musical context, and all his other intervals too; and he does this not because he has some theory about them, but simply because if he does not do it, the music sounds wrong. A string quartet playing Beethoven or Bartók in strict equal temperament—if such a feat could be managed—would sound intolerable even to the most naive ear. What musicians play and what listeners respond to, then, is not 'minor seconds' but an indefinite number of varying intervals all of which we normally class either in a single pigeonhole (if we are thinking in terms of equal temperament) or in one of two pigeonholes (if we are respecting enharmonic distinctions, say between E-E^b and E-D[#]).

You may say, what about pianos? But the fact that pianos are tuned in equal temperament does not mean people actually hear each minor second as being the same size in a given musical context. The interval between C and

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F# on a piano, if you think of them as part of a dominant seventh on D, sounds quite different from the same notes as part of a dominant seventh on A^b; the physical sound is the same, but the psychological response is not.

Now there is nothing wrong with pigeonholes, but we have to remember they are of our own making. The one or two pigeonholes marked 'minor second' do not belong to the psychology of musical perception; they are artifices of musical notation. And useful though pigeonholes of musical notation are for things like performance and memorization, they will not do as the basis of scientific research into how listeners perceive musical intervals. They are simply too broad: they muddle any number of responses together, so that it would be quite impossible to work out what the factors governing these responses might be. Any meaningful work in this area would have to be done on the basis of a far more detailed way of representing musical sound than conventional notation allows. . . .

. . . when musicians use the notation for the purposes it is intended for—when, that is, they *read* it—they supply a great deal of information which is not actually in the score. For example a violinist does not play the notes of the score in the same way that a touch typist types what she (or he) sees. Instead he (or she) reads the notation as music, and his performance is an interpretation of the music as he understands it: an interpretation in which intervals, rhythms and dynamics are given what seem to the performer to be appropriate values. They are not simply executed as a series of instructions in terms of equal-tempered intervals, arithmetically-related durations, and a scale of eight dynamic levels from pianissimo to fortissimo. Consequently when a composer writes down music he is relying heavily on the reader's musical ear and imagination in supplying the precise intervallic, rhythmic and dynamic values that the notation omits, just as he has to contribute sonorous, dramatic and emotional values that cannot possibly be specified in the score.

But none of this happens if you make a strictly 'scientific' analysis of a score—analyzing the distribution of notated intervals in terms of set theory, say, or by means of statistical comparisons. When you do this, you are analyzing the score without actually *reading* it in the sense I have described. This is the musical equivalent of trying to

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analyze Shakespeare by counting the letters on the page and working out the principles governing their distribution. And whereas counting notes or letters can have some applications in the area of comparative stylistics . . . it certainly does not allow you to make musical sense of pieces of music or literary sense of pieces of literature. Consequently, if you analyze a given composition this way, your analysis may be scientific in the sense of having an explicit methodology, but it will not be at all scientific in the sense of having any meaningful or predictable relationship to the music's physical or psychological reality—that is, to the noise it makes or the effect it has on people. Indeed, the more strictly deductive your analysis of the score is, the more directly will it be conditioned by the particular cultural and pragmatic assumptions built into the notation and the less bearing it will have upon the music you actually wanted to find out about.

Now all this may sound like a wholesale indictment of musical analysis as it is generally practised: are not just about all the techniques of analysis I have discussed based on scores? Yes: but it does not necessarily follow from that that they are analyses *of* scores. It is true that a Schenkerian analysis, say, looks as if it were an analysis of the score. But in fact it is not. Rather it is using the score as a convenient, and tolerably adequate, way of talking about the real topic of musical analysis, which is the analyst's (and hopefully his reader's) experience of the music. And investigating the way you experience a piece of music is not something that can be done by means of formal deduction; nobody can prove your statements about what you experience to be right or wrong, true or untrue. However, this does not mean that self-interrogation, which is what I think analysis basically is, has to be an exercise in uncontrolled subjectivity in which anything goes and nothing is ever correct or incorrect, better or worse. Doing a Schenkerian analysis is liked being asked a series of leading questions: at every point you have to say: 'Is this what I hear? Is it what I want to hear?' And though questions like this may have no scientific validity, the responses to which they give rise can certainly be musically valid or invalid. Doing a Schenkerian analysis is like composing in this sense, if no other: you actually have to be musical in order to understand what it is all about (pp. 224-228).

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In Part Two, Cook outlines some general first steps to initiate an analysis: hear the music; observe initial responses to it; notice large-scale repetitions, motivic connections, points of high tension or release, structural breaks, the most striking feature, movement toward goals, etc. These are intended just to get deeper into the music where issues of greater import can be addressed. His basic premise seems to be: "The way we experience a given section of a piece of music depends on the role that section has within the piece as a whole. And that makes a useful definition of what musical analysis is" (p. 259).

A detailed chapter on analyzing pieces in sonata form proposes an analogy between music and the kind of narrative drive found in drama, literature, and opera:

A traditional form, like the sonata, consists essentially of a set of expectations listeners have when hearing a piece. In a sonata the listener expects there to be a move away from the opening tonality to another, and later on a return to the opening tonality. He expects these tonalities to be presented as opposed forces, the opposition between them creating a tension that is resolved in the final return to the home key. And he expects this tonal drama to be projected and clarified by the musical surface with its themes, cadential passages, repetitions and caesuras. In other words a sonata is a kind of plot, functioning rather analogously to the stories on which ancient Greek plays were based—stories that the audience knew beforehand, so that what they were interested in was not *what* the play presented but *how* it was presented. Analyzing a sonata as a sonata, then, means analyzing it in the light of the expectations a contemporary listener might have been assumed to have (p. 262).

Analysis of serial works often overlooks, according to Cook, features that are common to pieces of music in general:

I have carried out tests in which musically qualified listeners made detailed observations of the first movement of Webern's Symphony without becoming aware of its being serially structured at all—simply because they had not been asked to listen out for a serial structure! And the

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observations these listeners did make were the sort of observations that could have been made about many non-serial pieces—of tensional shapes, developmental processes, effects of finality and so forth. It is clear that basic categories of musical experience such as these are as applicable to serial as to non-serial music. And this means that if what you are interested in is how a given piece of serial music is experienced, then its serial structure can only be the starting point for your analysis. As with sonata form, the important thing is not the structure as such, but the use the particular piece you are analyzing makes of that structure (pp. 295-96)

Many of the ideas in this book are expressed in a pithy, common-sense, direct style reminiscent of aphorisms: "If we want to understand phrase structure . . . we should consider the way people actually play the music, which is just as valid a source of information as the score" (p. 310); "Essentially there are two analytical acts: the act of *omission* and the act of *relation*" (p. 16); "Analyzing a piece of music means simplifying it in such a way that it continues to make some kind of sense in its simplified version" (p. 370); " . . . an analysis should not aim to be a carbon-copy of the listener's experience: rather it should simplify, clarify and illuminate it" (p. 229).

A final, and telling, point about readability grows out of these numerous quotes (and, of course, out of reading the whole book): this work is extremely user friendly. The writing style is compelling, forceful, filled with vivid analogies, and even witty—all traits in uncommon supply these days in much scholarly writing about music. I often felt pulled to read on just to see what additional points would be made about an analytical style, problem, or a given piece. In this regard the Cook book persuades us that exciting topics are being discussed in a stimulating way—much like Stephen Gould in writing about science.

Many books that present such a clear exposition of a complex topic do so at the expense of detail and depth. This book, though, never seems watered down. Remarkably, the opposite happens: through allegiance to a lucid writing style (aka thinking style), often hidden pathways are uncovered rather than bypassed. It is to Cook's credit that such a large number of tangential issues can be explored without the book seeming to get off track. Like a good Schenkerian reduction, the relationship between embellishment of key issues and the larger framework is not lost; focus is never sacrificed for elaboration. More importantly, all of these "extra" topics add up to something worthwhile and thought provoking. I would

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have trouble recalling another single music book about analysis that has made me feel so stretched. Almost every page contains a jolt. [I will anticipate with great relish two forthcoming additional books by Cook on related issues: *Musical Analysis and the Listener*, New York: Garland, 1989; and *Music, Imagination, and Culture*, Oxford University Press, 1989.]

In addition, Cook should be commended for a gratifying mix of objective description of the analytical systems themselves and subjective interpretation of their faults and values. The context always makes evident which is which. Beyond its obvious worth as a source of information about musical analysis and a catalyst for re-examining one's own belief system, Cook's book might also be considered as a model and reminder for graduate students and young scholars (maybe even old!) that writing about analysis and perceptive listening—they are almost inseparable here—need not be ponderous and labyrinthine.

DUNSBY/WHITTALL

Music Analysis in Theory and Practice covers similar ground compared to Cook. It is basically an overview of analytical systems in current usage: Schenker, Meyer, set theory, etc. The emphasis, however, is more on describing the features, goals, and assumptions of the individual systems than on comparing or interpreting them. The organization divides the book into four sections: Part I (a brief, but useful, introductory survey of historical background information on analysis); Part II: Aspects of Tonal Analysis; Part III: The Elements of Atonality; and Part IV: From Means to Meaning: Analysis and the Theory of Signs (a study of semiotics).

The nine chapters of Part III (on both free and serialized non-tonal situations) are especially detailed and thorough, providing perhaps a greater variety of different ways to make sense of atonal compositions than would be found in Cook. This part, I feel, is the strongest section of the book and one of special value for students since the emphasis is on supplying a large menu of options for different kinds of pieces or for different possibilities within the same piece.

Another useful section is the large (although not exhaustive) bibliography, which includes most major books and journal articles on analysis. Surprisingly, the Cook book contains no such similar listing although frequent reference is made both within the text and in footnotes to many of the important writings in the field. Cook, in fact, appears to be familiar with just about every source of information about analysis that could be imagined so a bibliography could have been constructed with ease.

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The main difference between Dunsby and Cook has to do more with style and emphasis than subject matter. While well written and articulate, Dunsby is more dry and matter-of-fact and reads like a graduate textbook—i.e., it lacks some of the flair and warm personal style that makes the Cook book so attractive and inviting. Controversies are often mentioned in passing by Dunsby but not always thoroughly explained, whereas in Cook the controversies often turn into the real meat of a chapter. Missing from Dunsby are the frequent and intriguing asides on aesthetics and musical perception found in Cook. *Music Analysis* reports the facts while Cook grapples with questions and problems.

BENT

This book is a revised and expanded version of the article on “Analysis” in the *New Grove Dictionary*. The scope and intent of this book is somewhat different than either the Cook or Dunsby. It focuses on a historical overview of the evolution of musical analysis rather than on current methods of *doing* analysis. Consequently it treats a much larger number of topics and theorists but each in less detail. Its strengths are measuring influences and establishing contexts within which systems exist. Expansions in the book (compared with the original lengthy article) include developments since 1975, Renaissance diminution theory, figured bass and harmonic theory, 19th-century theory, and set-theory analysis.

Additional enlargements involve updating, expanding, correcting, and rearranging (alphabetical rather than chronological) the bibliography, which is now even more impressive and comprehensive (33 pages). The most important and largest new element is an extensive glossary by William Drabkin (also 33 pages) of terms in current analytical usage (especially ones associated with Schenkerian analysis). Historical or standard items (like cadence) are omitted.

SUMMARY

All three books now seem, to me, indispensable for teaching any kind of graduate analysis course in comparative methodologies or techniques, although the Bent has an additional role to play as part of a history of theory class. Each one would not necessarily need to be a required text, but knowledge of the different issues raised in each would need to be part of the background that a thoroughly prepared teacher would bring to such a class. For an analysis course in a specific technique (such as Schenkerian reduc-

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tions or set theory) there are, of course, numerous specialty books available for texts, required reading assignments, or teacher preparation.

However, for studying analysis in a larger sense (i.e., as a topic in its own right: its definition, purpose, assumptions, goals, meanings, the different results achieved by doing it different ways), these three books under review are exemplary. It's lucky all three are so well done and useful because no others like them even exist. I find it notable, too, that while covering similar territory and overlapping one another (sometimes in strange configurations), they each contain ideas and facts not found in the others. And it's remarkable also that all three would appear at about the same time after such an extended dearth of material using these comparative approaches (under one cover anyway). Much of the information contained in these books can be found scattered in hundreds of isolated sources. The real accomplishment in each case is the creation of a conceptual framework for it all to exist within a single volume while blending together original interpretations at the same time. These books, both individually and collectively, set a high standard for those who may wish to continue advancing our understanding of the relationships between means and ends in musical analysis.

BARTON K. BARTLE, *COMPUTER SOFTWARE IN MUSIC AND MUSIC EDUCATION*
(Scarecrow Press, 1987)

Charles G. Boody

The impact of microcomputers has reached everywhere in society, and certainly the field of music is no exception. Some of the first programs for microcomputers were intended to be useful in producing music. Several programs allowing a user to write single-line tunes and play them back were available for the Apple II before the end of 1977, the year of its introduction. Nothing has been the same since.

Both computer and music hardware are constantly developing. The greatest impact on music has been the advent of MIDI specification. MIDI (Musical Instrument Digital Interface) is a combination of hardware specifications and communications protocols that allow communication among all sorts of different musical and computational devices. It might best be likened to the standardization of the gauge of railways throughout the country. Without such standardization nothing can go forward; with it a great deal can happen.

Software is also developing very rapidly. Some music teachers have been bitten by the programming bug and have produced programs for use by their students. Some programmers have been fascinated by music and have developed programs to help themselves and their friends learn more about music. Occasionally musicians and computer experts have collaborated to attempt large-scale development of music programs. The amount of software is a bit staggering. The newly released Courseware Directory of the Association for Technology in Music Instruction lists over 600 items, and it was out of date the day it appeared.

Barton Bartle's book is a welcome effort to make some sort of sense out of the technology for those just getting involved with it. It attempts to review much of the material published up its' publication date of 1987. No book can be expected to be complete and fully up to date in such a rapidly changing field, but it seems reasonable to assume that any book advertising itself as a guide should be expected to provide a well-rounded examination of most of the important efforts underway at the time the book went to press. The contents were examined with this assumption in mind.

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The writer of such a guide must have rather broad ranging skills, and must be willing to go to considerable effort to make sure that the work is useful. S/he must, for example, have access to all of the commonly used computer systems, must be conversant with the strengths and weakness of those systems so that one does not mistake computer limitation for software limitations, must be familiar with music and music education so that usefulness of the software can be ascertained, and must be familiar with the fundamentals of computer-based instruction so the quality of the software can be judged against what can be done. In addition, as with any such bibliographic project, the writer must be tireless in the effort to see that the materials are complete and accurate and to insure that reviews of the various items are consistent. If one or another of the skills is missing, the book will be considerably less useful and may, despite the author's best efforts, misguide rather than inform the reader.

This book begins with an introductory outline of the history of the field, and an overview of the different sections of the book. This introduction serves also to describe the methodology used in the reviews of software that make up the bulk of the book (229 of the 252 pages). Following the reviews are appendices listing computer manufacturers, peripheral manufacturers, software publishers, a bibliography of sources of information, and listings of the software according to the publishers' suggested audience and according to the computer for which the programs are designed. These appendices will be helpful even when the contents of the book are dated, for they include many other sources to which a new user may turn for information.

One can approach a bibliography like this in two ways: by asking what is missing, or by asking how well the materials included have been covered. In the first instance one should not seek to determine if the bibliography is complete (unless, of course, it claims to be and this book does not). Rather, one must ask if there is material missing that makes the bibliography off balance, or that shows bias or lack of knowledge on the part of the writer and makes one doubt his/her grasp of the field or suspect a deliberate slant. In the second instance, the question is twofold: is the material consistently examined, and does the information included indicate that the writer has the skills to fulfill the function of a reviewer. In this day of word processors it is very simple to produce a book. It is as difficult as ever, however, to accumulate the knowledge to do so well.

First the question of missing information: the book seems quite uneven. Materials describing the Soundchaser™ music system of Passport design are quite well covered even though the product was dropped from the market in 1986. Macintosh computers have been the "machine of choice" for many in the pop music field, and there are several exciting

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products for music education on that machine, yet no Macintosh materials are discussed (editor's note: see the Spring 1988 issue of JMTP for a thorough review of current Macintosh music theory software). IBM has become a much more important computer to music educators through the release of the GUIDO materials from the University of Delaware and through the extensive series of educational software packages marketed by the Roland Corporation. None of these items are discussed. The "new generation" of computers that immediately followed the Apple Macintosh from Commodore and Atari are not mentioned. No computer that reached that market after 1984 appears to be discussed. An entire new generation of hardware is ignored. The importance of MIDI is recognized by the author but there is little attention to the software that has been developed to use MIDI. The early sequencer from the Soundchaser™ (Four Track) is discussed as is the early transcriber package for the Soundchaser (Polywriter), but none of the many newer and more powerful sequencers and notators for use with MIDI equipment are mentioned. If the author felt such programs were outside the scope of the bibliography, that could have been made clear by a different title or by discussion in the introduction. The MIDI developments are having considerable impact on how we think about and teach music; probably more impact than the tutorial and drill and practice software. Software that uses MIDI should be included in any computer and music bibliography that presumes to be a guide. Perhaps the book simply languished at the publisher too long to be current in these matters. However, many of the pieces of software discussed have publication dates of 1986, and many of the missing items predate that—and so do many of the missing machines.

The book shows a similar unevenness when the quality and consistency of the reviewing are examined. Bartle has been careful to be consistent in the general outline of each review, but often the materials included in the reviews seem rather unimportant, or the things mentioned are misleading. Several examples should suffice to make this unevenness clear.

First, it is well known that the sound produced by the Apple speaker leaves a great deal to be desired. It is equally well known that by bringing the sound out to an external speaker the quality of the sound can be greatly improved, though that is not discussed. Bartle repeatedly points out the problem with the Apple sound as part of the review of software he examined on the Apple. A general comment might better be stated once in the discussion of the hardware, leaving space for more insightful matters in the software reviews. Further, that sort of comment can be quite misleading when the software is available for more than one machine. Pieces of software available for many machines often get widely differing comments about the acceptability of the sound "they" produce; apparently because

Bartle reviewed them on different machines. Such comments really have no place in the discussion of the software at all; they belong in the discussion of the hardware. And, in that context, one would do well to recognize that the sound of the Apple speaker (or the IBM speaker) can be useful for much ear training rather than rejecting both out of hand.

Second, some repeated comments serve to show a lack of understanding about the history of much of this software. Bartle repeatedly complains about Apple software that does not remind the user to depress the caps-lock key and does not work properly without the caps-lock key depressed. It is quite understandable that some software and documentation does not mention this problem. When the Apple II was first produced it did not have upper and lower case letter available. There was, in fact, no caps-key available or needed. It is certainly appropriate that Bartle makes notice of this problem, but the repeated litany of "Both the documentation and the instructions within the program neglect to warn the Apple IIe user that the <CAPS LOCK> KEY MUST be depressed throughout the program in order to make and responses" is not necessary. It does not seem appropriate that the word "neglect" be applied at all. Recognition of the historical circumstance and discussion of the problem in the section on hardware would be more suitable.

Third, Bartle mentions various sound boards in his hardware discussions, but he mistakenly applies the term DAC board to all of them, and he implies that many are available for all of the brands of computers. Actually, all of the boards he discusses except the University of Delaware sound card are for the Apple II series of computers. The University of Delaware board is for the IBM. Further, only the Mountain Computer board (no longer produced), the MMI DAC board (now quite obsolete in sound capabilities), and the University of Delaware board are DAC boards. DAC stands for Digital to Analog Conversion. Sound is produced by turning a series of numbers into a series of voltages to push a speaker back and forth. The procedure is exactly the same as that used for compact discs, though at a much lower level of fidelity and with much more noise. The remaining boards that Bartle discusses all produce their sounds by subdividing a rapid square wave. They, and the sounds of the Commodore 64 and 128, share the limited timbral qualities of the Apple II and IBM systems. Neither of these errors is a major one, but it does make one less confident of the reviewer's knowledge. A more important issue not mentioned in the discussion of sound devices is that of pitch accuracy. The IBM speaker, the Commodore 64 and 128, and the ALF 3 voice card produce pitches that deviate less than 2 cents from equal-tempered scales based on A-440. The ALF MC16, the Mockingboard, and the Applied Engineering Board (which Bartle does not mention) all begin to deviate quite drastically from standard pitch at about

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A-880. The MMI DAC board has good pitch accuracy possible, but the software has (or had—the programs may have been changed) an error that produced some fairly wide deviations from accurate tuning in a rather inconsistent manner. Programs using the Apple speaker must be evaluated separately for each seems to use a different software routine to produce the pitches. Accurate pitch is possible, but is seldom attained. The advent of MIDI makes all of this discussion somewhat moot, but it is relevant to software using these devices, and the reviewer should mention the problem, particularly of Apple software.

By now, the reader must think I feel Bartle's book is not worthy of attention. This is not so. Bartle has done a real service in bringing together reviews of much of the music education software, and attempting to describe and critically analyze that software. If readers will realize the work is somewhat inconsistent in treatment of the software and is by no means complete they can gain from it. To date it is the only attempt I have seen to discuss all of this software. Dr. Fred Hofstetter, of the University of Delaware, has undertaken a similar project, but that book was not yet available at the time of this review. Because Bartle's book is unique, it can serve as a useful starting point for getting acquainted with the field. The book, together with the Association for Technology in Music Instruction Courseware Directory, would give a reasonably complete overview of the music education software currently available. However, the book cannot stand alone as a single source and it should not be viewed as a final authority.

REPORT ON THE FIRST INSTITUTE FOR MUSIC THEORY PEDAGOGY STUDIES

ROGER E. FOLTZ

GARY WITTLICH

The Institute for Music Theory Pedagogy Studies sponsored by the College Music Society was conducted in Boulder, Colorado, June 12-18, 1988, and was hosted by the College of Music of the University of Colorado. The Institute was founded by Roger E. Foltz, University of Nebraska at Omaha and Gary Wittlich, Indiana University. Faculty for the Institute consisted of W. Kenton Bales, University of Nebraska at Omaha; Ann K. Blombach, The Ohio State University; Dorothy Payne, University of Connecticut; Mary Wennerstrom, Indiana University; Allen Winold, Indiana University; and Gary Wittlich. Roger Foltz served as Director of the Institute.

The Institute was organized around the theme "Materials, Strategies, and Relevancy for the College Teacher" to reflect the great amount of interest and activity in the development and restructuring of the undergraduate music theory curriculum during the past twenty-five years. The interest in curricular change has resulted in the theory teacher being confronted with a vast array of textbooks and pedagogical approaches, not to mention the many advancements in technology that have found their way into the theory classroom. As the initial announcement of the Institute indicated, "... this is an exciting time, but one in which it is difficult to keep up with the changes necessary to develop and implement effective theory curricula. . . ." It was with this thought in mind that the Institute was structured.

The Institute was divided into the following areas: skills teaching, including music fundamentals, drills, and the application of technology; demonstrations of analysis, including traditional tonal and twentieth-century music; curriculum design; various aspects of electronic technology; and student evaluation and testing. To each of these topics approximately one day was devoted. In addition, sessions were established during the

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evening and noon hours to acquaint participants with a variety of computer hardware and software. These sessions consisted of presentations by the faculty with a variety of different formats whereby participants could discuss ideas with mutual problems related to the topic at hand.

At the conclusion of the week an evaluation was administered over the Institute. Of those who responded, 84% indicated that they would attend a future Theory Pedagogy Institute sponsored by the College Music Society if different topic areas were covered. This response, along with numerous positive remarks throughout the week, led all to believe that a worthwhile experience had been achieved.

There were 102 registrants representing conservatories, colleges, and universities throughout the United States and Canada. Of the group, 27 had been teaching theory at the college level 1-5 years; 18 for 6-10 years; 15 for 11-15 years; 16 for 16-20 years; 19 for 21-25 years; and 7 had been teaching music theory 26 or more years. Approximately half of the individuals received their advanced degrees in theory or theory and composition with the remaining having completed their advanced degrees in various areas, including conducting, performance, musicology, and administration. When asked how the participants identified themselves in relation to their teaching responsibilities, the following responses were given: theorists 17%, theorist/composer 19%, theorist/musicologist 2%, theorist/performer 39%, theorist/music educator 8%, and 15% indicated another designation. With regard to size of institution in which they taught, the following was reported: more than 400 music majors, 7.5%; 100-400 majors, 35%; 50-100 majors, 21.3% and, less than 50 majors, 36.2%. In terms of their experience with computer-assisted instruction (CAI), there was a wide range of expertise ranging from the novice to some who had done extensive programming. While this assemblage of theory teachers does not necessarily comprise a statistical representation of theory teachers across the country, the group did appear to represent a rather diverse cross section, as shown by the above figures relating to years of teaching experience, educational background, size of music program, and diversity of teaching focuses.

In reviewing the week, some issues surfaced that participants, as well as faculty, felt needed to be addressed. One of the first concerns that emerged was the incorporation of technology into the music theory curriculum. As stated earlier there was a wide range of experience dealing with CAI, and yet regardless of the expertise one had attained, the majority seemed to be concerned with the role technology will play in the theory curriculum in the years to come. Questions were raised about the types of

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computers in which to invest, as well as how to integrate CAI into the curriculum. The faculty and a majority of the more experienced participants cautioned that CAI should not be viewed in any sense as a replacement of any facet of the theory sequence but rather as an enhancement of instruction. While questions were more numerous than conclusions, many found it comforting that other colleagues across the country shared some of the same concerns regarding technology.

Throughout the week there were discussions relating to overall curricular concerns. Some of the issues dealt with specific aspects of coursework, such as use of fixed "do," movable "do," scale-degree numbers, and neutral syllables for sightsinging. Thoughts were also expressed as to the integration of sightsinging and ear training, as well as the incorporation of keyboard harmony into the theory sequence. While these and many other such issues have long been debated, many found it helpful to undertake these discussions again, thereby gaining new insights into these perennial problems.

Discussion was also given to the evaluation of sightsinging and ear training. At one juncture during the Institute, three of the faculty performed a sightsinging example for participants to evaluate. They carefully rehearsed their respective errors and the manner in which they would sing a musical example, and they intended to demonstrate "obvious" differences of achievement among the three performances of the same melody. After the performances took place and discussion was undertaken, it became clear to all that many factors are taken into account when evaluating sightsinging and that there is no universal agreement on the ranking of these various criteria. Similar exercises were also undertaken in melodic dictation and comparable differences of opinions were found as well.

In the analysis sessions, once again the various presentations generated a number of questions. Topics relating to analysis in the undergraduate theory sequence that were discussed included the following: when in the curriculum do you use short examples versus entire movements of pieces? Should analysis examples be confined to excerpts from piano literature and/or piano reductions of orchestral scores, or should students be confronted with full scores at an early point? What proportion of the undergraduate theory sequence should be devoted to literature of the common-practice period, and what portion should be devoted to twentieth-century literature? And, finally, how much exposure to how many various analytical techniques should be given, and what is the appropriate depth of exposure during the undergraduate theory core? Once again, profitable, although not necessarily conclusive, discussion took place with some near consensus of thinking in a few areas.

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Based on the success of the first Institute that took place in 1988, we decided to hold a second Institute with a different theme. For this second institute the focus will be centered on the problems of undergraduate theory instruction, with an emphasis on relating music theory and performance. The Institute for Music Theory Pedagogy Studies II will be held June 11-16, 1989 on the campus of the University of Colorado and will be hosted by the College of Music. For further information regarding the next Institute, please contact:

The College Music Society
1444 Fifteenth Street
Boulder, CO 80302
(303) 449-1611

Reader's Response

WHAT IS AN INTERVAL?

Dear Editor:

I write for two reasons: first to praise the truly provocative and valuable Spring 1988 JMTP that focuses on teaching aural skills; and second to remind readers of an issue that lurks in the shadows of the excellent study of interval identification made by Ann Blombach and Regina Parrish. I refer to the anomalies that haunt our perspective of pitch intervals and the harum-scarum way we apply that shaky perspective in teaching young musicians. It is an issue that has been around implicitly since musicians first speculated about the relationship of one pitch to another, yet it occurs to me that the superior kind of empiricism exhibited in the article need not continue to lead us down blind alleys.

One of the major conclusions of the Blombach-Parrish study leaves us with more questions than answers, more frustration than enlightenment. As they appropriately observe, the results of their study "challenge the validity of some of our most basic aural-training assumptions and raise a question that most musician-teachers have not even considered."

The authors are led to this conclusion because rational interpretations of their data are hard to come by. Their careful hypothesizing and fastidious testings lead not to clear understanding but to even more discomfoting confusion. Intervals just don't seem to yield their phenomenological secrets, and the authors (and we alike) are left with no plausible way of guiding our students in apprehending and perceiving the tonal building blocks of their art.

In the early and gullible years of my teaching career I marvelled on occasion at a few boastful colleagues who informed me of their individual roads to ear-training success. All one must do, one of them once told me, was spend the first two weeks with freshmen mastering aural interval recognition. From there on, the sailing was as on glassy seas. Some decade or so after these rash promises were made, I was forced to conclude, reluctantly, that my informants were either sorcerers or liars. Pitch intervals yield to no such "mastery," whether in two weeks or in two years. (And my students were often of uncommonly great talent.)

The reason for this anomalous and frustrating intervallic recalcitrance,

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and the key to answering some of our most vexing questions, is, I believe, quite simple. (At least, in principle. But like the rules of chess, as opposed to playing a winning game, principles and application are quite different matters.)

Clearly, a pitch interval cannot be regarded as a singular entity, as a once-for-all-times unity whose "meaning" remains the same in all instances. As with similar simple pairings in perception, a pitch interval is to an extent whatever its many contexts lead us to believe it is. Even to achieve the perceptual level of intervallic unity—that is, *one thing* as opposed to *two things together*—some element of perspective, or structural "inclination," or "vectorial alignment" must enter into the act of identification.

We possess adequate data from other sensory modes to know the power of context in shaping our percepts. The viewer who observes that two dots are "about one-half inch apart" acts on unwarranted faith—a faith shattered when a shift of visual plane to "from above" clearly reveals that his "straight ahead" inference was perhaps premature: the attitude of those same dots changes considerably.

Straight-ahead dots:



Same dots from above:



Now they are seen to be more like three times farther apart than imagined earlier. The contextual "new angle" gives "new meaning" to our percept. Phenomenally, we might as well admit that both perceived distances are experiential actualities, one "truth" for one perspective, another "truth" for the other. The history of experimental psychology abounds with such titillating surprises in visual perception, and I wager

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that in this respect the two sensory modes, vision and audition, are not different.

And further, I challenge anyone to be sure of his ability to identify a particular hue once he has carefully viewed the *Homage to the Square* series of painter Josef Albers. Homages to the square they may be, but what they reveal—and this was Alber's goal in doing the series—is the fragile identity of a particular color; placed in a new surrounding of color, the one hue can become, chameleon-like, transformed. In radical instances of this contextual displacement, even the color's very identity becomes problematic.

And so it is with intervals. *This* perfect fifth is not the same as *that* perfect fifth in respect to this aspect of identity, and until experimental studies (and pedagogy) respect this elusive, but captivating, reality, we shall remain uninformed of the perceptual nature of intervals. Ignorance or insufficient respect for this simple principle has plagued studies of intervals and studies of melody throughout the history of empirical psychology. Long before the handy term *closure* was applied to more than doors or wounds, W. Van Dyke Bingham studied just that—without calling it such—in his “Studies in Melody” (1910, *Psychological Review Monograph* XII: 1-88). And, sad to say, his path-breaking study was tragically foredoomed: he was unaware of one simple, yet overpowering, ingredient in the brew he mixed: how the perception of one intervallic relationship is affected by the intervallic context that precedes it—instances when the tonal content's dice have been unwittingly loaded.

Professors Blombach and Parrish note, toward the end of their article, that in introducing to students intervals for study “a random order that makes no assumptions concerning what we as teachers might perceive to be best, would probably work as well for a diverse population of students as any—and might work better than most.” I suggest that one could go even further, stating emphatically that unless one learns how to anticipate and then control contextual sway, as it projects on an “isolated” interval, *any ordering will be more random than even suspected*. We cannot know *what* the auditing student may project onto the scene, what context he might frame (for sufficient or for insufficient reasons) for the interval in question, thereby skewing its “meaning” and denying our cherished, but improbable, expectations.

One of the most compelling examples of contextual influence I know occurs in a tune most Americans know, either from the original film track or from its ubiquity as the basis for jazz improvisations. It occurs in the thirteenth bar of David Raksins's *Laura*.



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What will the sophomores make of this relationship (as auditory stimulus, not notation) if the context has been appropriately established (E-flat major transforming into G major) and if their "mastery of intervals" has led them to believe that this two-pitch relationship always "sounds like" it is the third-to-second partials of a harmonic series?

Did I hear someone say "But he has made a major error: the interval is not a perfect fifth but a diminished sixth!"?

Correct! And thank you. And my point has been made. The very conventions of notation have derived over the years largely from the recognition of contextual bearing; the very craziness of the E-flat/G-sharp, qua spacious intervallic presence, is just another reminder that a couple of pitches lying around seven-hundred cents apart don't always sound the same.

Sincerely yours,

William Thomson
Professor of the Theory of Music
University of Southern California

Response to Professor Thomson's comments:

I agree wholeheartedly with Professor Thomson's beautifully stated commentary, and I would like to respond by slightly extending the scope of the issues he raises. Although I obviously use the accepted step-by-step, "cumulative" method of teaching aural skills, I have often questioned the efficacy of teaching students to recognize and identify isolated musical events—e.g., intervals, scales, chords, duration patterns—without regard to a meaningful musical context. The results of our experiment did little to allay my fears that the usual teaching methods may not be effective and might, in fact, even be counterproductive in terms of teaching meaningful aural comprehension skills. Similarly, I also wonder about the musical validity of music perception and cognition studies that deal with anything less than real musical questions presented in real musical contexts. For more on that and other related subjects, I refer the interested reader to a pair of articles in the Spring 1987 issue of *Psychomusicology* (Volume 7): "The

WHAT IS AN INTERVAL?

Perception of Sound as Music" by the late William Poland (pp. 63-70) and "Reflections on 'The Perception of Sound as Music'" by Ann K. Blombach (pp. 71-76).

Ann K. Blombach
Professor of Music Theory
Ohio State University

[Editor's note: for yet additional reading on these topics see Michael R. Rogers, "Beyond Intervals: The Teaching of Tonal Hearing," *Indiana Theory Review* (Spring 1983): 18-34. Coincidentally, two additional pertinent comments can be found (for those who are not yet exhausted by the topic) in this issue of *JMTP*. See pp. 284-285 of the Karpinski review; and the quote from the Nicholas Cook book cited on pp. 303-304 of my review.]

CONTRIBUTORS

Charles G. Boody

Charles G. Boody received his B.A. from Macalester College, St. Paul, MN and subsequently earned the M.A. and Ph.D. in Musicology from the University of Minnesota. He has taught elementary school music and spent eight years as an Assistant Professor of Music at Austin College, Sherman, TX. Currently he is employed by the Hopkins Minnesota schools as an analyst/programmer where he writes software for district use and provides support for district use of microcomputers. He has been actively involved with music and computing since 1967; is a published author of software for CAI and school administrative uses, and has been an active member of the Association for Technology in Music Instruction since 1977, currently serving as its president.

Lisa Hanford Halasz

Lisa Hanford Halasz is an Assistant Professor of Music at Rutgers University. She received a B.A. from Smith College in 1979 and a Ph.D. from Yale University in 1984. She has published articles in this journal and in *Music Analysis* and is presently completing a book, *What Did Mozart Really Learn from Haydn?*, about the relationship between Haydn and Mozart string quartets.

JOURNAL OF MUSIC THEORY PEDAGOGY

Gary S. Karpinski

Gary S. Karpinski is Assistant Professor of Music Theory and Coordinator of the Undergraduate Aural Skills Program at the University of Oregon School of Music. Previously, he was conductor and director of the Contemporary Players at the Brooklyn College Conservatory of Music, and he founded and directed Brooklyn's Lab for Computer-Assisted Instruction in Music. At Temple University he taught theory and aural skills. Mr. Karpinski received his B.Mus. and M.M. from Temple and has studied at Peabody Conservatory and the University of Michigan at Interlochen. He is currently a Ph.D. candidate at the City University of New York Graduate Center. His papers include "The Application of Music Theory in Programming Computer-Assisted Instruction," and he has authored numerous computer-assisted instruction programs that are used at several colleges. He is currently investigating motivic parallelism, early twentieth-century music, and music perception and cognition.

Rosemary Killam

Rosemary Killam became interested in the pedagogical problems presented by pretonal counterpoint during her undergraduate studies at Eastman, where she took courses in sixteenth-century, seventeenth-century, and madrigal counterpoint, as part of her B.M. studies in music theory. Her interest in problems of mode continued in her M.A. thesis on the modal implications of English ballad opera tunes, completed at George Washington University in 1969. The research published here was begun under the direction of Prof. William Mahrt, during her DMA studies at Stanford University. Currently, Killam is an Associate Professor of Music Theory at the University of North Texas. The results of her research into a variety of theory pedagogical concerns have been published in a number of journals, including *The Journal of Music Theory*, *College Music Society Symposium*, and *Music Theory Spectrum*. This current study of the use of solmization has been used by Killam in her undergraduate courses in sixteenth-century counterpoint.

CONTRIBUTORS

Michael R. Rogers

Michael R. Rogers is Professor of Music Theory at the University of Oklahoma and is editor of the *Journal of Music Theory Pedagogy*. He is also author of *Teaching Approaches in Music Theory: An Overview of Pedagogical Philosophies* and is currently doing research for another book on music theory teaching.

Rosalie Athol Schellhous

Rosalie Athol Schellhous is an Associate Professor in the Musicology Area of the Michigan State University School of Music. She earned her Ph.D. at the University of California, Santa Barbara, in 1978, and has taught at California Lutheran University and the University of California, Riverside. Her research interests include Bach's church music and music theories of the nineteenth century, and she has published in *The Musical Quarterly*, *The Music Review*, *College Music Symposium*, and *Current Musicology*.

CONTRIBUTORS' GUIDELINES

1. Articles on any aspect of teaching or learning music theory will be welcome. Contributions will be judged on originality, relevance, interest to a diverse audience, and clarity of writing.

2. Manuscripts should be typed double-spaced (including footnotes, references, and quotations) on 8 1/2 x 11 paper with at least one-inch margins. Please submit the original and four additional copies. All tables, figures, musical examples, etc. and footnotes should be placed at the end on separate sheets with an indication of where they fit in the text. Long musical examples and complex diagrams or charts should be avoided when possible or used in moderation. Please also avoid musical symbols (i.e., notation) within the running text.

3. Manuscripts are accepted on the condition that they are unpublished and are not presently being submitted for publication elsewhere. Since all submissions are reviewed anonymously, please include the author's name and address only in the cover letter. On most matters of form and style, *JMTP* will follow *The Chicago Manual of Style*.

4. Please address all correspondence to:

Journal of Music Theory Pedagogy
School of Music
University of Oklahoma
Norman, OK 73019