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From the Editor

Volume Ten of the *Journal of Music Theory Pedagogy* marks our tenth anniversary, since Volume 1/1 appeared in the Spring of 1987. The existence of this journal was made possible by the vision and hard work of several people at the University of Oklahoma. Michael Rogers, who was the editor of Volumes One through Six, worked hard to establish the appropriate academic level, content, and format of the journal. Alice Lanning and James Faulconer, who were also founding editors of the journal, continue as managing editor of JMTP and director of the Gail Boyd de Stwolinski Center for Music Theory Pedagogy, respectively. And of course Gail herself contributed so much to the field of music theory pedagogy and to the success of this journal. Alice Lanning's memorial to Gail appears at the beginning of this issue.

Volume Ten continues our practice of presenting major articles in both the written and skills aspects of music theory pedagogy. We also have a comprehensive article/review on all the CD-ROMs that have a connection to music theory. Appropriately this technology began just ten years ago, and Alexander Brinkman and Elizabeth West Marvin have discussed what has happened in these years and what might happen in the future. Additionally we have three substantial reviews: one again on a CD-ROM package, one on a skills book, and one on general books on college teaching. The last two reviews were contributed by Michael Rogers, our first editor, and by L. Dee Fink, whose review of books on classroom teaching ended Volume 1/1. Finally we include a 1996 bibliography, an update on new textbooks and new editions which have appeared since the 1995 bibliography. This feature was added to the journal in Volume Six.

We have many plans for the future. First is to try to obtain a more timely publication schedule. We appreciate the patience of contributors and subscribers and hope we can improve during 1997-1998. Second is to continue our exploration of the technological aspects of music theory pedagogy. Volume Eleven will include reviews of various CAI programs, to complement our overview in

this issue of CD-ROMs, and we have other ideas for the future. Third is the addition of a section entitled "From the Classroom": short, practical articles that present successful ideas tested in actual teaching situations. We already have some contributions to such a section, but we welcome your submissions. Contact me with your ideas (School of Music, Indiana University, Bloomington, IN 47405; WENNERST@indiana.edu).

Please send us your comments about any aspect of music theory pedagogy. As a reminder, the Guidelines for Contributors are included at the back of the volume. I appreciate the work of the editorial board, the production, reviews, and managing editors, and of course all those who submit articles for consideration. We look forward to another decade of the *Journal of Music Theory Pedagogy*.

Mary Wennerstrom
Indiana University

In Memoriam

GAIL BOYD de STWOLINSKI

(November 8, 1921 - July 15, 1996)

When Gail de Stwolinski retired in 1984 after 38 years of teaching theory at the University of Oklahoma, we searched for an appropriate way to both honor and continue her work. The *Journal of Music Theory Pedagogy* exists because Gail's students, colleagues, and friends, along with her husband and son, provided encouragement and financial resources for this unique publication through their gifts to the Gail Boyd de Stwolinski Center for Music Theory Pedagogy.

JMTP reflects Gail's insistence that excellence in teaching is expected, that learning how to teach is as important as knowing what to teach, and that critical thinking about teaching is essential to academia. Her classes in the University of Oklahoma School of Music were artistically sensitive performances in teaching. Each minute of each class was thoroughly prepared with exhaustive analyses supported by recorded or live musical examples and pounds of graphs and diagrams on overhead transparencies plus volumes of reserved materials in the music library. She also insisted that alternative student viewpoints were not only welcomed, but that they might be as appropriate as her own carefully crafted analyses. She approached each lecture from an aural standpoint; as far as Gail was concerned, musicians were meant to think through their ears. Her textbook, *Form and Content in Instrumental Music*, was a unique contribution to our field, demonstrating her convictions about the value and benefits of aural analysis as primary source material. She worked through each excerpt, each sentence, each process of that text until she was sure that any willing student could follow and comprehend what she had to say.

Gail set an example for students and colleagues alike by performing on cello and piano in ensembles and in class. She continued to be an active musician even after her retirement. She spent many hours playing cello in string quartets, and some of her most regular appointments were spent with friends exercising her key-

board skills in two-piano reading sessions. She was also an accomplished artist, exhibiting in a local gallery while continuing to study oil techniques.

As a campus role model, Gail was outstanding. She served as the first woman chair of the University of Oklahoma Faculty Senate, having won election to that position not only by countless hours of service on department, college, and university-wide committees and boards, but by the sound counsel she offered to each of the groups to which she was appointed or elected. Her advice was welcomed by a diverse group of colleagues from a wide range of departments and administrative offices. Her eclectic interests and expertise led to her selection as a founding faculty member of the University of Oklahoma College of Liberal Studies, an unusual degree program pioneered in the 1960's at what was then the Kellogg Center for Continuing Education. Her support of and advocacy for women's issues won her the admiration and respect of hundreds of women who came to the University of Oklahoma and found a mentor unlike any they had encountered before or afterwards. Her music students learned theory, they learned how to teach, and by observing Gail, they learned compassion for and acceptance of each student who entered their own classrooms or offices. To be a student of Gail's was to know that you were accepted, valued, and cherished as a human being.

Each time she served as a director or committee member for a thesis or dissertation, that student was assured of counsel, assistance, and the nurturing support so necessary to completion of a project of this magnitude, knowing that although she would willingly give large amounts of time, she would never compromise her standards or ethics. Faculty colleagues found that her breadth of knowledge was invaluable for this kind of stringent academic endeavor. The energy and enthusiasm she devoted to the appropriate completion of each of these documents were exceptional.

Gail was a consummate student throughout her lifetime; when she was curious about something, she went directly to the expert in that area, no matter who or where that person might be. She once made a quick trip to Los Angeles to talk with Halsey Stevens about a particularly knotty analytical detail in Bartók's string quartets.

She queried colleagues at national CMS meetings about unusual or new pedagogical techniques because she said she received such good ideas from colleagues who did not consider themselves "theorists." Many of these college music faculty members reported that they gained more from talking with Gail than she could possibly have learned from them. She openly admired and praised faculty colleagues who put themselves in the place of the student when writing, lecturing, or performing; she had little, if any, patience with peers whose writing and teaching appeared to be done solely to impress their colleagues.

As a staunch and vocal advocate of faculty development, she and another theory teacher from a sister state college started the Oklahoma Music Theory Roundtable in the early 1950s to stimulate discussion and support among theory teachers at Oklahoma colleges and universities. This group developed into a strong, if somewhat loosely-organized, network of musicians who enjoyed teaching and learning about music theory and who enjoyed learning from each other. Over the years, nationally recognized theorists, educators, and researchers found themselves in the middle of the Oklahoma heartland presenting their ideas and then discussing theory pedagogy with an enthusiastic and dedicated group of college theory teachers. Gail and Louis often provided accommodations and relaxing downtime for these guests after the OMTR yearly meetings. On these occasions graduate students found themselves invited to dinner at Gail's to meet and talk with some of the most outstanding scholars in the field of music theory.

Gail's work will continue at the University of Oklahoma and throughout the nation as JMTP continues. Her deep interest in the study of aural perception will continue in the Gail Boyd de Stwolinski Center for Music Theory Pedagogy. And her personal influence will continue through all of us who were profoundly and positively affected by her disciplined intellect, unbridled curiosity, creative talents, and her joy in sharing interesting books, fine paintings, good music, and cherished friendships.

Alice Lanning,
for those who knew Gail.



Takadimi: A Beat-Oriented System of Rhythm Pedagogy

Richard Hoffman, William Pelto, and John W. White

Students entering college in the 1990s are less well prepared in many areas of fundamentals than were students of previous generations. This situation is not surprising given reductions in public school music education, a shift away from music making as a leisure time activity, and changing musical values. As a result, there are increasing numbers of students with the interest and talent to study music at the college level who lack the requisite skills. Further, the teaching of these students is influenced by an emerging egalitarian approach to higher education in which it is expected that all students, regardless of background, will be given every opportunity to succeed. Students, administrators, and the circumstances themselves demand pedagogic techniques that not only evaluate and hone basic skills, but effectively teach those skills to novices as well.

These conditions present a particular challenge to music teachers in their efforts to teach rhythm skills. While most students begin college needing remediation or basic instruction, the level of rhythmic complexity at which they are expected to function continues to increase. Teachers, therefore, need pedagogic techniques that address elementary skills and complex rhythmic concepts in order to provide a strong foundation for musicians who will practice their art well into the twenty-first century.

Goals of Effective Rhythm Pedagogy

In order to address these concerns, we propose the following goals for an effective rhythm pedagogy:

1. It should lead to accuracy and musicality in performance, both studied and sight-read, including the ability to recognize and perform musical gestures.
2. It should require and reflect an understanding of rhythmic structure, recognition of metric and rhythmic interaction, and an awareness of precise contextual location of beats and attack points.
3. It should facilitate aural recognition and identification of rhythmic patterns and metric divisions.
4. It should provide a precise and consistent language for the discussion of temporal phenomena. There should be no need to create new terms or separate categories for performance, transcription, or analytical work.
5. It should address rhythmic issues presented by musics outside the realm of traditional tonal literature such as asymmetric meters, modulation of meter or tempo, complex syncopations, complex tuplet groupings, and passages that combine these in novel and challenging ways.
6. Like pitch solfège, it should be a system that is easily applied and adapts to broad applications, and it should be a tool for life-long use.

A Brief Survey of Other Systems

Many approaches to rhythm study have been devised over the years and remain in use today. A set of rhythm syllables is frequently a hallmark of such systems. At the simplest level, a system may rely entirely on a single neutral syllable, like “da” or “la.” Such a system does not ascribe meaning to its syllable, but merely uses it for intoning rhythmic materials. As a result, analytic activities regarding duration, beat value, and meter are not explicitly conveyed in the vocalization. Other systems use syllables to provide labels for temporal phenomena, in a manner analogous to the use of solfege syllables to label pitch phenomena. They are designed to help students learn, remember, and quickly identify recurrent patterns, and they provide a link—a translator—between aural and visual domains.

Rhythm systems typically fall into two categories, those that emphasize counting within the measure and those that emphasize pat-

tern or beat.¹ For example, counting systems include the common “1-e-&-a, 2-e-&-a” system, which developed along with the introduction of music into American public schools,² and the more elaborate system developed by Allen McHose and Ruth Tibbs (discussed below). Kodály’s and Gordon’s systems (discussed below) rely upon pattern or beat orientation, as do other language-based systems that ascribe English words to rhythm patterns.³ Many systems, including the one we propose in this article, can be traced back to the French Time-Names system developed in the early nineteenth century. An American adaptation of the French system yielded a set of syllables summarized in Figure 1.⁴

The system of syllables devised by Hungarian composer and pedagogue Zoltán Kodály ascribes syllables to specific notational values and rhythmic patterns as shown in Figure 2. For instance, an eighth note may be called “ti” in either simple or compound meter, regardless of its placement within a beat. Primarily geared toward elementary-school curricula, the system does not extend to the level of sophistication demanded by college-level music programs. Additionally, it is restricted to notational values within the most common meters, with either the quarter note as the beat in simple meter or the dotted quarter as the beat in compound meter. Modifications to Kodály’s system have been suggested that provide further subdivision-level syllables.⁵

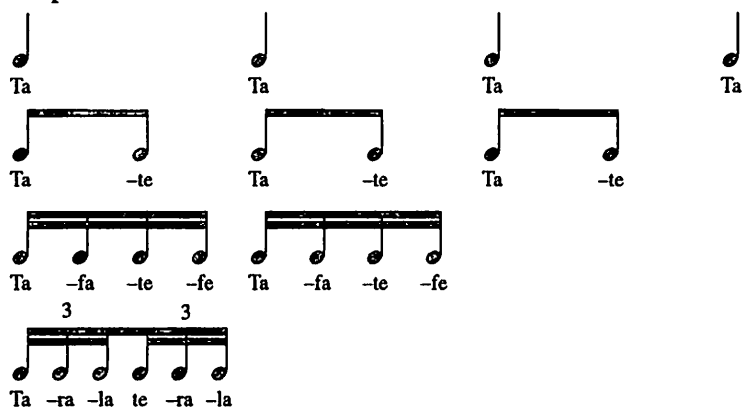
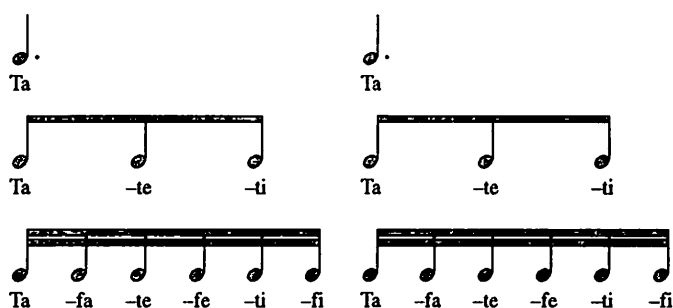
¹Edwin Gordon provides a comprehensive history of the use of rhythm syllables in his book *Learning Sequences in Music* (Chicago: GIA Publications, 1993), 263-287.

²Gordon, 265.

³For example, Daniel Kazez uses a speech-cue method for rhythm reading, such as te-le-phone for patterns of two sixteenth and an eighth. See *Rhythm Reading*, 2nd ed. (New York, W.W. Norton, 1997), especially xviii-xix, and 221-222.

⁴Gordon, 265. Gordon notes that of the systems developed in the nineteenth and early twentieth centuries, only Kodály’s continues to be used widely.

⁵Several of these are discussed by Lois Chosky in *The Kodály Context: Creating an Environment for Musical Learning* (Englewood Cliffs, NJ: Prentice-Hall, 1981), 191.

Figure 1. French time-names system (simplified American version)**simple meter****compound meter**

The system of syllables advanced by Allen McHose and Ruth Tibbs accounts for more complex rhythmic and metric contexts (see Fig. 3).⁶ Unlike Kodály's it emphasizes counting within a measure; any attack occurring on the beat is articulated with that beat's ordinal number. Also, McHose and Tibbs include divisions and subdivisions within a beat-level emphasis: each beat is divided and subdivided, and syllables are ascribed according to their place within

⁶The system is introduced throughout their text *Sight-Singing Manual*, 3rd ed. (New York: Appleton-Century-Crofts, 1957).

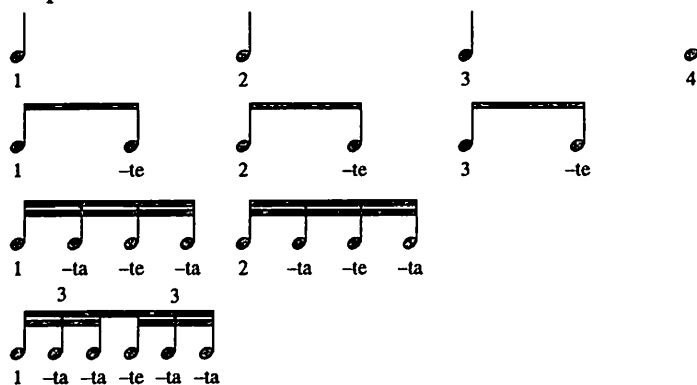
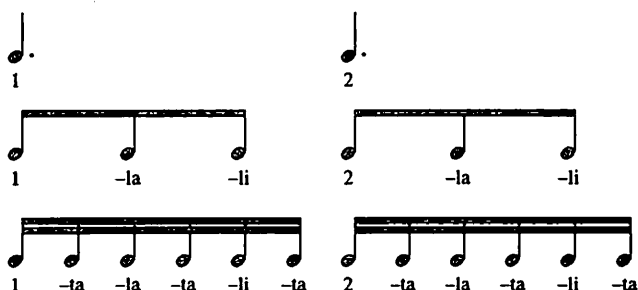
Figure 2. Kodály system of rhythm syllables

the beat, not their notational value. At the subdivision and lower levels, some different attack points are articulated with the same syllable. For example, the syllable “ta” occurs three times within a single beat of compound meter, as in “1-ta-la-ta-li-ta 2-ta-la-ta-li-ta.” This system also extends syllables to second-level subdivisions (for example, 32nd notes in 4/4) by inserting “ta”s, yielding “1-ta-ta-ta te-ta-ta-ta.” Counting systems such as McHose/Tibbs require the presence and formal understanding of meter before the syllables can be applied, thus limiting application in aural contexts.

Edwin Gordon’s system, like that of McHose and Tibbs, features beat orientation. He differentiates, however, between what he calls “usual” and “unusual” meters, and ascribes different syllables to similar patterns because of their occurrence in specific types of meter. For example, a beat that includes three eighth notes in 6/8 is intoned “du-da-di,” whereas the same eighth notes in 7/8 are articulated “du-ba-bi” (see Fig. 4).⁷

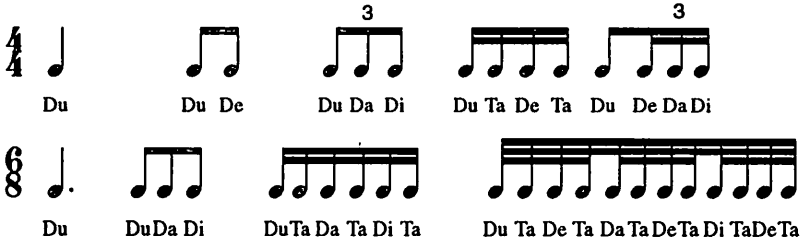
In evaluating beat-oriented systems such as McHose/Tibbs and Gordon, one might consider a continuum with a single neutral syllable at one end, and a system with discrete syllables for every possible beat-level subdivision at the other. Thus, one could imagine a set of as many as sixteen different syllables occurring within a complex beat-level pattern. Clearly, neither endpoint satisfies our pedagogic goals, suggesting that a more centrist approach such as McHose/Tibbs or Gordon is more appropriate. These systems emphasize specific attack points with discrete syllables, but only at the

⁷Gordon, 284-285.

Figure 3. McHose/Tibbs system of rhythm syllables**simple meter****compound meter**

beat and division level. Subdivision-level syllables occur in more than one location within a beat, a duplication that Gordon claims "simplifies rhythm solfege,"⁸ since it results in a smaller number of syllables. (In Gordon note the recurrence of "ta" in "Du-ta-de-ta" and "Du-ta-da-ta-di-ta.") Thus, neither McHose/Tibbs nor Gordon requires students to differentiate among five different attack points, all of which are intoned as "ta."

⁸Gordon, 285.

Figure 4. Gordon system of rhythm syllables**"Usual" meters****"Unusual" meters**

All systems value the recognition and labeling of rhythmic patterns but choose to emphasize or facilitate one aspect of the rhythm learning process at the expense of another. All are strong when used to teach the concepts for which they were designed, and all have weaknesses when applied across the broad spectrum of rhythmic study.

Basics of the Takadimi System

During the last several years, we have developed a program of rhythm pedagogy that we believe addresses the goals stated above.⁹ At the center of our method is a set of rhythm syllables for use in sightsinging and theory classes at all levels of instruction. Our system shares many of the same goals and is similar in design to those already mentioned, but differs from them in several significant re-

⁹We wish to thank our colleagues John Benoit (Simpson College, IA), Craig Cummings, and Timothy Nord for using Takadimi in their classes and for providing encouragement and valuable suggestions.

spects. As with all systems, ours is selective in what it emphasizes and requires trade-offs in some areas, but we believe it avoids or minimizes many of the shortcomings of earlier systems and is well suited to teaching rhythm at the college level. It is simple enough for the prenotational stages of first-year courses but comprehensive enough to address the complexities of recent musical styles including polyrhythm, polymeter, and asymmetric divisions.

We call our system Takadimi. It features two related sets of syllables, one for simple beat division and one for compound. Figure 5 displays these syllables at the beat, division, and subdivision levels. Note that the syllables are assigned to location within a beat, not the notational value. In simple meter, any attack on the beat, regardless of notation, is called "Ta," and any attack on the second half of the beat is called "di." Further subdivisions are called "ka" and "mi." At the subdivision level, then, the syllables yield the pattern "Ta-ka-di-mi," the name we have given the system.¹⁰ In compound meter, "Ta" again represents an attack on the beat, and the syllables "ki" and "da" serve to articulate the divisions of the beat. Further subdivisions are "va," "di," and "ma," yielding the composite pattern "Ta-va-ki-di-da-ma." (Note that unlike the other systems examined Takadimi specifies a unique syllable for each subdivision.)

In order to accommodate complex beat-level combinations of five and seven divisions, the system adds the syllable "ti" to produce "Ta-ka-di-mi-ti" for a quintuplet and "Ta-va-ki-di-da-ma-ti" for a septuplet. Figure 6 illustrates these complex patterns along with other irregular divisions within the two types of meter.

¹⁰The reader may recognize these syllables as being similar to those used in North Indian tabla playing to vocalize divisions of a pulse. A brief introduction to the Indian system and an adaptation for musicians is provided in Robert Chappell, "Understanding Rhythm—A World Music Approach," *Percussive Notes*, 28/3 (1990): 8-10. Don Ellis was among the first to recognize the potential for using the Indian system for teaching complex rhythms to Western performers. See Ellis, *The New Rhythm Book* (North Hollywood, CA: Ellis Music Enterprises, 1972), especially chapters 1 and 4. John Craig Cooper proposed a similar adaptation in a series of workshops. See George Lohring, "The Takadimi Rhythm Method: An Interview with John C. Cooper," *Piano Guild Notes*, 39/4 (1990): 6-8. Each of these adaptations was influenced by the authors' extensive study of Indian music. None is entirely systematic, nor does any account for the variety of Western rhythmic practice.

Figure 5. The Takadimi System: regular divisions

Simple meter:





syllables: Ta Ta -di Ta -ka -di -mi

Compound meter:





syllables: Ta Ta -ki -da Ta -va -ki -di -da -ma

Figure 6. The Takadimi System: irregular divisions

Simple meter (quarter note = beat)



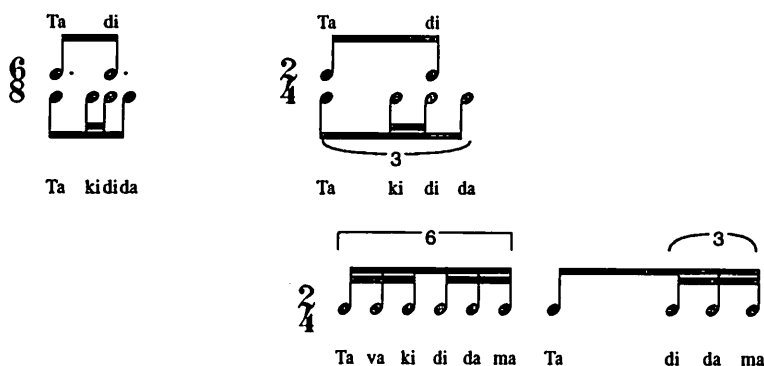
Ta di Ta ki da Taka di mi Takadimi ti Ta va ki di da ma Ta va ki di da ma ti

Compound meter (dotted quarter note = beat)



Ta di Ta ki da Taka di mi Takadimi ti Tava ki di da ma Ta va ki di da ma ti

Figure 7. The Takadimi System: synchrony of compound and simple meters



The system also provides for coordination between simple and compound divisions where attack points coincide. "Ta" begins the beat and "di" marks the middle. Figure 7 illustrates this synchronization.

Through application of the system, rhythm emerges as specific syllabified patterns that can be spoken consistently and accurately within the span of a beat, regardless of prevailing metric divisions. Figure 8 charts idiomatic patterns in simple and compound division. The patterns shown in different meters yield the same syllables, even though notation differs. As these exercises illustrate, application of the system satisfies our first pedagogic goal by emphasizing patterns and musical gestures. Vocal facility increases rapidly because of the discrete one-to-one mapping onto metric attack points. Additionally, facility is aided by the easily articulated variety of initial consonants and the duplication of vowel sounds within individual beat divisions ("Ta-ka-di-mi" and "Ta-va-ki-di-da-ma.").

Addressing the second pedagogical goal, the Takadimi system requires students to recognize the position of any articulation rela-

Figure 8. Rhythm exercises in simple and compound division**a. simple meter****b. compound meter**

tive to the predominant beat (in contrast to systems that emphasize notated rhythmic values). Figure 9 shows a syncopated rhythm pattern. Unlike a neutral approach (da-da-da-da), Takadimi enables students to understand the syncopation in terms of precise contextual locations of beats and attack points. Compared to systems previously mentioned, Takadimi encourages more specific understanding of metric position, and allows students to convey explicitly their understanding to the instructor, thereby facilitating accurate diagnosis of many common errors.

Figure 9. Syncopated exercise with a comparison to other systems

Kodály:	Ti -ri -ri -m -ri -ti Tri -o -la ri -ti -ri -m -ri -ti	McHose/Tibbs:	1 -ta -ta -te 1 -la -li -ta -te -ta -te -te	Gordon:	Du -ta -ta -ta -de Du -da -di Du -da -di Du -de -ta -ta -ta -de	Takadimi:	Ta -ka -mi -ka -di Ta -ki -da -ka -di -mi -ka -di -mi -ki -da -di

Use of the system encourages aural recognition and identification through its emphasis on verbally identifiable patterns (without differentiating among specific notational values), thus satisfying our third goal. If an instructor uses the pattern in Figure 9 for a dictation exercise, students could learn and intone the rhythm on syllables before notating the pattern or even knowing the actual meter. Once students can translate the rhythm to vocalized syllables, they can write it in a number of meters, paralleling the way in which many instructors use pitch solfège.

The fourth goal is satisfied by the system's provision of a consistent, usable language for discussing temporal phenomena. The syllables may be used for identifying and reproducing patterns aurally and orally, then ascribing notation to sound, rather than a more traditional approach that begins with the complexities of notation.

Complex Applications

The following examples and applications relate to our fifth goal, illustrating the ability of the Takadimi system to address issues presented by rhythm found in music outside the realm of traditional tonal literature. Three sample applications are given.

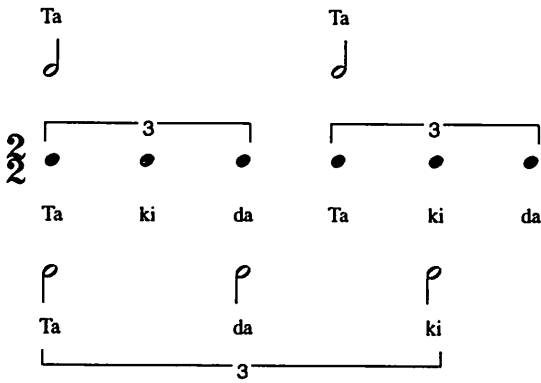
Application 1. Figure 10 presents challenges typical of late medieval as well as contemporary music. This exercise contains complex rhythms similar to those found in Elliott Carter's "Canaries" from *Eight Pieces for Four Timpani*. The performer is required to execute irregular groupings and complex syncopations within a context of changing meters and division types. Application of Takadimi helps demystify the complex notation of the passage by providing familiar syllables for every beat-level pattern. Accuracy in performing the complex syncopations is aided by muting the nonarticulated syllables (shown in parentheses). Switching from one division type to another requires a change from "Ta-ki-da" to "Ta-di" or vice versa, as well as altering syllable lengths when the beat value remains constant (as in Figure 10). The synchronous relationship among patterns such as the second beat of m. 2, the second beat of m. 3, and the first beat of m. 4 is reinforced by the recurrence of the syllables "Ta-di" in each case.

Figure 10. Exercise with irregular and complex patterns

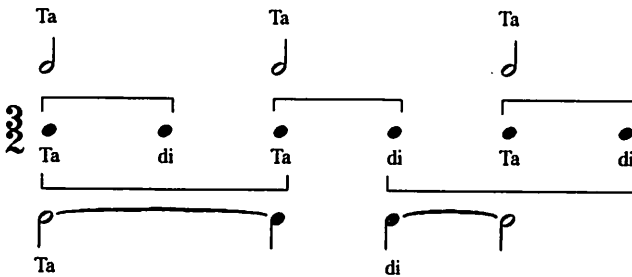
Figure 10 displays three staves of music, each with a key signature of one flat (B-flat) and a time signature of 5/8. The first staff contains the lyrics: Ta ki di da Ta di mi Ta di da Ta ka di mi. The second staff contains the lyrics: Ta kidi ma(Ta) di Ta di Ta ki da (Ta)ka di mi ti (Ta)ka mi. The third staff contains the lyrics: Ta da (Ta) ki (Ta) di mi Ta ki da. The music features various rhythmic patterns, including duplets, triplets, and quadruplets, indicated by brackets and numbers above the notes.

Application 2. Patterns involving duplets, triplets, and quadruplets of types spanning more than one beat are not uncommon in contemporary literature and present particular challenges for many students. Appearance of these patterns in multiple-voice textures complicates the problem still further. An intellectual understanding and an accurate performance of such patterns are goals of rhythm training. Application of the system can facilitate execution of these patterns in two ways: by helping students identify precise attack points, and by providing consistent syllables for representing and reproducing the aural phenomena.

A triplet over two beats, sometimes called a supertriplet, can be vocalized based on attack points corresponding to the division of the underlying beat into three. Such a supertriplet becomes "Ta-da-ki" spanning two beats as shown in Figure 11. The similarity with the spoken triple division of the beat, "Ta-ki-da," helps the student perform the pattern accurately as a triplet while at the same time emphasizing the differences between the two-beat and one-beat triplet.

Figure 11. Three-within-Two

In a similar way the vocalization for the superduplet derives its syllables from attack points corresponding to the division of the underlying beat in two, yielding "Ta-di" spanning three beats as shown in Figure 12.

Figure 12. Two-within-Three

A similar procedure applied to patterns of four-within-three and three-within-four results in the following vocalizations: "Ta-mi-di-ka" spanning three beats and "Ta-ki-da" spanning four beats as shown in Figure 13. Application of syllables requires an understanding of the relationship of the superrhythm to the underlying beat and at the same time provides a measure of performance accuracy by demanding precise coordination with the beat. The decision whether to suspend the perception of the prevailing beat in favor of the irregular division or to coordinate the prevailing beat with the irregular division is left to the discretion of the performer or instructor. The system accommodates and encourages either approach.

Figure 13. Four-within-Three and Three-within-Four

The figure illustrates two rhythmic patterns: "Four-within-Three" and "Three-within-Four".

Four-within-Three (Top Pattern):

- Time signature: $\frac{3}{4}$
- Syllables: Ta, ka, di, mi, Ta, ka, di, mi, Ta, ka, di, mi
- Groupings: Brackets indicate groups of four syllables: [Ta, ka, di, mi], [Ta, ka, di, mi], [Ta, ka, di, mi]
- Notes: The notes below the syllables are quarter notes for 'Ta', eighth notes for 'ka' and 'di', and a dotted quarter note for 'mi'.

Three-within-Four (Bottom Pattern):

- Time signature: $\frac{12}{8}$
- Syllables: Ta, ki, da, Ta, ki, da, Ta, ki, da, Ta, ki, da
- Groupings: Brackets indicate groups of three syllables: [Ta, ki, da], [Ta, ki, da], [Ta, ki, da], [Ta, ki, da]
- Notes: The notes below the syllables are dotted quarter notes for 'Ta', eighth notes for 'ki' and 'da'.

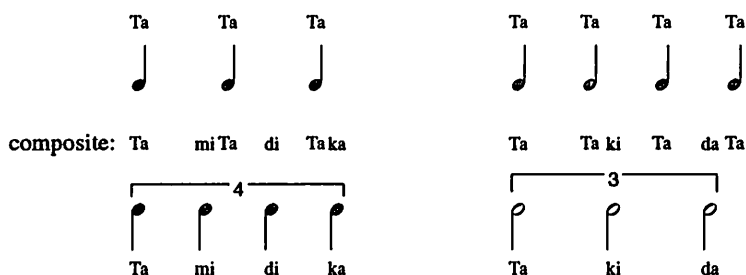
Occurrence of these patterns in multi-voice textures, the so-called “three-against-two” and “four-against-three,” presents challenges to traditional rhythm pedagogy. Often these complex interactions are presented in terms of the resulting composite pattern. Too often, however, the experience stops with the experience of the composite. Many times performing 4:3 rhythmic ratios involves reciting a saying such as, “Pass the bright red catsup.”¹¹ This approach is problematic because, much like using familiar songs for interval learning, it can encourage perception of the pattern in a single rhythmic and metric guise. Any sense of contextual flexibility and independent line is lost to expediency.

These poetic aids also tend to treat four within three beats and three within four beats as identical phenomena.¹² While the resulting composites are, in a purely temporal sense, identical, the patterns are vastly different musically and metrically. The particular 4:3 composite associated with the familiar “catsup” saying has three strong beats and is a valid abstraction only for four within three beats. Transforming it to serve a context with three attack points spanning four primary beats can be accomplished only with considerable difficulty.

Takadimi syllables provide a different vocalization for each relationship as shown in Figure 14. Both combinations produce easily learned and experienced composites, while accurately reflecting and retaining the essential beat and metric structures. Maintaining “Ta” as the underlying beat value provides a strong foundation for the crucial next step—moving from performing the composite to performing both parts of the rhythm, either alone or in ensemble. One person demonstrating both parts simultaneously could, for example, clap on “Ta” and speak the other line. With practice “Ta-mi-di-ka” and “Ta-ki-da” are learned as the correct vocalization of the contrasting rhythm to the prevailing beat. The syllables provide a vocalization for each pattern that is free of any preexisting language-

¹¹ Anne C. Hall uses this rhythmic device in her text *Studying Rhythm* (Englewood Cliffs, NJ: Prentice Hall, 1989), 94.

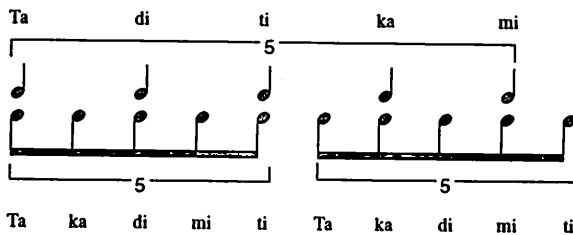
¹² Hall avoids this common pitfall by supplying a separate phrase for speaking a pattern with four beats grouped into three, “When will he come again” (94).

Figure 14. Performing polyrhythms with a composite

based accents or durations and is adaptable to the metric or rhythmic context. It remains internally consistent with the rest of the system, reinforces previous learning, and requires no new jargon. The result is an aurally based introduction to the two 4:3 phenomena, rooted in the interaction of the parts heard as a composite yet allowing for either three or four underlying beats.

One less common pattern, the quintuplet over two beats, the superquintuplet, illustrates application of the system to one additional complex pattern. By dividing each beat into a quintuplet, the superquintuplet can be vocalized as shown in Figure 15. Certainly not all possible combinations can be addressed following this approach. Relationships such as 5:4 and 6:5 must be learned in ways different from a composite. Nevertheless, Takadimi provides a very powerful tool for the understanding and performance of many of the most common cross-rhythms above the beat level and virtually all patterns typically included in the undergraduate curriculum.

Application 3. Figure 16 presents a two-voice exercise constructed from patterns abstracted from several well-known works in the con-

Figure 15. Five-within-Two

temporary repertoire.¹³ It includes challenging individual lines made more difficult by the required coordination between parts. Selected issues will be discussed.

Measures 1 through 3 illustrate difficulties posed by varied division types. The performer of part 1 in m. 1 is required to enter on the last division of the quintuplet. Coordinating the entrance with "ti" in part 2 ensures accuracy. Both parts are required to use both simple and compound division types within the first two measures. Shifting between the two is facilitated by learning "Ta-ka-di-mi" and "Ta-ki-da" as two options for dividing a beat equally and applying the correct division at the appropriate time. Synchronization of "di" at midbeat ensures coordination between parts. The metric modulation between mm. 2 and 3 in part 2 is facilitated by

¹³Patterns for this example are modeled on excerpts from the following works: mm. 1-2 on Joseph Schwanter, ". . . and the mountains rising nowhere" (mm. 64-65); m. 3 on Warren Benson, *The Leaves are Falling* (mm. 127-128); m. 4 on Darius Milhaud, *Alissa* (melodic excerpt found in Robert Ottman's *More Music for Sight Singing*, 1981, 287); m. 6 on Luigi Dallapiccola, *Goethe-Lieder*, No. 1 (m. 15); m. 7 on Edgard Varèse, *Hyperprism* (mm. 21 and 41).

Figure 16. Complex two-part exercise

part 1: 1 ti di ki da di mi Ta ki ma va ki ma

composite: Takadimi ti di ka di mi Ta ki da Ta ki di mi Ta ki di ma Tava ki di ma

part 2: Takadimi ti ka di mi Ta Ta ki di di Ta di

3 Ta ki Ta ki da ki Ta da ki Ta Ta

Ta ki di Ta ki di da Ta ki di Ta di da Ta ki Ta di Ta di ti Taka mi

Ta di di Ta di di Ta Ta di Ta di ti ka mi

5 Ta va di ma ka mi Ta di da Ta ma Ta da ki

Ta vaki di dama Ta ka mi Ta ka di mi Ta di da Ta ki da ma Ta da Ta ki da

Ta ki da Ta ka mi Ta di di Ta ki da ma Ta ki da

7 Ta ki di di Ta mi di ka Ta

Ta di dama Ta ki Ta ka di mi di dama Ta mi Ta di mi ka di mi Ta

Ta di dama Ta Ta ka mi dama Ta Ta mi di mi Ta

the consistent use of "Ta-di" for both the two dotted eighth notes in m. 2 and the eighth notes in m. 3.

Performance of the polymeter in m. 3 is aided by the presence of "di" in both division types. In learning and rehearsing this rhythm, performers could vocalize the composite then extract individual parts from it. Also, one group could vocalize the composite while others performed the separate parts. In either case syllables help the performers and the instructor judge the accuracy of the performance and diagnose any shortcomings.

Measure 4 requires the performer of part 2 to execute a superquintuplet spanning two beats and coordinate the line with part 1. The Takadimi system suggests at least two possible approaches to this measure. As one solution, the performer of part 2 might coordinate the attack points with the imagined division of the quarter notes into five. This was the method suggested in relation to Figure 15. A different approach would involve executing the entire measure in cut time, as though there were two beats. The result would be "Ta-di-mi" for the quarter and two eighth notes on the first beat followed by "Ta-ka-di-mi-ti" for the quintuplet on the second beat. This solution has the advantage of asking the performer to vocalize only familiar patterns, promoting even divisions and accuracy. It does not, however, produce a helpful composite.

Performing m. 5 requires both performers to change division types facilely several times within a short temporal span and execute complex patterns constructed from the basic divisions. Coordination with the other part complicates matters further. The synchronization of syllables reflected by the composite helps align the sextuplets with the eighth notes and simple triplet in part 2. The familiar "Ta-va-ki-di-da-ma" composite produced by the interaction of parts on the first beat of m. 5 helps unravel the complex notation and facilitates accurate performance of this pattern as well.

Measures 6 and 7 present the challenges of asymmetric meter and triplets at three different beat levels. The syllables shown on the example indicate an approach to performing each line. The composite suggests points of coordination between the lines.

Measure 8 illustrates the four-within-three superquadruplet occurring over three beats of a four-beat measure. The familiar relationship of the pattern to the composite will help guide place-

ment of the attack points and coordinate the irregular grouping with part 2.

The application of syllables in this example highlights several guiding principles underlying the pedagogy of Takadimi: 1) Careful application of syllables can aid greatly the understanding of seemingly impenetrable notational complexities. 2) Division types are associated with specific syllables and can be drilled apart from notated exercises. 3) Composites are useful in aligning parts and provide a valuable diagnostic tool and teaching aid. 4) The beat may be felt on higher or lower levels as necessary to accommodate the particular rhythmic complexity.

Nothing except years of practice and training could make contemporary rhythm or passages such as this easy or readable at sight. The Takadimi system, however, provides tools for unraveling and simplifying the complexities of the notation and promotes the execution of the rhythm in a highly accurate and musical fashion. In a class or rehearsal setting, instructions and suggestions can be given in precise terms and drills devised to rehearse troublesome passages.

Conclusions

Our experience with this rhythm pedagogy has demonstrated that the system is quickly learned and easily applied to a wide variety of styles in a consistent and accurate manner. In summary we believe its strengths are as follows:

1. It is based fundamentally on the aural phenomenon of beat division, and as such moves from the perceived sound through a process of translation and verbal description, before addressing issues of graphic description. In other words, identification and labeling occur before notation. With the Takadimi system, rhythm teaching can begin prenotationally in both written theory and aural skills classes. This approach can speed the learning process and allow students to comprehend and experience complex rhythmic events (such as syncopation and cross-rhythm) long before they are expected to read the notation.

2. The system reinforces the fact that much of the rhythm we encounter is based on a relatively small number of patterns, which can be notated in different ways. By learning and thinking in terms of patterns, students are taught strategies for chunking and learn to practice higher-level listening skills. They come to regard rhythm as identifiable and interrelated units of sound rather than a simple stream of attack points.
3. One of the most useful features of the system is the coordination of "di" marking the mid-point of the beat in both simple and compound meters. This synchronization allows for precise understanding and performance of duplets and triplets along with various elaborations (see Figure 7). Viewing meter with this internal consistency suggests that the two types of meter as traditionally understood are much more similar than different. Indeed, in contemporary theory and practice the distinction between metric types continues to be blurred. Learning rhythm with a built-in appreciation for the synchrony of "di" in the two common meter types lessens the artificial barriers encouraged by the familiar dichotomous approach.
4. The system provides a useful set of tools for teaching and evaluating rhythm in the classroom and ensemble. When all the students in a class routinely speak rhythm exercises using the same syllables and become accustomed to new rhythmic patterns or issues being taught in these terms, classroom or rehearsal efficiency is increased tremendously. Student participation in peer evaluation is aided by the common language the system provides. When students perform a rhythmic example, all those listening know both what the students actually performed as well as what they intended to perform. The differences between misreading a pattern and misperforming it are immediately clear to the students and the instructor.
5. Anecdotal evidence suggests that the system has proven useful to students of varying skill levels in both the classroom and the concert hall. Less skilled students are given a concrete method that helps them develop accurate and useful rhythm skills. Students with stronger backgrounds are given

a practical tool for unraveling rhythm in the most challenging literature. Furthermore, students have begun using "Takadimi" in lessons and coachings, eliciting interest and positive feedback from studio teachers. Others have successfully introduced the system to younger children in private lessons and classroom instruction.

In the dynamic world of music and music education where students often come to college ill prepared for their encounter with increasingly complex literature, rhythm pedagogy must keep pace with the challenge. It is no longer enough to leave rhythm to chance or to assume students learn it in lessons or ensembles. Rhythm must now be taught. Systems based on syllables are not new, either in Western or non-Western music education. We have found a system that addresses many of the needs of contemporary higher education and presents a healthy challenge to many traditionally held views on rhythm pedagogy. It is consistent with other significant trends in theory pedagogy and could be a successful part of many theory programs.

A Psychological Addendum to *Takadimi*: A Beat-Oriented System of Rhythm Pedagogy

Justin London

In the previous article Hoffman, Peltó, and White address the various problems involved in designing and using systems of rhythmic solfège. As they rightly note, the designer(s) of such systems are first and foremost faced with a choice between “those that emphasize counting within the measure and those that emphasize pattern or beat.” After surveying various approaches (Kodály, McHose/Tibbs, Gordon) the authors recognize that “all systems value the recognition and labeling of rhythmic patterns but choose to emphasize or facilitate one aspect of the rhythm learning process at the expense of another. . . . All have weaknesses when applied across the broad spectrum of rhythmic study.” Not only is this assessment quite true; it in fact runs deeper than the authors had perhaps intended. For this choice impinges upon one of the most basic dichotomies of human perception and cognition.

In psychological studies of perception researchers have long made a distinction between “serial” and “hierarchical” organization of stimuli (as well as patterned behavior—see the References citations of Lashley 1951, Restle 1970, Martin 1972, Divenyi and Hirsh 1978, and others). This body of research covers a wide variety of human activities, not only musical perception and performance, but also dynamic visual perception, auditory and/or speech recognition (and production), and complex behaviors such as touch-typing and juggling. A specific example will help make the serial versus hierarchical distinction clearer in a musical context. Consider

the following durational sequence:  . When construed in terms of its serial organization we may regard it as a string of five events which can be encoded in various ways—as a series of specific durations (200ms, 100ms, 100ms, 200ms, 200ms), or as a series of relative durations (such as N, .5N, .5N, N, N), or as a sequence of

positions on a timeline (e.g., 0, 1, 1.5, 2, 3...). Note that if the timeline is maintained by some type of clock (and thus counts in modular arithmetic) the result is a serial pattern that is functionally equivalent to placing the pattern in a metric context (i.e., "one-and-a-two-and...").

Alternatively, we can regard  in terms of its hierarchical organization, that is, as a pattern whose notes are grouped in a certain way: (Long+short+short), (Long+Long). Indeed, these two groups cohere into a larger structure: [(Long+short+short)+(Long+Long)], and it is on account of this nesting that the term "hierarchical" is used to describe such patterned relationships. As Restle has pointed out, while a computer is perfectly happy to deal with information sequences in a serial fashion (since each event is simply put in a successive memory location), humans are less happy with purely serial approaches to cognition, given the limitations of our perception and memory (Restle, 483). It is for this reason that hierarchical patterns are also known as "rhythmic" or "figural" patterns in the psychological literature. The memorability of such patterns is what gives them a sense of shape (hence "figural"), while the regularities of their substructure give them a sense of predictability as they unfold (hence "rhythmic").

What the previous example illustrates of course is that most musical passages can be understood in both serial as well as hierarchical terms. Small wonder, then, that Hoffman et al., as well as their pedagogical forebears, have had to struggle to devise a system which tries to capture *both* the serial as well as the figural aspects of rhythmic patterns as they occur in a metric context. The Takadimi system is particularly admirable in that it steers a middle ground between figural and serial encoding of rhythmic sequences. The serial structure of beat subdivisions is encoded by the various syllables. The two choices for subdivision syllables (Taka-dimi for simple meters, Tava-kidi-dama for compound) are, in effect, two different "clocks" which give a unique location to articulations which occur below the level of the beat. Moreover, as the student learns how to both recognize and declaim various syllable patterns, they become less like serial descriptions and more like rhythmic figures; one learns particular "words" (i.e., strings of syllables) which demark characteristic durational patterns. In so doing the student learns to

hear particular rhythmic shapes in terms of an archetypal rhythmic category.¹

In their explanation of how a student may use different strategies to declaim a single, complex rhythm (such as the 4-within-3/3-within-4 patterns in Figure 13 or the composite rhythms in Figure 14), Hoffman, Pelto, and White note that "while the resulting composites are, in a purely temporal sense, identical, the patterns are vastly different musically and metrically." In so doing, the authors have broached another area of temporal perception and cognition relevant to musical pedagogy, and that is the problem(s) of figure/ground perception (and switching) within complex visual or auditory patterns. As perceptual studies have shown, when confronted with such composite auditory patterns we tend to hear one part as the dominant shape or figure while the other articulations are heard as subordinate or background (see, for example, Handel and Oshinsky 1981). And while the phenomenon of figure-ground switching is well known, we almost never see or hear "both at the same time," but rather perceive one OR the other. While the Takadimi system allows students to "hear both sides" of a composite pattern, it does not ask the students to hear and/or declaim two independent streams at once. Rather, in learning the various strategies for declaiming a single complex pattern the student learns different aggregate patterns, aggregates which each embody different figure/ground relationships.

Finally, and perhaps most important, Takadimi is psychologically proper in the primacy it gives to the beat level of the metric hierarchy. Numerous studies have investigated (though it would not be fair to say that they have "proven") the special salience of beats (as well as the relations between beats and beat subdivisions) in rhythmic perception.² When we listen to a rhythmic pattern we first and foremost identify a particular level of periodic articulations within it as the level of tactus or beat, most often within the

¹For background on the categorical nature of rhythmic perception see, for example, Povel 1981, Sloboda 1983, Balzano 1986, Clarke 1987, Schulze 1989, Collyer et al. 1992, and Raffman 1993. The strength of any syllable system is its ability to create equivalence-classes among different rhythmic sequences; any series that one would articulate with the same set of syllables is, by definition, an instance of a particular figural pattern or type.

range of 70-120 attacks per minute. It is this level which gives the musical surface its sense of tempo, and it is in terms of this level that both shorter and longer durations are understood. Indeed, Jones and Boltz speak of the need for a particular level to serve as a "referent" for the construction of both higher and lower levels of rhythmic structure (Jones and Boltz, 470). Thus by marking beats with the "TA" in each "Taka-dimi" / "Tava-kidi-dama" declamation, students use the beat level as the point of entry into the overall rhythmic/metric structure of a particular passage. Moreover, given that one can mark downbeats with the dynamic emphasis of a particular syllable (e.g., TA-ka-di-mi, ta-ka-di-mi, TA-ka-di-mi, ta-ka-di-mi, etc., for running 16ths in a 2/4 meter), Takadimi is perhaps not quite so metrically neutral as the authors imply.

In the music theory classroom the usual pedagogical goal in teaching solfège, rhythmic declamation, harmonic and melodic dictation, and so forth is to enhance the students' overall level of musicianship. Rhythmic reading and performance skills are especially important; Yee et al. (1994) have documented how counting subdivisions greatly enhances a subject's ability in rhythmic judgment and performance tasks. But along with its practical value there is another lesson to be taught here as well. As these skills all involve the perception and memory of musical patterns, time spent in the aural skills lab can also be used to demonstrate the way the ear and mind organize musical sound. Because the Takadimi system is consonant with a number of basic attributes of our perceptual faculties, one can use Takadimi as a means of contrasting "easy" and "difficult" patterns (that is to say, those which one can readily declaim versus those which one cannot), not only in terms of their musical complexity but in terms of their cognitive complexity. In so doing our students not only gain a musically useful skill; they also learn how music theory can provide a unique window onto the workings of the human mind.

²See, for example, Clynes and Walker 1982, Fraisse 1982, ten Hoopen et al. 1982, Shaffer et al. 1985, Dowling and Harwood 1986, Clarke 1987, Halpern 1988, Jones and Boltz 1989, Drake et al. 1991, Parncutt 1992, Drake and Palmer 1993, and London 1995.

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Strict Use of Analytic Notation

Steve Larson

This paper introduces a usefully restricted notation for rendering Schenkerian analyses, called "strict use" of analytic notation.¹ Strict use brings several pedagogical advantages to the teaching of Schenkerian analysis.²

¹Earlier versions of portions of this paper were presented to the 1989 annual meeting of the Texas Society for Music Theory and to the 1991 annual meeting of Music Theory Midwest.

For more on analytic notation, see V. Kofi Agawu, "Schenkerian Notation in Theory and Practice," *Music Analysis*, 8/3 (October 1989):275-301; Allen Forte, "Introduction to the English Edition," in Heinrich Schenker, *Free Composition: Volume III of New Musical Theories and Fantasies*, trans. and ed. by Ernst Oster (New York and London: Longman, 1979), xvii-xx; Sylvan Kalib, "Thirteen Essays from the Three Yearbooks *Das Meisterwerk in der Musik* by Heinrich Schenker: An Annotated Translation" (Ph.D. dissertation, Northwestern University, 1973), 186-211; William J. Mitchell and Felix Salzer, "A Glossary of the Elements of Graphic Analysis," *The Music Forum*, 1 (1967): 260-268; Gregory Proctor and Herbert Lee Riggins, "Levels and the Reordering of Chapters in Schenker's *Free Composition*," *Music Theory Spectrum*, 10 (1988):102-126; Herbert Lee Riggins, "Heinrich Schenker's Graphic Notation and Contemporary Variants," (Ph.D. dissertation, The University of Texas at Austin, 1981); Felix Salzer, *Structural Hearing: Tonal Coherence in Music* (New York: Charles Boni, 1952; reprinted, New York: Dover, 1962), Vol. 2, xii-xiv; and Felix Salzer, "Introduction to the Dover Edition," in Heinrich Schenker, *Five Graphic Music Analyses* (New York: Dover, 1968).

²Four textbooks have been written specifically to introduce the student to Schenker's analytic method: Allen Forte and Steven Gilbert, *Introduction to Schenkerian Analysis*, text and Instructor's Manual (New York: W. W. Norton, 1982); David Neumeyer and Susan Tepping, *A Guide to Schenkerian Analysis* (Englewood Cliffs, NJ: Prentice Hall, 1992); Salzer, *Structural Hearing*; and Gerald Warfield, *Layer Analysis: A Primer of*

An Analogy With Strict Counterpoint

Strict use may be best introduced by making an analogy: strict use relates to Schenkerian analysis as strict counterpoint relates to free composition. This analogy is based on three important principles that emerge when Schenker discusses the nature of musical hearing, the relation between simplicity and complexity, and the distinction between counterpoint exercises and "real music." (1) For Schenker, strict counterpoint should train the ear to the characteristic effects of tones by studying their movement quality in artifi-

Elementary Tonal Structures (New York: David McKay Co., Inc., 1976). While these textbooks do not employ the strict use proposed in this paper, some of the ideas presented in this paper were inspired by these textbooks. In particular, Forte and Gilbert begin with a limited set of symbols and gradually expand that set; it was this idea more than any other that led to this paper. Other inspirations for this paper came from Fred Lerdahl and Ray Jackendoff, *A Generative Theory of Tonal Music* (Cambridge, MA and London: MIT Press, 1983) and Peter Westergaard, *An Introduction To Tonal Theory* (New York: W. W. Norton, 1975).

For discussions of Schenker's ideas about theory pedagogy and for pedagogical ideas based on Schenker's theories, see Jack Adrian, "Pedagogically Speaking: On Studying Species Counterpoint Before Studying Harmony," *In Theory Only*, 8/2 (1984):15-19; David Beach, "Schenker's Theories: A Pedagogical View," in *Aspects of Schenkerian Theory*, ed. David Beach (New Haven and London: Yale University Press, 1983), 1-38; David Beach, "The Analytic Process: A Practical Demonstration—The Opening Theme from Beethoven's Opus 26," *Journal of Music Theory Pedagogy*, 3/1 (Spring 1989):25-46; Richmond Browne, "Initial Readings in Schenker," *In Theory Only*, 1 (1975):4-5; David Allen Damschroder, "Pedagogically Speaking: Structural Levels and the College Freshman," *In Theory Only*, 8/6 (1975):17-26; Allen Forte, "Introduction to the English Edition," in Schenker, *Free Composition*; Ernst Oster, "Preface to the English Edition," in Schenker, *Free Composition*; Karl Otto Plum, "Towards a Methodology for Schenkerian Analysis," trans. by William Drabkin, *Music Analysis*, 7/2 (1988):143-164; Herbert Lee Riggins and Gregory Proctor, "A Schenker Pedagogy," *Journal of Music Theory Pedagogy*, 3/1 (Spring 1989):1-24; John Rothgeb, "Strict Counterpoint and Tonal Theory," *Journal of Music Theory*, 19/2 (1975):260-281; John Rothgeb, "Schenkerian Theory: Its Implications for the Undergraduate Curriculum," *Music Theory Spectrum*, 3 (1981):142-149; William Rothstein, "The Americanization of Heinrich Schenker," *In Theory Only*, 9/1 (1986):5-17, reprinted in Hedi Siegel, *Schenker Studies* (Cambridge: Cambridge University Press, 1990):193-203; and William Rothstein, "The Americanization of Schenker Pedagogy?," *Journal of Music Theory Pedagogy*, 4/2 (1991):295-299.

cially restricted contexts. "The purpose of counterpoint, rather than to teach a specific style of composition, is to lead the ear of the serious student of music for the first time into the infinite world of fundamental musical problems."³ (2) He advocates progress in small steps from a set of narrowly defined simple rules toward a deeper understanding; more complex phenomena are explained as extensions of more basic phenomena. This progress is reflected both in the ordering of the species and in their explanatory relation to free composition. And (3) he repeatedly emphasizes the critical distinction between the artificial world of strict species exercises and the real world of free composition. "Counterpoint must somehow be thoroughly separated from composition if the ideal and practical verities of both are to be fully developed."⁴

The strict use of analytic notation proposed in this paper reflects all three of these principles. (1) The purpose of strict use, rather than to teach a specific style of analytic representation, is to lead the ear of the serious student of music into the infinite world of fundamental analytic questions. (2) Strict use progresses in small steps from a set of narrowly defined rules toward a deeper understanding; more complex analytic representations are explained as extensions of strict use. This progress is reflected both within the description of strict use and in its explanatory relation to Schenker's analyses. And (3) just as species counterpoint must be separated from free composition, strict use must be separated from Schenkerian analysis if the ideal and practical verities of both are to be fully developed.

A Description of Strict Use

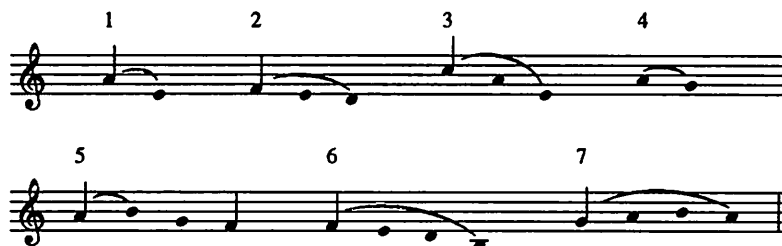
Strict use begins with two sets of rules for the use of analytic notation. The first set of rules governs the use of analytic notation on each individual graphic level of an analysis. The only symbols (in addition to clefs, staves, and accidentals) that may be used are

3 Heinrich Schenker, *Counterpoint: A Translation of 'Kontrapunkt' by Heinrich Schenker (Volume II of New Musical Theories and Fantasies)*, trans. John Rothgeb and Jürgen Thym, ed. John Rothgeb (New York: Schirmer, 1987), 10.

4 Ibid.

noteheads, stems, and slurs. Furthermore, these symbols are limited to specific configurations showing four types of embellishment figures (primary embellishment figures, secondary embellishment figures, double-stem figures, and combined figures). On each graphic level, each unstemmed notehead (an embellishing note) must either be attached by one slur to one stemmed notehead (the note that is embellished), or be contained within such a slur. Notes within the slur must consist entirely of steps or entirely of leaps. If the slur joins more than three notes, there may not be a change of direction. Thus, each graphic level unambiguously clarifies the embellishment function of every unstemmed notehead on that level. Example 1 illustrates these rules.

Example 1. Illustrations of rules governing the use of analytic notation on individual graphic levels of an analysis



The first three figures are allowed in strict use.

The remainder are prohibited:

4. Unstemmed notes must be attached by (or contained within) a slur to a *stemmed* notehead.
5. The G is not attached by (or contained within) a slur to a *stemmed* notehead.
6. This figure mixes steps and leaps under a single slur.
7. Figures longer than three notes may not change direction.

The second set of rules governs the relationships between graphic levels of an analysis. One of these rules says that all noteheads with stems—and only those noteheads with stems—that appear on any given analytic level must also appear on the next, more remote (that is, more abstract, closer to the background) level, as stemmed or unstemmed noteheads. Thus, if a note is represented as a stemmed notehead on a given level, then its embellishment function is clarified at some level closer to the background. Other rules in this second set concern such things as the alignment of levels, the status of inner voices, and the direction of stems.

After offering a taxonomy of embellishment figures and illustrating strict use with analytic examples, I conclude with examples that illuminate the level-dependent nature of harmonic rhythm, that suggest relations between dynamics and structure, and that clarify issues concerning internal consistency of analyses.

Before proceeding, however, a clarifying disclaimer is in order. Strict use is a set of rules governing analytic notation. It is not a theory of musical structure (although it may help to clarify or modify Schenker's theories). It is not a technique of analysis (it may ease and improve the creation of analyses, but its rules govern the representation, not the determination, of analytic relations). It is not an attempt to formalize or computerize Schenker's theories (although it may provide a useful point of departure for others whose interests lie in that direction). And its name (intended to reflect "strict counterpoint") is not intended to imply that other techniques lack strictness. It is, simply, a much needed theoretical clarification and a useful pedagogical tool.

A Classification of Embellishment Figures

Strict use begins by observing that musical motions can be classified by interval direction, interval size, and note order. Direction separates melodic intervals into those that:

- stay the same (repeat a note),
- move up, or
- move down.

Size separates melodic intervals into those that:

- move by common tone (repeat a note),
- move by step, or
- move by leap.⁵

Combining these criteria gives us the following table:

	stay	move up	move down
common tone	repeat	-	-
move by step	-	ascending step	descending step
move by leap	-	ascending leap	descending leap

Thinking of a simple melodic interval in which one note (the embellishing note) embellishes the other (the embellished note) suggests an additional criterion related to musical motion—order; an embellishing note may come before (a prefix embellishment) or after (a suffix embellishment) the note it embellishes. Strict use calls such simple pairs of notes “primary embellishment figures.”

Primary Embellishment Figures

All possible types of primary embellishment figures are listed and illustrated in Example 2. In strict use, these figures are unambiguously represented with two noteheads and one slur: the note that is embellished is given a stem, and the (unstemmed) embellishing note is attached to the (stemmed) embellished note with a slur. The size of the interval between stemmed and unstemmed notes (common tone, step, or leap) unambiguously indicates the type of em-

⁵For further references on the theoretical and psychological importance of this distinction between steps and leaps, see Steve Larson, “Scale-Degree Function: A Theory of Expressive Meaning and Its Application to Aural-Skills Pedagogy”, *Journal of Music Theory Pedagogy*, 7 (1993):69-84. For a musical example of the practical impact of this distinction, see Steve Larson, “Another Look at Schenker’s *Counterpoint*”, *Indiana Theory Review*, 15/1 (Spring 1994):35-52.

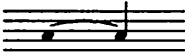
bellishment. For example, if you see a single unstemmed notehead attached to a following single stemmed notehead, and

- ... the interval connecting them is a unison, then it's an anticipation.
- ... the interval connecting them is a step, then it's a prefix incomplete neighbor.
- ... the interval connecting them is a leap, then it's a prefix embellishing leap.

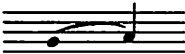
Example 2. Schematic representations of primary embellishment figures

Prefix embellishments:

by common tone
anticipation
(a prefix common tone)



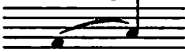
ascending by step
prefix incomplete
lower neighbor



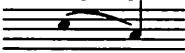
descending by step
prefix incomplete
upper neighbor



ascending by leap
prefix ascending
embellishing leap

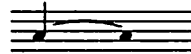


descending by leap
prefix descending
embellishing leap



Suffix embellishments:

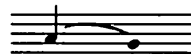
by common tone
repetition
(a suffix common tone)



ascending by step
suffix incomplete
upper neighbor



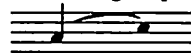
descending by step
suffix incomplete
lower neighbor



descending by leap
suffix descending
embellishing leap



ascending by leap
suffix ascending
embellishing leap



If a single voice is shown on a staff, then stemmed noteheads in the upper staff are stemmed up and stemmed noteheads in the lower staff are stemmed down, and slurs go the same direction as stems. If more than one voice is shown on a staff, then stem and slur direction is used to show membership in different voices (for example, one staff may show a structural soprano with stems up and a structural alto with stems down). Strict use does not provide a way of distinguishing between the incomplete neighbor and the incomplete passing tone—more on this below.

Example 3 illustrates the analytic notation of some of these primary embellishment figures in a familiar musical excerpt. (If one hears $\hat{3}$ as primary, then the first embellishment figure shown, in which C# is a prefix ascending embellishing leap, would have the stem on the other note, making the E a suffix ascending embellishing leap).

Secondary Embellishment Figures

Secondary embellishment figures are created by adding a notehead (or noteheads) between the stemmed and unstemmed noteheads of a primary embellishment figure. The added notes must consist entirely of steps or entirely of leaps. If more than one note is added, the added notes must not introduce a change of direction. If steps are added to an embellishing leap, then the embellishing leap must be completely filled by step (i.e., the steps must form an uninterrupted string of passing tones). Example 4 lists and illustrates every type of secondary embellishment figure that can be shown in strict use. In strict use, these secondary embellishment figures are unambiguously represented in analytic notation with three (or more) noteheads and one slur: the note that is embellished is given a stem, the (unstemmed) primary embellishing note is attached to the (stemmed) embellished note with a slur, and the (unstemmed) secondary embellishing note is contained within the slur attached to the (stemmed) embellished note.

Example 5 illustrates the analytic notation of some of these secondary embellishment figures in a familiar excerpt. The embellishment figure shown in Example 5a occurs on the surface of the mu-

Example 3. Primary embellishment figures in Mozart, Sonata for Piano in A major, K. 331, first movement, mm. 1-4

a)  prefix ascending embellishment leap

b)  suffix common tone

c)  prefix incomplete upper neighbor

d) 

sic, while those in Examples 5b and 5c occur on more remote levels of structure.

This classification suggests that secondary embellishment figures may be generated by a two-step process. For example, the passing tone that fills an embellishing leap may be generated by: (1) taking a single pitch and embellishing it with an embellishing leap, and then (2) filling in that embellishing leap with a passing tone. It is important to recognize that the symbols that identify such a passing tone actually represent—on one *graphic* level—several *analytic* levels of musical structure.⁶ One way to make this clear

⁶Carl Schachter, "A Commentary on Schenker's *Free Composition*," *Journal of Music Theory*, 25/1 (1981):115-142, discusses this point (see esp. 118-121). Schachter distinguishes between "layer" and "level," but Proctor and Riggins, "Levels and the Reordering of Chapters in Schenker's *Free Composition*," make a different distinction between the same two terms. A year later, Riggins and Proctor, "A Schenker Pedagogy," distinguish between "theoretical levels" and "notational levels" (p. 8).

Example 4. Schematic representations of secondary embellishment figures

a) fills an embellishing leap

by step passing tones: prefix ascending suffix descending	by leap arpeggiations: prefix ascending suffix descending
--	--

The first staff shows four measures of music. The first two measures are filled by step (passing tones), and the last two measures are filled by leap (arpeggiations). The second staff shows four measures of music, all filled by leap (arpeggiations).

NB: The passing tones shown fill a small embellishing leap (a third). Passing tones may also fill a larger leap.

b) fills an anticipation or repetition

by step above complete upper neighbor notes prefix suffix	by step below complete lower neighbor notes prefix suffix
--	--

The first staff shows four measures of music. The first two measures are filled by step above (complete upper neighbor notes), and the last two measures are filled by step below (complete lower neighbor notes). The second staff shows four measures of music, all filled by leap (arpeggiations).

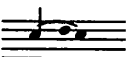
c) fills incomplete lower neighbor fills incomplete upper neighbor

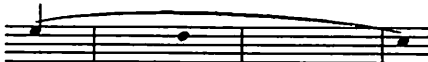
chromatic passing tones (all)*			
prefix ascending	suffix descending	prefix ascending	suffix descending

The first staff shows four measures of music. The first two measures are filled by step (chromatic passing tones), and the last two measures are filled by leap (arpeggiations). The second staff shows four measures of music, all filled by leap (arpeggiations).

* These schematic representations are notated without clefs. Adjustment of accidentals may be necessary in specific clefs.

Example 5. Secondary embellishment figures in Mozart, Sonata for Piano in A major, K. 331, first movement, mm. 1-4

a)  suffix upper neighbor

b)  suffix descending passing tone

c)  prefix ascending passing tone

d) 

Example 6. "Dot notation" (Lerdahl and Jackendoff, p. 19)

Beats:

1	2	3	4	1	2	3	4	1
•	•	•	•	•	•	•	•	•
•		•		•		•		•
•				•				•

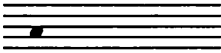
is to compare strict use with a different kind of notation, one that displays only one level of analytic structure on each graphic level. One such different kind of notation, shown in Example 6, is the "dot notation" described by Lerdahl and Jackendoff.⁷ In dot notation, beats (regularly recurring time-points) are represented by dots. The authors write that "for beats to be strong or weak there must exist a metrical hierarchy—two or more levels of beats. The relationship

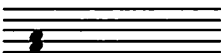
⁷Lerdahl and Jackendoff, *A Generative Theory of Tonal Music*—see the discussion of "The Metrical Hierarchy" that begins on page 18.

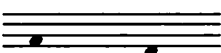
of 'strong beat' to 'metrical level' is simply that, if a beat is felt to be strong at a particular level, it is also a beat at the next larger level."⁸ Thus, dot notation displays one "metrical level" on each graphic level.

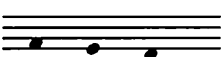
Analytic notation could display pitch relationships in a similar way, with only one analytic level shown on each graphic level. Example 7 does this with a structural analysis of a suffix descending passing tone. Example 7a shows a single pitch. Example 7b adds an inner voice. Example 7c horizontalizes the interval created in 7b; 7d fills in the horizontalized interval with a passing tone. If all graphic levels are shown, then no stems or slurs are required to make this analysis clear.

Example 7. Ultra-strict use showing only one structural level on each graphic level

a) 

b) 

c) 

d) 

⁸Ibid., 19. See also Maury Yeston, *The Stratification of Musical Rhythm* (New Haven and London: Yale University Press, 1976).

Example 8. The redundancy of strict use when showing only one structural level on each graphic level



Example 8 shows that, in the ultra-strict use of Example 7, stems and slurs would be redundant. The stem in Example 8b indicates the structural superiority of the original upper voice. But that information is redundant when we can compare Examples 8a and 8b; the appearance of the original note on both levels makes its structural superiority apparent. The slur in Example 8c shows that the lower note is an embellishing leap. But that information is redundant when we can compare Examples 8a, 8b, and 8c; if the original note is structurally superior and the added note is a leap-related inner voice, then the added note is an embellishing leap by definition. The stepwise motion of the note added in Example 8d shows that the added note is a passing tone. But, again, that information is redundant when we can compare Examples 8c and 8d; if the slurred interval is structurally superior and the added note fills it in by step, then the added note is a passing tone by definition. Because the other information is redundantly reproduced by the stems and slurs, Example 8d contains all the information displayed in

Examples 8a through 8d; it shows all those analytic levels on one graphic level.⁹

An ultra-strict display of pitch relationships such as Example 7—with only one analytic level of musical structure displayed on each graphic level—might at first glance seem advantageous. However, ultra-strict use is neither practical enough nor sufficiently clear for effectively displaying Schenkerian analyses. It is impractical because the number of graphic levels required for a long passage of music would make it difficult to display the levels together, and one of the main purposes of Schenkerian analysis is to show concisely relationships between levels. And it is not sufficiently clear: in some cases, some notation (such as stems and slurs) is required in order to identify clearly the function (e.g., passing tone versus embellishing leap) of notes that are removed (or added, depending on whether one thinks foreground-to-background or vice versa). Strict use more clearly specifies the voice-leading function of what simply appears as residue in ultra-strict use (e.g., in a many-voiced texture, ultra-strict use would make it possible to add or remove notes without being able to see to which voice they were added or from which voice they were removed).

Double-Stem Figures

Primary and secondary embellishment figures are displayed with only one stemmed note. But some embellishment figures involve two structural tones, and thus must be represented with a figure that has two stemmed notes. Embellishment figures that are best represented this way may be called double-stem figures. One such figure is the suspension. Another is the passing tone that fills an interval between two different notes, each of which is harmonized by a different chord.

Classifying a note as a suspension requires criteria not yet mentioned. One of these is metric placement. Usually, metric place-

⁹The ultra-strict use shown in Example 7 differs from the "prolongational reductions" of Lerdahl and Jackendoff. It more closely resembles examples in Westergaard, *An Introduction To Tonal Theory*.

ment is implicit in the classification of common-tone embellishments as either prefix common tones (called “anticipations”) or suffix common tones (simply called “repetitions”).¹⁰ But not all suffix repetitions are suspensions. In fact, the definition of a suspension requires that we think of it not as embellishing a single pitch (which would prevent us from classifying it as a primary or secondary embellishment figure), but as a specific rhythmic treatment of a pair of notes.

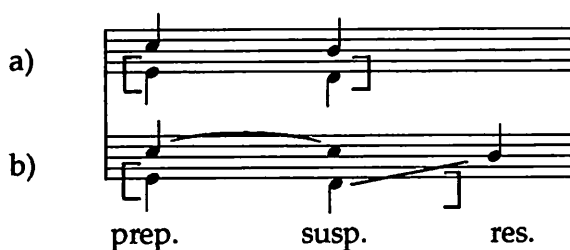
Example 9 shows how strict use represents a suspension figure. This example shows an analysis on two graphic levels. Example 9b shows the suspension figure (upper voice) as three elements: a structural preparation (stemmed), a less structural suspension (unstemmed and attached to the preparation, showing that the suspension is a suffix common-tone embellishment), and a structural resolution (stemmed). No slur attaches the suspension to its resolution. Remember that “less structural” does not necessarily mean “dissonant”; there are consonant suspension figures. Example 9a is a reduction of Example 9b. Only the stemmed notes of Example 9b appear in 9a. The suspension figure has been normalized; Example 9a suggests that the resolution belongs where the suspension occurred.¹¹

Passing tones that fill an embellishing leap are represented as secondary embellishment figures, but passing tones may also appear between two notes that do not form an embellishing leap. (The latter arises in the traditional second species, but the former does not appear until third species.) Example 10 shows a passing tone that fills an interval between two different notes, each of which is harmonized by a different chord. For reasons having to do with harmonic rhythm (discussed in more detail below), it may be best to avoid slurs altogether for the passing tone that does not fill a primary embellishment figure; such notes could simply be labeled “P.”

¹⁰This is because metric placement can determine that we hear a single pitch in terms of its repetition—see Westergaard, *An Introduction To Tonal Theory*, Chapter Seven.

¹¹William Rothstein, “Rhythmic Displacement and Rhythmic Normalization,” in *Trends in Schenkerian Research*, ed. Allen Cadwallader (New York: Schirmer Books, 1990), 87-113.

Example 9. Schematic representation of a suspension



Example 10. Schematic representation of the passing tone filling an interval between two different notes, each of which is harmonized by a different chord



Combined Figures

Strict use allows the combination of embellishment figures; under certain circumstances, a single stemmed note can share two or more embellishment figures without confusion. Example 11 gives schematic representations of a few such combinations of embellishment figures.

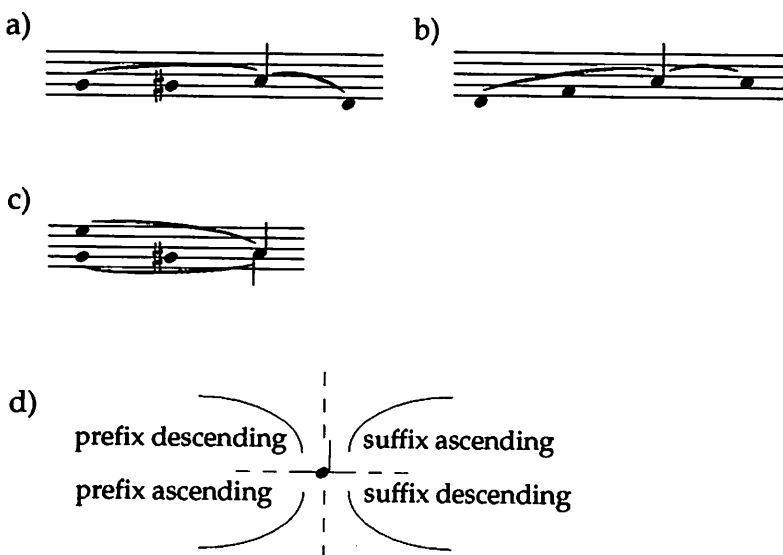
Examples 11a and 11b show combinations of a prefix embellishment and a suffix embellishment. Example 11a shows a prefix incomplete lower neighbor filled with a chromatic passing tone combined with a suffix descending embellishing leap. Example 11b

shows a prefix ascending embellishing leap filled with an arpeggiation combined with a suffix common tone. Because the stemmed note separates the embellishing notes into "before" and "after," the meaning of the figures remains clear.

Example 11c shows a combination of upper and lower embellishments. The upper slur in Example 11c shows a prefix embellishing leap, and the lower slur shows a prefix incomplete lower neighbor note filled with a chromatic passing tone. Because the doubly stemmed note separates the embellishing notes into "above" and "below," the meaning of the figures remains clear.

Taken together, these examples suggest that as many as four embellishment figures could be combined and their meaning still remain clear; where inner voices do not complicate the display, slurs could come from any of the notehead's four quadrants shown in Example 11d. Example 12 summarizes the four types of embellishment figures.

Example 11. Schematic representations of combined figures



Example 12. Summary of embellishment figures

PRIMARY EMBELLISHMENT FIGURES: two noteheads, one of them stemmed, with one slur attaching them.

SECONDARY EMBELLISHMENT FIGURES: at least three noteheads, the first or last of them stemmed, with one slur attaching the first and last (thus, noteheads in the middle — all steps or all leaps — are contained within the slur).

DOUBLE-STEM FIGURES: at least three noteheads, two of them stemmed.

COMBINED FIGURES: at most one slur per stemmed notehead quadrant.

Rules for Combining Graphic Levels

In strict use, the embellishing function of every note must be interpreted.¹² To interpret a note is to show how it depends on other more structural notes. Strict use can show that a note depends on another more structural note in two ways: (1) by representing it as an unstemmed note that is attached by or contained within a slur to a stemmed note, or (2) by representing it as an (unstemmed or stemmed) inner voice of a stemmed note (that is, by aligning it vertically under a stemmed upper-voice note or above a stemmed

¹²Mitchell and Salzer, "A Glossary of the Elements of Graphic Analysis," point out the importance of interpreting all notes, suggesting that a feature of good analytic notation is that no noteheads are left unattended (p. 261). But see Riggins, "Heinrich Schenker's Graphic Notation and Contemporary Variants," p. 226, for a discussion of unattended noteheads in Mitchell and Salzer.

lower-voice note). A given level interprets only its unstemmed notes. In order to interpret the stemmed notes, another level is required. In fact, in strict use, every note that is stemmed on one level must appear on the next more remote level (and no note that is unstemmed on one level appears on the next more remote level).

The Meaning of Slurs in Analytic Notation

Slurs in strict use indicate only one thing: which notes embellish which other notes. Thus slurs in strict use differ from slurs in traditional durational notation and differ from slurs in Schenker's analytic notation. In durational notation, slurs may mean a variety of things. Schenker argued that poor editorial practices have obscured the meaning of slurs in durational notation—sometimes indicating legato, sometimes indicating phrase boundaries.¹³ Sometimes slurs in durational notation indicate which notes "go to" other notes. When we say one note "goes to" another, we may be speaking of a musical gesture, an articulation, or a voice-leading connection. Schenkerian analytic notation often uses slurs to show these types of "goes to" relationships. A slur used to indicate that two notes belong to the same "voice" may show a voice-leading connection between two notes that do not belong to a single embellishment figure.

But strict use does not use slurs to show musical gesture, articulation, or even voice-leading connections. In strict use, voice-leading connections are shown in other ways (e.g., by stem direction or by step relations on more remote levels). The slurs indicate only which notes embellish which notes by showing notes that "go with" (or better still, "belong with") other notes.

By underscoring the importance of distinguishing between "goes to" and "goes with," Forte and Gilbert take an important step in

¹³Heinrich Schenker, "Weg mit dem Phrasierbogen," *Das Meisterwerk in der Musik*, Jahrbuch I (Munich: Drei Masken Verlag, 1925), 41-60, reprinted in facsimile (Hildesheim: Georg Olms Verlag), and translated as "Let's Do Away with the Phrasing Slur" in Sylvan Kalib, "Thirteen Essays from the Three Yearbooks *Das Meisterwerk in der Musik* by Heinrich Schenker," Vol. 2, 52-83.

clarifying the use of slurs in analytic notation (see the portion of their Instructor's Manual that is reproduced in Ex. 13).¹⁴

Example 13. Forte and Gilbert, comments on slurs in analytic notation

Cautionary note #2: Be prepared for small problems that may arise in connection with melodic skips. A typical instance is shown in Example A. Two analyses of the passage at (1) are given at (2) and (3). Which is correct? The first shows a neighbor-note pattern, the second a series of consonant skips. Answer: the second analysis, at (3). The second note of each pair is still governed by the same bass note, and is thus understood as belonging to the first as its diminution. To be sure, there is a stepwise relation between the second and third notes, the fourth and fifth notes, and so on, but that is secondary. The reading at (2), on the other hand, distorts the correct structural associations by wrongly emphasizing the secondary stepwise relation. However, in the setting of a similar configuration at (4), the reading of neighbor-note diminutions is correct. There the bass coincides with the accented upper neighbor note (*appoggiatura*) each time, and the dependency of that note upon the following one is made clear by the bass. In this situation it is the skips which are secondary--and so, this time, reading a series of consonant skips would be incorrect. Informally, it should be pointed out that the main use of slurs in analytic notation, even at this elementary stage, is to show that things go with other things, rather than to them.

Such distinctions, which may seem academic both to instructor and student at this point, are often crucial in later analytical work.

Example A

The musical notation for Example A consists of four staves, each representing a different analytical reading of a melodic passage. The notation is in treble and bass clefs, with a key signature of one sharp (F#). The passage is divided into four measures. (1) shows a neighbor-note pattern with slurs. (2) shows a series of consonant skips with slurs. (3) shows a series of consonant skips with slurs. (4) shows a series of neighbor-note diminutions with slurs.

Used by permission of W. W. Norton and Company. Forte and Gilbert, *Instructor's Manual for Introduction to Schenkerian Analysis* (New York: W. W. Norton, 1982), pp. 10-11.

¹⁴Forte and Gilbert, *Introduction to Schenkerian Analysis*, Instructor's Manual, 10-11.

Unfortunately, the text does not always follow the advice of the Instructor's Manual. For example, on page 28, the authors discuss relationships shown in their Example 21 (reproduced here in Ex. 14).

Examples 15a and 15b analyze this passage in strict use. The use of two levels clarifies the function of each note and allows the slurs to show more clearly how notes "go with" (or rather, "belong

Example 14. Brahms, *Rhapsody in Eb major*, Op. 119, No. 4, mm. 1-4:
Discussion from Forte and Gilbert, p. 28

The main purpose of the next example, Example 21, is to illustrate the *consonant passing note* (CP). This is a note that could be simply a passing dissonance above the bass, but is highlighted and given special emphasis by consonant support. Thus, in m. 2 of Example 21, the passing tone G connecting the upper and lower neighbor notes of G is supported by Eb, which makes the interval between upper voice and bass a consonant 10th instead of the dissonant 7th which would have been formed (as G over Ab) had the bass not changed. Similarly, in m. 3 the passing note F in the upper voice is given its own bass note. The F on the downbeat of m. 4 is an indirect passing note that relates back to the main note G on the downbeat of m. 3. Thus, the small motion in the upper voice of m. 3, G-F-Eb, is repeated in expanded form by G (m. 3)-F-Eb (m. 4), the latter indicated by the stemmed notes.

EXAMPLE 21. Brahms, *Rhapsody in Eb major*, Op. 119, No. 4

a. *Allegro risoluto*

b.

Used by permission of W. W. Norton and Company. Forte and Gilbert, *Introduction to Schenkerian Analysis* (New York: W. W. Norton, 1982), p. 28.

with") other notes. Example 15a shows that Ab is a neighbor note to the G of measures 1 and 3. Example 15b shows how the G in measure 2 and the F in measure 3 are, as the text points out, passing tones made consonant by the addition of a less structural harmony (this analysis also shows that the F in measure 1 is a neighbor note made consonant by the addition of a less structural harmony). The text describes the Ab and F of measure 2 as "upper and lower neighbors of G." Examples 15c and 15d present a slightly different reading that shows this double-neighbor pattern.

Example 15. Brahms, Rhapsody in Eb major, Op. 119, No. 4, mm. 1-4:
A strict-use analysis

The image displays four staves of musical notation, labeled a) through d), representing different harmonic analyses of the first four measures of Brahms' Rhapsody in Eb major, Op. 119, No. 4. Each staff shows a single melodic line in treble clef with a key signature of three flats (Eb major).
 - Staff a) illustrates a double-neighbor pattern where Ab in measure 2 acts as a neighbor to the G notes in measures 1 and 3.
 - Staff b) shows the G in measure 2 and the F in measure 3 as passing tones, made consonant by the addition of less structural harmony. It also identifies the F in measure 1 as a neighbor note.
 - Staff c) and d) present alternative readings of the double-neighbor pattern, showing how the same melodic sequence can be interpreted differently through harmonic analysis.

The Roles of Top-Down and Bottom-Up Thinking in Analysis

Because strict use indicates *only* embellishment function—that is, it shows (completely and hierarchically) which notes embellish which notes—it can clarify theoretical issues in analysis such as the roles of harmony and counterpoint, the roles of bottom-up and top-down thinking, and the roles of transformation and reduction.

At first glance, strict use may seem overly reductionist. It may appear that with strict use one follows a simple recipe, working from the foreground to the background—that is, from the bottom up, rather than from the top down.¹⁵ But it seems clear that both approaches (as well as some complicated combinations thereof) characterize the discovery methods of good analysts. Schachter, after discussing examples of consonant embellishment, explains why this is so:

What this means is that one can never hope to arrive at a correct view of the background by simply making a “reduction” of the foreground, for example, by eliminating dissonances, chromatics, or non-tonic notes. Without some sense of the background, one can’t begin to understand the foreground; it might be precisely those dissonant or chromatic elements a reduction would eliminate that form the “background” of a passage. But if one needs to understand the background to make sense of the foreground, one also needs to understand the foreground to make sense of the background—a seemingly hopeless impasse. Actually it’s a heuristic problem that confronts people all the time and in areas far removed from musical analysis: one can grasp neither the part without the whole nor the whole without the part.¹⁶

Analysis (and presumably the learning of analysis) involves a constant interaction of top-down and bottom-up approaches.¹⁷

¹⁵Riggins and Proctor, “A Schenker Pedagogy” suggest an essentially top-down approach for the pedagogy of Schenkerian analysis. For a response, see Rothstein, “The Americanization of Schenker Pedagogy?”. Neumeyer and Tepping, *A Guide to Schenkerian Analysis*, also advocate an essentially top-down approach.

¹⁶Schachter, “A Commentary on Schenker’s *Free Composition*,” 132.

¹⁷William Benjamin, “Schenker’s Theory and the Future of Music,” *Journal of Music Theory*, 25 (1981):155-173, writes that Schenker’s “theory provides a rich array of techniques which allow for the rational

To the extent that it encourages a purely bottom-up approach, strict use is thus problematic. But it must be remembered that strict use is a method of depicting musical relationships rather than a method of discovering them. Strict use may be used to display the results of analyses that combine any mixture of bottom-up and top-down approaches.

The following analyses (of Mozart's Sonata for Piano, K. 331, first movement, mm. 1-8; Schubert's Impromptu in Bb major, Op. 142, No. 3, theme, mm. 1-8; and Schumann's "Aus meinen Tränen spriessen," *Dichterliebe* No. 2) show some of the advantages of strict use. They illuminate the level-dependent nature of harmonic rhythm, relations between structure and performance, and internal consistency.

Harmonic Rhythm as a Level-Dependent Phenomenon

The first eight measures of Mozart's Sonata for Piano, K. 331, first movement, are given in Example 16. The strict-use analysis in Example 17 illustrates the level-dependent nature of harmonic rhythm.¹⁸

reconstruction of the piece being 'analyzed', a reconstruction which proceeds from the middleground, or product of creative synthesis (composition)[.] to the repertory piece by virtue of these techniques" (p. 159). This process combines top-down and bottom-up approaches because it is constrained both by the forms of the *Ursatz* and by the surface of the music. See also William Benjamin, "Models of Underlying Tonal Structure: How Can They Be Abstract and How Should They Be Abstract?," *Music Theory Spectrum*, 4 (1982):28-50.

¹⁸In Example 17, the original tenor voice (which basically prolongs E) has been omitted. Downward stems on the upper staves show an alto voice (the structural alto of Ex. 17b, mm. 1-3, consists of notes that were part of the soprano voice in Ex. 17c; yet the structural alto of Ex. 17b, m. 4, consists of notes that were part of the alto voice in Ex. 17c). Any reasonably consistent analysis can be shown in strict use. The analysis in Example 17 differs only slightly from Schenker's. Schenker's analysis appears in "Fortsetzung der Urlinie-Betrachtung," *Das Meisterwerk in der Musik*, Jahrbuch I, 185-205, reprinted in facsimile (Hildesheim: Georg Olms Verlag), and translated as "Resumption of Urlinie Considerations" in Kalib, "Thirteen Essays from the Three Yearbooks *Das Meisterwerk in der*

Example 16. Mozart, Sonata for Piano in A major, K. 331,
first movement, mm. 1-8

Andante grazioso

5

Musik by Heinrich Schenker," Vol. 2, 130-155. According to Schenker's analysis, the second (instead of the first) bass notes in mm. 1-2 should be stemmed (this stemming would emphasize the parallel tenths between outer voices—duplicating the stems-down alto of Ex. 17b—and de-emphasizes the A-G#-A neighbor-note motion).

The notation "leads/follows" in Example 17b indicates that the upper voice has the leading linear progression and that the lower voice has a subordinate line that follows in tenths. (The upper linear progression prolongs a chord to which both its beginning and ending notes belong; the subordinate lower line ends on a note of this chord, but, because it follows in tenths, begins with a note not in the chord prolonged.) On leading and following progressions, see Schenker, *Free Composition*, 78-80.

Example 17. Mozart, Sonata for Piano in A major, K. 331,
first movement, mm. 1-8: A strict-use analysis

The image displays a musical score for the first movement of Mozart's Sonata for Piano in A major, K. 331, measures 1-8. The score is presented in three systems, labeled a), b), and c), which are grouped by a large brace underneath. Each system consists of a grand staff (treble and bass clefs) with a key signature of two sharps (F# and C#). System a) shows the initial measures with a large slur over the first four measures. System b) is labeled 'leads' and shows the continuation of the melody. System c) is labeled 'follows' and shows the final measures. The notation includes various musical symbols such as notes, rests, slurs, and ties, indicating the melodic and harmonic structure of the piece.

Rothstein, in "Rhythmic Displacement and Rhythmic Normalization", has shown that Schenker's analytic notation often makes interesting, albeit implicit, observations about rhythm through the vertical alignment of graphic levels. Strict use requires the vertical alignment of noteheads and stems at various levels and so makes consistent statements about rhythm that can be clearly perceived and understood. For example, in Example 17b, the soprano D of m. 4 is "realigned" with the bass D; this suggests that rhythmically it belongs with the bass, but is displaced in Example 17c by the prefix incomplete upper neighbor note, E. A similar realignment, at a more remote level of structure, takes place between Examples 17a and 17b: in Example 17b the soprano C# does not appear until m. 4, but the appearance of this C# in Example 17a on the downbeat of m. 3 suggests that the ascending third of mm. 3-4 delays a C# that belongs in m. 3.¹⁹

In strict use, slurs used for "belongs with" can show a level-dependent harmonic rhythm (provided that passing tones that fill an interval between two different stemmed notes, each of which is harmonized by a different chord, are not contained within a slur, but instead identified with a "P"). Consider mm. 1-4 of Example 17c. The slurs show the harmonic rhythm of that level; each new prolonged tenth represents a dotted-quarter-note beat. Perhaps "harmonic rhythm" is a misnomer here; while chords change inversion on the second halves of mm. 1 and 2, the harmonies themselves do not change. However, while something like "event rhythm" or "contrapuntal rhythm" might be a better term, the point is that such terms specify a rhythm of events in some model of tonal structure at a specific level. Whatever they are called, these rhythms help generate the fluctuating tension and release that give expres-

¹⁹Carl Schachter has written a series of articles on rhythm and linear analysis: "Rhythm and Linear Analysis: A Preliminary Study," *The Music Forum*, 4 (1976):281-334; "Rhythm and Linear Analysis: Durational Reduction," *The Music Forum*, 5 (1980):197-232; and "Rhythm and Linear Analysis: Aspects of Meter," *The Music Forum*, 6/1 (1987):1-59. These articles also use vertical alignment to make some interesting statements about rhythm (for a revealing discussion of striking syncopations at various metric levels, see the second of these articles, pp. 215-222—the discussion of Beethoven's Op. 14, No. 1).

sive direction to tonal music. In Example 17b, the slurs identify the one-measure tonic-dominant-tonic rhythm of that level (but note the extension of the one-measure duration of m. 3 into m. 4). In Example 17a, where the contrapuntal function of the second measure is identified, the slurs identify the three-measure duration of the initial tonic prolongation.

Structure and Interpretation

The clarity with which strict use displays embellishment function and the degree to which it graphically separates analytic levels help it to illuminate relationships between analysis and performance. Example 18 is the first eight measures of Schubert's *Impromptu* in Bb major, Op. 142, No. 3. The strict-use analysis of this score in Example 19 can be used to illustrate relationships between analysis and performance.²⁰ One symbol requires special comment, however. In Example 19a, m. 4, the symbol "IP" signifies an "incomplete passing tone." When a linear progression (such as the third progression D-C-Bb of mm. 5-8) is interrupted at $\hat{2}$ (as in mm. 1-4), the result is always an incomplete passing tone.²¹ In strict use, the incomplete passing tone is indistinguishable from a suffix incomplete neighbor note. When beams are used for linear progressions and interruptions shown with parallel lines (/ /), this problem disappears.

²⁰Actually, the analysis departs from strict use, but only in ways that are clear: in Example 19c, stem direction indicates inner voices; implied notes are shown in parentheses; common-tone repetitions are not shown; and register has been altered. Another way to say this is to assert that one or two graphic levels closer to the piece could be created in strict use, and that their content is obvious from a comparison of Example 19c and the score (Ex. 18).

²¹Forte and Gilbert, *Introduction to Schenkerian Analysis* correct a reading of one example by saying that "specifically, Eb would then have to be understood as the first and perhaps unique instance of a new kind of passing note: the incomplete passing note!" (p. 59). In light of the ubiquity of interrupted progressions, this remark seems questionable. See Schenker, *Free Composition*, 37.

Viewing dynamics as a response to the motion quality of the music (rather than as a mechanical “get louder here—get softer there” approach), one may associate dynamics with each of the voices of each level of Example 19. Appropriate dynamics will vivify the ways in which the music of a given level departs from the music of underlying levels. For example, if the neighbor-note figure D-Eb-D in mm. 1-3 of Example 19b is performed with a swell, the reduction of tension that results from returning to the more stable D is felt as an appropriate reduction in dynamic intensity. Of course, other interpretations are possible, but the point here is to explore the result of this appropriate choice in terms of the relations it projects.²²

The melodic shapes of right and left hand move in an interdependent way. At the level of Example 19c, the left-hand measures group in twos, moving in simple melodic arcs. At the same time, the right-hand measures tend to group in fours, moving to and from the Eb of m. 2 and concluding with the motive D-C-F (the notes with stems bracketed in mm. 3-4). (The main reason that the contours of the right and left hand group these four measures differently has to do with the locations of leaps and steps within and across the barlines.) If the performer brings out the interdependent dynamic paths of the two hands, the left hand may tend to emerge where it has the same D-C-F motive—a nice anticipation, or “hidden repetition,” of the right-hand motive that follows in mm. 3-4. In fact, the D-C-F motive appears again as the last three notes of the phrase in the foreground of m. 4, where Schubert adds a distinctive ornament that connects $\hat{2}$ down to the inner voice, D-C-F (see Ex. 19d). This distinctive ornament becomes a source of diminution in Variation 2 (as shown in Ex. 20.) In mm. 7-8, the D-C-F motive is transposed to sound G-F-Bb. (This may explain why the G and F appear an octave higher at the end of the phrase—see Ex. 19e.)²³

²²For another view of the Schubert theme, see Alexandra Pierce, “Climax in Music—Structure and Phrase (Part III),” *In Theory Only*, 7/1 (1983): 3-30.

²³John Rothgeb (letter to author) points out that the three-note shape D-C-F of the bass (mm. 1-2) is also echoed by the Eb-D-G shape of the soprano (mm. 2-3), dovetailing these shapes (and that the association

Example 18. Schubert, Impromptu in Bb major, Op. 142, No. 3,
theme, mm. 1-8

Andante

The musical score is presented in three systems. The first system (measures 1-2) begins with a treble clef, a key signature of two flats (Bb major), and a 3/4 time signature. The tempo is marked 'Andante' and the dynamics 'p'. The melody in the right hand starts on a half note Bb, followed by quarter notes D, C, and Bb. The left hand provides a steady accompaniment of eighth notes. The second system (measures 3-4) continues the melody with a half note G, followed by quarter notes F, E, and D. The left hand accompaniment remains consistent. The third system (measures 5-6) shows the melody moving to a half note C, followed by quarter notes Bb, A, and G. The piece concludes in measure 8 with a double bar line and repeat dots.

between C-F in the bass of m. 2 and Bb-Eb in the bass of m. 3 further bridges the seam between the two 2-bar subphrases). But he finds the interplay of four-note shapes (e.g., D-G-C-F in the soprano of mm. 3-4) a more compelling aspect of motive in this theme. (I would add that the diminution that begins Variation 2—see Ex. 20 again—supports the argument that G plays an important role in the D-G-C-F shape of the soprano in mm. 3-4.) Whether the analyst selects the three-note shape, the four-note shape, or both, this selection becomes more relevant to the performer when strict use of analytic notation makes the selection more vivid.

Example 19. Schubert, Impromptu in Bb major, Op. 142, No. 3, theme, mm. 1-8: A strict-use analysis

The image shows a musical score for Schubert's Impromptu in Bb major, Op. 142, No. 3, theme, mm. 1-8. The score is divided into five parts: a) the original notation with a first ending bracket labeled 'IP'; b) the original notation with a second ending bracket; c) the original notation with a third ending bracket labeled 'D C F'; d) a diagrammatic representation of the first ending bracket labeled 'D C F'; e) a diagrammatic representation of the second ending bracket labeled 'G F Bb'.

It is an appealing aspect of strict use that it can highlight the ways in which the relations between dynamics and structure not only produce insight into interpretation, but also have the effect of bringing out an elegant hidden repetition. The question (inevitably) arises as to how much such things should be emphasized in performance. One excellent recording of the Impromptu answers this question by shaping the theme according to these dynamics in an attractive but unexaggerated way—but then brings out this hidden repetition with striking clarity in the first variation.²⁴

²⁴Vladimir Horowitz, *The Studio Recordings*—New York 1985, Deutsche Grammophon 419 217.

Example 20. Schubert, Impromptu in Bb major, Op. 142, No. 3,
Variation 2, mm. 1-8.

VAR. II

The musical score for Variation II of Schubert's Impromptu in Bb major, Op. 142, No. 3, measures 1-8, is presented in four systems. The key signature is Bb major (two flats) and the time signature is 3/4. The score is written for piano (p) and includes dynamic markings such as *p*, *cresc.*, and *p*. The notation features complex rhythmic patterns, including sixteenth and thirty-second notes, and various articulations like accents and slurs. The bass line consists of chords and single notes, while the treble line contains more intricate melodic passages. The score concludes with a double bar line and repeat dots.

Internal Consistency

Although Schenker's analysis of Schumann's song "Aus meinen Tränen spriessen" from *Dichterliebe* has been much discussed, it was not until I attempted to render it in strict use that I noticed that this analysis seems internally inconsistent.²⁵ The score is given in Example 21. Schenker's analysis of this song, his Figure 22b, is reproduced in my Example 22.

Examples 23 and 24, in strict use, render contradictory interpretations of Schumann's song; yet both interpretations are derived from different parts of Schenker's analysis of the same measures. Example 23 asserts that the vocal C# in m. 2 (on the syllable "en") is a "consonant passing tone" between the D in m. 2 (on the syllable

²⁵It forms the centerpiece of Allen Forte, "Schenker's Conception of Musical Structure," *Journal of Music Theory*, 3/1 (1959):1-30; which was reprinted in *Readings in Schenker Analysis and Other Approaches*, ed. Maury Yeston (New Haven: Yale University Press, 1977), 3-37; excerpted in *Dichterliebe: An Authoritative Score, Historical Background, Essays in Analysis, Views and Comments* (Norton Critical Scores), ed. Arthur Komar (New York: W. W. Norton and Company, 1971), 96-106; and highlighted in Browne, "Initial Readings in Schenker." Arthur Komar, "The Music of *Dichterliebe*: The Whole and Its Parts," in *Dichterliebe: An Authoritative Score*, 63-94, reviews Schenker's analysis, considers Forte's alternative reading, and offers an alternative reading of his own. Joseph Kerman, "How We Got Into Analysis, and How to Get Out," *Critical Inquiry*, 7/1 (1980): 311-331, reviews Schenker, Forte, and Komar. David Neumeyer, "Organic Structure and the Song Cycle: Another Look at Schumann's *Dichterliebe*," *Music Theory Spectrum*, 4 (1982):92-105, motivated by his analysis of "feeling references" in this and in the preceding song, suggests a correction of Schenker's reading. Forte and Gilbert, *Introduction to Schenkerian Analysis* offer yet another reading in their Instructor's Manual (pp. 45-46). Agawu, "Schenkerian Notation in Theory and Practice," discusses Schenker's reading in detail. Joseph Dubiel, "'When You Are a Beethoven': Kinds of Rules in Schenker's *Counterpoint*," *Journal of Music Theory*, 34/2 (1990):291-340, discusses an apparent contradiction in the song's second measure (the apparent contradiction that Dubiel discusses is less an internal inconsistency and more a contradiction between what we might expect and what Schenker offers—in any case, it is not the same contradiction that I discuss). And William Drabkin, "Schenker, the Consonant Passing Note, and the First-Movement Theme of Beethoven's Sonata Op. 26," *Music Analysis*, 15/2-3 (1996): 149-189, begins his article by returning to Schenker's reading of this piece.

Example 21. Schumann, "Aus meinen Tränen spriessen,"
Dichterliebe No. 2

Nicht schnell.

Aus mei - nen Trä - nen sprie - ßen viel blü - hen - de Blu - men her -

vor, und mei - ne Heuf - ser wer - den ein Nach - ti - gal - len - chor. Und

wenn du mich lieb hast, Kind - chen, schenk' ich dir die Blu - men all, und ver

dei - nem Fen - ster soll kün - gen das Lied der Nach - ti - gall.

ritard.

Example 22. Schumann, "Aus meinen Tränen spriessen,"
Dichterliebe No. 2: Schenker's analysis
(from *Free Composition*, Figure 22b)

Schumann, "Aus meinen Tränen spriesst" (*Die Lärche*, no. 2)

b)
The score is for a voice and piano piece. It consists of three systems. The first system shows the vocal melody and piano accompaniment. The second system continues the melody and accompaniment. The third system shows the vocal melody and piano accompaniment, with a final chord marked 'A 2'.

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Example 23. Schumann, "Aus meinen Tränen spriessen,"
Dichterliebe No. 2: A strict-use analysis of mm. 1-4
 (agrees with *Free Composition*, Figure 22b, lowest level)

a)

I ————— V I

b)

I IV V I V I

Example 24. Schumann, "Aus meinen Tränen spriessen,"
Dichterliebe No. 2: A strict-use analysis of mm. 1-4
 (agrees with *Free Composition*, Figure 22b, middle level)

a)

I ————— V I

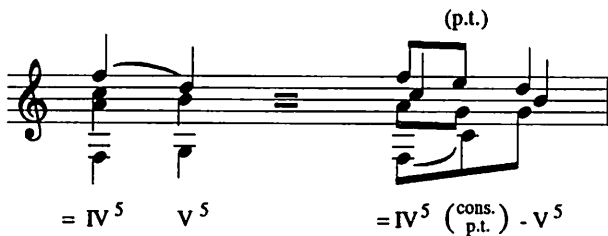
b)

I IV ("I" —) V I

"spriess-") and the B in m. 3 (on the syllable "blü-"). Although Schenker does not offer Figure 134,1 of *Free Composition* (reproduced here as my Ex. 25) as an explanation of his Figure 22b, it explains the voice-leading origin of this vocal C#; it is a "consonant passing tone."

Schenker offers Figure 134 to illustrate "fifth-relationships which lack the significance of harmonic degrees." His comment on Figure 134,1 makes it clear that the E in his example (and the C# in Ex. 23, m. 2) is structurally subservient to the notes that surround it. "When the bass moves stepwise upward and the upper voice starts from the octave position, a skip results in the upper voice; if this is filled in by a passing tone, an ascending fifth can be interpolated, which makes the passing tone consonant."²⁶ Example 23b shows the structural subservience of this C# by its containment within the slur D-B; this reading is consistent with mm. 1-4 of the lowest level of Schenker's Figure 22b. (And in fact, Schenker's depiction on the middle level of Figure 22b of the return of this passage in mm. 12-15 clearly shows the hierarchical relations shown in Ex. 23.) All the notes with stems, and only the notes with stems, in Example 23b appear in Example 23a. Thus, this consonant passing tone C# does not appear in Example 23a. Furthermore, since the bass D of m. 2

Example 25. Schenker, *Free Composition*, Figure 134,1



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²⁶Schenker, *Free Composition*, 115.

(representing IV) in Example 23b functions as a neighbor note to the E of m. 3 (representing V), it cannot appear in Example 23a unless the E also appears, because it is less structural than the E. The slurs in Example 23a, mm. 1-3, show that the initial C# (of m. 1) is prolonged by a motion to an inner voice. This prolongation is indicated by a similar slur on the lowest level of Schenker's Figure 22b. Furthermore, it is consistent with the Roman numerals below that level. As Forte observes, "The long slur from I to I indicates that the IV and V chords lie within the control of that chord, while the abbreviation *Vdg.* (*Vordergrund*) shows that the succession belongs to the foreground."²⁷

Example 24 contradicts Example 23. This analysis asserts that the same vocal C# in m. 2 (on the syllable "-en") is a "consonant passing tone" between the vocal D in m. 2 (on the syllable "spriess-") and a different B—the vocal B in m. 4 (on the syllable "-vor"). Example 24a shows the structural subservience of this C# by its containment within the slur D-B. But strict use requires that all the notes that appear in Example 24a also appear with stems in Example 24b—and that only those notes appearing on both levels have stems in Example 24b. Thus Example 24b must show the vocal B-A of m. 3 ("blühende Blumen") as less structural than the vocal C# of m. 2 ("-en" and "viel"). Furthermore, since the bass D of m. 2 (representing IV) in Example 24a functions as a neighbor note to the E of m. 4 (representing V), it must be more structural than the E and A (of m. 3) that immediately follow it in Example 24b, because these do not appear in Example 24a. This reading is consistent with mm. 1-4 of the middle level of Schenker's Figure 22b.

Therefore, Examples 23 and 24 flatly contradict one another. Example 23b asserts that the vocal C# of m. 2 ("-en") is less structural than the vocal B that follows in m. 3 ("blü-"); Example 24b asserts the opposite—that the same C# is more structural than the same B. And Example 23 asserts that the V-I of m. 3 is more structural than the IV of m. 2; Example 24 asserts the opposite—that the same V-I is less structural than the same IV. Of course, one does not need strict

²⁷Forte, "Schenker's Conception of Musical Structure," 12. I have photocopied Example 22 from the newer translation of *Free Composition*, in which *Vdg.* has been translated to *Fgd.*

use in order to recognize this inconsistency. But strict use works against such inconsistencies; this inconsistency simply cannot be shown in a single strict-use analysis.

One may respond to this apparent inconsistency in several ways. I will consider four different responses and discuss how those responses may inform and be informed by strict use.

The first response might be that Schenker's reading is mistaken. The alternative analyses of this piece that have been published suggest that many hold this view. But this is not the only—or the most interesting—response.

The second response might be that Schenker's analysis offers two readings because he intended that the reader be able to choose. Because Schenker said nothing of the sort about this analysis (nor about any other *single* analysis that I know of—he did discuss alternative readings, but used different graphs to display them), this response seems far-fetched. However, if one were to make this second response, one might also point to another discrepancy in the same analysis, suggesting that this second discrepancy also allows the reader a choice between rival readings: while the last three notes in mm. 3-4 are depicted as more structural than the notes they repeat, the same three notes in mm. 16-17 are depicted as less structural than the notes they repeat.²⁸

The third response might be that Schenker's analysis presents two readings, but that he intended that the reader not choose. The point here would be that the music is ambiguous and that the analysis should therefore also be ambiguous. But if ambiguity is important in music, then the contradictory nature of rival readings should be made as clear as possible, not hidden by ambiguous notation.²⁹

²⁸In fact, this may point us to the most plausible explanation—that Schenker meant something different than is printed, because of a typographical error. That is, in the first two graphic levels, the B and A that occur in m. 4 should have been placed in m. 3. This makes the reading of mm. 1-4 analogous with that of mm. 13-17 and eliminates the contradictions discussed here.

²⁹Steve Larson, "Questions About the *Ursatz*: A Response to Neumeyer," *In Theory Only*, 10/4 (1987): 11-31.

The fourth response might be that strict use has forced us to see conflict where there is none. The point here would be that the first treble five-note succession in Schenker's Figure 22b, third system, is a complete linear progression of a third (supported by the slurred harmonies depicted beneath, I-IV-V-I) and that the next three treble notes merely repeat the last three notes of the previous five-note gesture, yet are more structural. While I do not agree with this interpretation of Schenker's reading (I believe it misreads a motion to an inner voice), I think that it can raise interesting issues concerning the role of abstraction in analysis. But to really understand what such arguments about abstraction mean in the context of specific pieces, one needs a tool that highlights analytic decisions clearly enough to allow focused discussion of abstraction. Strict use is such a tool.

My point here is not to defend a particular reading—or even to defend a particular interpretation of a particular reading—but rather to suggest that internal consistency, musical ambiguity, and analytical (as well as perceptual) abstraction are important issues that deserve the clarification that strict use can bring.

On the other hand, I do not mean to suggest that there are not wrong or bad analyses, nor that there are not mistaken interpretations of analyses. For example, Kerman suggests, of Schenker's Figure 22b, that "from Schenker's foreground sketch one gathers that in bars 4 and 8 he counted the voice's half cadences as primary, whereas in bar 17 he counted the piano's full cadence."³⁰ This is clearly a misreading of Schenker's analysis. The vocal B at the beginning of mm. 4 and 8—just like the vocal B of m. 16—is depicted as a passing tone. The vocal B at the end of m. 8 (part of a $\hat{3}\text{-}\hat{2}$ interruption) is the pick-up to m. 9. While Schenker's analysis gives different weights to these cadences, they are both clearly authentic cadences. Kerman also asserts that "the song's most striking feature—practically its *raison d'être*, one would think—is the series of paired cadences in the voice and then the piano at the conclusion of lines 2, 4, and 8 of the poem."³¹ Kerman's comments may give the

³⁰Kerman, "How We Got Into Analysis, and How to Get Out," 325.

³¹*Ibid.*

impression that Schenker offers “no explanation” for these but rather indulges “the analyst’s instinct to reduce these ambiguities out of existence.”³² This misimpression can be corrected by consulting Schenker’s analysis of the same piece in *Harmony*.³³

Conclusions

Because strict use offers an artificially limited world in which the effects of musical motion can more carefully be examined—like strict counterpoint—it provides an excellent starting point for generating the more complex analyses that illuminate the role of simplicity and complexity in real music.

Strict use offers several advantages. The function of each note is made clear (contradictory readings must be displayed in alternative analytic representations), and the clarity of the notation imposes a consistency within graphic levels that enforces clear thinking (and thus aids clear hearing). The limited number of “embellishment schemata” allows the student to check the “well-formedness” of an analysis by comparison with a table of those embellishment schemata. A clear taxonomy of embellishment types clarifies their musical function and allows fruitful discussion of underlying principles of musical space and time. Specificity and alignment of levels clarify the rhythmic and metric implications of Schenkerian analysis. And finally, the separation and consistency of analytic levels allow the ear to play a greater role in discovering relationships, confirming or denying them, and learning from them.

³²Ibid.

³³Schenker, *Harmony*, 219-221.

A Different Approach to Teaching Melodic Dissonance

Robert Gauldin

The subject of nonharmonic tones is usually introduced sometime during the first semester of collegiate freshman theory.¹ There are two time-honored ways of presenting this material. In many harmony texts, all of the various specific types of melodic dissonance (passing tones, anticipations, escape tones, and so forth) are lumped together and provided with appropriate definitions and accompanying musical examples.² In more linearly oriented harmony books, on the other hand, the presentation proceeds along principles laid down in species counterpoint. Passing and neighboring motion, which falls on weaker metric positions (second and third species), is contrasted with the rhythmic delay of consonance, where suspensions fall on strong beats (fourth species). Once these primary dissonances are assimilated, the remaining nonharmonic tones, relegated to a more decorative status, are then added to complete the picture (via third and fifth species). This approach is carried out to some degree in the Aldwell/Schachter text.³

¹Some theorists have reservations about the term "nonharmonic tones;" for instance, Kostka/Payne uses "nonchord tones" while Forte prefers "submetrical embellishment." Although I prefer the expression "melodic dissonance," the former has such wide usage and its meaning is so well known that I see no reason to discard it.

²For instance, see Stefan Kostka and Dorothy Payne, *Tonal Harmony*, 3rd ed. (New York: McGraw-Hill, 1995); Walter Piston, *Harmony*, 5th ed. expanded by Mark DeVoto (New York: W.W. Norton, 1987); and Robert Ottman, *Elementary Harmony: Theory and Practice*, 4th ed. (Englewood Cliffs, NJ: Prentice-Hall, 1989), to cite but several. In his abbreviated presentation, Turek omits any reference to neighbors or incomplete neighbors (Ralph Turek, *The Elements of Music: Concepts and Applications*, 2nd ed. (New York, McGraw Hill, 1996).

³See Edward Aldwell and Carl Schachter, *Harmony and Voice Leading*, 2nd ed. (San Diego/New York: Harcourt, Brace, Jovanovich, 1989), 9-11 and 43-44.

The first method has always seemed to me less than satisfactory. The student is not only forced to memorize at least seven different patterns, each with their own specific contour and accentuation features, but also is immediately asked to distinguish one from the other in subsequent analyses. The initial task of keeping all of these terms straight is frequently confusing to the student, partly because no relationships are established that categorize the various nonharmonic tones according to *similar* or *shared* characteristics.

The second method does have the advantage of setting up hierarchical levels of dissonance. However, the resulting distinctions are based largely on structural considerations. Couched in the rather abstract context of species counterpoint, freshmen often have a hard time understanding *why* passing motion is more structurally significant than a mere decorative anticipation. This distinction may become apparent only after extensive work in foreground reductive techniques, a process that is time consuming.

In my opinion, neither of these methodologies sufficiently comes to grips with the *affective* nature of melodic dissonances. Yet it is their very affective characteristics that guide composers in choosing whether a neighboring tone or a suspension is more musically appropriate for their particular need. This approach is in marked contrast to the typical way that undergraduates tend to employ melodic dissonances in their melody harmonizations; following an initial block-chord version, they usually end up by sprinkling dissonances indiscriminately throughout the exercise. Is it possible to group nonharmonic tones into categories that not only illustrate their shared topographical features but also reveal their affective similarities?

One problem in the past has been the tendency to classify dissonances primarily by their melodic contour, while giving only secondary consideration to their metric positioning. Yet I would argue that the question of accentuation versus nonaccentuation should be our *first* criterion for classification. At the foreground level of the music, with which freshman classes are most concerned, unaccented dissonances tend to function in an embellishing or decorative capacity—they are rhythmically driven. At normal tempi unaccented passing tones, neighboring tones, and anticipations have a way of falling “into the cracks” of the rhythmic surface, resulting in a de-

emphasis of their pitch dissonance. It is only when we slow the music to a snail's pace that we begin to notice their dissonant character. If we take a typical chorale harmonization that utilizes these nonharmonic figures and proceed to remove them, it is the forward rhythmic propulsion they impart to the music that we eliminate rather than the attendant loss of dissonance. In contrast, the accented nature of suspensions or appoggiaturas immediately brings their dissonant nature to the fore at the musical surface, since their resolution displaces the normally accented consonance onto weaker metric positions. If we now proceed to remove them from a harmonization, the affective character of the music is completely changed—they are more “essential” to our aesthetic appreciation of the passage in question.

The remainder of this article proposes a method by which the points raised in the preceding argument can be incorporated into a more meaningful presentation of nonharmonic tones. In freshman classes that I have taught, I first begin by introducing the term *melodic figuration*. Given a phrase that consists of a bare-bones block chordal progression, melodic figuration implies the way in which meaningful melodic lines are created through the process of elaboration—in other words, through the use of chordal and nonchordal tones. I do not mean to suggest that composers begin with a harmonic background first and then subsequently derive their melody from the chords, although this process does occasionally occur, as in jazz improvisation. Rather, it represents a possible model to illustrate the process of melodic elaboration or figuration. The tones of the primary (or secondary) melodic lines will consist of pitches that either belong to the supporting harmonies (chord tones) or create dissonances to those chords (nonchord or nonharmonic tones). Obviously, the former category should be explored first. Single chordal skips, broken chords, or arpeggiations are standard ways of prolonging a supporting harmony while creating melodic shape. Such devices can also occur in the lower voices in the form of an Alberti bass. Even 5-6 or 6-5 patterns illustrate ways to incorporate stepwise motion without resorting to dissonance.

Our main thrust, however, deals with the second category of melodic dissonance. I divide nonharmonic tones into four basic groups that are dependent on *both* their accentuation (or lack thereof)

and on melodic shape or contour. In the case of contour, the criteria for our selection center on the presence of conjunct (by step) versus disjunct (by leap) motion. If a melodic dissonance proceeds exclusively by step or common tone, it belongs to the former, while the presence of a single leap will relegate it to the latter. Thus the categories emerge as follows: unaccented-stepwise (abbreviated as US), unaccented-leap (UL), accented-stepwise (AS), and finally accented-leap (AL).

The various nonharmonic tones are parsed out to their respective classifications in the manner shown below:

1. Unaccented-stepwise (US): unaccented passing and neighboring tones and anticipations (which by their very nature are unaccented).
2. Unaccented-leap (UL): unaccented incomplete neighbors, such as escape tones (step-leap), "leaping tones" (leap-step)⁴, or even Hindemith's "free tone" (leap-leap).⁵
3. Accented-stepwise (AS): accented passing and neighboring tones and suspensions (which by their very nature are accented). Obviously, the topic of suspensions will require considerable amplification at a later time.
4. Accented-leap (AL): accented incomplete neighbors, such as accented escape, leaping, and free tones.

It will be noted that the term *appoggiatura*, used in its correct historical sense as an accented melodic dissonance that resolves stepwise, encompasses all of the nonharmonic tones in the last two categories except the accented escape and free tones, both of which are very rare. Although we do not customarily think of a suspension as an "appoggiatura," it nevertheless fits the definition.

This classification allows us to group the various melodic dissonances by their actual "sound" in the surface of the music. Thus the

⁴There is no available term to describe an *unaccented* melodic dissonance that first leaps and then resolves by step. The *appoggiatura* is historically incorrect in this context, since by nature its dissonant note is always accented. I therefore resort to the phrase "leaping tone" for want of anything better.

⁵See Paul Hindemith, *The Craft of Musical Composition* Book I, trans. Arthur Mendel (New York: Associated Music Publishers, 1942), 173.

nonharmonic tones in a particular group have a similar sound, a fact that is verified by taking down in dictation all the parts of a four-voice texture. In such instances students commonly have difficulty distinguishing between unaccented passing and neighboring motion in the inner voices, since they both belong to the same grouping.

In addition, the above categories represent a sliding scale of affective function. The unaccented-stepwise group is the most decorative in nature, while the unaccented-leap group is slightly less so, since the melodic leaps tend to call our attention to the dissonances, even though they remain unaccented. Our perception of the accented-stepwise group, on the other hand, is considerably different due to the metric placement of the dissonance. The subsequent delay of the consonant note recalls some of Leonard Meyer's notions about how such procedures give rise to emotional responses in music. Therefore the dissonance now becomes more essential to the affective meaning of the passage in question. Finally, the accented-leap group is even more extreme, as we now factor in the ingredient of disjunct melodic motion. The continuum exemplified by these groupings may even be applied to style systems in general. The polyphony of the late Renaissance features a highly regimented treatment of dissonance that is largely controlled by stepwise motion (our categories 1 and 3). On the other hand, it is easy to see the relationship of category 4 to Late Romantic practice.

In Example 1 I have taken a common chord progression (I ii⁶ V I) and composed four tunes above it, each of which features only those melodic dissonances belonging to each category. Individual nonharmonic tones are circled and identified with an appropriate abbreviation. The degree of stylistic consistency within each is remarkable.

This exercise suggests counterparts in actual music literature. Composers will often create a sense of stylistic consistency by utilizing nonharmonic tones from a single category. For instance, Beethoven's insistence on accented-stepwise dissonance in the opening section of his F major Violin Sonata Op. 24 ("Spring") is but one of countless examples. In addition, the prior use of a certain nonharmonic tone will set up a future implication that is then realized. The little phrase in Example 2 incorporates Gjerdingen's Clas-

Example 1. The four categories of melodic dissonance

Unaccented-stepwise

Unaccented-leap

Accented-stepwise

Accented-leap

See Legend in Example 3

sical schema of $\hat{8} - \hat{7}$ followed by $\hat{4} - \hat{3}$.⁶ Since the first is set with an accented-stepwise dissonance, we naturally expect its consequent to be set in the same manner. What is interesting here is that although the first uses a suspension, the accented passing tone on the second is perfectly satisfying, since both belong to the same group.

Example 2. A setting of the $\hat{8}-\hat{7}/\hat{4}-\hat{3}$ schema using accented-stepwise dissonance



I employ a simple reduction notation to denote the various nonharmonic tones. All melodic chord notes appear as stemmed quarter notes, while all melodic dissonances are indicated with unstemmed note heads. Appropriate slur marks indicate their stepwise characteristics. These are illustrated in Example 3.

The use of melodic dissonance in certain contexts may prove problematic to students. I cannot resist quoting a passage that Michael Rogers has employed in a similar instance.⁷ In the opening of J.S. Bach's F minor Three-Part Invention, most students will ana-

⁶Robert O. Gjerdingen, *A Classic Turn of Phrase: Music and the Psychology of Convention* (Philadelphia: University of Pennsylvania Press, 1988).

⁷See his illuminating article "The Rich Messiness of Music: Teaching Theory in Music with Contradiction and Paradox," *College Music Symposium* 30/1 (Spring 1990): 131-141.

Example 3. A reductive notation for non-harmonic tones

The image displays four staves of musical notation, each representing a different level of reduction for non-harmonic tones. The staves are labeled US, UL, AS, and AL from top to bottom. Each staff shows a sequence of notes with brackets above them indicating specific non-harmonic tone categories.

- US:** Shows three groups of notes. The first group is bracketed and labeled 'P' (unaccented passing tone). The second group is bracketed and labeled 'N' (unaccented neighboring tone). The third group is bracketed and labeled 'A' (anticipation).
- UL:** Shows three groups of notes. The first group is bracketed and labeled 'IN' (incomplete neighbor). The second group is bracketed and labeled 'ET' (escape tone). The third group is bracketed and labeled 'LT' (leaping tone). The fourth group is bracketed and labeled 'FT' (free tone).
- AS:** Shows three groups of notes. The first group is bracketed and labeled 'APP' (appoggiatura). The second group is bracketed and labeled 'S' (suspension). The third group is bracketed and labeled 'A/P' (accented passing tone). The fourth group is bracketed and labeled 'A/N' (accented neighboring tone).
- AL:** Shows two groups of notes. The first group is bracketed and labeled 'APP' (appoggiatura). The second group is bracketed and labeled 'A/FT' (accented free tone).

Legend:	P	= unaccented passing tone
	N	= unaccented neighboring tone
	A	= anticipation
	IN	= incomplete neighbor
	ET	= escape tone
	LT	= leaping tone
	FT	= free tone
	S	= suspension
	A/P	= accented passing tone
	A/N	= accented neighboring tone
	APP	= appoggiatura
	A/LT	= accented leaping tone
	A/FT	= accented free tone

lyze the G and A in the soprano as the more obvious nonharmonic tones, when in actuality it is the Ab and Bb that are dissonant, as shown in the reduction of Example 4. Bach's use of slurs clearly marks these as appoggiaturas. Another good example for class use is the opening of Bach's familiar chorale prelude *Wachet auf*.

Example 4. J. S. Bach: Three-Part Invention in F minor, mm. 1-2

The image shows a musical score for J. S. Bach's Three-Part Invention in F minor, measures 1-2. The notation is in F minor (three flats). The treble staff has a slur over the first two measures, with 'A/IN' written above the notes. The bass staff has a slur over the first two measures, with 'S' written above the notes. A bracket under the first two measures of the bass staff is labeled '2 3 4 6'.

Instances may arise where two levels of melodic dissonance occur simultaneously. Upon visual inspection, a student might initially identify the first figure in Example 5a as a changing note or double neighbor figure. In performance, however, it is readily apparent that the four notes consist of an underlying passing motion (G-F-E) with embellishing incomplete neighbors at the surface level. A similar problem occurs in Example 5b, where three consecutive dissonances appears. Once the underlying suspension is revealed, the remaining nonharmonic tones merely serve to embellish it.

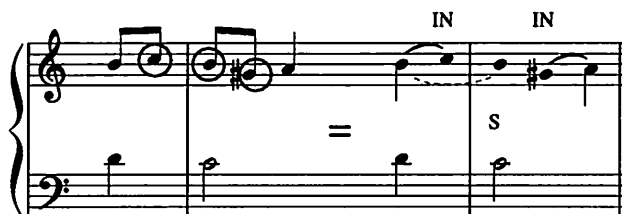
Melodic figures associated with passing motion, neighboring motion, and suspensions also occur at deeper harmonic levels, appearing not only in "passing and neighboring" harmonies, such as I-(vii^{o6})-I⁶ or I⁶-(IV)-I⁶ respectively, but also in the preparation and resolution of seventh chords. It is an easy matter to demonstrate how the chordal seventh originated from dissonance figurations during and immediately following the Renaissance. The few models in Example 6 are sufficient to illustrate these procedures; notice that in the last case the appoggiatura-like leap to the seventh occurs over the same harmony.

Example 5. Superimposed levels of melodic dissonance

a)



b)



Example 6. Nonharmonic figurations used in the preparation and resolution of seventh chords



In summary, it is hoped that this suggested method will provide an alternative (and perhaps improved) way to introduce the subject of nonharmonic tones to freshmen. The four categories allow the students to see how certain dissonant figurations are related, both in terms of their function within the music and their affective properties. I believe this approach is more in keeping with the manner in which composers utilize these figurations and how we aesthetically respond to them. I close with one final quotation which demonstrates the significance that melodic dissonance plays in the composition of certain passages. Those of you familiar with the climatic portion of Richard Strauss's *Death and Transfiguration* (near the end of that work) can vouch for the overpowering effect this music has on the listener. Yet when we examine the score, given in reduced form in Example 7, we find only the barest of harmonies: a C major tonic triad and its attendant V^7 , which are suspended over a dominant pedal, producing an extended six/four cadence. The emotional impact of the music derives *solely* from the use of accented-stepwise nonharmonic tones, arising out of the opening bracketed motive,⁸ whose dissonance sometimes stretches over several beats before resolving.

⁸This $\hat{3}-\hat{2}-\hat{1}$ figure with its dissonant supertonic prevails to the conclusion of the work, occurring on bVI , vi , and finally I successively.

Example 7. Closing section from Richard Strauss'
Death and Transfiguration (condensed score)

The image displays a condensed musical score for the closing section of Richard Strauss' *Death and Transfiguration*. The score is written for piano and is organized into three systems, each consisting of a treble and bass staff joined by a brace. The time signature is common time (C). The first system spans four measures, with a bracket above the treble staff grouping the final two measures. The second system also spans four measures. The third system spans four measures and concludes with a double bar line. The notation includes various musical symbols such as notes, rests, accidentals, and dynamic markings (e.g., *mf*, *f*, *ff*). The bass staff features complex chordal textures and sustained notes, while the treble staff contains more melodic and harmonic lines.

CD-ROMs, HyperCard, and the Theory Curriculum: A Retrospective Review

Alexander R. Brinkman and Elizabeth W. Marvin¹

The introduction of Apple computer's HyperCard program for Macintosh in 1987, followed by Robert Winter's 1989 pioneering efforts with the Voyager company, began a new era in computer-assisted instruction (CAI) for music.² No longer are music educators forced to rely upon synthesized sound (generated either internally by the computer or externally by MIDI synthesizer). Now, using a CD-ROM drive controlled by HyperCard, they can employ a variety of orchestral and other sounds in their CAI packages by using digitally-recorded commercial or custom-made compact discs (CDs). Further, HyperCard and other hypermedia programs developed subsequently allow users to traverse lessons by their own custom-designed linear or nonlinear paths; lessons can now easily exploit the pedagogical power of nonlinear music listening with the click of a button. To what extent are commercial packages harnessing these tools to teach music theory more effectively? How can music educators best utilize their potential?

By way of background, let us look first at HyperCard's design metaphor: the stack of cards. Each card may contain text fields, buttons, pull-down menus, graphics, and so on. Buttons, fields, portions of text, and even cards can be designed so that when the user

¹The authors' names are listed in alphabetical order. Placement is not intended to convey primary or secondary authorship; both authors were equal contributors.

²Danny Goodman, author of *The Complete HyperCard 2.2 Handbook*, 4th ed. (New York: Random House, 1993), cites in his acknowledgments a precursor of HyperCard called WildCard, which he previewed in March of 1986. HyperCard 1.0 was released the following year. Robert Winter's first "CD companion," on Beethoven's Symphony No. 9, was released by Voyager Company in 1989.

clicks on them with the computer's mouse some action occurs, such as moving to a new card, playing music, viewing a movie, seeing hidden text, etc. Stacks are often designed so that information can be accessed in a nonlinear fashion—that is, in an order different from the sequential ordering of the cards in the stack. For example, clicking on an item in a Table of Contents card might take the user directly to the specified section of the stack, and clicking on highlighted words ("hot text") might take the reader to a glossary with a definition of that text or to another section of the stack that explains a related concept. A map or diagram might be covered with invisible buttons, so that clicking on a specific location will transport the user to another card with related information, graphics, and sound. Often, at least within sections, linear navigation is also possible by clicking on buttons—typically right or left arrows—to move to the next or previous card in the sequence. Thus both linear and nonlinear learning styles can be accommodated within the same stack. Further, the integration of graphic representations for visual study, explanatory text for reading, sound files of musical excerpts or spoken narrative for listening, and movies for viewing allows the learner to explore a topic through many modalities, which (again) accommodate the variety of learning styles present in a diverse group of students.

Another advantage of HyperCard is that its creators designed the program not only as a browsing tool to be used in navigating commercially purchased HyperCard stacks, but also as an authoring tool whose power for creating custom-made stacks is available to anyone who purchases HyperCard.³ Indeed, educators with access to a Macintosh equipped with HyperCard and a few peripherals—MIDI keyboard/synthesizer, CD-ROM drive, and scanner—as well as a few companion software packages to support this hardware, are able to create CAI packages tailor-made for their students and

³This has been true of HyperCard during most of its brief life. For a time, however, Claris Corporation required developers to purchase a "HyperCard Development Kit," while a scaled-down version of the program (the HyperCard "Player") was bundled with all Macintoshes sold.

their classroom needs, with a visual style almost as professional looking as the commercial packages.⁴

In the spring of 1995, the Eastman School offered its first HyperCard development course, entitled "Computing for Pedagogical and Cognitive Research Applications." The course, now offered each spring semester, is designed to use HyperCard as a vehicle for studying computer-based learning and music-cognitive experimental design and implementation. During the course of the semester, students engage in a review of commercial software packages (both CD-ROMs and non-HyperCard CAI packages for ear training and theory instruction), design and run a music-cognitive experiment that is completely implemented on the Macintosh in HyperCard, and create an individual final project in HyperCard. Final projects vary from music theory tutorials, to ear training drill-and-practice, to repertoire-based CD "companions." Students are also required to complete smaller assignments to acquire HyperCard authoring and scripting skills.⁵

This article draws upon student opinions of the CD-ROMs reviewed as a course requirement, as well as our own.⁶ Based upon

⁴The software we used in our first HyperCard course included MidiPlay for the synthesizer, OFOTO for the scanner, the Voyager CD Audio Toolkit to control the CD-ROM drive, and AudioShop to create sound files. Similar packages are available from other manufacturers. In our first year, we taught in a small classroom equipped with a PowerMac 6100 with built-in CD-ROM drive, a Roland JV-30 multi-timbral synthesizer, AppleDesign speakers, and an overhead projector with Sharp LCD projector panel for displaying the computer images on the classroom wall. For our initial class of ten students, there were three computers in the music library—one with MIDI keyboard—and one additional computer/keyboard station in a student computer lab in another building.

⁵We have used various textbooks in the two years the course has been offered; these books have included George Beekman, *HyperCard 2.3 in a Hurry* (Belmont: Wadsworth, 1996); David Butler, *The Musician's Guide to Perception and Cognition* (New York: Schirmer Books, 1992); Peter Desberg, *Hyper InterActive CAI: Using HyperCard to Develop Computer-Assisted Instruction* (Boston: Allyn and Bacon, 1994); and Danny Goodman, *The Complete HyperCard 2.2 Handbook*, 4th ed. (New York: Random House, 1993).

⁶We wish to acknowledge the input of students who participated in the course: in 1996, Conrad Alexander, Kurt Fowler, Jon Hynes, Jonathan

evaluation criteria developed by the class, Alexander Brinkman implemented an "online" HyperCard journal. This journal stack can usually be opened at the same time as the software being reviewed, and the user can go back and forth between the application and the journal at will. Menu items allow the user to print out the text of the entire journal or of individual entries, to save a copy, to import entries from another journal, and so on. The journal serves two purposes besides the obvious one of providing a place to keep the reviews: it illustrates an ad hoc application written in HyperCard specifically for the course, and the scripts used to implement the stack are studied later in the course when the students are learning HyperTalk programming techniques. The review process familiarizes students with commercial applications that they may wish to use eventually in the classroom; it also provides a "jump start" for the planning of their own final HyperCard projects for this course. Students are encouraged to make note of features they particularly like (or don't like) in the commercial products so that they can incorporate (or improve upon) these features in their own stacks.

The journal template consists of a title card, one blank journal entry, and help cards that give instructions for use of the journal. Each review is contained on one card, shown in Figure 1, which has fields for the reviewer's name, the date of the review, and the title and author of the software. The program type (Tutorial, Drill and Practice, Game, or Simulation)⁷ is specified by clicking on radio buttons, as is the overall rating, which ranges from 1 (poor) to 5 (excellent). Once students have determined the program type, they

Keeble, Jeff Markarian, Jocelyn Neal, Sean Owen, Scott Spiegelberg, Matt Stull, Kristin Tait, Allen Tinkham, Gustavo Tolosa, Allison Weitzman, and Matt Wozniak; and in 1995, Robert Blaine, John Clevenger, Stefanie Crumbley, Bret Dorhout, Valerie Errante, Jonathan Flowers, Rebecca Levell, Gerry MacDougall, Kimberly Shaw, and Tom Toner.

⁷Desberg, *Hyper InterActive CAI*, 6-11. According to Desberg, tutorials present new information; he characterizes a tutorial as "a private tutor for the student." A drill-and-practice program, on the other hand, "assumes that there has been previous instruction" and is used to "strengthen associations, or refine and improve new skills." A simulation "presents a model, or recreates an event. The student then interacts with the model." Games are fun, interactive activities which may reinforce or test mastery of concepts previously taught.

are asked to evaluate the program based upon criteria specific to that type. For example, in the drill-and-practice and game categories, students consider not just content, sequence of presentation, and pedagogical appropriateness of the tasks, but also a number of other factors that are important to these software types. Is the medium appropriate? Is the activity fun and engaging? Is speed a factor? Is effective feedback given? Does the program contain branching for remediation and advancement? For tutorials, students again look at content and evaluate the appropriateness of the examples chosen. They also look to see whether the interface allows students to traverse the stack by different routes and at different paces to meet different learning needs, whether there is a vehicle for student input, whether there is any feedback, and whether it tests mastery.

Various parts of the students' reviews are contained in the journal's pop-up fields, which are accessed by clicking on buttons labeled Publication Information, System Requirements, Overview, Visual Style, Navigation, and so on, as Figure 1 shows. When the user clicks on one of the buttons, the button "expands" to become the title bar of a field that fills the whole card. The field scrolls, so that any amount of text can be entered; reviewers can also access additional pop-up fields that contain outlines summarizing the criteria students are to consider in evaluating each feature, as shown in Figure 2. For every piece of software, students are asked to provide as much information as possible about the authors and publishers and to evaluate: 1) hardware and installation requirements, 2) visual style, 3) ease of navigation, and 4) instructions. Visual factors include the choice and size of fonts, use of integrated modalities (such as musical examples, graphic artwork, animation, speech, and movie clips), use of color, layout, and attractiveness. Ease of navigation is judged by the consistent placement of buttons and fields, intuitive icon choices, a clear indication of where the user is and how to get elsewhere, and use of nonlinear navigation tools such as hot text. Finally, the instructions are evaluated for clarity and concision. Students also report on the mode in which the instructions are delivered, since they may appear as printed documentation, or online as balloon or pop-up help, as help screens accessed by buttons or menu items, as spoken narrations, or as animated "tours" of the software.

Figure 1. Online journal

Reviewer: Tom Toner	Date:	Publication Information
Title: Igor Stravinsky: Rite of Spring		System Requirements
Author: Robert Winter		

Program Type: ☒ Tutorial ☐ Drill and Practice ☐ Game ☐ Simulation	Overall Rating: ☐ 5 ☐ 4 ☐ 3 ☐ 2 ☐ 1 ☒ 4.5 ☐ 3.5 ☐ 2.5 ☐ 1.5
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User Interface:	Visual Style Navigation Instructions
General Discussion Content Other	

Help Menu Bar New Card Delete Card Navigate
--

It is important to remember that the media (hardware and software) were in the process of development during the years that these programs appeared on the market. All of the early products are black and white because color Macintosh computers were not yet in common use, and early HyperCard versions did not support color. In addition, new features were added to the HyperCard program itself with each new release. For example, HyperCard 2.0 (1990) introduced many new features, such as "clickLine," which allowed the user to navigate not only by clicking on buttons but also by clicking on lines of text in fields. This version also introduced the "picture" command, which displayed color or black-and-white pictures at high resolution. More recently, other authoring packages with different strengths have been used in product development, and some products originally written for Macintosh are now available for PCs running Windows.⁸ It is important in reviewing each CD-ROM to keep in mind the limitations of the media at the time when the packages were written, and not to discount the early ones on the basis of features that were not available then; we find some of the early packages among the most satisfying in terms of their content.

As our review process progressed, it became clear that each software company has developed its own individual style that varies only slightly from package to package. We have chosen to discuss the common features of these programs by company before examining the content of individual products in more detail.⁹ For each company—the Voyager Company, Warner New Media, Future Vi-

⁸The Voyager web page (<http://www.voyagerco.com>) lists Windows versions of four of the CD-ROMs reviewed here: the Beethoven 9th *Symphony*, Stravinsky *Rite of Spring*, Mozart "Dissonant" *Quartet*, and Strauss *Tone Poems*.

⁹Two packages, owned by Eastman's Sibley Music Library and reviewed by our students, are not included in this essay. These are "Xplora: Peter Gabriel's Secret World" and "Jump: The David Bowie CD-ROM." Due to the length of this review and the fact that these packages are less useful for teaching music-theoretical concepts, we have omitted them here. Of interest, however, is an extended section in Peter Gabriel's product on non-Western instruments, complete with sound clips of indigenous music, color videos, and related information.

Figure 2. Sample journal entry with help screen

The screenshot shows a software window with a title bar and navigation buttons. The window is divided into two main sections. The left section contains a journal entry, and the right section contains a help screen for the 'Overview' topic.

Journal Entry:

Robert Winter's Igor Stravinsky: The Rite of Spring is an interactive CD-ROM/HyperCard stack that explores almost every possible aspect of Stravinsky's Rite of Spring. The first card outlines the overall format of the stack:

- A Word from Winter
- A Pocket Guide
- Stravinsky's Orchestra
- Stravinsky's World
- The Rite as Dance
- Rite Listening
- A Close Reading
- The Rite Game

Help Screen (Overview):

Overview Outline

Include:

- A SHORT description of product (what does it do?)
 - Features (short overview)
 - Audience (stated or presumed)
 - Objectives (are they stated or implied?)
- Pros (strong points)
- Cons (weak points)
- Bottom Line (Sum up in one or two sentences)

Winter's Rite is designed primarily for a music student, probably at the college level, who is not familiar with Stravinsky's work. This particular audience, more than others, would benefit from the detailed historical and theoretical discussion and would best achieve Winter's implicit goal of heightening his user's knowledge of the Rite. However, someone who was only an appreciator of music, with marginal knowledge of music theory, could skip over aspects of the stack that would not be understood and still learn a great deal about the Rite. At the other extreme, Winter includes some rather

sion, Microsoft, and Calliope—the general discussion is followed by a review of each product in chronological order by publication date.¹⁰ Finally, readers will recognize in our format design elements from other publications: the consistent use of identical subsections was borrowed from *Consumer Reports* and the Pros/Cons headings from the product reviews in *Keyboard Magazine*.

VOYAGER COMPANY

Voyager was the first to introduce a CD companion series, beginning with Beethoven's Ninth Symphony in 1989. Each of the six packages surveyed here shares a number of organizational features: most contain a Pocket Guide, information about instrumentation, information about the composer's life and times, a "Listening" section, a Close Reading, More Reading, a Glossary, and a Game. Though most of these section headings are self-explanatory, a few require further description. The Pocket Guide provides a broad overview of a work's formal design on a single card, as shown in Figure 3. Clicking on any line (e.g., First Theme) highlights the line and plays the specified passage. The Close Reading section "flips" from card to card, displaying a running commentary on what is heard in the music. The user can read the commentary while listening, or turn off the sound while browsing the information. The Close Reading commentary is generally aimed at the level of a music appreciation class and is frequently accompanied by attractive scanned artworks, which makes for entertaining light reading but provides little of interest to music theorists. Finding the right tone for this commentary is understandably difficult, considering the broad range

¹⁰Contact addresses and/or phone numbers from the CD-ROM packaging follow: Voyager Company, 578 Broadway, New York, NY 10012, (212) 219-2522; Warner New Media, 3500 W. Olive Avenue, Burbank, CA 91505, (818) 843-6311; Future Vision, 300 Airport Executive Park, Nanuet, NY 10954, (914) 426-0400; Microsoft, (800) 936-3500 or (206) 635-7172; and Calliope Media, 1526 Cloverfield Blvd., Santa Monica, CA 90404-3502, (510) 427-3906. Some of these companies may also be reached electronically; Voyager Company may be reached at techsupport@voyagerco.com or <http://www.voyagerco.com>; Calliope at magic@calliope.com or <http://www.calliope.com>.

of musical abilities users may bring to these packages. The level of music-theoretical discourse and explanation also varies widely from package to package—considerably higher in the Stravinsky and Strauss packages, for example, than in the Mozart.

In the later Voyager packages, the Close Reading cards sometimes contain buttons that provide “an in-depth study of themes and events using audio examples and notation.”¹¹ These “Closer Look” or “Detailed View” links take the user to more detailed analyses, often including excerpts from the score in musical notation. The music stops while the reader examines this additional information; in this respect, our reviewers preferred the Warner New Media packages, in which the user may choose to continue listening to the music while exploring hypermedia links. The Closer Look details are generally of more analytical interest to the music theorist. Unlike the Warner New Media products, the Voyager packages generally do not attempt to teach music theory “rudiments” (like note reading, scales, triads, etc.) in an individual tutorial section; the music-theoretical content generally relates directly to issues arising from the piece under study.

The More Reading section is an annotated reading list. With the exception of the earliest product, in which this bibliography was a subsection buried within Beethoven’s World, the reading list is accessible from the main table of contents. Musicological and music-theoretical books and journal articles are cited, complete with publication information and a short description of contents. These descriptions vary in their usefulness from package to package, possibly another by-product of the authors’ search for the right balance for a diverse audience. Our reviewers felt that the Mozart Dissonant Quartet package is aimed at users with less musical background than the other Robert Winter packages, and this is evident in such bibliographical commentary as “if you’ve wondered what a crack Mozart scholar does, here’s a wonderful introduction” (in reference to an article by Alan Tyson). After the initial Beethoven CD-ROM (which has far fewer opportunities for nonlinear browsing), most of the Voyager products use a small superscripted “R” throughout

¹¹Robert Winter, “User’s Guide” to the CD Companion “Igor Stravinsky: *The Rite of Spring*” (New York: The Voyager Company, 1991), 6.

Figure 3. Pocket guide with navigation bar: Schubert,
"Trout" Quintet (Voyager)

Pocket Guide				
First Movement	Second Movement	Third Movement	Fourth Movement	Fifth Movement
EXPOSITION First theme Second theme Closing themes Repeat (exposition) DEVELOPMENT RECAPITULATION First theme Second theme Closing themes	FIRST PART First theme Bridge Second theme Closing themes SECOND PART First theme reprised Bridge Second theme Closing themes	SCHERZO First theme Second section Repeat TRIO First theme Repeat Second section Repeat SCHERZO DA CAPO	THEME Variation 1 Variation 2 Variation 3 Variation 4 Variation 5 CODA	EXPOSITION First theme Transition Second theme Closing themes RECAPITULATION First theme Transition Second theme Closing themes
QUIT	?	G	CONTENTS ^	RETRACE ^
			☒ PLAY THROUGH	PAUSE
			00:12	

the text as a link to the More Readings section; these function like footnotes for attribution of quoted material and as sources for further exploration of a topic. In comparison with other publishers, Voyager is most consistent in providing detailed bibliographical information for its quotations (Future Vision is the poorest in this respect). Finally, most of the Voyager packages include "A Word from the Author," a lengthy sound clip of the author speaking in general terms about the creation of the CD-ROM, accompanied by his scanned photograph or sketch.¹²

Each of the Voyager CD-ROMs concludes with a Game section, which varies by author. Most of the Winter programs use a multiple-choice quiz format for up to four players, with three topic categories: Listen Up, Knowing the Score, and Life and Times. On each turn, the player chooses a category and level of difficulty (measured by the number of points awarded). In the Listen Up category, the user hears an excerpt from the composition under study, and then answers a question about its orchestration, structure, location within the work, etc. In Knowing the Score, players are quizzed about orchestration, special effects like *col legno*, dynamic or tempo indications, etc. In Life and Times, questions about the composer, collaborators, first performance, or historical era are posed. Humorous feedback is excellent in these packages, and may include short sound files of German (Beethoven and Mozart) or French (Stravinsky) exclamations of congratulations or dismay—depending on whether the question is answered correctly—applause, animations (such as Beethoven sprouting sunglasses that wiggle up and down in delight),¹³ and text fields with amusing comments about the answer

¹²Our reviewers soon tired of this feature and felt that these messages were a little too self-serving for the authors' egos. In particular, Robert Winter's voice became all too familiar, since in the Mozart Dissonant package he chose also to read the entire Mozart's World text into a sound file. His obvious enjoyment of the limelight reaches its height in the Ragtime package from Calliope; much of this CD-ROM is comprised of videos of Robert Winter delivering user-friendly music appreciation lectures.

¹³Users with faster computers may find that those animations timed to correspond with sound files were clearly written for older and slower Macs. In the Beethoven package, in particular, one hears the German exclamation first and then views Beethoven opening and closing his mouth like a fish, with no sound present at all!

chosen. The Voyager products designed by other authors contain other types of games, described in more detail below. Several packages use games based on "Concentration," in which players match pairs of musical excerpts by ear; these provide less feedback and test fewer areas of knowledge than the quiz-style games of the Winter products, and usually received lower ratings from our reviewers.

All of the Voyager packages share a similar visual style and user interface. For example, Voyager limits its software to a black-and-white format with screen size appropriate to the Mac Classic, but the visual design is extremely tasteful and the company adds visual interest by creating clever animations with its scanned images, often synchronized with the recordings. This black-and-white "limitation" works to the company's advantage for individuals or schools that own older Macintoshes, since many of the color packages produced by other companies either will not run at all on black-and-white monitors, or crash frequently on machines with limited memory. Installation of the Voyager programs is uniform and generally not problematic.¹⁴

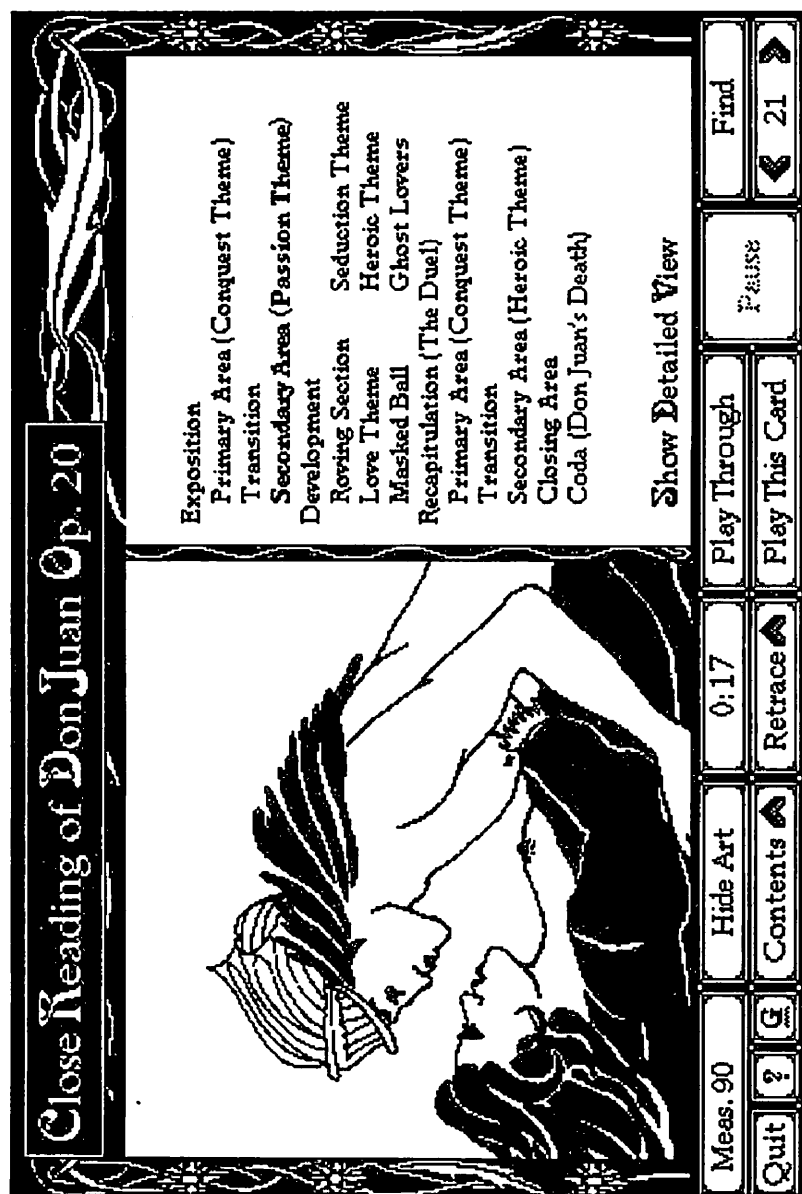
Most Voyager programs share a navigation bar similar to that shown at the bottom of Figure 3. The first two buttons are fairly obvious in their function: Quit terminates the program and the question mark turns on "balloon help." The "G" button (for Glossary) identifies hot text visually; when this feature is enabled, words that are linked to the Glossary are underlined so that they are easily identified. Once transported to the Glossary, users can navigate via

¹⁴To install, users copy a folder from the CD-ROM onto their own hard disk (a version of HyperCard is included in a separate folder, and may be copied as well if needed); most Voyager packages also have fonts that must be installed in the user's system folder (to ignore this step, as some of our student reviewers did, destroys the screen design and alignment of buttons and text fields). The program is run by clicking the appropriate file on the hard disk, not the CD itself. Despite the fact that some of these programs were created with very early versions of HyperCard, we had no problem running the Voyager CD-ROMs on our hard disks from more recent HyperCard versions. In all CD-ROM packages, Virtual Memory should be turned off; in early versions of System 7, "playthrough" must be checked on the "Sound In" portion of the Sound Control Panel.

a pop-up alphabetical menu or with the right- and left-hand arrows; they return to the hot-texted card that brought them here by means of the Retrace button. One limitation in the Voyager packages is that hot text is linked only to the Glossary, so that clicking on "English Horn," for example, will bring the user to that entry in the Glossary but with no means of accessing the discussion of the English Horn in the section on orchestral instruments. This is but one example of the hypermedia limitations of the early Voyager packages, which tend to include large text segments for linear browsing with few links for further exploration (like an online book). Another such limitation is the Find button, which only functions within the portion of the program the user is currently navigating. If the user implements a search for English Horn while in the Glossary section, for instance, the orchestral instruments chapter is likewise not found.

Figure 4 shows additional navigational features in the Close Reading sections. The Contents button displays a pop-up menu that allows easy navigation to all main sections of the stack. Retrace has two functions: clicking on the word takes the user to the card previously visited; clicking on the arrow provides a lengthy pop-up listing of the titles of recently visited cards. By dragging the mouse up the list and releasing it, the user can return directly to any of these cards. We found these navigational tools among the best of the CD-ROMs surveyed. The "Find" button activates HyperCard's search function. Finally, the user moves through the cards via left and right arrows in the lower right-hand corner of the screen. A numeric tally (e.g., "33 of 37") shows the location in this portion of the stack—an important feature in hypertext documents, where users can become overwhelmed or "lost" among the various navigational links. Above the navigation bar is a second bar that shows the current measure number in the composition, a Hide Art button (unique to the Strauss package), the time elapsed in minutes and seconds since the beginning of the movement, and buttons that allow the user to pause the CD, play the entire movement (Play Through), or play just this single card.

Voyager should be credited with sharing its achievement by marketing its CD Audio Toolkit for other HyperCard developers right from the beginning (rather than hoarding their achievements

Figure 4. Close reading interface: Strauss, *Tone Poems* (Voyager)

for in-house use). In the Toolkit are ready-made buttons that act as CD controllers, a template for the Close Reading sections that can be adapted to work with any commercial CD, and an Audio "Event Maker" that captures timings of the CD so that developers can access discrete excerpts.¹⁵ With these tools, music theory instructors are not limited to the repertoire represented by these commercial CD-ROMs, but can develop their own literature-based classroom presentations with only minimal HyperCard experience.

Ludwig Van Beethoven, *Symphony No. 9*: A CD Companion by Robert Winter (The Voyager Company, 1989)¹⁶

Pros

An instructive tool for those interested in CD-ROM development, this product was the first of its kind. Content generally good; retains an "open" HyperCard environment.

Cons

Fails to exploit the full potential of hypermedia—no true hot text, rudimentary graphic design, poor synthesized sound on some examples, and long passages of online reading without sound.

Bottom Line

This product remains strong despite its relative age in this rapidly changing technological field; users who look beyond the computer interface will find useful information embedded here.

¹⁵"The Voyager CD AudioStack: A Toolkit for using HyperCard with CD Audio Discs" (Santa Monica, CA: The Voyager Company, 1989).

¹⁶The documentation that accompanies the Beethoven package reviewed here is dated 1989, while the CD itself is dated 1991. The reason for this discrepancy is made clear by a small insert, notifying the user that this is an "upgraded" version of the CD Companion to run under HyperCard 2.0. [Perhaps such an upgrade would have solved the installation problems we encountered with "The Magic Flute," the earliest of the Warner New Media Products.] The Beethoven upgrade also adds

Survey of Contents

The Beethoven 9 CD-ROM was a remarkable achievement in its time and remains so today. The visionary Robert Winter must be credited with adapting HyperCard for teaching theory and history through music literature, and with the tenacity to carry this idea through to marketable products. His initial offering contains a recording of the work by the Vienna Philharmonic and Vienna State Opera Chorus, conducted by Hans Schmidt-Isserstedt, with soloists Joan Sutherland, Marilyn Horne, James King, and Martti Talvela from their 1966 Decca recording. This CD-ROM set precedent at the Voyager Company for what was to become a standard organizational scheme: A Pocket Guide, Beethoven's World, The Art of Listening, A Close Reading, and The Ninth Game. Most of these subdivide into "chapters." For example, Beethoven's World contains an Introduction, Beethoven's Life, The Conversation Books, Beethoven's Sketches, Beethoven and Schiller, Performing the Ninth Then, Performing the Ninth Today, and More Reading. Beethoven's World has much to offer in terms of historical content, including a discussion of the Napoleonic wars, the three primary crises of Beethoven's personal life, the conversation books (with extended quotations that are fascinating to read) and sketches, the logistics of arranging the ninth symphony's premiere, etc. The package fails to maximize the hypermedia potential of HyperCard, however, and contains several long sections for silent reading with limited changes in graphics and few links to related topics or musical excerpts. One exception occurs in the section on the sketchbooks, which contains synthesized sound files of early versions of symphonic themes drawn from the sketches; users can compare the sound of the early versions with Beethoven's final realization (though the quality of the synthesized sound is quite poor).

the balloon help feature, which has become standard in the other Voyager packages. The printed documentation that accompanies this CD, incidentally, is the most complete of all the products reviewed here, with detailed set-up, installation, and navigation instructions including numerous "screen shots" of the product in action. It may therefore be a good "starter" program for the novice HyperCard user, even though some of the later packages exploit hypermedia capabilities more fully.

The Art of Listening's title and organization imply content appropriate to a music theory class, but the analysis is low-level and aimed primarily at hearing the character, recurrence, and development of themes, with only cursory attention given to the tonal structure of the symphony (and of sonata form in general). The subsections include Musical Architecture, Sonata Form Demystified, The Classical Orchestra, Anatomy of a Symphony, and The Text of Schiller's Ode. The first of these includes scanned images of famous buildings like the Taj Mahal and Guggenheim museum to illustrate principles of repetition, contrast, and variation that occur in architecture and music. Sonata Form Demystified divides into further subsections: History, Terminology, Sonata Psychology, Musical Elements, Exposition, Development, Recap, and Coda. The sonata psychology section introduces ideas of stability, conflict, and resolution; these remain primary principles throughout Winter's disappointing treatment of sonata form. On the positive side, many appropriate listening examples drawn from the Symphony allow musical novices to hear a three-part structural division of sonata form in the most general sense, and the Musical Elements section puts symphonic excerpts to good use in defining such concepts as key, mode, modulation, rhythm, meter, etc. The Classical Orchestra contains only a few cards per family of instruments, with scanned black-and-white images of the instruments and excerpts from the symphony that allow users to hear the instruments in context. This section does not contain extra sound files of the instruments as soloists for comparison with their orchestral sound, as do many of the later CD-ROMs.

Anatomy of a Symphony is perhaps the most useful section to music theorists. Throughout this section are opportunities to play excerpts from the symphony and view musical notation of the excerpts in reduction, but information is packed into dense prose. Again, Winter gives more attention to thematic analysis than tonal, and a few unusual terms are employed (he calls the final movement "sonata-concerto" form). In an interesting nonlinear design feature, Winter links this section interactively with the Close Reading section. At any point during the Close Reading, users may click on the button bearing the movement number and be transported to Anatomy of a Symphony for more detailed reading; there, another button is provided to return.

Evaluation of Contents

Winter's prose does not "talk down" to the user in this package, nor is it quite so flowery as in the *Dissonant Quartet*; instead it is packed full of interesting nuggets of musicological and historical information of interest to amateurs and professionals alike. It is unfortunate that his analytical emphasis on thematic characterization and "psychology" of the movements takes precedence over attention to harmonic structure.

Design Features

Experienced users will miss some elements they expect in a *Voyager* package. It has no opening animation and no spoken narrations, solo instrument examples, or excerpts from other compositions pressed onto the CD. In the primary navigation bar, there is no *Retrace* button nor a "G" button to identify hot-text links to the Glossary. Indeed, there are no hot-text links to the Glossary at all, which is a self-contained portion of the package. The *More Reading* section is contained within *Beethoven's World*, and is not linked—as in the later packages—to other portions of the stack by the superscripted-R "footnote" icons. There is no true hot text for non-linear exploration of topics; instead, words preceded by bullets may be clicked on to activate pop-up fields containing definitions or related information. The graphics too are quite rudimentary compared with the later *Voyager* products. One helpful feature of the *Beethoven* package is a blank text field in which the user may take notes online; although *Voyager* abandons this idea in its later offerings, it is a standard feature of the Warner packages.

The limitations cited above pale in comparison with Winter's achievement, however. For the company's initial offering, the interface is remarkably similar to what was to become *Voyager's* standard. Of interest to developers is the fact that this is an "open" HyperCard stack; that is, no limitations or protections have been placed in the scripts to prevent knowledgeable users from "peeking" at the stack's internal structure, studying scripts, altering buttons, changing texts in fields, and so on. This is in keeping with the philosophy surrounding early HyperCard development efforts, in which sharing and cooperation were common.

W. A. Mozart, *String Quartet in C Major, K. 465, The "Dissonant": A CD Companion* by Robert Winter (The Voyager Company, 1991)

Pros

Contains some good aural reinforcement of music-theoretical concepts relating to form, harmonic motion, and dissonance treatment using excerpts from the quartet.

Cons

Interface sometimes resembles an online book—with sections consisting of many successive cards of “linear” text to be read, and insufficient opportunities within these sections for listening to the quartet or for nonlinear exploration of related concepts.

Bottom Line

The least successful offering by Robert Winter.

Survey of Contents

This CD-ROM contains the familiar sequence of primary topics in a Robert Winter product—A Pocket Guide, The Instruments, Mozart’s World, Quartet Listening, A Close Reading, More Reading, A Quartet Glossary, and The Mozart Game—accompanying a performance of the Mozart composition by the Angeles Quartet. The structure and interface of the Pocket Guide, Close Reading, More Reading, Glossary, and Game are enough like the other Voyager packages to warrant no further discussion here. The Instruments section is divided into four chapters: The Quartet Instruments (a fairly basic introduction to the string instruments, but with click-and-hear features), Anatomy of a String Quartet (primarily a labeled diagram that focuses on the various parts of the violin—neck, scroll, f-holes, etc.), The Bow (often neglected in discussing the string instruments), and From Home to Concert Hall (just two cards, focusing primarily on the change in players’ seating arrangement from

the intimacy of the home to the more public venue). The *Anatomy of a String Quartet* is really a misnomer, since it does not deal with the full quartet in any detail; further, it is easily confused with *Anatomy of a Quartet*—a valuable subsection under *Quartet Listening*—which includes detailed diagrams of the movements' formal structure.

The content of *Mozart's World* is fairly predictable, with chapters entitled: *Child of the Enlightenment*, *The Prodigy*, *On the Road*, *A Prisoner in Salzburg*, *Escape to Vienna*, *Public Successes*, *Music for the Home*, *Papa Haydn*, *Writing Quartets*, and *A Quartet Party*. The section on "Writing Quartets" is completely missing from the stack, though it appears as a menu item; selecting the menu item takes the user nowhere, and clicking sequentially through the cards of *Mozart's World* brings the reader directly from the *Papa Haydn* subsection to the *Quartet Party*. Obviously a section originally envisioned by the author was cut from the final product, but was never removed from the chapters menu.

The section *Quartet Listening* includes: *A Rationale*, *Democratic Impulses*, *Characterization*, *Tension and Resolution*, *Rhythmic Play*, *Color*, *Anatomy of a Quartet*, and *Mozart at Work*. The first three of these deal in vague generalities, while the remaining sections are quite specific analytical sections with much to offer the music theory student. The *Characterization* section is particularly weak, especially Winter's decision to retell the first movement of the quartet as a narrative:

We do no violence to the spirit of Mozart's age—nor to the view of music as the ultimate mirror of society—if we trace the evolution of an imaginary heroine throughout the course of the first movement of K. 465. She enters the world innocently enough, as a theme accompanied simply by second violin and viola. . . . When the theme emerges again, it is, to be sure, in the same minor mode in the cello. But almost immediately the darkness turns to sunshine. Our heroine stands upright and proud, wiser and stronger from having overcome adversity.

Many of our students were appalled enough by this narrative to quote whole long portions of it in their reviews, as we do now. Clearly, Winter is not speaking to an audience of music theory stu-

dents, but to whom exactly is he speaking? We question this approach, even for general audiences.

On the other hand, several sections of *Quartet Listening* are among the strongest of the package. These contain good examples drawn from the piece to explain music-theoretical concepts. For example, the *Tension and Resolution* section explains the concept of *appoggiatura*, then gives aural examples from the quartet; whenever this type of dissonance occurs in the listening excerpt, the screen flashes the text "*Appoggiatura!*" Similar "ear training" cards are provided to illustrate dissonance resolution, tonic and dominant harmonies, modulation, and pedal point. The *Rhythmic Play* section uses a similar approach to examine phrase structure and rhythmic crescendos, while *Color* explores chord spacing, register, use of inversion versus root position chords, mixture (without using the term), and so on. The most valuable portion of the package for form study is *Anatomy of a Quartet*, which contains schematic formal diagrams of the movements, complete with repeat signs as appropriate and Roman numeral designations of the primary harmonic areas tonicized in each section. The user really must dig to find this type of structural analysis, however; discussions of sonata form elsewhere in the stack are more superficial and deal with a three-part characterization of the form in terms of stability moving to conflict and then to resolution (see the Glossary entry, for example).

Evaluation of Contents

This package generated a good deal of disagreement among our reviewers, and was rated (on a scale of 1 to 5) anywhere from 2.5 to 5. Two features stood out among those who rated the product poorly: first, the linear nature of much of this CD-ROM and, second, the level and tone of the commentary. One student, for example, summarized her opinions as follows: "I would not purchase this program due to. . . the boring visual style, and the fact that you cannot listen to the piece in the majority of stacks. The good theoretical content is too difficult to glean from the eloquent [but] not-so-entertaining commentary. It is too much like listening to a lecture or reading a book."¹⁷ She is correct that much of the stack is designed

¹⁷Kimberly Shaw, a student in the 1995 spring semester.

to be read, and no musical clips are available in these portions. Unlike the Warner products, which make a CD controller available at all times, Voyager only allows the user to play music at particular points in the stack. The user is left reading in silence much of the time, which defeats the purpose of a multimedia product in our opinion. Winter may have sensed this silence problem himself, and tried to solve it by providing a recorded spoken narration of the Mozart's World section; thus users can choose to listen, rather than read. Still, this section has a linear design, with few opportunities for user-determined exploration of related issues.

Design Features

This package follows the standard Voyager interface, with less attention given to visual design than subsequent offerings by this publisher. The Pocket Guide is particularly plain. The title card of each main section uses scanned black-and-white images of some type, with a musical motto played as the card is opened, and throughout the stack there are recurring images of a hand-written score—presumably Mozart's autograph copy. One feature unique to this package is the option for listeners to navigate Mozart's World with spoken narration; users may choose to view the text and read along with the narration, or to view related artwork while listening to Winter reading the text. Fortunately, the narration may be "paused" at any time, so that users can read in silence if they prefer.¹⁸

¹⁸Unfortunately, the Pause button is not available in the Quartet Listening section, so users may assume that they are forced to listen to entire pre-determined musical excerpts here or jump to another card to turn off the excerpt. A little experimentation shows, however, that a second click on the button that plays the excerpt will also stop the excerpt.

Franz Schubert, *Quintet in A Major, D. 667*: A CD Companion by Alan Rich (The Voyager Company, 1991)¹⁹

Pros

Excellent graphic form charts with harmonic structure detailed; good and accurate tutorial on sonata form. Detailed discussion of "Die Forelle" that allows comparisons between the song and quintet.

Cons

Information less deeply embedded than later Voyager Products (e.g., Stravinsky, Dvorák); many successive cards with mostly linear reading material.

Bottom Line

A good resource on sonata form and this work in particular. Quality comparable to the Beethoven Ninth Symphony stack; shares its "open" HyperCard format if you know a few key commands.

¹⁹Alan Rich has continued to develop multimedia CD-ROMs for the Voyager Company in his own series, entitled "So I've Heard." These reasonably-priced products (\$24.95) are introductions to music history (or music appreciation) in three volumes: Bach and Before, The Classical Ideal, and Beethoven and Beyond (the latter available also in Windows format). In his own humorous style, Rich is quoted on Voyager's web page, saying "if I had this available when I studied music in school, I'd probably still be a musician."

We were intrigued to discover that Rich has authored a similar product in book form for Polygram in collaboration with Harper Collins (1995), part of its "Play by Play" series. This book is marketed with a CD of the Mozart Piano Concerti, Nos. 20 and 21, and reads just like a low-tech version of a CD-ROM in (linear!) book form with chapters entitled: Classicism Reborn, Music Goes Public, Musical Structure in the Classical Era, Mozart: Divinity and Reality, From Sublimity to Tragedy, Mozart After Mozart, and Play by Play: Mozart's Reinvention of the Piano Concerto. This last section is intended to be read while the user listens to the work, with CD timings indexed to the commentary; form charts are also presented with timings indexed to each formal division. The book contains a glossary and suggestions for further reading and listening.

Survey of Contents

The Table of Contents summarizes the eight primary sections of this product: Pocket Guide, "Die Forelle," Close Reading, A Classical Background, Inside Schubert, Glossary, More Reading, and Trout Cookbook (a game). The CD contains performances of the quintet—by the Alban Berg Quartet with guest artists Elisabeth Leonskaja playing piano and Georg Hörtnagel playing double bass—and the song from which Schubert drew inspiration and thematic material, with Barbara Hendricks, soprano and Radu Lupu accompanying at the piano. The Pocket Guide, Glossary, and More Reading sections need no further comment, since they are virtually identical in format to other Voyager products, except to say that the More Reading section is disappointing. Only 13 cards in length, More Reading contains sketchy annotations and gives no publishers for any of the books; no specific articles are cited. The "R" icons, which in all Voyager stacks function like footnotes to bring users to the More Reading section, are used only sparingly here.

The "Die Forelle" and Close Reading sections follow a similar format, with commentary timed to change in synchrony with the music. As usual, these comments are intended as light and entertaining reading, and contain little music-theoretical depth. The first card on the first movement, for example, contains the following text: "A big, gleaming arpeggio starts the movement off with two pieces of good news: 'I am here' and 'I am in the key of A major'." An improvement over earlier Voyager packages is the link between Close Reading and Charting the "Trout Quintet" (discussed below), which allows users access to a detailed click-and-hear analysis of the tonal structure that they can follow while listening, if they tire of Rich's commentary. Unlike the Warner New Media packages, however, this change cannot be made without disrupting the play-through; thus, the CD stops and listeners must start again at the beginning of the movement or click on the appropriate place in the form chart to resume listening. "Die Forelle" also uses the Close Reading Format, with commentary on the left-hand side and the song's text on the right; a click of a button changes the text from German to English (or vice versa).

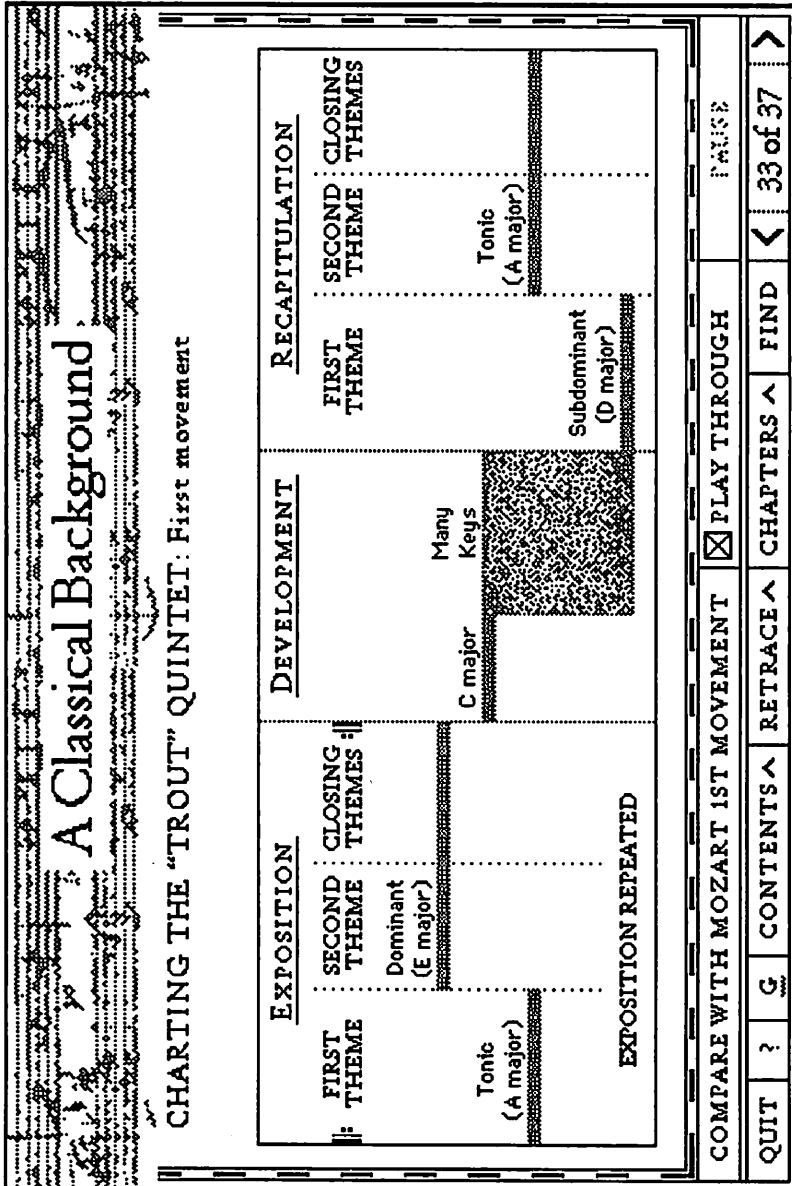
Inside Schubert contains no surprises, and follows a format similar to the biographical sections of the other early Voyager products in that they are very much text and image oriented (like an online book), with very few opportunities to click and hear or to leap to other related portions of the stack. Hot text (revealed when the user clicks on the "G" button) is linked only to the Glossary, and "R" icons (few in number) are linked to More Reading. The subsections include: Schubert's Vienna, An Unfinished Life, The Tone Poet, and A Trout is Born.

By far the strongest section—from the point of view of the music theory teacher—is A Classical Background, whose subsections include: The Classical Ideal, Sonata Form, Schubert as Classicist, and Charting the "Trout" Quintet. The second and last subsections contain Rich's treatment of form and tonal structure, which is better than any of the Voyager products authored by Robert Winter and more useful for the classroom. Figure 5 shows Rich's diagram of the first movement from Charting the "Trout"—very similar in format to what we might draw on a classroom chalkboard. The Compare with Mozart button takes users to a similar diagram for "Eine kleine Nachtmusik," the subject of much of Rich's sonata form discussion. Listeners can toggle back and forth between Mozart and Schubert to compare Schubert's subdominant return to Mozart's tonic return in the recapitulation, as well as Schubert's choice to begin the development in a key other than the dominant. The sonata form section contains many listening examples from the Mozart work to help users hear key changes and structural divisions; even the definition in the Glossary is sensitive to the issue of harmonic design.

The CD-ROM concludes with a Trout Cookbook: "ten Voyager-tested recipes for the venerable fish, and a game of musical concentration you can play while cooking."²⁰ The left-hand side of the game card displays a palette of icons, each of which plays a musical excerpt from the quintet; excerpts must be matched by clicking on icons in pairs until two matching items are found. The icon buttons

²⁰Alan Rich, "User's Guide" to the CD Companion "Franz Schubert, Quintet in A Major, D. 667: 'The Trout'" (Santa Monica, CA: The Voyager Company, 1991).

Figure 5. Interactive sonata form chart:
Schubert, "Trout" Quintet (Voyager)



disappear as excerpts are correctly matched, revealing a graphic humorously related to the trout recipe shown on the right-hand side of the card. This is the most successful concentration-style game of all the products reviewed here; excerpts are distinctive and of sufficient length to facilitate matching, and the gradually revealed graphic beneath the music icons provides extra incentive.

Evaluation of Contents

There is simply not as much information here as there is in the Warner New Media products, nor even in the Voyager Dvorák package. Information is not very deeply embedded, so the user can visit most of the cards in one or two sessions with the stack. What is here, however, is quite good—particularly the treatment of sonata form and the comparison between song and quintet, which anyone teaching the composition would want to show.

Design Features

The “Trout” is a recurring design motif, and little fish grace every title card in clever animations. Some fish are dressed: the Inside Schubert trout wears a Sherlock Holmes cap while peering through a magnifying glass; the More Reading trout wears glasses and peers at a book. This is an entertaining feature of the design, which otherwise bears all the standard characteristics of a Voyager product.

Interestingly, this product maintains an “open” HyperCard environment like the Beethoven stack, except that in this case the environment is more concealed. The menu bar has been hidden and cannot be summoned by the common keyboard command; likewise, the message box’s functions have been disabled. Other HyperCard keyboard commands work, however, and we were able to examine scripts and to cut-and-paste text into this review without difficulty. While this is a useful feature for HyperCard stack developers, the stack contains enough safeguards to keep all but the most computer-savvy students from getting into the product and changing text, moving buttons, etc.

Igor Stravinsky, *The Rite of Spring*: An Interactive Companion by Robert Winter (The Voyager Company, 1991–1992)

Pros

Terrific explanation and clarification of a difficult modern musical idiom. Accessible to the aficionado; enlightening for the professional. Lots of good background material.

Cons

Essays occasionally spend too much time in linear online-book mode.

Bottom Line

One of Winter's most successful Voyager packages: "Anyone, at any level, who is studying, performing, or appreciating the Rite should be familiar with (or preferably own) this stack."²¹

Survey of Contents

This program uses the magnificent 1985 Decca recording by the Orchestre Symphonique de Montréal conducted by Charles Dutoit and supplementary audio tracks on individual instruments recorded especially for this package. The primary sections of the program will come as no surprise to Winter fans: A Word from Robert Winter, A Pocket Guide, Stravinsky's Orchestra, Stravinsky's World, The Rite as Dance, Rite Listening, A Close Reading, Rite Glossary, and The Rite Game. As in other Voyager products, the Pocket Guide is a single card that allows users to listen nonlinearly by clicking on sections in any order. The first card of Stravinsky's Orchestra is a diagram of the standard orchestral seating plan; clicking on each section transports the user to another card with pictures of individual instruments. The user can listen to an excerpt by the section or go to discussions of the individual instruments. Orchestral sections and individual instruments are illustrated with recorded ex-

²¹Tom Toner, a student in the 1995 spring semester.

cerpts from the *Rite*. The brief comments are not generic; they deal with the way Stravinsky uses the instrument or section in this work. Like the other primary sections of the program, Stravinsky's Orchestra is designed for nonlinear browsing, but can be read sequentially through the use of right- and left-arrow buttons.

Stravinsky's World contains ten "chapters": Introduction, Stravinsky: A Biographical Sketch, Stravinsky's Creative Life, Sergei Diaghilev, Avant-garde Paris, The Ballets Russes, *The Firebird* and *Petrushka*, The Genesis of *The Rite*, A Brief Performance History, and More Reading. This section gives lots of fascinating background information about the composer, his times, and the piece. Each card contains text and a picture or other appropriate graphic. Long stretches of text are interrupted only occasionally by Reference icons ("R") identifying quotations or spoken commentaries by Winter, accessed through buttons with titles such as "Tell me more about Rimsky's Romanticism" or "Tell me more about 'The Firebird'." These short lectures with examples played on the piano offer insights about Rimsky Korsakov's influence on his pupil, and stylistic differences between *The Firebird*, *Petrushka*, and *The Rite*. The More Reading section is a well-annotated bibliography that provides paths for further exploration of various relevant topics: Introduction, Origins, Criticism, Dance, Analysis, and Stravinsky on Stravinsky. This section is linked to several different primary sections.

Appropriately, *The Rite as Dance* opens with a flip-card animation that simulates a dancer in motion. This section has three chapters: A Lost Legacy, Scenario and Choreography, and Reconstructing Nijinsky, plus a link to the same More Reading section discussed above. This section presents notes on the choreography and gives details of attempts to reconstruct Nijinsky's choreography from Stravinsky's notes in the original four-hand piano score. The Scenario and Choreography chapter presents information collated from four different sources for each dance.²²

²²The sources are a letter by Roerich, Stravinsky's notes on the four-hand score, an interview attributed to Stravinsky but later disavowed by him in the journal *Montjoie!*, and notes prepared by Stravinsky for Koussevitzsky for an early concert performance. (Roerich collaborated with Stravinsky in creating the scenario for the ballet.)

Rite Listening, the largest expository section, has the following subdivisions: Getting our Bearings, Revolutionary Rhythms, Rite Themes, Rite Harmonies, The Rite Orchestra, Rite Orchestration, The Shape of a Ballet Score, Performing the Rite, and More Reading. It is here that Winter attempts (with a good deal of success) to make Stravinsky's compositional style in the work meaningful to both amateurs and trained musicians. He accomplishes this with characteristic humor ("How do we describe a chord that seems ideally suited to accompany an Excedrin headache?") and carefully chosen audio-visual aids. For example, he illustrates regular meter by showing "ONE two Three four" on the screen with each word highlighted cyclically as an excerpt from *Spring Rounds* is played. This is contrasted with techniques like the cross-accents in "Augurs of Spring" by a graphic showing metric beats with accented beats in larger font:

1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4

As the music plays, each measure is highlighted. Winter uses similar techniques to illustrate a whole litany of rhythmic techniques, in his terminology: regular meter, syncopation, unit pulse, "revealed" unit pulse, "complex" unit pulse, "erratic" unit pulse, meterlessness, and polyrhythm, always with examples from the full ballet or with single instrument excerpts. In a similar manner, Winter illustrates various scales, e.g., octatonic, pentatonic, dorian, etc. with a graphic showing the scale degrees and interval patterns; as a tune from the *Rite* is played, the appropriate scale degrees are highlighted on the screen. In describing Stravinsky's use of "borrowed" material, Winter aligns Stravinsky's altered version of the music with the original, as Figure 6 shows. The user clicks on icons to play and contrast the versions. He goes on to contrast Stravinsky's melodic material with more traditional tunes in a number of different ways, e.g., contrasting the number of different notes and tessitura in Stravinsky's themes with a number of well-known traditional melodies.

Figure 6. Thematic derivation: Stravinsky, *Rite of Spring* (Voyager)

RITE LISTENING

Rite Themes

EXAMPLE 1. Though perhaps the simplest instance of adaption, Stravinsky drops extraneous notes (shown by *), adds the grace notes, and varies the rhythms.

Juszkiewicz, no. 157

Introduction

5

5

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Of course, Winter introduces other common elements of Stravinsky's style, such as ostinato, modified ostinato, opposition (contrast), "evolving" themes, and so on. Winter's inventive expository methods make Stravinsky's compositional techniques understandable to the nonmusician and clarify them for the trained musician. His approach to the harmonic material is equally accessible:

In the baldest possible terms, harmonies in *The Rite of Spring* result from the superimposition of individually consonant chords in collectively dissonant relationships. The great majority of chords in *The Rite* can be reduced to clusters of major triads, minor triads, and dominant sevenths (technically a dissonant chord, but a mild one). I hasten to add that these harmonies exist in *The Rite* largely as self-sufficient sonorities, far from their traditional tonal functions.

Winter uses graphic techniques and superb examples to help clarify concepts such as superimposition, layering, "chord streams," "stacked chords," compound ostinatos, etc. His discussion of Stravinsky's orchestration again deals with specific techniques, always illustrated by excellent musical examples.

The Shape of the Ballet Score discusses form in the work, beginning with similarities and differences between parts one and two. This is followed by a discussion of each section of the score. A Show Overview button on each card produces a diagram section (see Fig. 7); clicking on each element in the diagram plays the excerpt. Performing the Rite discusses differences in recordings conducted by Stravinsky, Monteux, and Dutoit, particularly with regard to tempo. Winter concludes that the latter most accurately follows the tempo indications in the score, and discusses several reasons for his elation in discovering this recording.

A Close Reading is typical of Winter's other packages. Each card combines a basic music-appreciation description synchronized with the music and a table giving an overview of the form of the current section. The user can toggle back and forth between the overview and a more detailed chart at will. The Rite Glossary and The Rite Game are similar enough to these sections in other Voyager products to warrant no further discussion here, except to say that the Game is stimulating, fun, challenging, and really does test understanding of the material presented and familiarity with the composition as a whole.

Figure 7. Formal overview: Stravinsky, *Rite of Spring*,
 "Ritual of Abduction" (Voyager)

RITE LISTENING		The Shape of a Ballet Score		
	OVERVIEW Ritual of Abduction [Presto] J. = 132			Shape
	Theme 10 a (21 ♩, timpani) b (24, triplets) a (27, timpani)			A
	Brass arpeggios (10 + 8)			
	Themes 11 (13) 10 a (11) 11 (6) 10 a (9) 11 (15) 10 b (21)			B
	Brass arpeggios Tremolos			
	Theme 12 a (6, staccato chords) a (6) a' (13) a' (10) a' (12)			C
	Theme 11 (27) Tremolos			B
	Descending chords + 2-note motive (27)			
	Theme 10A a (3 + 10 ♩, timpani → brass) a (3 + 20)			A'
	Theme 10B a (9 J., timpani → strings) a (3) a (6) a (4)			
Four emphatic chords Trills (link to "Spring Rounds")				
HIDE OVERVIEW				
QUIT ? G INDEX ▲ CHAPTERS ▲ RETRACE ▲ FIND				

Evaluation of Contents

In his spoken introduction to this program, Robert Winter says that the program is intended both for those whose music training is limited to listening to their favorite music program on their car radio, and for trained musicians; for each group he promises to "open the music up and bring it into sharper focus." Presenting a work such as this in a way that is meaningful to such a diverse audience is a tall order, and Winter succeeds admirably. Difficult concepts are made exceptionally clear through use of many innovative and creative graphic and audio techniques—this is multimedia at its best! Although the material is presented in a manner that should be accessible (at least at some level) to nonmusicians, the presentation never talks down to the listener, and many concepts will be enlightening to users at any level of musical sophistication.

Design Features

The basic design is vintage Voyager with few surprises. Some of our reviewers complained about the "primitive" art work in black and white, but we found the visual style effective and appropriate to the material. The uses of animation, particularly the presentation of pictures in the introduction synchronized with accents in the score and the flip-card animation of the dancer at the beginning of the Dance section, were particularly effective. Not stretching the technological envelope has definite advantages: these programs run flawlessly on Macs that are primitive by current standards, and fly on newer models.

Richard Strauss, *Three Tone Poems*: A CD Companion by Russell Steinberg (The Voyager Company, 1992)

Pros

One of the best Voyager offerings in terms of the depth of embedded information, accuracy of music-theoretical definitions, documentation of sources, and striking “art deco” visual design.

Cons

The graphics include a number of scanned artworks of semi-nudes which may be offensive to younger users (or, more likely, to parents of younger users!); disappointing game section that does little to test mastery of concepts.

Bottom Line

The author has managed to strike the right balance in his prose, user options, and content, so that the package is useful for collegiate music majors, while still providing nontechnical and entertaining information for a general audience.

Survey of Contents

This product contains the typical Voyager features, as well as some that are distinct to this offering. The primary contents include: Pocket Guide, Close Reading, Master Orchestrator, Inside the Score, The Tone Poem, Pragmatic Romantic, Prankster’s Game, More Reading, and Glossary. In this package, the Pocket Guide covers three distinct works and thus comprises four cards: the first a sketchy formal diagram of all three compositions, then three additional cards with more detailed diagrams of each work (*Don Juan*, op. 20; *Death and Transfiguration*, op. 24; and *Till Eulenspiegel*, op. 28 in performances by the Cleveland Orchestra with Lorin Maazel conducting). Each of these features the standard interface, whereby section names are highlighted as the corresponding section of music is heard, and listeners may click on any section to listen and compare sections in a nonlinear manner.

The Close Reading offers two choices on its split screen. On the right side is a broad formal diagram of the work that successively highlights sections as they are heard; if the user clicks on "Show Detailed View," the table is replaced by a deeper-level formal analysis of thematic entrances similarly linked to the music. It is disappointing that Steinberg chooses to focus solely on thematic analysis here and not to include any tonal analysis, especially since he has a rather detailed section on chromatic harmony in the Inside the Score section. On the left side of the screen is running commentary typical of the Voyager Close Reading sections; however, users may choose instead the "View Art" button, which replaces the commentary with a series of pictures that paint the story of the tone poem in broad strokes and are synchronized to change in time with the events depicted in the music.²³ Steinberg's running commentary, while geared to general audiences, does not seem to "talk down" to the more knowledgeable user as does the commentary of some of the other CD-ROMs reviewed here.

The Master Orchestrator and Inside the Score are among the most useful sections for undergraduate music majors. The Master Orchestrator contains three subsections: Strauss's Orchestra, Instrumental Artistry, and Master Brushstrokes. The first of these pales next to the detail of the Microsoft and Future Vision packages; yet it contains accurate information on orchestral instruments, instrumental effects, tone color, etc., and does so using musical examples drawn from the tone poems. The Instrumental Artistry and Master Brushstrokes sections move far beyond what is accomplished in the Microsoft and Future Vision packages, however, in that they discuss with some sophistication techniques of orchestration employed by Strauss in these works. In all of the Master Orchestrator sections, instrumental solo excerpts from the tone poems may be heard alone or in their orchestral contexts—some with accompanying score re-

²³One rather jarring element in the beautifully designed user interface is the number of bare women's breasts visible in the semi-nude people who populate this CD-ROM. In particular, one of the artworks accompanying the *Don Juan* Closer Reading shows the protagonist atop a woman whose chest is bared; even the title card to the Glossary features a ring of dancing nude maidens carrying a garland that conceals only some of their attributes.

ductions and “scrolling highlights” that move in time with the music to identify the section of the score being heard—and commentary describes the special effects achieved by the composer.

Inside the Score contains five subsections: Shapes and Textures, Motives and Themes, Tempo and Rhythm, Harmony, and Structure. The least useful of these for the theory student is the Shapes and Textures section, which speaks in general terms to a general audience and uses contour graphs (with scrolling highlights synchronized to the music) instead of score representation. Of interest to conductors and performers, in particular, is the Tempo and Rhythm section, which (among other things) contains comparative tempo choices between a 1957 recording by George Szell and the 1982 recording by Lorin Maazel. This section also contains a clickable “metronome bar”—a linear graph with tempo markings from zero to about 165. Clicking on the bar at any point plays a Strauss excerpt at the tempo chosen. Of most use to music theory teachers are the final two subsections of this unit, on Harmony and Structure. These contain accurate and informative diagrams and definitions of concepts commonly taught in theory classes, including mixture, augmented sixth chords, and sonata form. Sonata form is taught as an expanded binary structure, with emphasis on harmonic motion rather than on a three-part thematic or dramatic layout. Here, at last, is a discussion of the tonal structure of the tone poems and their formal relation to “traditional” sonata form. Discussions in these sections are illustrated with CD excerpts and score reductions (complete with moving highlights, as in other sections of the package).

The final three sections of the CD-ROM are The Tone Poem, Pragmatic Romantic, and Prankster’s Game. The first two are historical in nature: the Tone Poem contains subsections on the Genesis of the Tone Poem, Sounds of Romanticism, and Strauss’s Tone Poems; the Pragmatic Romantic contains the composer’s Biography, Influences and Contemporaries, and Strauss and Film Music (which documents elements of Strauss’s music that may have been influential upon contemporary composers of film music). Finally, the Prankster’s Game is a disappointing series of Concentration-type games, organized by topic (Heroic Themes, Virtuositic Excerpts, Sigh Figures, Brass Passages, etc.) in which players click on pairs of Play icons in

search of matching Strauss excerpts. While the excerpts are drawn from the pieces under study, this game design does little to test students' mastery of the concepts covered in the CD-ROM and there is little in the way of "bells and whistles" to reward students who perform well on the Frankster's Game.

Evaluation of Contents

The content of this CD-ROM is excellent on many levels—from the descriptions of the tone poems' stories through graphics, sound, and text, to the music-theoretical explanations of sonata form, harmonic function, and so on. Figure 8 shows Steinberg's diagram of sonata form as compared to the structure of two of the tone poems. Music theorists will note that this sonata form diagram is not at all in conflict with what is generally taught in music theory classes—a problem that does occur in some of the other CD-ROMs reviewed here. In preparation for the Roman numeral analysis that appears in this diagram, the author has clearly introduced the concept of harmonic function (including not just a cursory explanation of I, IV, and V, but also more advanced topics like VI as a key area in Romantic music). He defines other concepts crucial to this repertoire as well, including the appoggiatura, deceptive resolutions, mixture, and the respelled augmented sixth to effect "surprising" modulations—all illustrated aurally with sound clips from the Strauss tone poems under study (plus a few from Wagner and Mahler).

Design Features

This CD-ROM employs one of the most striking designs of all the black-and-white products. Its art deco borders and graphics impart a certain "flavor" that is distinct from all the other Voyager packages. The user option in *A Close Reading* to view art instead of text provides the interested amateur with yet another path through the music that is entertaining and nontechnical. The quality of the art varies dramatically from tone poem to tone poem, with *Till Eulenspiegel's* art work the least effective. In most other respects, the design features are consistent with other Voyager titles.

Figure 8. Sonata form adapted to the Strauss *Tone Poems* (Voyager)

Inside the Score Structure

The broad tonal frameworks for both *Don Juan* and *Death and Transfiguration* adhere to Romantic sonata form. In the following chart click on the roman numerals to hear excerpts from the major structural moments of each piece.

Part 1	Part 2	Part 3
EXPOSITION	DEVELOPMENT	RECAPITULATION
Primary Area	Extension + Retransition	Primary Area
Theme 1	many parts + lead in	Theme 1
Secondary Area		Secondary Area
Theme 2		Theme 2
<i>Don Juan:</i>		
I	VI	I
<i>Death and Transfiguration:</i>		
i	III VI vi	i V I

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Antonín Dvorák, *Symphony No. 9: A CD Companion* by Robert Winter (The Voyager Company, 1994)

Pros

The only CD-ROM with a complete interactive reduced score of a symphonic work; contains a fascinating repository of primary sources regarding Dvorák's trip to the U.S. and the influences of African-American and Native-American music upon his work; good hypermedia links.

Cons

Contains very little in the way of a music theory tutorial; harmonic analysis is buried in "Show Overview" buttons.

Bottom Line

One of the strongest offerings by Robert Winter, though somewhat short on music-theoretical detail.

Survey of Contents

The primary sections of the CD-ROM include: A Pocket Guide, A Romantic Orchestra, Dvorák and the New World, New World Listening, A Close Reading, A New World Glossary, an Annotated Bibliography, Direct Testimony, and Getting to Carnegie Hall (a game/quiz); the work is performed by the Vienna Philharmonic, conducted by Kirill Kondrashin. Many of the primary section types will be familiar to users of previous Voyager packages. The Glossary and Bibliography are similar enough not to warrant further discussion here, though their links to the Direct Testimony section (described below) increase their effectiveness. The Pocket Guide differs slightly from previous packages, however, because of the cyclic nature of Dvorák's composition: some themes are given two designations, one of which is a "cyclic" number. This designation enables the listener to identify and click on the themes that recur

from movement to movement in an effective (nonlinear) listening demonstration of cyclic composition.

The sections on the orchestra and on Dvorák's life and times are what one would expect from their titles. The Romantic Orchestra presents the line drawings and information about the symphonic instruments divided by family, as well as examples of the instruments playing solos and excerpts from the New World Symphony. The engaging Dvorák and the New World tells the story of Dvorák's reluctance to leave the "Old World" for the New, his contract negotiations with the National Conservatory where he was to teach, and the fascination he developed for the American-Indian and African-American musics he encountered. The story is told in eleven chapters: Humble Beginnings, Recognition and Celebrity, Invitation and Crossing, Life in New York, The National Conservatory, The Great Debates, The Summer of '93, Hiawatha Meets Buffalo Bill, New World Premieres, Goin' Home, and The Legacy. This section contains a copy of the only known recording of the famous Negro Spiritual singer and arranger, Harry T. Burleigh, singing "Go Down, Moses." In both of these sections—indeed throughout the CD-ROM—information is deeply embedded, and nonlinear modes of navigation are encouraged (the effective use of hypermedia has grown with each of Winter's CD-ROMs). Thus, for example, a brief quotation is given a superscripted "R" icon, which takes the user to the More Readings Section; clicking on a magnifying glass icon there transports the user to Direct Testimony, where the complete text is given in its original context (which often makes for fascinating reading!). Throughout both sections are many opportunities to hear musical examples; the historical section even contains sound files of interviews with Dvorák's acquaintances from the American years.

New World Listening contains many opportunities for listening in its subsections: Confronting the New World, Symphonic Folk Songs, Repetitive Rhythms, Heartrending Harmonies, Sophisticated Scoring, The Quest for Unity, listening units for each movement, and Knowing the Score. Of interest historically throughout this section are comparisons between musical events in the New World Symphony and dramatic events in Longfellow's poem, "Song of Hiawatha"; Dvorák apparently acknowledged such links in the primary sources Winter consulted in assembling this CD-ROM. Par-

ticularly disappointing are the two units that would seem to be of interest to music theorists: Heartrending Harmonies and Knowing the Score. The first of these includes illustrations of concepts like the diminished seventh chord and the augmented sixth chord—complete with animated ear-training examples from the symphony—but the explanations are cursory and nontechnical (e.g., no mention of how to spell the chords), and very little other music theory is explained. Knowing the Score is aimed at the nonmusician and gives ten “maxims” for following score highlighting with the eye as a means of learning to read music. The units on folk song and rhythm provide some interesting listening material on pentatonic and modal melodies, on the nature of repetition, and on Dvorák’s indebtedness to “Negro” and “Indian” music; highlighting analytical units during musical examples also makes for effective ear training here. Winter finally addresses the issue of key relations and tonal structure in the movement-by-movement analysis that follows the Quest for Unity section, but only if the user chooses to click the “Show Overview” button. Here, one finds a rather cluttered form diagram with thematic analysis and keys (both letter name and Roman numeral function) identified, as well as words like “build up” and “dissolve” between formal units. Users can click at any moment to listen to the item selected.

The Dvorák Close Reading section shows marked improvements over its predecessors. Winter’s commentary, synchronized with the music, is a listening guide that describes what is heard in language that novices will understand, but it does not resort to the simplistic adjectives that characterize many other CD-ROMs. What truly sets this section apart is a Show Score button that gives the user an online reduced score with (optional) moving highlights for the entire symphony! More experienced users who do not care to read Winter’s listening guide can instead follow the score; choosing this option reveals a Show Commentary button that stops the movement temporarily to give a more detailed discussion, complete with buttons that play related sound files. Available throughout the Close Reading section is a magnifying-glass button linked to the New World Listening section, so that listeners can toggle back and forth between sections to compare information at several levels.

The last two sections of the CD-ROM are both strong. Direct Testimony—a section that appears also in Winter's first project for Calliope—is an online repository for primary sources relevant to the topic, including the complete text of period newspaper articles, reviews, letters, etc. It is linked interactively with most other sections of the package; this is a valuable research tool and makes for fascinating reading. The game, *Getting to Carnegie Hall*, is an ingenious multiple-choice quiz. Users are presented with a map interface; questions appear in pop-up boxes superimposed upon the map. For each question answered correctly, the Dvoráks are gradually advanced along the map across Europe to board their ship to the U.S., and so on (pertinent dates and details regarding their mode of travel and stops along the way are given as well). Questions are generally well-designed. They are offered at beginning, intermediate, or advanced levels, and require players to identify themes from the symphony and to retain historical and biographical information about the times. Bonus points can be earned to pay for a post-premiere party for the Dvoráks!

Evaluation of Contents

This product is a wonderful musical and cultural history of the United States at the end of the nineteenth century, using Dvorák's years here as its point of entry. It provides a good formal overview of the symphony, along with a possible programmatic and literary interpretation based on Longfellow's "Hiawatha." Information is deeply embedded and linked at many levels, so that the user will undoubtedly return on more than one occasion and still find something new. The CD-ROM's primary sources and recorded interviews alone are valuable features; indeed, these features make this package "not so much a 'CD-Companion' to Dvorák's New World Symphony as the beginnings of a cultural history of America at a crucial juncture in her history," to use Winter's own words.²⁴

It is clear—by the inclusion of primary sources, by the responsible footnoting and bibliographical detail, and by the level and type

²⁴Robert Winter, Read Me ("About This Program"), from the CD Companion to "Antonin Dvorak, Symphony, No. 9: From the New World," card 25.

of analysis—that the author is a fine musicologist who is committed to winning new audiences for “classical” music through interactive media. It is unfortunate that Winter does not have a music theorist on his design team; a theorist could serve as a useful double check on analytical terminology and symbols, which sometimes do not conform to common usage (for example in E minor, Winter correctly identifies a G Major section as III, then goes on to discuss a modulation to g# minor as motion to iii# instead of #iii).

Design Features

This is the best of Voyager’s packages in terms of nonlinear opportunities for navigation. Users are kept from “losing themselves” in hypermedia possibilities by means of the Retrace button, function-specific icons (like the magnifying glass for links to Direct Testimony), and through helpful indexing using pop-up menu bars. On the opening card, for example, are two buttons (Sounds and Pictures) that pop up an alphabetical index to all the sound files and pictures in the entire product—an invaluable feature if the user is trying to track down a specific item, such as the sound file of Harry Burleigh’s performance. Navigation buttons are consistently placed from section to section, and their function is easy to intuit; hot-text links to the Glossary (as in all Voyager products) are underlined when the user clicks on the “G” button. Even the Glossary and More Readings sections contain various buttons to play audio examples and to transport the user to Direct Testimony for further detail.

The graphic design and black-and-white animations that mark the Dvorák package are simple, yet striking and effective. The depth and breadth of the historical and cultural information, as well as improved hypermedia links at all levels of the design, make this product stand out from the other Voyager products.

WARNER NEW MEDIA

The three Warner packages (Mozart: *The Magic Flute*; Beethoven: *String Quartet No. 14*, op. 131; and Johannes Brahms: *A German Requiem*) are similar in design and interface. Each has a First Choices card where the user decides the starting point in the program, which listening mode to use, etc. In addition there is a button that opens another stack with detailed instructions and descriptions of features of the package. Each of the three programs offers five different "tracks" of running commentary, presented on cards that change at appropriate times while the music is playing. The Exploring the Music and Notebook tracks are common to all three. Like Voyager's Close Reading section, Exploring the Music gives commentary at a basic level that guides untrained listeners through the music. Each card includes a CD control panel, the current time and measure in the movement, an array of buttons that allow the listener to change tracks at will, and links to related topics. The Notebook, a feature unique to this company's products, consists of blank cards for users to take notes. Each of these cards is labeled with the section of the composition, and the cards change as sections change in the performance.

The other three tracks differ among the packages: *A German Requiem* and *Magic Flute* offer complete German text and English translation; the *Requiem* includes a track presenting a conductor's notes on performance and interpretation; and the *Magic Flute* offers a Running Commentary of the action, which helps the listener to envision what is happening on the stage. Since text and translation tracks are not needed for the Beethoven Quartet, these are replaced by two more analytical tracks: Structural Analysis is a running commentary on form in the piece; and Harmonic Analysis comments on keys. Although some statements are merely descriptive ("A turn toward the key of B minor begins"), others show how keys relate to one another within a movement or between movements.

Each of the Warner products has a Program Book—the primary table of contents. Here the user can select any of the five listening tracks, or click on buttons that take one to a new listing of related topics about historical period, composer, music theory rudiments,

or genre. Each package includes a multilevel "Map" of the composition, similar to the Voyager Pocket Guides. The highest level lists the primary movements or sections of the work. An In Depth button next to each section title takes the user to another card, which shows the primary subdivisions of the movement, with measure numbers and CD start times. In Depth buttons at this level reveal pop-up fields showing more detail and various icons. Clicking on an eighth-note icon displays music notation of the current theme and plays it, usually on the piano; a button called "More about this theme" gives more detailed information. This type of embedded structure occurs in other sections as well; for example, hot text may bring up a pop-up field with additional icons, such as a magnifying glass for more information or a microphone that plays a recorded voice pronouncing foreign names and terms. In the sections that present expository material, the cards are numbered (e.g., 9 of 44). Each package includes a separate sound-clip index, glossary, bibliography, pronouncer index, and tempo guide.²⁵ A Backstage section gives detailed information about the recording, writers, programmers, editors, and production staff. Each program has a Final Exam on the music, composer and background material. The Exam includes True/False, Multiple Choice, and "Drop the Needle" sections.

Navigation is consistent within each program and between them, so the user should never get badly disoriented despite the complexity and diversity of the material. Each program uses a special icon—the composer's face in the Brahms Requiem and Beethoven Quartet, and the Sphinx in *The Magic Flute*—to return to the main menu (Program Book) from other sections. One can change commentary tracks while the composition is playing by selecting one of five numbered buttons at the top left of the card. Although the user can take many varied "side trips" or digressions for related background material or definition of terms, a special icon (different in each stack but always in the upper left corner of the card) takes the

²⁵The tempo guide defines tempo indications such as Allegro, Andante, Presto, etc. All of these programs have links to passages in the specified tempo. The *Magic Flute*, in addition, has metronome icons which invoke simulated metronome clicks for each tempo.

user back to the currently selected commentary track. A small CD control panel is almost always present, although its location sometimes changes, and the user has the option of letting the music continue while exploring related topics or pausing so that none of the running commentary is missed.²⁶ Topics can be accessed in a variety of ways: from the Program Book, via hot text and related-topic buttons on many cards, and through specialized indexes.

The depth and breadth of information in these packages are remarkable: commentary and analysis of the music at different levels of sophistication, historical background, information about the composer and genre (including examples by other composers), clips of other compositions by the current composer, an introduction to music theory rudiments and definitions (even including some basic ear-training), and much more. Related material is presented in various ways. Occasionally an introductory passage is presented via recorded voice—a pleasant change of pace. Many of the cards include line drawings and scanned art work (in monochrome), and hot text is always available if the user needs definitions of terms.

²⁶Our reviewers liked being able to listen to the music while browsing related material—a feature not available in many packages.

Mozart, *The Magic Flute* (Warner New Media, 1989)²⁷

Pros

A wealth of deeply embedded information about the opera, Masonic tradition, music theory, and the composer; a complete online translation of the libretto, and high-level music analysis with effective aural demonstrations.

Cons

Buggy program on newer Macs, even when run on the older versions of HyperCard on which it was developed.

Bottom Line

The information presented here was well worth the major problems we encountered retrieving it. We would love to see this program reworked to run reliably on current Mac systems.

Survey of Contents

This is the first of three CD-ROM packages from Warner New Media's "Audio Notes" series. The package consists of three compact discs, containing the full performance of Mozart's opera by the Chor des Opernhauses Zürich, directed by Nikolaus Harnoncourt, plus HyperCard stacks that, according to the promotional literature, contain more than 7000 "screens."²⁸ The text and analysis are both by Irene Girton. The basic design and style used in all of the Warner products are present here, although they were refined and improved in the Beethoven and Brahms packages released subsequently.

²⁷Although the copyright date is 1989, this package was not released until March of 1990.

²⁸We did, however, note that cards are not always used efficiently. For example the Help section, which consists of 19 cards, was replaced in the later releases by a single card with pop-up fields.

Users make initial decisions on the First Choices card. They may choose whether they want to hear the music only or whether they want to hear a summary of the dialogue in English or German between numbers. Users then specify the starting point: Overture, Program Book, Opera Map, or Index. Other choices include whether or not to hide the menu bar,²⁹ and whether or not a laser disc player is attached to the computer system. On the Program Book card, the user selects one of five listening tracks: English, German, The Story, The Music, and Notebook. The first two give an English translation or the original German text on screen as the opera plays. The Story is a running description of the action on stage, which helps the user envision the opera. The Music is a basic commentary at a music-appreciation level, and Notebook consists of blank pages synchronized to the music, on which users can make their own notes. Besides the listening tracks, the Program Book offers sections called Analysis, Opera Map, Transition Menu, Sidebars, and Final Exam.

For each numbered section of the opera, The Analysis offers a form diagram and summary of the key relationships. Figure 9 illustrates the content of two cards, showing the form of No. 1 and a more detailed analysis of section C.³⁰ The analysis goes beyond simply naming keys; it often provides a discussion of the larger tonal context in the passage. Clicking on an icon (not shown in Fig. 9) plays the passage in question.

As in the later packages, the Opera Map is the primary vehicle for choosing or changing locations in the opera. At the highest level, it lists the acts and numbered sections. Clicking on the More Detail button at the bottom of the card shows a second-level breakdown by measure, e.g., "1–17 Introduction; 18–32, The Snake Attacks; 33–39, Tamino Pleads," etc., as shown in Figure 10. Next to each entry in this table is an Info icon, which takes the user to the corresponding entry in the Analysis stack. At each level of the Opera Map the current section is highlighted during continuous play, and the user can listen nonlinearly by clicking on various sections.

²⁹The default is to hide the menu bar. Clicking on Show consistently crashed the program.

³⁰From the analysis of the first portion of the C section of Act I, No. 1, Introduction. *Magic Flute* (Warner New Media, 1989).

Figure 9. Form diagram and key relations, *The Magic Flute* (Warner)**No. 1. Introduction. Tamino, Three Ladies**

Form: A: introduction a b a'
 B: introduction; a a' b c d c d'
 C: a b c extension
 D: a b b
 coda

Key: C minor – E-flat major – G major – C major

Tempo and meter: Allegro 4/4 – Allegretto, 6/8 – Allegretto, alla breve

Subsequent cards give a more detailed analysis:

C: a, mm. 120–127: (eighth-note icon) Once again tonality, tempo and meter change here; we are now in G major (not the expected G minor!), Allegretto, in a lilting folk-like 6/8 meter. G major is a key often associated with the rustic clown, Papageno; it is interesting that the Ladies appropriate it here. It serves a long-range function in the harmonic structure of the entire ensemble, as a stepping stone in a vast arpeggio from the key of the opening, C minor, through E-flat major, on now to G major, which will soon lead to the final key of the number, C major. A harmonic full circle is achieved thereby.

The Transition Menu affords an opportunity to experience the material between musical numbers in the form of Dialogue Text, English Summary, or German Summary. The user chooses the transition by number and format. Dialogue Text displays the complete text of the spoken dialogue in English translation, while the user listens to the German. The summaries provide a description of the action and dialogue in English or German. These are presented on cards while a pleasant male voice reads the text. Another button displays a Dialogue Text Menu, which allows the user to go directly to the dialogue text for any transition.

On each disc, a Sidebar menu lists supplementary material (the contents are listed in Table 1). Topics are not grouped into logical categories, as they are in later packages; thus, subjects of all sorts—historical, theoretical, sociological, and musicological—are lumped together. Still, the amount of information here is monumental, and

Figure 10. Opera map, second level: Mozart, *The Magic Flute* (Warner)

OPERA MAP • NO. 1 • 1 OF 2 0:13

No. 1 – Introduction

Measure	Event	CD1	LD1	Info
1-17	Introduction	0:00	9:51	
18-32	The Snake Attacks	0:30	10:18	
33-39	Tamino Pleads	0:56	10:44	
40-46	The Ladies Answer	1:09	10:57	
47-62	The Ladies Boast	1:24	11:11	
63-86	They Admire Tamino	1:54	11:42	

Main Opera Map
 Transition Menu

LaserDisc
 Index

several techniques are used to present it—short essays, clickable menus and graphics, animated lectures, etc. In addition to text, graphics, and music notation, the essays contain hot text and note icons that play music, so there is ample opportunity for nonlinear browsing and user interaction. Although there is some duplication among the three discs, different material is often presented under the same sidebar title. For example on one disc, clicking on Masonic Symbolism produces a card with pictures of the characters and objects that have symbolic meaning in the opera (flute, snake, glockenspiel, etc.). Clicking on each produces a card with a discussion of the symbolic meaning of that character or object. On another disc, the same sidebar title produces a discussion of early alternative theories—that symbols and characters in the Magic Flute represent Austrian historic figures, eighteenth-century music and art, the French monarchy, or the French revolution. An interactive table lists these four categories; clicking on a picture of each character inserts information into the table showing who or what the character represents in each theory.

Several topics on each disc are presented in lecture format, with a recording of a human voice presenting material. The lecturer illustrates concepts on the piano, while music examples and diagrams are shown on the screen, often with animated highlighting to clarify points. This mode of presentation is used effectively to introduce theory concepts such as fugue and modulation. Although not interactive in the usual hypermedia sense, it is fast paced, informative, and a refreshing change of pace. Sometimes various techniques are combined. The discussion of Florence Foster Jenkins is begun in lecture format; then while a historic recording of the famous (or infamous) soprano singing the Queen of the Night aria is played, cards with text and pictures present additional biographical and historical information.

Unlike the other Warner products, the Final Exam consists only of multiple-choice questions, but these deal with the music as well as with historical and theoretical concepts, and many questions are given.³¹ The user is given immediate feedback and correct answers

³¹We never did get to the end, but exited by clicking on the Sphinx button to return to the main program or on Exit.

Table 1. Supplementary material: Mozart, *The Magic Flute* (Warner)

“Sidebars” on Disc One Anti-Feminism, Cast of Characters, Debut: “The Magic Flute”, Dialogue in Opera, Dynamics, Fugue, Giesecke & the Libretto, Magic in Opera, Masonic Symbolism Menu, Modulation, The Musical Styles, Original Playbill, Origins of the Story, Rhythm & Meter, Emanuel Schickaneder, Tempo Guide
“Sidebars” on Disc Two The Bass Aria, Cast of Characters, Coloratura, Debut: “The Magic Flute”, Florence Foster Jenkins, Mozartian Recitative, The Opera’s Transition, Origins of the Story, Patter Song, The Power of Music, Recitative, Seventh Chord, Shakespeare and Mozart, Sound and Sensation, Symbolism of the Opera, Vocal Ranges
“Sidebars” on Disc Three Cadence, Cast of Characters. Characters– Masonic, Chorale, Debut: “The Magic Flute”, Dynamics, History of Singspiel, Isis and Osiris Legend, Letters from Mozart, Magic Opera’s Fate, Masonic Prejudices, Masonry, Mozart’s Death, Mozart’s Final Year, The Musical Styles, Past Performances, Symbolism of the Opera, Tempo Guide

are supplied immediately. After many questions, appropriate clips from the opera are played until the user clicks on Next Question. When the user exits the exam a picture of an obelisk is shown, with seven levels labeled from 1 to 7. A line moves up the obelisk (like rising mercury in a thermometer) to the appropriate level—then a “sun” icon is placed over the level marker and an appropriate message is displayed, from “You need much help” to “International Superstar.”

As in the other Warner Packages, the Back Stage section gives extensive information about the performers, the authors and production staff, and the Audio Notes series. Other supplementary information includes a bibliography with full publication informa-

tion and an index that is implemented in a manner similar to that in the Brahms Requiem package described below. Although a Glossary is mentioned in the Back Stage credits to Irene Girton, we were unable to locate this as a separate section. The Glossary seems to be folded into the index—clicking on some words takes the user to a specific card in other supplementary discussions; others produce a pop-up field with a short definition. We miss a readily available Reference Guide, which was introduced with the Brahms package.

Evaluation of Contents

This package contains a wealth of deeply embedded historical, sociological, and analytical information about the opera. Though theory rudiment sections are more limited than in the later Warner products, the introductory sections, e.g., Fugue and Modulation, are presented at a high level that will be accessible to beginners but still meaningful to more advanced students. The analysis is very well done, both in the analytical sections and in the tutorials, which use examples from the opera as illustrations. For example, after introducing pivot-chord modulations in the abstract, an excellent example from the opera is played while an analytical reduction of the passage is shown on screen. Although measure highlighting is not used, the analysis is added below the staves as the music is played. The reduction is easy to follow and is an exceptionally clear illustration of the concept. A similar technique is used to illustrate common-tone modulations. The depth of the analysis, including large-scale tonal motions, analytical reductions, and effective use of Roman numerals, reflects the close involvement of a “real” music theorist in this project.³²

Design Features

This stack, which uses a wide variety of hypermedia techniques effectively, is designed in black and white in an art deco style with an Egyptian theme. Navigation is consistent, both internally and with the other Warner products. Although there is a great deal of

³²Irene Girton, the author of the text and analysis for this package, is a professor of music theory at California State University at Los Angeles.

deeply embedded information, users can click on flute or Sphinx icons at any time to get back to the current listening track or to the main table of contents, respectively. In addition, each card has left and right arrow buttons for moving forward or backward in the current section, a Back (retrace) button, and a CD icon that brings up a full CD control panel.

Our biggest problem with this stack was getting it to run, which proved to be very difficult on contemporary Mac systems. We did finally manage to run it on a Macintosh Centris and (after a fashion) on two Power Macs.³³ The program crashed frequently, sometimes locking up the computer system completely. We wish there were a newer version of this CD-ROM package that would run on current Macs. The content is magnificent, but few users will have the patience to get through it.

³³The auto-install program in this package did not work at all. Following directions that came with the media, we got the program to work by installing all of the files manually, and hiding or renaming the Home stack on our computer. We then started the program by double-clicking on HyperCard 1.2.5, the newer of the two versions provided by Warner New Media. The earlier version of HyperCard provided on the CD (Version 1.2.2) crashed immediately, and the Package would not run using the current version (2.3) of HyperCard on our system. On the Power Macs, the program was unable to keep track of the location of the various stacks in the package, and every time we clicked on a button we got a dialogue box asking us to locate the required file, even when it was the stack currently in use.

Ludwig van Beethoven, *String Quartet No. 14* (Warner New Media, 1990)

Pros

Progressively more detailed music analysis in different listening tracks; innovative Blueprint section details the function of each instrument. Contains a basic music theory tutorial.

Cons

Occasionally buggy. Why play Beethoven's Fifth Symphony while viewing the title card?

Bottom Line

The weakest of the three Warner packages, but still well worth study.

Survey of Contents

This application is based on the 1987 Teldec recording of Beethoven's Op. 131 by the Vermeer Quartet. The commentary was written by Cynthia Woll, the producer of the later Brahms Requiem package. Unlike the other two Warner New Media products, this package is contained on only one disc—not due to the amount of detailed supplementary material, which is extensive, but because the composition is shorter.

Like the other Warner products, this one contains five different "tracks" of running commentary synchronized with the music: Exploring the Music, Structural Analysis, Harmonic Analysis, Blueprints, and Notebook. The first and last of these are like the tracks by the same name in the other packages. Since there is no text, and translation is not required, there is room in Warner's standard design for more analysis, and successively more detailed levels of analysis are a strong point in this package. Exploring the Music presents the user with elementary comments at a music-appreciation level and introduces music terminology through hot-text links. Struc-

tural Analysis is a running commentary on form, a bit more detailed but still nontechnical, which might be appropriate for an undergraduate music major studying form. Harmonic Analysis identifies key relationships in the current movement primarily, but also shows relationships between movements. Since the emphasis is on harmonic goals and tonic and dominant “structural pillars,” this section would be useful for students learning to hear basic harmonic function and tonal motion. The Blueprint section was a favorite of many of our reviewers. This section is a graphic representation of the music (see Fig. 11). Each instrument is represented by a rectangular field on the top of the card. Beneath is a description of the “building blocks” of the movement, with the primary melodic material notated on the staff, and identification of the movement and current formal division. As the music plays, the text in the instrument fields constantly changes to indicate the role each instrument is playing at any given moment, and cards change to show new “building blocks.”

Quartet Map provides a multi-level overview of the form of the Quartet, with the current section highlighted. Each entry in the chart identifies the current section, measure numbers, and the time, not only on the Vermeer Quartet recording but on an alternate recording by the Juilliard Quartet, a useful comparative tool for an analysis-and-performance discussion.³⁴ The top level lists the seven movements, with In Depth buttons to transport the user to the next level, which shows the primary formal divisions of the movement. Where appropriate, there is a third level giving a more detailed breakdown, but deeper levels giving information about keys and thematic relationships found in the Brahms package are missing here. The Quartet Map also serves as a “junction box,” which allows the user to change movements or sections within the stack. Clicking on the buttons numbered from 1 to 5 at the upper left takes the user back to each of the five listening tracks.

A summary of the background and supplementary material in this package is shown in Table 2. Some of the material presented in Foundations—Major Scales, The Circle of Fifths, Minor Scales, Keys,

³⁴The alternate recording is not included in the package and must be purchased separately.

Figure 11. Blueprint section: Beethoven, *String Quartet No. 14* (Warner)

1

2

3

4

5

0:29
m8

Violin I

FREE MATERIAL

Violin II

FREE MATERIAL

Viola

SUBJECT PART I

Cello

This movement's building block: FUGUE SUBJECT

Key: C# Minor

Meter: Alla Breve

Form: Fugue

Exposition 1

The Fugue

Quartet Map

Blueprint Help

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↷

and Understanding Harmony—is identical to material in the Brahms package, discussed in more detail below. The subsection on The Invention of Notation is a 37-card side trip that begins with Guido d'Arezzo and the hymn for the feast of St. John the Baptist (*Ut queant laxis*).³⁵ As usual, the hypermedia format is used effectively—the beginning of the hymn is shown in music notation with buttons to play sound clips of a men's chorus singing the first syllable of each phrase, producing the notes of the scale. The following discussion relates the C, G, and F clefs in common use to overlapping instances of the Guidonian hexachord, explains the "Guidonian hand," and then "mutates" to discussion of whole and half steps, the development of the piano keyboard, and a philosophical discussion of fact versus theory (presented as "natural" versus "man made").

Musical Architecture is a potpourri of topics dealing with chamber music, string quartets, musical form in general, and (primarily melodic) analysis of movements in this particular quartet. Some subsections duplicate material from other Warner packages.³⁶ The discussion of Fugue is cursory, but defines general principles and terms, with links to excellent examples of inversion, retrograde, and stretto from Bach's *Musical Offering*, Bartók's *Music for Strings, Percussion and Celesta*, and Stravinsky's *Symphony of Psalms*, for example. Keys to the Puzzle is an interesting discussion of relationships between Op. 131 and other late quartets by Beethoven. The discussion of melody emphasizes motive, but also relates surface events to the larger structure, as shown in Figure 12.

The Composer discusses various aspects of Beethoven's life and character. The section on Beethoven's Deafness—based on extensive research by Dr. Vincent Goodhill, Professor of Surgery and Chairman of the Board of UCLA's Hope for Hearing Foundation—is fascinating. Twenty-eight cards speculate on the cause and effects of Beethoven's deafness. Audiograms are used to show the probable extent of Beethoven's handicap at various stages of his

³⁵This example is shown to be related to "Doe, A Deer" from *The Sound of Music*, which is more familiar to most users.

³⁶For example, much of the discussion of sonata form is similar to that in the Brahms package, but with a different Mozart piano sonata as the model. The first movement of Mozart's Sonata in Bb, K. 333 is used here.

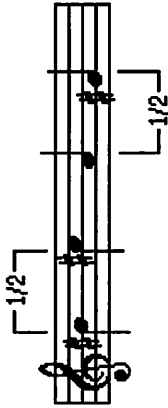
Table 2. Supplementary material: Beethoven,
String Quartet No. 14 (Warner)

Primary Section	Topics Covered
Foundations	Rhythm and Meter, Tempo Guide, Dynamics, The Basics (Theory vs. Fact, Pitch, The Octave, Intervals, Naming Intervals, Consonance and Dissonance, Naming Pitches, Invention of Notation, Major Scales, The Circle of Fifths, Minor Scales, Keys, Understanding Harmony)
Musical Architecture	About Melody, Melody Movement 1, Melody Movement 2, Melody Movement 3, Melody Movement 4, Melody Movement 5, Melody Movement 6, Melody Movement 7, About Chamber Music, Chamber Music Menu, The Fugue, Keys to the Puzzle, Musical Architecture, Sonata-Allegro Form, The String Quartet, Texture, Violin, Viola, Cello, Stringed Instruments, Enharmonic Notes and Keys, Chord Inversions
The Composer	Beethoven the Visionary, Images of Beethoven, The Irreverent Beethoven, The Three B's, What is Classical Music?, Beethoven's Deafness, The Late Quartets, Beethoven and the Metronome, First Performances, The Conversation Books, The Sketchbooks
The Timeline	Medieval, Chant, Ars Nova, Renaissance, Baroque, Classical, Romantic, Modern, Monteverdi, Josquin, Bach, Haydn, Mozart, Beethoven, Brahms, Stravinsky
Final Exam	Drop the Needle, Multiple Choice, True/False
Backstage	About This Series, About the Recording, About the Creators
Index	
Bibliography	

Figure 12. Motivic and key structure: Beethoven,
String Quartet No. 14 (Warner)

Melody Mvt. 4: Theme & Variations • 7 of 15

The large outline of the work is based on the thematic idea of B#-C#-A-G#: two pairs of half steps.



The half-step theme is even reflected in the outline of the **keys** of the first four movements: C#-D-B-A. It seems logical then, that Beethoven uses pairs of half steps—A-G#: D-C#: G-F#: E-D#—as the main material in building his melody here.



Theme & Variations

Keys To The Puzzle

Melody Menu

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⏩

⏭

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life, and excerpts from his works from the same periods are filtered to show what Beethoven probably heard.³⁷ This attention to detail contrasts favorably with the Future Vision Beethoven Fifth package, which only briefly discusses Beethoven's deafness and his "Heiligenstadt Testament."

The Timeline is a thumbnail sketch of music history, showing only the high points. The user can click on various composers or periods to reach a brief discussion, including a few sound clips. The Final Exam has three categories: Drop the Needle, Multiple Choice, and True/False. Within each category, questions are presented in random order, and feedback is limited but immediate. The user is told that the answer is correct, or the correct answer is provided and the question is put back in the question pool so that it can be asked again. Many questions have a humorous element. For example: "Ars nova is" . . . (choose one) an exploding star, bel canto singing, "new music" of the Middle Ages, or "a refined insult." These light moments make the "exam" fun as well as informative. Backstage gives detailed information about Warner's product line, the developers, and performers. The other reference material (Index, Bibliography, and Glossary) is similar in structure to corresponding sections in the Brahms Requiem package, but not as extensive.

Evaluation of Contents

One of our reviewers said of this package, "This CD-ROM is so incredibly thorough it could be its own music course. If you learned everything in it you should earn at least 3 college semester credits."³⁸ This product provides information that will be interesting and stimulating for users at many levels. Many concepts and ideas are appropriate, at least as supplementary material, for college-level music theory courses, but information is also provided at a more basic level, useful for amateur musicians or interested high school music students. Users at this level will find that the program is challenging and provides ample room for growth.

³⁷ Audiograms are graphs that show hearing profiles through air and bone conduction over the normal range of hearing. The graphs show the extent of hearing loss in various frequency ranges.

³⁸ Stefanie Crumbley, from our TH 423 class of Spring 1995.

Although a great deal of information is presented, the organization is not as strong as in the Brahms Requiem package, which came out a year later. The careful reader probably noticed in Table 2 that the subsections are sometimes forced into sections rather randomly. In spite of a few organizational problems, the content is generally excellent, and presented in a manner accessible to users with a broad range of musical skill and background.

Design Features

Like the Mozart package, this CD-ROM is tastefully done in black and white, with a consistent interface and appearance from section to section. The visual and artistic design are given as much care as the content, and the combination is rewarding in many ways. Some of our reviewers felt that navigation could be confusing at times—that it was easy to become lost in the “labyrinth” of nested hyperlinks. Others would have liked to be able to change movements or sections without going through the Quartet Map junction. Some of these problems could have been alleviated by adding extra buttons to each card, but the result would have been more cluttered and could have resulted in more user confusion. We think the design choices are reasonable, even elegant in many cases. With the amount of material presented, users will want to spend many hours with this stack, and will quickly become accustomed to the Warner design conventions.

We did notice some problems in synchronization of cards with the music in the continuous commentary tracks—cards sometimes flip back and forth a couple of times rather than changing cleanly. This problem seems to have been solved before producing the Brahms package. The program was a bit “buggy” on some computer systems, and would occasionally produce error messages or hang up completely, necessitating rebooting the computer; it is much better in this regard than the Magic Flute package, and the content is well worth the effort.³⁹

³⁹We found that the program ran best if we first opened our current version of HyperCard and then started the Beethoven stack.

Johannes Brahms, *A German Requiem* (Warner New Media, 1991)

Pros

Beautiful performance, with relevant material accessed through a variety of linear or nonlinear paths. Good introduction to music theory rudiments, including some ear training.

Cons

Occasionally buggy on some systems. Why play the Brahms-Haydn Variations while showing the title card?

Bottom Line

A prime example of hypertext design; of interest to users at all levels from amateur to professional. Imparts an understanding of the style, historical period, and the way this particular Requiem fits into the genre and relates to the human need to express mourning.

Survey of Contents

This is the last of the three Warner offerings and in many ways the most polished. The performance, by the Atlanta Symphony Orchestra and Chorus, is conducted by Robert Shaw. The primary author is Martin Perlich, with the music analysis by Roger Lebow. The package shares many features with the earlier Warner products.

Immediately after the title card, the user is given a choice of starting points similar to those in the Mozart package. The main table of contents, or Program Book, lists the five listening "tracks" (Exploring the Music, English Text, German Text, A Conductor's Thoughts, and Notebook) and primary supplementary topics on this disc. At the bottom of the card are links to the Reference Guide, Requiem Map, the Help card, and The Texts (which accesses texts for the entire work, in English or German, listed by movement). Among the listening tracks, A Conductor's Thoughts is unique to this package. This commentary—written by William Hall, conductor of the William Hall Chorale, *not* by Robert Shaw—is displayed

on cards as the music plays, and gives insight into performance and interpretation issues, although it would hardly be sufficient for a conductor preparing for a performance.

Like Voyager's Pocket Guides, the Requiem Map gives an overview of the work's form with the current section highlighted in synchronization with the music; the user can listen nonlinearly by clicking on any section. The number of levels in the Requiem Map is remarkable. The highest level lists the movements. Clicking on an In Depth button next to each movement brings up another card showing the large-scale form of the movement and the primary subdivisions. An In Depth button next to each subdivision shows a pop-up field with additional detail, usually including the measure numbers, the key, and the German text. Clicking on an eighth-note icon shows the theme of this section in music notation, which is realized in a piano recording. More About This Theme pops up another field with additional information, e.g., the derivation of the theme or comments about the orchestration. Some fields also contain hot text linked to the Glossary or other sections of the program.

The supplementary "chapters" in this package are listed in Table 3. Each of these sections is divided into a number of subsections, most of which are many cards in length and contain hot text and buttons linked to definitions in the Glossary and related music clips. The two discs contain some duplication, but the amount of information here is impressive. The sections that occur on both discs are treated in more detail below. Time and Place puts the Requiem in historical and sociological context, while Music of Romanticism discusses common genres of the period. The Composer gives a thumbnail sketch of the composer's life, introduces some of his other major works with substantial sound clips, and discusses Brahms's debt to Beethoven's work. Music, Mourning & Magic is an interesting look at mourning rituals in several diverse cultures. The Requiem Timeline presents a card with nine tombstones labeled with titles of Requiems from different historical periods, detailed in Table 3. Clicking on each icon plays a sound clip from the work, while showing appropriate artwork.⁴⁰

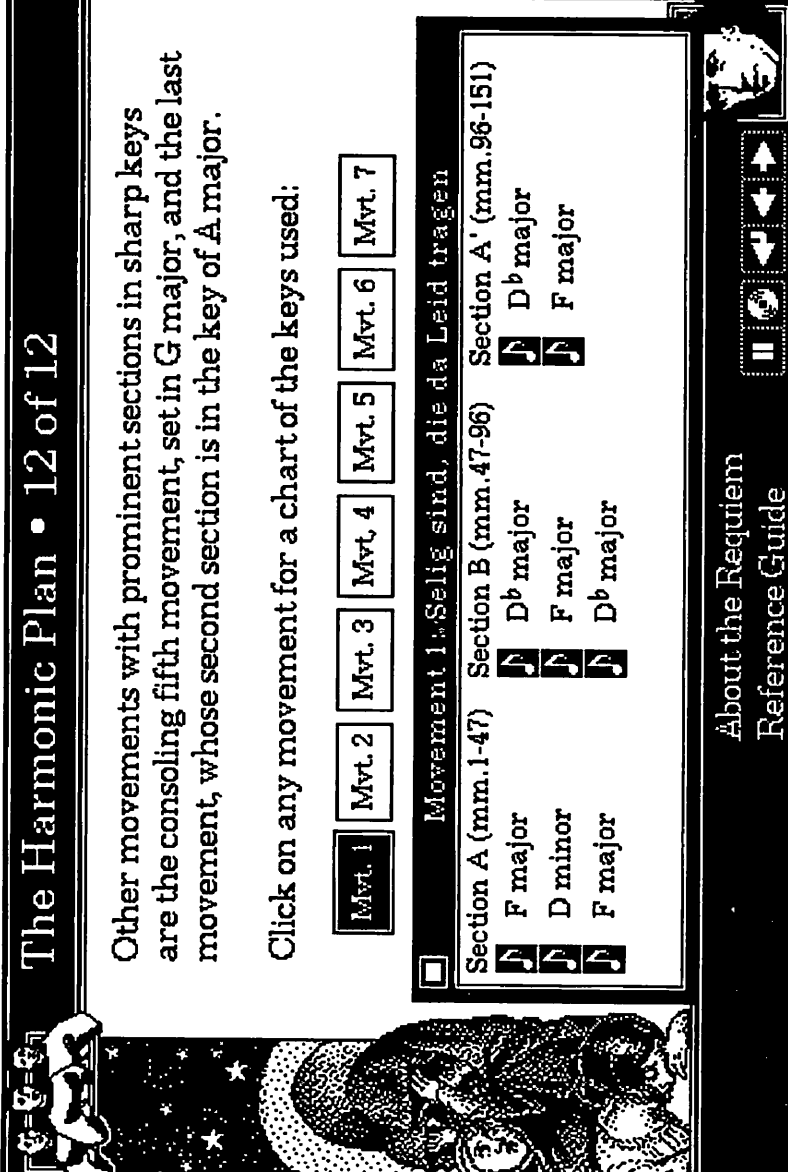
⁴⁰These clips are identical to those in Music, Mourning & Magic's section "Compare the Requiems."

Table 3. Supplementary material: Brahms, *A German Requiem* (Warner)

CD One: Movements 1–3	
Primary Section	Topics Covered
Time and Place	Romanticism, French Revolution, Napoleon, Rationalism, Rise of the Middle Class
Music of Romanticism	The Nationalist Opera, The Song Cycle, The Tone Poem, Ethnic Dances
The Composer	A Brahms Gallery, More Music of Brahms, Footsteps of the Giant
Music Theory	Sonata-Allegro Form, The Fugue, Rhythm & Meter, Major Scales, The Circle of Fifths, Minor Scales, Keys, Understanding Harmony
About the Requiem	A German Requiem, First Performance, Later Performances, Derivation of the Texts, Musical Sources, The Harmonic Plan, Theme Transformation, Choral Basics, Choral Composition, Word Painting–Mvts. 2 & 3, Solo Lines–Mvts. 1 & 2, Fugal Techniques–Mvts. 1–3, Creative Highs & Lows–Mvts. 1–3
Reference Guide	Glossary, Index, Pronouncer Index, Sound Clip Index, Tempo Guide
Requiem Map	Theme-by-theme guide to the music allowing selection of various levels of detail
CD Two: Movements 4–7	
Primary Section	Topics Covered
Music, Mourning & Magic	Mourning in Music, Ancient Mourning Rituals, Magic Rituals, Gregorian Chant, The Requiem Mass, Compare the Requiems, The Dies Irae, Protestant Mourning
Music Theory	Sonata-Allegro Form, The Fugue, Key Color, Rhythm & Meter, Major Scales, Circle of Fifths, Minor Scales, Keys, Understanding Harmony
About The Requiem	A German Requiem, Derivation of the Texts, Theme Transformation, Word Painting–Mvts. 4–7, Solo Lines–Mvts. 4–7, Fugal Techniques–Mvts. 4–7, Creative Highs & Lows–Mvts. 4–7
Requiem Timeline	Middle Ages: Anonymous; Renaissance: Pierre de la Rue; Baroque: Heinrich Schütz; Classical: Mozart; Romantic: Berlioz, Brahms, Verdi, Fauré; 20th Century: Britten.
Reference Guide	Bibliography, Glossary, Index, Pronouncer Index, Sound Clip Index, Tempo Guide
Requiem Map	Theme-by-theme guide to the music allowing selection of various levels of detail
Final Exam	Multiple Choice and True/False questions about the Requiem and supplementary material.
Backstage	About the Series, About the Recording, About the Creators

About the Requiem gives historical and analytical information about the work. The background material includes speculation on why Brahms wrote the Requiem, discussion of the premiere and later performances, derivation of texts, musical influences, an introduction to the problems of choral writing, and so on. The analytical material includes thematic transformation, contrapuntal techniques, and key relations. The latter is presented in The Harmonic Plan, a section that discusses key relationships in general and in the Requiem, and terminates with tables showing the key relationships in the whole work. This is implemented with buttons for each movement that display diagrams showing the form and primary keys for each (see Fig. 13). Clicking on the note icon next to each key label plays a cadential progression (on the piano) establishing the key. Thus the user can hear the large-scale tonal motion in a condensed format, but cannot hear actual excerpts from the Requiem. Unfortunately, keys are listed only by name (Bb), rather than by function (e.g., V). The Fugal Techniques section employs music notation for the subject and a graphic representation for each fugal entry. The user can listen to the subject alone, or can play the full excerpt while rectangular boxes representing subject and answer entries are highlighted in real time.

The Music Theory tutorial is surprisingly thorough, considering the format and the intended audience. Sonata form is presented as an extended binary form with emphasis on the key relationships. The first movement of Mozart's piano sonata in C Major, K. 279 is used as a model. During the discussion the user clicks on buttons to hear the themes, and is even given the opportunity in the recapitulation of comparing the sound of the second theme in the tonic with its original statement in the dominant. This piece is contrasted with a Brahms sonata (also in C) that uses less conventional key relationships (C major to A minor in the exposition; C major and C minor in the recapitulation). The Fugue section introduces basic concepts and familiarizes the user with concepts and terms such as imitation, episode, repetition, inversion, and stretto. Understanding Harmony, with 44 cards, is the longest section. The concepts are mostly sound, though basic, but there are glaring part-writing errors in the opening discussion comparing horizontal (melodic) music with vertical (harmonic). The user is taught to construct triads on various scale

Figure 13. Harmonic plan: Brahms, *A German Requiem* (Warner)


The Harmonic Plan • 12 of 12

Other movements with prominent sections in sharp keys are the consoling fifth movement, set in G major, and the last movement, whose second section is in the key of A major.

Click on any movement for a chart of the keys used:

Mvt. 1 Mvt. 2 Mvt. 3 Mvt. 4 Mvt. 5 Mvt. 6 Mvt. 7

☐ Movement 1: Selig sind, die da Leid tragen

Section A (mm. 1-47)	Section B (mm. 47-96)	Section A' (mm. 96-151)
F major	D ^b major	D ^b major
D minor	F major	F major
F major	D ^b major	

About the Requiem
Reference Guide

degrees, and is introduced to various cadence types. Quizzes after each section reinforce understanding of the material; the user is asked to perform tasks such as choosing the correct scale degree on which to spell primary triads (in several keys), and even recognizing tonic and dominant chord functions and cadence types aurally. Immediate feedback is given, but the program does not keep track of the score and mastery of the material is not mandatory.

The number of different entry points into the material is refreshing, particularly after spending an exasperating hour trying to relocate some specific bit of information in one of the Future Vision Products. A Reference Guide (book icon) is available from the Program Book, as well as directly from many different cards. Clicking on this icon summons a pop-up field with a clickable table of contents: Glossary, Index, Pronouncer Index, Sound Clip Index, and Tempo Guide. The Index is in hypertext format: clicking on each item takes the user directly to a discussion or definition of a related topic or word elsewhere in the stack. In the right margin of each card are buttons labeled with initial letters of the first and last entry on each card (e.g., Ac–Br, Br–De) that allow the user to go directly to the desired page without flipping through cards. The Glossary is arranged in much the same manner. The Pronouncer Index lists all foreign words used in the program; clicking on a word produces a recorded human voice giving the correct pronunciation.⁴¹ The Sound Clip Index on the first disc lists 33 other works quoted in various discussions. Clicking on a note icon next to each title plays an excerpt from the work. The Sound Clip Index from the second CD lists about 40 entries, including several from the discussions of mourning in music: Keening, Hindu Chant, Arabic Chant, and Navajo Night Chant. All of these clips are worked seamlessly into the supplementary discussions throughout the program. The tempo guide lists the Italian tempo indications from the score, with buttons to play representative passages. The bibliography is not annotated, but does contain complete publication information.

The Final Exam consists entirely of multiple-choice and true/false questions, asked in random order. We like the fact that many

⁴¹The pronunciation of individual words is available from many locations in the program by clicking on a microphone icon.

questions deal with the music directly. For example, instead of being asked to define terms like *stretto* or *polyphony*, an excerpt from the *Requiem* is played and the user is asked to choose the answer that best describes the excerpt. The user is also asked to identify the movement from which excerpts are drawn, and many questions deal with the background material as well. Since the correct answer is given immediately, one can learn a good deal by taking the exam. A running total of the number of correct answers and the number of questions answered is displayed on the card. If the user clicks on *Next Question* without answering, the question is not counted in the total. Feedback is gentle—when leaving this section the user is presented with a mountain scene with an animated sunrise. A text from the *Requiem* is displayed on the sun—“Ye now have sorrow” or “Blessed are they who live in your house”—depending on the percent correct.

Backstage has three subsections. About the Series is a commercial for the three Warner products. About the Recording includes nine cards with information about The Atlanta Symphony Orchestra, Robert Shaw, and the soloists on the recording. About the Creators credits the producers, authors, editorial staff, artistic and graphic staff, programmers, etc. It is refreshing to have this level of detail. The only thing missing is a discussion of the credentials of the primary writer and analyst, although perhaps the contents of this impressive CD-ROM are sufficient documentation of their abilities.

Evaluation of Contents

This is the culmination of the Warner New Media products that have appeared on the market, and is the most highly developed in terms of organization of material for hypermedia presentation. The authors have done a magnificent job in finding a balance and tone suitable for diverse audiences, and the package will be enjoyable and educational for many levels. Although accessible to the interested amateur or aficionado, the content of most sections is interesting even to a professional musician. Understanding some of the harmony segments requires at least elementary music reading proficiency, although the sections on form (e.g., sonata and fugue) should be accessible and informative to nonmusicians. Although

the theory content is basic, it is essentially correct, and could reinforce concepts taught in many undergraduate theory courses; it would certainly be valuable and challenging to a music appreciation class. The form diagrams (including key relations) and discussion of compositional techniques would be a valid starting point for anyone who wants to get to know the work more intimately.

Design Features

The designers solved the problem of distractions from the “desktop” by introducing a colorful floral background that covers everything, and placing their stack over this.⁴² The stack itself uses only dark blue and cream; the text may be blue on cream, or white on blue. Thus the effect is not that different from the two earlier Warner Products—most of the artwork is essentially monochromatic, but substituting blue and cream for black and white adds warmth. Warner New Media is the most successful of all of the publishers reviewed in consistently implementing a successful hypermedia format, and this product is outstanding in that regard.⁴³ Navigation is always consistent and intuitive. Our reviewers liked the fact that it was possible to listen to the music continuously while exploring related topics. The user can change listening “tracks” or explore background material at will, all while the music plays. The only time the music stops is when one clicks on a note icon to play an excerpt, or in a few places where spoken narrative is used for contrast. In these instances the music picks up seamlessly after the interruption. A pause button is always available at the bottom of the card, so the user can stop and start the music at will, and clicking on

⁴²Our only complaint about this arrangement was that it was impossible to get to the desktop while the stack was in use, making note-taking for this review difficult. It would have been nice to have a button somewhere to escape temporarily from the application, as in the Future Vision products. However, it was easy to print individual cards in the Warner New Media Products, which proved to be impossible in Future Vision.

⁴³Voyager and Robert Winter improved their hypermedia skills with each product, with the Dvorák and Ragtime packages the most effective in this respect.

a disc icon brings up a full CD control panel. Despite the true non-linear capabilities and complexity of this program, after a short acclimation period the user is never lost. From any card in the package, the user can click on an icon (three choristers) at the upper left of the card to return to the primary listening "track" (German or English text, descriptive commentary, user notes, etc.). It is also easy to change tracks, flip to the Requiem Map or Program Book, or take hypermedia excursions into the background material. The music doesn't falter and each new track picks up in exactly the right place.

FUTURE VISION

Future Vision, a company which produces CD-ROM packages on a number of subjects, includes two music literature-based CD-ROMs in their product line: "Beethoven's 5th: The Multimedia Symphony," and "Tchaikovsky's 1812: The Multimedia Festival Overture." These two packages share many design features, including a striking color interface, beveled buttons, and transparent text fields that let beautifully crafted backgrounds show through. The Main Menu has large buttons for each primary section: biographical information on the composer, a "listening guide," the "structure" of the piece, games, and a control panel for the CD player.

The Biography section is implemented as a time line covering approximately 100 years, with red dots indicating the years in which the composer was born and died and a sliding button that indicates the current year. Above the time line on each card are two fields that contain text and scanned art work or paintings, often in full color. The user traverses the time line by clicking on right and left arrows on either end or by dragging the slider to the desired year. Either action takes the user to the closest chronological entry—some years have no information at all. When more than one topic is to be presented for a given year, the text field is replaced by a short topic menu.

The listening guide (e.g., "Listening to the 5th") consists of two fields. The first is a form table listing the sections of the movement; clicking on a section label produces text in the second field describ-

ing that section of music. The description is pretty low level: ("Here comes the second **theme** . . . a very calm, lyrical and legato melody. What a contrast!"). Above each table are buttons for changing movements. To the right of the text field are four buttons. The first has as its icon the opening motive of Beethoven's Fifth Symphony (the same icon is used for Tchaikovsky). Clicking on this button displays a portion of the score, sometimes in reduction, corresponding to the first few measures of the section. The Play Section button plays the music in the excerpt while each measure is successively highlighted, a Pause button stops the music, and Play All plays the movement beginning with the section selected on the form table. As the music plays, the current section is highlighted on the form table, and the accompanying descriptions appear in the text field. Some of these descriptive comments have a More button in the text field, which stops the music and displays a pop-up field with more detailed but still mostly nontechnical commentary. The descriptive text is often disappointing in content, and awkward syntax hints that the writers or editors are not fully conversant with musical terminology and usage. For example, one "detailed" comment states that "the bridge theme is extended but this time it is not modulated." There are also some unfortunate associations made in hot-text links.⁴⁴ At one point, the authors note: "Tchaikovsky made a slight **harmonic** change, and the last **note** is now played no less than fourteen times instead of the former three." Clicking on the hot text **harmonic** brings up the acoustical definition of harmonics, however, rather than one dealing with harmony.⁴⁵

The Structure section consists of one card with form charts for each movement, similar to the Voyager Pocket Guides, and duplicating exactly the form tables from the listening guide. Clicking on one of the movements transports the user to the corresponding section of the listening guide; thus this section provides a slightly different starting point but does not provide any new information.

⁴⁴The bold words are "hot text." Clicking on these brings up the definition in the Glossary.

⁴⁵There are many similar examples. It seems that someone went through the text and made a link for any word that occurred in the glossary, without checking to see if the definition had anything to do with the context in which the word was used. This could have been generated by a computer program.

Perhaps the strongest section of these packages is "Musical Instruments," which includes for each instrument group (woodwind, brass, strings, percussion) and each individual instrument a color picture, the range, a short "essay," and a QuickTime movie of the instrument or family in performance. Unfortunately, the musical excerpts in the movies are not taken from the piece under consideration. The essays are a strength, however; they often comprise several cards and give considerably more detailed information than the "Musical Instruments" package from Microsoft.

The Glossary contains an alphabetical list of words, each of which is linked to a card with a definition or discussion. The arrow buttons for changing cards are labeled with the next (or previous) term in the Glossary—a nice feature. The user can drag a slider to the desired letter or click on any letter of the alphabet. There are a few glaring errors in the Glossary's contents. For example, in the definition of harmonic we are told: "On stringed instruments, harmonics are relatively high sounds which are produced by lightly touching the strings at definitive points with the bow."⁴⁶ This definition also contains a circular reference: "see also **Harmonic Series**," an entry that merely says "see **harmonic**." Most of the Glossary is identical in the two programs.

The Future Vision packages include three games, which are virtually identical in the two products; each has "novice" and "advanced" levels, and can be set for one or two players. Play the Tune is a glorified "Simon" game played on a beautiful three-dimensional keyboard (white keys only). The program plays a note (the key is depressed), and the user plays the same note by clicking on the key with the mouse. The computer then repeats the first note and adds another, and the user tries to match the sequence, which gets progressively longer until the user fails to match a pitch. Although the exercise is fun and has great visual and aural effects, the sequences—which appear to be random—have no relation to the piece in question. At the novice level there is a different colored dot on

⁴⁶When we printed this entry, a slightly different text was produced: "Harmonics are relatively very high sounds produced in stringed instruments by lightly touching the strings at definite points while using the bow." It may be that some of the errors and awkwardness were produced by an editor rather than by the author of the text.

each key, so the user can use visual cues in addition to (or instead of) aural memory. "Match the Tune" is a glorified version of "Concentration." Here 24 buttons, each with a picture of the composer's face, are arranged in random order on the card. Clicking on each button plays a short clip of a theme from the work under study. When two buttons with the same clip are chosen in succession, the buttons disappear, and the objective is to clear the board. The clips are so short (1-2 seconds) that it is sometimes difficult to tell which ones match. At the novice level, clicking on each button displays a graphic symbol (heart, spade, club, etc.) so again the player can use visual cues rather than aural ones. There is no requirement to identify the themes or the movements from which they are taken. "Tune on Trivia" is essentially a timed multiple-choice game. A question is asked and the user tries to select the correct answer. Questions are all from the supplementary information (Glossary, Biography, and Musical Instruments) and do not deal specifically with the music. The game is fast paced with lots of aural feedback and real-time scoring of points for correct answers. Many of the questions are identical between the two packages.

Both programs are easy to use. Navigation is consistent and intuitive, since each card features the same control bar at the bottom, with buttons for Help, Main Menu, Glossary, Back, and Quit. In each section, Help consists of an animated guided tour. The instructions are given by a recorded human voice, which describes the features of the section while the cursor moves on the screen, clicks on buttons, etc. These programs are visually stunning; each section has a different background, e.g., the composer's face, a portion of a manuscript or hand-written letter, etc., all in pastel colors with occasional details in bright basic colors.

Although our reviewers had mixed opinions of these packages, most felt that the visual aspect was far superior to the content. One student summed up the Beethoven package as follows: "If multimedia for multimedia's sake is okay with you and you are less concerned with the content being presented than the way it looks, this CD just might be for you. Otherwise, grab a good recording of the Fifth and a score and enjoy."⁴⁷ In our opinion, the Beethoven pack-

⁴⁷Allison Weitzman, a student in the 1996 spring semester.

age was stronger than the Tchaikovsky, particularly with respect to the musical analysis, but a fair evaluation of a product such as this must consider its intended use and audience. Another student summarized the Tchaikovsky program as "an 'edutainment' package for the general public, not a tutorial for a course in musicology."⁴⁸ As such, these programs do a decent job of introducing the novice to musical terminology and to the music, although at a very basic level.

Some of our students had technical problems running these packages. There were frequent crashes and problems with video clips, which may have been caused by insufficient memory or improper settings.⁴⁹ Fewer problems were encountered if the students were working on PowerMacs. Finally, this company was the first among those reviewed here to issue versions for Macintosh and IBM computers on the same CD-ROM. Macintosh users can run the Future Vision applications directly from the CD-ROM by clicking on an icon of the composer's face, while IBM users must run an installation program to install the appropriate files on the hard disc.⁵⁰ We suspect this will become more common; the Calliope offering from Robert Winter is also a cross-platform product, and Voyager has now reissued its early products in Windows versions.

⁴⁸Jeff Markarian, student in the 1996 spring semester. We are amused to note that the Future Vision web page does indeed list these products in an "edutainment" category.

⁴⁹Although the directions don't state this explicitly, the operating system control panel for the Monitor should be set to 256 colors. If the colors are set to a higher number, the buttons that highlight measures in the music examples turn black instead of gray, and the music is hidden instead of highlighted. Thanks to Jeff Markarian for finding the solution to this problem.

⁵⁰We did not try to run the IBM version.

Beethoven's 5th, the Multimedia Symphony (Future Vision, 1994)

Pros

Art work and graphics are among the best of the products reviewed; there are many interesting design features. Useful tutorial on orchestral instruments with video clips.

Cons

Weak in content and overall organization; contains numerous factual errors. There is no bibliography, and sources of information are not cited.

Bottom Line

Appropriate for novice or for a music appreciation course, less so for college-level music majors.

Survey of Contents

This package utilizes a recorded performance of Beethoven's Symphony No. 5 by the Zagreb Philharmonic, conducted by Richard Edlinger. Video clips in the Musical Instrument section are of members of the Ra'ananna Symphonette Orchestra. The main menu has six sections: Beethoven's Biography, Listening to the 5th, The 5th's Structure, Musical Instruments, Games, and CD Player. The biography, implemented as a time line, contains information about Beethoven's life, presented in bite-sized chunks—1740: Beethoven's Father; 1746: Beethoven's Mother; 1770: Beethoven's Birth; 1773: Death of Beethoven's Grandfather; 1774: Beethoven's Music Education; and so on. An extra Quote button on many cards displays a pop-up field with a quotation from Beethoven or about him. Most are from Beethoven's letters, but some are by writers about Beethoven.⁵¹ Each card has beautifully scanned art work, often in

⁵¹The exact source or context of the quotations is never given. Most are followed by vague parenthetical references to the source: Letters, Schindler's Biography of Beethoven, etc.

full color, and usually pertinent to the topic. Listening to the 5th provides a clickable form table for each movement and running commentary, at a music appreciation level, synchronized to the music. Often cards contain a second level of detail, available through a More button. Many short examples are given in beautifully rendered music notation, with measure highlighting while the example is played. The 5th's Structure provides a second path into this same section, but with form tables for each movement combined on the same page. "Musical Instruments" is one of the strengths of this CD-ROM, as described in our general discussion of the Future Vision packages.

Evaluation of Contents

This program is probably designed for nonmusicians with an interest in music, and much of the music description is appropriate for that level. College-level music students and music professionals will find some interesting information in the Biographical section, although the level of information and detail is nowhere near that of some of the other programs reviewed here. There is no bibliography, and sources of information and art works are not identified. Although the running commentary in the "Listening" section is at a pretty low level, some of the material accessed through More buttons may be useful to music students. The Musical Instruments section has the strongest content. Although the coverage here is limited to the standard orchestra, this area is treated in more detail than in the Microsoft product. As with the rest of the program, the games emphasize "glitz" over substance and do little to test or develop knowledge or skill. Even the "Concentration" game, the only section that deals with the actual music at all, only requires the user to match snippets of themes. A more meaningful variation could have required the player to put the snippets in order to reconstruct themes, or to identify the source movement. For any audience, the factual errors that occasionally appear are problematic. We even found errors in the game: when asked how many players were required to play a quintet, the program told us that five was the wrong answer: "To play a quintet you need 3 players!"

Design Features

The visual design is superb, and navigation is straightforward due to a consistent interface. We also liked some of the innovative aspects of the interface, e.g., the sliders on the Biography's time line and Glossary's alphabet. The most annoying design feature is the lack of direct access to "detail" cards during playthrough. Accessing these cards through "More" buttons is slow, both entering and leaving the detail layer, and the music stops when this feature is used. A separate pop-up layer that can be viewed continuously while listening to the music, as in the Warner New Media products, would make this information much more accessible. We also would have liked an option for continuous playthrough with the score visible, as in Voyager's Dvorák package. Since so much of the score is already embedded in the program, this would not have been difficult to implement.

Although navigation is easy and intuitive, we found the organization of material awkward. Nowhere at the top level is the form of the piece or individual movements identified by name, for example. The section labels on the form diagrams suggest to the knowledgeable reader (but probably not to the intended audience) that the first movement is in sonata form, yet explicit statement of this fact is buried somewhere in the "More" detailed discussion. Since information at this level can only be reached indirectly through individual links from cards in the Listening section, trying to find or relocate a specific bit of information that is not in the Glossary can be a frustrating experience.

Tchaikovsky's 1812, the Multimedia Overture (Future Vision, 1994)

Pros

Like the Beethoven 5th package, this program is visually stunning. The art work and graphics are outstanding. Excellent tutorial on orchestral instruments is nearly identical to the Beethoven package.

Cons

Weak in content and overall organization; "analysis" consists mostly of inventing and elaborating upon a symphonic poem-type program for the overture. No bibliography, nor are sources of information cited.

Bottom Line

The content, particularly the music analysis, is pretty thin and contains factual errors; probably not useful for music majors except for entertainment.

Survey of Contents

This package utilizes a recording of Tchaikovsky's 1812 Overture by The Sydney Symphony Orchestra, conducted by José Serebrier. Video clips in the Musical Instrument section are of members of the Ra'ananna Symphonette Orchestra. The main menu has six sections: Tchaikovsky's Biography, Listening to the 1812, The 1812's Structure, Musical Instruments, Games, and CD Player. As in the Beethoven package, the biography is implemented as a time line with discussion and artwork—in this case many scanned photographs, including Tchaikovsky's body and death mask. Although Tchaikovsky's final illness is discussed in some detail, there is no mention of the controversy over the circumstances of his death. The quotations that appeared in this section of the Beethoven package are replaced here by short digressions about other historical events in the same year. These are sometimes interesting and help the reader place events in historical context; they are sometimes trivial.

In "Listening to the 1812," it is apparent from the section labels on the form table that the author considers the piece to be at least loosely based on sonata form. The author divides the work into five large sections: Introduction, Exposition, Development, Recapitulation, and Re-Introduction. Under each of these are subheadings. For example, the Introduction is subdivided as follows: Theme I (A Solemn Prayer), Theme II (A Heartbreaking Melody Toward Battle), Development (Theme II), A Vortex of Ideas (Preparation for War), and Theme III (The Russian Army). Similar labels are given for each section.

The commentary in the Listening section consists almost entirely of developing this "program" throughout the overture. "More" buttons simply elaborate the program, as in the following quotation:

One after the other, the French units storm forth in succeeding waves. Little do they know what General Winter has in store for them. They are still full of enthusiasm, confidence, and fighting spirit. The rising waves are executed by the violins and the violas, while the other instruments play fragments from the continuation of the French anthem, leaving little doubt as to the absence of the march that signified the Russian army, the one we have heard in the introduction to the whole overture. Did you notice the entrance of the bass drum and the cymbals at the end of each wave? Do they depict the thundering of cannons?⁵²

As in the Beethoven package, The 1812 Structure duplicates the form charts from the "listening" section and provides a different entry into this section. The Musical Instrument section, Games, and Glossary are virtually identical to those in the Beethoven 5th package.

Evaluation of Contents

The programmatic dimension of the work's structure is not unreasonable, considering the subject, use of Russian and French national themes, etc., but we were unable to find such a detailed and specific program in the literature. Since (as in the Beethoven pack-

⁵²*Tchaikovsky's 1812, the Multimedia Overture* (Future vision, 1994), from the running commentary in "Listening to the 1812" section and "More" commentary for Section 3, part 5.

age) no sources are cited, it is impossible to determine whether the program outlined is the author's invention, Tchaikovsky's intent, or another scholar's analysis. The emphasis on extramusical events results in a shallow "analysis" at best. Though sequences, motives, and the like are indicated on the music examples, there is no mention of keys, and tonal relationships are ignored entirely. The author asserts that this movement is based on sonata form, but there is no discussion of how the work relates to that form in terms of tonal areas, presentation or recapitulation of material, or development of ideas.⁵³

Design Features

The design is virtually identical to that of the Beethoven 5th; see the general discussion of Future Vision products for further detail.

MISCELLANEOUS PUBLISHERS

Two CD-ROMs fall into our miscellaneous category, since they are not part of a series produced by a single company but are instead individual efforts: Microsoft's "Musical Instruments" and Robert Winter's "Crazy for Ragtime." The latter promises to be the first of a series produced by a new company, Calliope Media, Robert Winter's new affiliation after leaving Voyager.⁵⁴ These programs have color interfaces with striking visual design features. While they seem expressly designed for the home rather than the educational market, both contain information appropriate to a university setting, particularly for schools with ethnomusicological or popular music course offerings.

⁵³Compare this to the treatment of form in the *Voyager Strauss: Three Tone Poems* package discussed elsewhere in this review.

⁵⁴A check of Calliope's web page reveals two music packages currently in production, featuring famous performing artists: "Itzhak Perlman Interactive Tchaikovsky" and "Domingo." Other offerings by this company focus on the visual arts.

***Musical Instruments* (Microsoft Corporation, 1993)**

Pros

Encyclopedic coverage of instruments from many cultures in a user-friendly and attractive format, including not only pictures but lengthy sound files of stylistically appropriate music for each instrument.

Cons

No mechanism for testing user's comprehension or mastery of content; no videos of instruments in performance.

Bottom Line

Appealing and useful for all age levels in university or home setting.⁵⁵

Survey of Contents

The Contents card offers users four choices: Families of Instruments, Musical Ensembles, Instruments of the World, and A-Z of Instruments. The families of instruments are divided as one might expect: brass, strings, woodwind, keyboards, and percussion. Musical Ensembles explores ensembles of the Western classical tradition, as well as popular and non-Western groups: orchestras, wind bands, jazz bands, steel bands, gamelans, chamber groups, and rock bands. Each of these groups is further divided into types. For example, the Orchestras card contains buttons for the Baroque, Classical, Nineteenth-, and Twentieth-century orchestras. Even more surprising is the level of detail for the popular media: Rock Bands are divided into Rock 'n' Roll, Heavy Metal, Soft Rock, and Pop

⁵⁵One of the reviewers (Marvin) took this package home for her children (ages 4 and 7) to try; they were entranced and engaged for many hours and were spouting information about instruments for days afterwards.

Band; while Jazz Bands are divided into Small Jazz Band, Dixieland, Jazz-Rock Fusion, and Big Band. The level of hypermedia embedding is also impressive: under Gamelan, the user may choose Javanese or Balinese; a picture of the ensembles' instruments appears, along with explanatory text and an extended sound file of each type of ensemble in performance. Clicking on individual instruments of the ensemble provides a close-up and more detailed information, with a sound clip of that instrument playing an idiomatic excerpt in solo. Beneath the individual pictures are icons, entitled: Types (cross-cultural links to other instruments within that "family"—so that French horn, Wagner tuba, shofar, and rkang-gling all appear together), Facts (such as size, range, origins), and See Also (links to instruments related by membership in the same ensemble). This layout for individual instrument cards is consistent throughout the stack, with the exception that some of the more common Western instruments are treated in more detail, including labels for all of the instrument's parts (some in red hot text which, when clicked, reveals close-up photos and additional information), a View icon (which provides photographs taken from other perspectives), and a Sound Box icon (which gives the range of the instrument, possible special effects like muting, and additional sound clips). At the top of each instrument card beside its name is another sound icon: this one invokes a human voice which pronounces the name of the instrument (handy for those non-Western instruments!).

Clicking on Instruments of the World transports the user to a map of the world with clickable continents. Choose a continent and a close-up of that geographical area appears along with small color pictures of the folk instruments indigenous to that area; next to each instrument is a small speaker icon, which plays an abbreviated clip of the instrument when clicked. Clicking on a picture takes the user to that instrument's information card, as described above. A-Z of Instruments is an alphabetical listing—from Accordion to Zurna—beautifully displayed with instrument pictures and sound icons arranged in columns beneath large alphabet letters. Choosing an instrument from this array has the same result as choosing from the world map, though this listing is more complete; it contains both folk and "Classical" instruments.

Evaluation of Contents

The material is excellent, with the small reservation that this is a browse-only stack; there is no vehicle for student input. A concluding quiz—possibly in gamelike format—would make this stack much more useful in an educational setting. Videos of the instruments in performance would also add to the CD-ROM's educational value. Incidentally, none of our reviewers (many of whom were performers) found any factual errors in the information given for their own instruments. Though we cannot vouch for the accuracy of the information on non-Western instruments, we suspect that these were as thoroughly researched as the Western instruments.

Design Features

This package features easy and intuitive navigation; users may either click on instruments or hot text, or they may use the navigation bar that appears at the top of each screen. This bar contains buttons for Contents, Index, Back, Next, and Random (all of which are self-explanatory except the last, which moves the user randomly from card to card). Choosing "About Musical Instruments" from the Macintosh Apple menu provides extensive documentation regarding the compositions played and the recordings from which they are drawn; individual performers or ensembles are generally not credited, however. Sources of the images are also identified.

Robert Winter's *Crazy for Ragtime* (Calliope Media, 1996)

Pros

Impressive repository of primary sources (articles, sheet music covers, film clips) within a beautifully designed full-screen color interface; a fascinating historical and sociological window into the ragtime era.

Cons

Of limited usefulness in the music theory classroom; requires a powerful computer with plentiful memory and disk space.

Bottom Line

Buy this package for musicology or popular music courses, or take it home to enjoy with the family.

Survey of Contents

"Crazy for Ragtime" is a very impressive package. Like the Future Vision products, this CD-ROM has a beautiful color interface—with transparent fields so that background graphics subtly show through—many color videos of the author and performers speaking and playing, and full-screen music notation of complete compositions with moving highlights as pieces are played. Robert Winter's previous multimedia experience and musicological training elevate this product far above Future Vision's two packages, however.⁵⁶ Winter's training as a scholar is clearly evident in this CD-ROM's emphasis on primary sources: silent film footage of authentic ragtime dance performances from the Library of Congress, color scanned images of some 200 sheet music covers, an annotated bibliography of current ragtime research, archival sound clips, and the full text of (and complete citations for) 248 articles on ragtime

⁵⁶Robert Winter is listed as President of Calliope, which represents a break from his previous association with the Voyager Company; much of Winter's design team seems to have come to Calliope with him as well.

and related subjects from the first two decades of this century. Winter has found an authentic voice here that is free from the flowery prose and music appreciation-type vagueness found in some of his *Voyager* offerings. The Glossary entries, for example, read like true dictionary definitions.

The primary table of contents contains the following sections: A Word from Robert, The Ragtime Craze, A Ragtime Sampler, Listening to Ragtime, Let Me Perform!, Make Your Own Rag, Reference Room, and Credits. The Ragtime Craze and Listening to Ragtime sections use roughly the same lecture format. Each begins with a video clip of Robert Winter delivering an entertaining and informative talk on the topic in question, then moves to scanned images appropriate to the topic, which change in synchronization with his spoken narrative. Users have the option of reading the narrative in a text field while listening, or of turning off the audio track to read silently. One advantage of the reading option is that these fields are filled with hot-text links to the Glossary for further edification. Unfortunately, Winter's narration is the only audio choice given the user; so listening to ragtime compositions while reading is not an option. A CD controller would be a welcome addition to the product.

Choosing to listen to the narration straight through the Ragtime Craze results in a continuous 54-minute presentation, with a mixture of Winter's lectures on video and images from primary sources. Subsections give a history of the various ragtime traditions and biographies of some of the primary figures, including Minstrels and Cakewalkers, Coon Songs and Piano Men, Stark Contrasts: Classic Ragtime, Adaline, Julia, and May (female ragtime composers), Animal Dancing, Tin Pan Alley, and Usurped by "Jass." We found some of this history to be fascinating—particularly the incipient racism present in the Coon Songs, the discussion of women's suffrage and how the Victorian climate impacted female composers, and the biographical information on composers like Irving Berlin. Winter tells a great story.

Listening to Ragtime, in a format nearly identical to the Ragtime Craze, contains subsections articulated as questions: What is Ragtime, Anyway? Don't All Rags Sound Alike? How Fast Should Ragtime be Played? Do Ragtimes Have Tunes? Can I Learn Rag-

time Harmony? How are Ragtimes Put Together? This section contains virtually the only music-theoretical information in the CD-ROM. Of particular interest is the "What is..." section, which defines duple and quadruple meters and explains some basic formal units like the "curtain" introductions and 16-bar "strains," with examples from various marches and ragtimes. The "How Fast..." section defines concepts relating to tempo and performance practice, and includes fascinating sound files from the Library of Congress of Jelly Roll Morton playing Joplin's "Maple Leaf Rag" in a fast "St. Louis style" and a slower, bluesy "New Orleans style." The Ragtime Harmony section, evaluated below, is the primary music-theoretical resource.

The Ragtime Sampler is the primary music-listening section, containing 54 piano rags and nine ragtime songs played by Winter himself and sung by soprano Dale Franzen and baritone Nmon Ford-Livene. All the selections are accompanied by orange and brown dots: orange dots signify a digital audio performance, brown ones denote an additional synthesized piano version. These synthesizer versions allow the user to change the tempo in real time, and (in another section) to transpose and string together excerpts from various compositions to "make your own rag." Users may play the rags from this title card by clicking on a dot, or may click instead on a title to learn more about the rag. This latter choice brings up a card with historical information and links to the Cover Gallery and Composer Gallery, as well as two types of listening opportunities with moving highlights: Play the Notation (a full-screen score that highlights one measure at a time) or Form (a pictorial form diagram that highlights each 8- or 16-bar unit as it is heard).

The final three sections of the CD-ROM address performance, composition, and research on ragtime. Let Me Perform addresses three performance venues: playing piano rags, dancing to rags, and singing rags. In the first of these, Winter coaches performers on issues of rehearsal technique and performance practice with video clips of himself at the piano in six miniature master classes entitled: Ragtime is Hard, Separate the Hands, Use a Metronome, Lose the Pedal, Take Appropriate Freedoms, and Perform a Drama. While these tips may seem self-evident to the seasoned performer, these units contain valuable lessons to the amateur or beginning per-

former, and Winter conveys them convincingly. The second, on ragtime dancing, contains Library of Congress footage of authentic ragtime performances with explanatory text (all for silent reading and viewing—again, there is no CD controller for listening here). The third, on ragtime singing, offers short videos of the two singers featured on the CD, describing their experiences performing this music and seeking convincing interpretations. The composition section, described more fully below, takes the place of a game (which was standard fare in Winter's Voyager packages).

Finally, the Reference Room offers users a wealth of resources—pictures, text files, and video clips—for browsing. Organized into six sections (Composer Gallery, Picture Browser, Cover Gallery, Movie Arcade, Direct Testimony, and More Reading), this section provides hours worth of fascinating reading and viewing. All but the last subsection are comprised of original sources gleaned from library and private collections (a clear demonstration for students of the difference between primary and secondary sources for research purposes). The sheer number of resources stored here is impressive: 138 pictures, 200 sheet music covers, and 248 articles dating roughly from 1900 to 1920. Of particular interest is the section entitled Direct Testimony; the titles of these articles alone are revealing: "War on Rag-Time," "'Coon Songs' on the Wane," "Rag-Time Hurts Classics," "Paderewski Can Play Ragtime," "Harmless Sexuality of Syncopated Music," etc. To his credit, Winter has not simply listed the titles; complete texts are given in lengthy files for most of these essays. More Reading is an annotated bibliography of secondary sources organized by topic.

Evaluation of Contents

Of particular interest to teachers of music theory who wish to incorporate some popular music into their curriculum is the harmony subsection of Listening to Ragtime. Without talking down to his readers, Winter succinctly explains the use of Roman numerals for diatonic triads, and illustrates I, IV, and V through ragtime excerpts with Roman numeral analytical charts that highlight the appropriate harmony in synchronization with the music. This tutorial continues with generally accurate definitions of secondary dominants, augmented sixth chords, bVI chords, and fully-diminished

sevenths. The musical excerpts that illustrate these are well-chosen "ear training" examples, though the analytical symbols sometimes leave something to be desired (e.g., IV^{6#} for the augmented sixth chord). Ear training of various formal designs may be accomplished with some of these rags (including strophic song forms, binary forms, marches with trio, etc.) by using the form diagrams in the Ragtime Sampler. A few features mar this section, however: the absence of harmonic information in the form diagrams, the fact that users cannot move between the two listening venues (the form diagram and score notation) without starting the piece over from the beginning, and the fact that the design prohibits users from listening while reading explanatory material.

The Make Your Own Rag section is a wonderful tool for teachers who appreciate the value of model composition for teaching music-theoretical concepts. In this section, users choose a type of rag and the corresponding formal scheme appears on the screen (e.g., "curtain, vamp, A-strain," etc.). Next, users choose among any of the authentic rags for which the CD has MIDI files, and a formal diagram of that rag appears. By choosing formal sections from a succession of rags, users can piece together their own compositions (e.g., the curtain from "Alexander's Ragtime Ball," the A-strain from the "American Beauty Rag," the B-strain from "Heliotrope Bouquet," etc.). This hands-on exercise reinforces various concepts regarding form, phrase structure, and variation. The next step reinforces harmonic concepts: the user must now transpose the various borrowed sections (with the click of a button) to a unified tempo and key; students who have learned the harmonic lessons of this CD-ROM will remember to transpose the trio to the subdominant.

On the whole, this package has too little music-theoretical content to recommend it to theory teachers, but that conclusion is not intended to denigrate the product. Indeed, its seamless blending of historical, sociological, biographical, musical, and artistic information is a real cross-disciplinary multimedia achievement—one can envision wonderful uses for such a product in a liberal arts course on cultural history or in any number of cross-disciplinary courses spanning this historical period.

Design Features

This is a beautifully designed CD-ROM with impressive navigational features. Upon opening, viewers are treated to a full-color map of the United States. As ragtime strains are heard, a Maple Leaf moves to the center and expands into a viewing screen on which a black-and-white cakewalk movie begins to play, while colorful sheet music covers appear and disappear upon it. Users may continue to watch this animation for the full duration of the rag, or may click to move on. Clicking produces a number of pulsating dots on the map, which mark important cities in the history of ragtime development; simultaneously, the main menu items appear along the bottom edges of the map. Users may click on menu items to begin exploring the CD-ROM or they may move the mouse over the city dots; pop-up fields identify the cities at their map location, which then move center screen and expand to reveal the cover of a rag written or published in that particular city, along with supplementary information and a sound clip drawn from the rag. This opening screen sets the stage for a product that is visually stunning throughout.

This product's beauty, comprehensive topic coverage, and hypermedia capabilities come at a price, however. The CD-ROM requires a powerful Macintosh, and the documentation gives a number of trouble-shooting tips for getting the video or sound to work.⁵⁷ Like the Future Vision products, "Crazy for Ragtime" is a cross-platform product that also runs on Windows for IBM. This is not a HyperCard program, incidentally, but runs in an application called ScriptX; the installer puts a copy of ScriptX Player on the user's hard disk.

⁵⁷The product requires a 68040 processor or faster, 8 MB available RAM (12 MB installed), a 256-color display and System 7 or higher; the required RAM is even higher for a PowerMac (16 MB installed). The trouble-shooting tips came in handy during the review process, when at seemingly random times the audio narrations would suddenly cease working so as to result in movies with no audio track sounding, while musical excerpts from the rags played perfectly. At other times, the narrations would work, but the rags wouldn't play. Sometimes quitting the program and restarting the machine was all that was needed to solve the problem.

Finally, the navigation tools in this package are just as impressive as its visual design. A control strip that can be retracted out of the user's way appears along the top of the screen, and contains the following elements: Quit, Contents, Find, Glossary, Retrace, a "back" arrow, and "?". Some of these features are familiar from the Voyager products, but some are remarkably improved. The Find button, for example, asks the user to specify which portion(s) of the stack to search, rather than limiting its search to the section from which it is called. The Glossary is implemented as pop-up fields, with dictionary-like definitions that contain hot-text links in two colors: green links transport users to other Glossary items and red links play related sound file examples. The question mark button calls pop-up fields appropriate to the current section. These help screens give detailed instructions for navigating and using the particular section in question. Within certain sections of the CD-ROM, users are also given a Sort function. In the Cover Gallery, for example, icons for each cover are initially listed in alphabetical order, but users may resort by date, composer, city, publisher, or subject. In sum, this is a polished package, the product of many years of multimedia experience by Robert Winter and his design team. We encourage Calliope to continue seeking subjects that will attract buyers in the home market, but also to develop those subjects in ways that will have more relevance for the music theory classroom and the educational market.

MULTIMEDIA DEVELOPMENT: PAST, PRESENT, FUTURE

Someone once said, "If you don't know where you are going, you'll probably end up somewhere else." We undertook this review, in part, to understand where we have been, where we are now, and where we are going in multimedia development. Table 4 summarizes this progression as a timeline. Reflection upon the offerings listed leads us to project some trends. There was a two-year period between the introduction of HyperCard and the first Voyager CD-ROM release; this must have been a period of intense development at both Voyager Company and Warner New Media. The timeline

shows at least one classical music release each year between 1989 and 1992. The only release in 1993 was Microsoft's "Musical Instruments," which is not music literature-based. We found no new releases in 1995; however, 1996 saw the publication of CD-ROM "companions" to two music anthologies: *The Norton CD-ROM Masterworks* (see Gary Wittlich's review elsewhere in this issue), and Rebecca Kaufman's *Maestro 2.0*, which accompanies Roger Kamien's *Music: An Appreciation*.⁵⁸ The future looks promising.

Almost all of the new releases from 1993 to the present are in color and include color pictures and QuickTime movies; the single exception is the Voyager Dvorák package. The Read Me button on the Dvorák opening card contains what amounts to a farewell to the black-and-white HyperCard interface that Winter has used to such good effect in his Voyager products. After outlining some of the innovations in computer hardware over the last half-decade, Winter summarizes:

If the past is any guide, these technological advances will continue, perhaps at an even more dazzling pace. And if the past is any guide, multimedia producers will rush to implement these bells and whistles into their programs. When you can bump the retail price up twenty bucks for packaging that says "Includes QuickTime Movies," it is hard to argue with the logic.

While Peter [Bogdanoff] and I are looking forward to color, to video, and to the big screen, I must confess that we feel downright nostalgic about our farewell to 9-inch one-bit. Like the pencil sketch or the charcoal drawing, this is a medium with its own subtle beauties.⁵⁹

Another trend is toward multi-platform products. In the beginning, Apple was way ahead in providing multimedia capabilities in its computers, but all of the recent releases are available for both

⁵⁸The *Norton CD-ROM Masterworks* by Daniel Jacobson and Timothy Koozin (New York: W.W. Norton, 1996) includes twelve pieces from the repertory of *The Norton Scores* and Joseph Machlis's *The Enjoyment of Music*. Rebecca Kaufman's *Maestro 2.0* (New York: McGraw-Hill, 1996) contains a tutorial on music fundamentals, as well as a listening guide to over 40 compositions discussed in Roger Kamien's *Music: An Appreciation* (New York: McGraw-Hill, 1996).

⁵⁹Robert Winter, from the Dvorák package, Read Me, cards 3 and 26-27. Peter Bogdanoff was Winter's collaborator on all the Voyager products, as graphic and interface designer, as well as programmer. He has remained with Winter in the move to Calliope.

Table 4. A music CD-ROM timeline

1987 1988 1989 1990 1991 1992 1993 1994 1995 1996 1997 1998

- HyperCard Introduced (Apple)
 - Beethoven Symphony No. 9 (Voyager)
 - Mozart "Magic Flute" (Warner)
 - Beethoven Quartet No. 14 (Warner)
 - Mozart "Dissonant" Quartet (Voyager)
 - Schubert "Trout" Quintet (Voyager)
 - Brahms Requiem (Warner)
 - Stravinsky "Rite" (Voyager)
 - Strauss Tone Poems (Voyager)
 - Musical Instruments (Microsoft)
 - Dvorák "New World" (Voyager)
 - Beethoven 5th (Future Vision)
 - Tchaikovsky 1812 (Future Vision)
 - Ragtime (Calliope)
 - Masterworks (Norton)
 - Maestro (McGraw)
 - La Bohème (EMI)

????

Macintosh and IBM platforms. This is not surprising, since the multimedia potential of the latter has been catching up, and this is a much larger market.

What has become of the pioneers in the field? A brief search of the World Wide Web yielded both bad and good news. At this writing, despite numerous web searches and telephone calls, we have been unable to determine whether Warner is still in the classical CD-ROM business. It is disappointing that we have seen nothing from this company since 1990, despite an extensive list of projected titles in their initial publicity literature and the excellent content of their initial offerings.⁶⁰ There are two possible reasons for this. First,

⁶⁰An insert in the Magic Flute package states: "This full-range program will cover, at first, the core music works important in surveying the fundamentals of 'what do I listen for' in music." The projected titles for the initial series included, in addition to the three titles reviewed here, Bach: *The Art of the Fugue*; Berlioz: *Symphonie fantastique*; Stravinsky: *The Rite of Spring*; Mozart: *Symphony No. 40 in G Minor*; Tchaikovsky: *The Nutcracker*; Britten: *Young Person's Guide to the Orchestra*; Vivaldi: *The Four Seasons*; Rachmaninoff: *Second Piano Concerto*; and Schoenberg: *Pierrot*.

the market for this type of product can't compare with the potential for popular music releases in our culture. Second, at the turn of the decade, when initial development was taking place, few computers were routinely equipped with the requisite CD-ROM players, which may have affected sales adversely. A recent PBS radio piece on the plight of CD-ROM development companies stated that the market is not as large as expected, users demand polished, "glitzy" products at low cost, and commercial development of high-quality packages is expensive (estimated in the quarter-million-dollar range). The conclusion was that only large well-established companies could afford to stay in the business. Certainly Warner falls into this category, and we hope they will return to center stage, since their products were among the best we reviewed. We are pleased to report that Voyager is still producing "classical" CD-ROM packages. They have introduced versions of their earlier products in the IBM (Windows) format and new packages are promised as well.⁶¹

It appears that the Dvorák package was Robert Winter's "swan song" with the Voyager Company, though he never states this explicitly in any product materials. His last package for Voyager, in 1994, predates his Calliope "Crazy for Ragtime" by two years. Calliope has a number of CD-ROMs in the fine arts available and under development. At this writing, "Itzhak Perlman: Interactive Tchaikovsky" (on the violin concerto) is under development, and "Domingo," a CD-ROM package featuring the famous tenor, is projected for joint publication by Calliope and EMI Classics in 1997.⁶²

Lunaire. They also state that "the initial Warner Audio Notes series will supplement this repertoire with compilations of works covering subjects from plainchant to pop."

⁶¹Voyager's new products (either released or imminent) include a survey of music literature in the "So I've Heard" series, cited previously, and Morton Subotnick's "All My Hummingbirds Have Alibis." Their online catalog also includes a number of pop music and children's music packages.

⁶²According to their web site, EMI Classics has a new multimedia division, which contains one Mac/IBM cross-platform "enhanced CD" thus far: on Puccini's *La Bohème*. An enhanced CD can be played like a regular audio CD but contains extra tracks for multimedia material, which can be read by a computer with a CD-ROM drive and software.

Apple Computer's HyperCard continues to evolve, both in its native capabilities and through external command packages developed by other companies. Though it is still a useful development tool, it is no longer the only player in town. Competing products such as Macromedia Director (available for both Macintosh and IBM platforms) and Multimedia ToolBook for IBM are viable and powerful alternatives, and other multimedia development tools continue to be introduced. As both hardware and software evolve, more advanced features such as color, video, three-dimensional graphics, and sophisticated animations will become routine in multimedia productions.

The capabilities of the World Wide Web continue to evolve as well, with the introduction of high-level development tools such as those provided by Java. In the future, multimedia development efforts may be ported to the Web, obviating the distinctions between different types of hardware, but at this time the bandwidth necessary for real-time transmission of high-quality audio and video is not available.⁶³

We hope that the trend toward glitzier products will enhance rather than replace the attention to detail and content in the early releases. We would encourage any product development team to include a music theorist as well as a musicologist. A theorist's input would broaden the product's audience even further among the musically literate, and would open up its market to the theory classroom (in their present form, most CD-ROM packages seem aimed toward music appreciation and music history content). Theory teachers could use more emphasis on harmony and harmonic concepts—both in the analyses and in supplementary "tutorial" sections—and more detail and sophistication in the discussion. A theorist would help sort through the occasional errors in analysis and terminology that tend to creep into these products as well.

We predict an increase in the use of multimedia development tools for in-house development of ad hoc teaching applications by theorists and musicologists. Some faculty members are already us-

⁶³Voyager Company has released CDLink, a product that makes it possible to control CD-ROMs over the Web, but each user must have the requisite hardware and the specific CD for any given application.

ing these tools, and their use will increase as students, such as those in our current multimedia development class, become faculty colleagues. Many of our students' final projects are just as polished as some of the commercial products we have reviewed here, and the level of musical discourse is often higher. Although they are working in HyperCard at the present time, the techniques and concepts learned will serve them well in any multimedia development environment. Of course, a prerequisite for developing in-house applications for teaching is the availability of classrooms equipped for multimedia presentation. Fortunately, these are beginning to appear more commonly on college campuses.⁶⁴

Although many of the packages reviewed here were designed for the mass market, the best of them are superb supplementary material for theory, musicology, and music literature courses. Encourage your libraries and computer labs to purchase them, and if you find them valuable, spread the word to your colleagues, recommend them to your students, let the publishers know your needs, and request that valuable older releases be maintained in current catalogs.

⁶⁴We currently have one such facility at the Eastman School of Music, and others are being planned.

Reviews

Daniel Jacobson and Timothy Koozin. *The Norton CD-ROM MasterWorks: Interactive Music Guides for History, Analysis, and Appreciation*, Vol. 1. New York: W.W. Norton, 1996.

Reviewed by Gary Wittlich

The *Norton CD-ROM MasterWorks* is a recent addition to the growing collection of CD-ROM publications for music study. According to the description of the *MasterWorks* on the box in which it is published, this software "is the first multimedia resource that enhances the entire music curriculum in appreciation, history, and theory. Designed for individual study or class presentation, each volume provides a dozen works specially chosen to display styles and genres from all eras of Western music."

Contents

MasterWorks comes with a booklet that briefly describes the contents, hardware requirements, installation instructions, and the basic operation of the software. The application is written in HyperCard and requires a Macintosh computer with at least 4 MB of RAM and System 6.07. However, it is recommended that System 7.x and 5 or more MB of RAM be available for best operation. I tested *MasterWorks* on two different Macintosh computers, a Quadra 840 and a PowerMac 8500, both running System 7.5 and with greater than the required RAM. I used two different AV monitors, one 15" and the other 17". As might be expected, viewing is better on the larger monitor.

Figure 1 shows the *MasterWorks* main menu. In typical HyperCard fashion, clicking on a title on the menu takes the user to that module. Each module opens with an introduction that activates an audio recording of the work and displays the work's title, the author of the module (either Jacobson or Koozin), and one or more scanned images pertinent to the work. Clicking on the graphic brings

up a reference to its original source. The Introduction, which can be bypassed from the *MasterWorks* Menu page by clicking the checkbox at the upper right, moves directly to the contents screen.

Figure 2 shows the contents screen of the Rodgers module, which features a 1952 Chet Baker trumpet solo in a performance of "My Funny Valentine" by the Gerry Mulligan Quartet, with additional improvisations by vibraphonist Gary Burton and guitarist Jerry Garcia.

Figure 1. *MasterWorks* Menu



Figure 2. Rodgers module: Contents

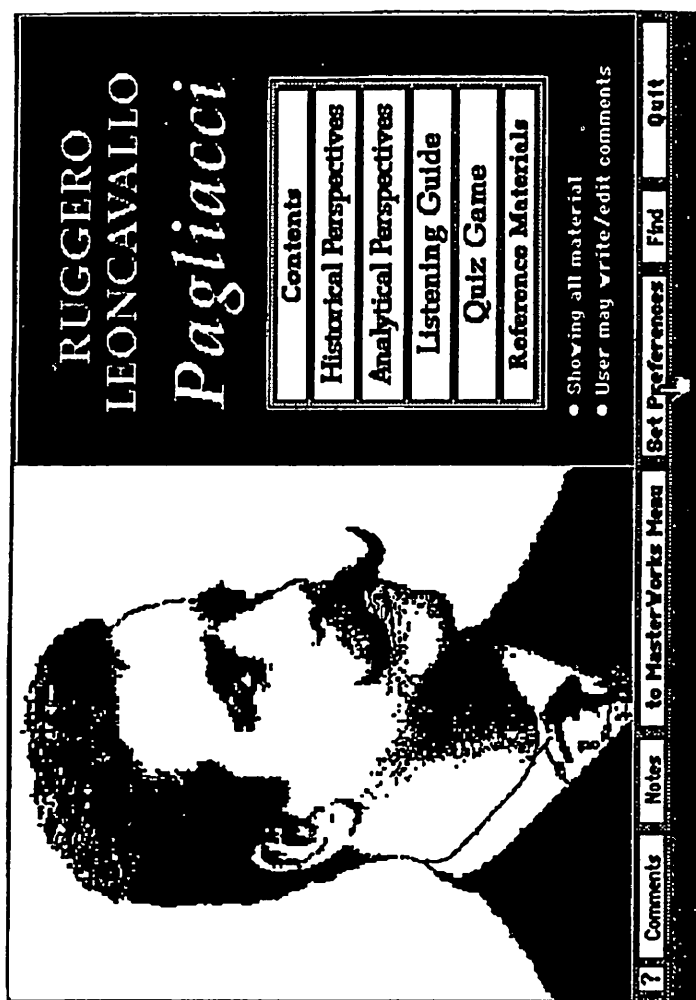


Each module of *MasterWorks* contains the same basic components: Historical Perspectives, Analytical Perspectives, Listening Guide, Quiz Game, and Reference Materials. With the Set Preferences option at the bottom of each module's contents screen, the user can configure the presentation as shown in Figure 3. Presentation of information is structured into two levels. The user can call

for only level 1 information to simplify the presentation, but level 2 information is always available via a mouse click. From the Set Preferences option, the user can also choose whether to show title bars within the modules, to enable writing of comments, or to clear the content of previously written comments.

Also available from the menu bar at the bottom of the screen are buttons enabling help, comments, notes (files for user entry of text),

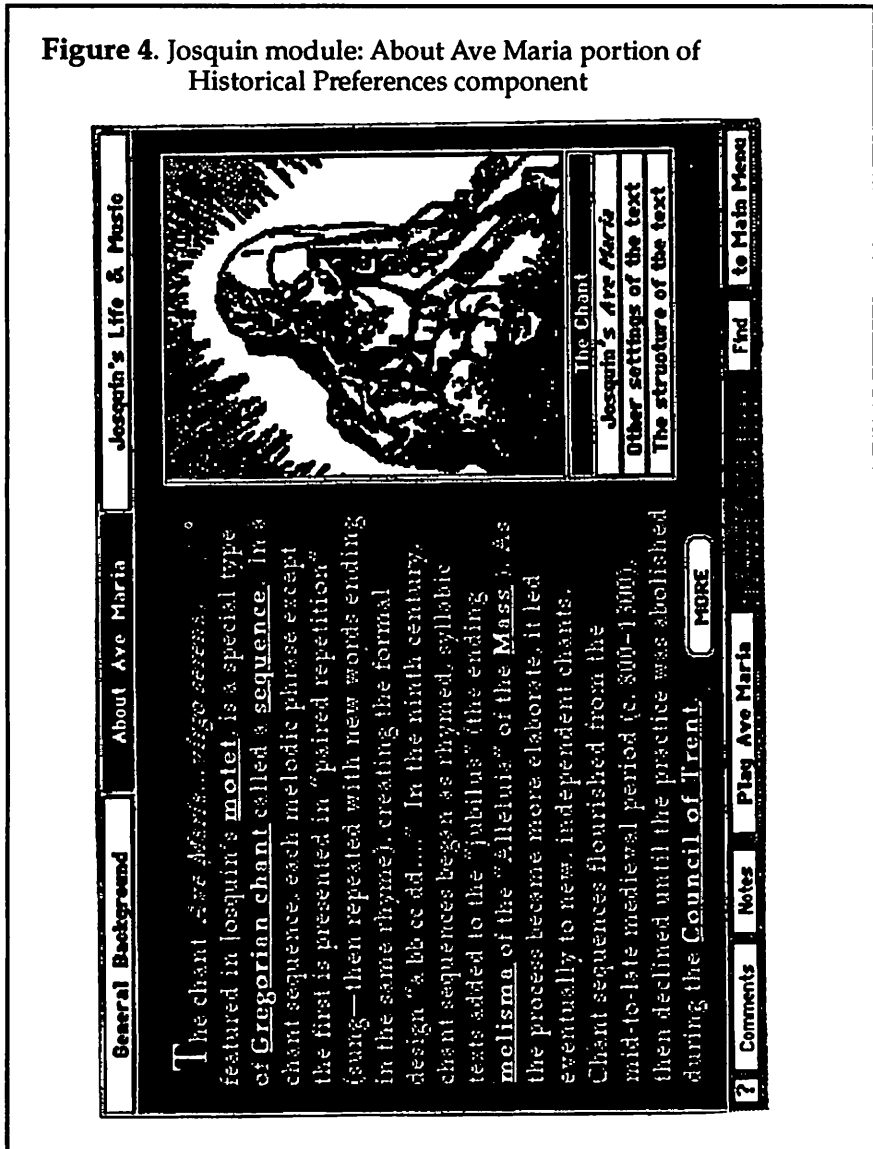
Figure 3. Leoncavallo module: Set Preferences option



a find option for locating words in the glossary, and a quit button. The notes button also keeps a history of references (bookmarks) to sections of the *MasterWorks* the user has entered, with an option for clearing those points. The help, glossary, comments, and notes options all appear as pop-up windows.

Figure 4 shows a page from the About Ave Maria portion of the Historical Preferences component in the Josquin module. Gener-

Figure 4. Josquin module: About Ave Maria portion of Historical Preferences component



ally, the authors provide one screen of text for each heading within a module component or subcomponent, though in some cases additional information is available via a button. From any of these screens, the work can be played and additional information is available via clearly marked buttons. Underlined words appearing throughout the modules are linked to the glossary, which provides brief definitions, many containing links to other definitions.

An example of an Analytical Perspectives section from the Chopin module is shown in Figure 5. The figure shows the result of clicking on the Show Cross-Rhythms button, which activates an audio excerpt of the passage shown. Throughout the modules, segments of graphic illustrations are coordinated with the sound and highlighted to orient the user. Clicking on the other buttons brings up information about the harmonic contents of the passage, including illustrations in music notation.

The Listening Guide portion of each module takes the user through the work with a variety of graphic aids, starting with a form view of the complete composition or excerpt at the top of the screen. All graphics are synchronized with the form graph and with the CD audio. Shown in Figure 6 is a screen from the Beethoven module's Analytical Perspectives section in which a linear (Schenkerian) graph complements the form graph. Clicking the mouse button at any point on the graph calls up the audio and invokes a moving cursor above the form graphic to orient the user to the portion of the movement that the linear graph represents. An important feature of the linear graph is that it is laid out proportionally in terms of the time spanned, and each point along the horizontal axis of the graph is linked to the performance as well as to the cursor on the form graph (more on this later). In addition, the linear graphs include a Graph Info button giving access to information about what the graphs say about the music. Hidden beneath the Graph Info button is a Show Score button, which appears when the Hide Graph button is clicked. Scores, some of which appear in reductions depending on the size of the ensemble, scroll in synchrony with the audio. For modules that involve text, the text lines are generally coordinated with the form graph, highlighting the lines as the music unfolds. In the case of the Schoenberg *Pierrot* module,

Figure 5. Chopin module: Analytical Perspectives

Introduction "A" Section "B" Section "A" Return Listening Guide

The introduction begins with a bold ascending motive. The repeated descending motive which follows will return later in the piece. Both the tonality and meter are somewhat ambiguous in the introduction. Although the piece is in triple meter, "cross-rhythms" create a temporary feeling of duple rhythmic accents.

Harm

Cross rhythms: 1 2 1 2 1 2 1 2

Ascending motive

Descending motive

Show Cross Rhythms Overview

Find to Main Menu

Comments Notes Step CD

both German and English texts appear side by side, with simultaneous text highlighting in synchrony with the music.

As is typical of most software intended for instructional use, there is a quiz component, in this case in the form of a game for one or two players with 10 or 20 questions to be answered for varying points and with appropriate sound effects for correct and incorrect

Figure 6. Beethoven module: Analytical Perspectives with linear graph option chosen

The screenshot displays a software interface for analyzing Beethoven's music. At the top, a menu bar includes 'Motives and Themes', 'The Orchestra', 'Sonata-Allegro Form', 'Other Movements', and 'Listening Guide'. The central area shows a musical score with measures 125 to 221. The score is divided into sections: 'Exposition' (measures 125-145), 'Development' (measures 146-180), and 'Recapitulation' (measures 181-221). The score includes various musical notations such as 'Theme 1', 'Theme 2', 'Exposition', 'Development', 'Recapitulation', and 'Coda'. The text below the score states: 'Several minor keys are explored in sequence, as a fragment from the second theme passes between winds and strings.' The bottom control bar includes buttons for 'Comments', 'Notes', 'Pause CD', 'Stop', 'Graph Info', 'Hide Graph', 'Find', and 'to Main Menu'.

answers and for completion of the game. Quiz items range from multiple choice to those in which the listener has to arrange icons containing excerpts from the module's work to represent the order in which they occur in the composition. This latter exercise is similar to approaches taken in applications developed by David Will-

iams (*Toney Music Games*)¹ and Richard Ashley (*Big Ears*).² When the user completes the quiz or elects to quit (which is possible at any point within the game), he or she is able to get a review of the items missed and to print the results of the review. Figure 7 shows an example of the quiz game from the Stravinsky module. (Igor and Sergei are names I entered for the players.)

The remaining component of each module is the Reference Materials, which varies from module to module but which in general cites the particular performance used in the module, published writings about the composer and the work, the source of the score used in the presentation (which in some cases is adapted for the presentation by the authors), and, in some modules, other score editions.

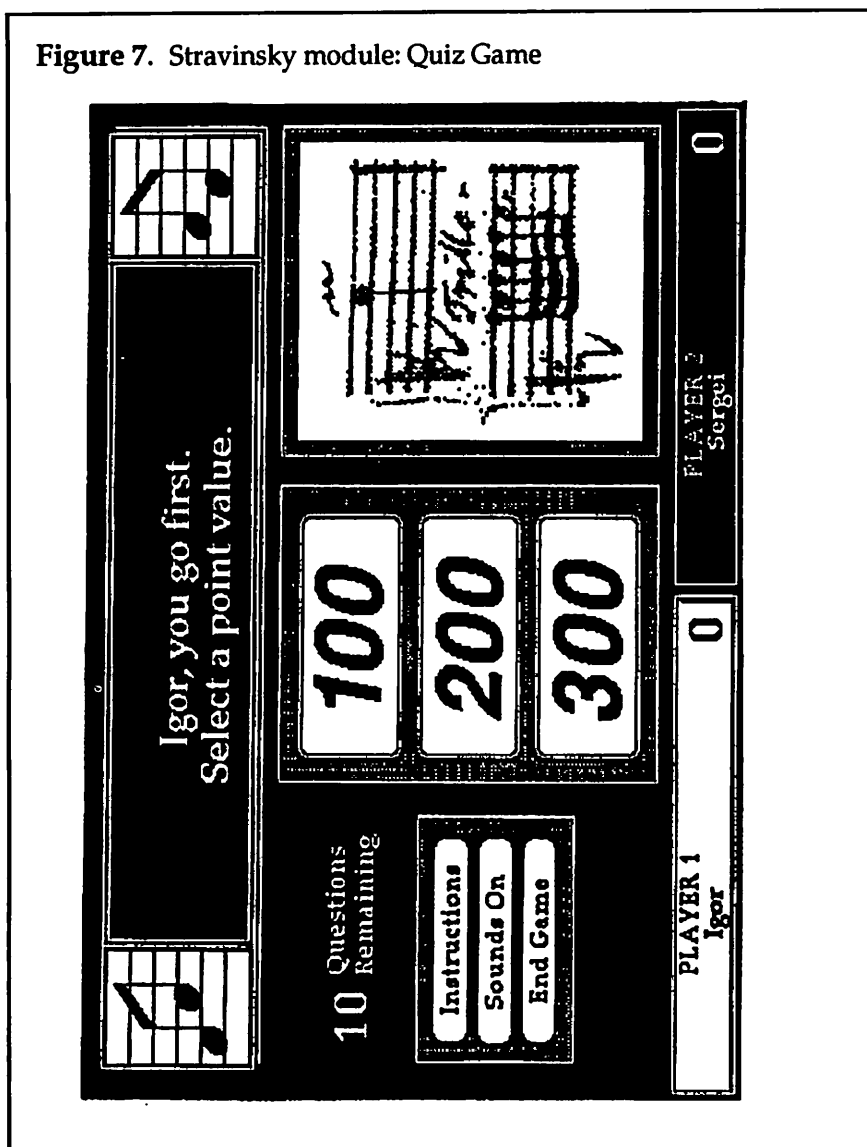
Evaluation

MasterWorks has much to recommend it. The coverage is good and appropriate for undergraduate music study. The inclusion of a jazz module is appealing and reflects a growing awareness on the part of music theory and literature teachers that we have excluded a vital part of our twentieth-century musical heritage from core curricula in many schools for far too long. The information presented by way of background on the works and in support of various analyses appears to be accurate and is concise and clearly written. Graphics are both appealing and well chosen, and the glossary is easy to use and is comprehensive. In general, the software operates without fatal flaws, and the clear and consistent user interface design permits easy navigation within and among modules. Given the variety of approaches within the modules, ranging from simple time

¹The games are a series of HyperCard stacks that let children practice music discrimination, order and form, and music conservation. They are available from the Office of Research in Arts Technology, Illinois State University, Normal, IL 61790-5600. Screen prints and a discussion appear on p. 95 of David Williams and Peter Webster, *Experiencing Music Technology* (New York: Schirmer Books, 1996).

²Richard Ashley, "A Computer System for Learning Analytic Listening," in *Proceedings of the Computer Music Conference*, ed. David Butler (San Francisco: Computer Music Association, 1989), 5-8

Figure 7. Stravinsky module: Quiz Game



lines to more complex analytic graphs, the software should serve the curriculum enhancement purpose for which it is intended.

With any complex software application, however, there are inevitably some operational problems. I encountered three of these, two of them minor, one major. One of the minor problems took place within a quiz game when I attempted to reset the quiz to take it again. In this instance the screen reviewing answers from the previ-

ous game showed up beneath the dialogue box asking for the number of players. This problem did not recur in my trials. The second minor problem, one that did recur, is that clicking on the reset test button on the quiz game screen appears always to generate an error message saying that there is no background number 0 and to contact the author or the publisher of the stack for assistance. The error, however, is not fatal, for the message can be canceled and the game resumed or quit. The serious problem occurred when I clicked several times on the note icons at top of the quiz game screen (see Fig. 7). I received the error message mentioned above, but when I canceled the error message box, a blank screen containing a question and blank answer fields appeared. Clicking on the reset test button on the screen again called up the same error message and locked up the software. I tried restarting the lesson by selecting one of the module icons in the Norton *MasterWorks* folder, but when I tried to activate the quiz in the module, I was told there was a quiz in progress and asked whether I wanted to end that quiz or cancel the request. I tried to end the quiz but wound up unable to launch another one. I then rebooted the computer and relaunched the *MasterWorks* software. However, the error apparently corrupted the software so that my only recourse was to reinstall *MasterWorks*. Fortunately, the installation procedure is simple, so the error was not completely fatal. While one might question why someone would click on the notes at the top of the game screen, this is precisely the kind of thing an inexperienced user might do, especially since the note icons might be taken to represent buttons. Happily, I could not replicate this error in subsequent trials.

Pedagogy

We've come a relatively long way in some twenty years of computer-based instruction development in terms of the quality of software intended to serve the learning needs of students and the presentation needs of teachers. The capabilities of today's desktop and laptop computers surpass those of mainframes in the 1970s and 1980s, and we can now develop multimedia applications with many different kinds of authoring tools, from relatively simple tools, such as HyperCard and Multimedia ToolBook, to more complex and

powerful development tools, such as Macromedia Director and Authorware. Given the limitations of HyperCard—lack of color, lack of high-resolution graphics, and limitation to a single platform—the authors of *MasterWorks* have done a masterful job.³

There is, however, a missing component that I think warrants inclusion, namely, a set of guidelines about how *MasterWorks* might be used by students and instructors, especially those unfamiliar with CD-ROM hypertext applications. Given the relatively straightforward operation of *MasterWorks*, perhaps the developers and the publisher assumed its use is self-evident: one simply launches the application, explores the contents through the many paths possible, and thereby learns about the included music literature and its structure. Yet those of us who have worked with hypertext applications with students know that learning in a hypertext context is not quite so simple. One of the strengths of such contexts is that they offer a rich database navigable in different ways by different users. But this strength can also be a weakness, particularly for young learners, for exploration does not necessarily equate with learning. Diana Laurillard, pro-vice-chancellor of technology development of the British Open University, points out that hypertext, while useful as an encyclopedic resource, does not provide much help when trying to make sense of things. "When students are trying to understand a difficult conceptual idea [musical structure being a case in point], they need a narrative line."⁴ Users will likely need some guidance

³In a communication from Timothy Koozin, I learned that Volume 2 of *MasterWorks* is being developed for cross-platform use, and that it will include color and high-resolution graphics. The composers tentatively selected for inclusion are Dufay, Palestrina, Purcell, Corelli, Bach, Haydn, Beethoven, Berlioz, Wagner, Webern, Copland, and Messiaen. Koozin also mentioned that the present volume is available at a reduced price (\$25 instead of \$49.95) with any Norton music book and with certain other publications, such as *The Norton Scores*. Persons interested should contact the publisher.

⁴See "Learning, Teaching, Technology: Putting First Things First," an interview with Diana Laurillard by Russ Edgerton in the *AAHE Bulletin* 49.1 (September, 1996): 3-6. See also the discussion of problems of learning in hypertext contexts in Thomas Duffy and Randy Knuth, "Hypermedia and Instruction: Where is the Match?" in *Hypertext: A Psychological Perspective*, ed. D. Jonassen and H. Mandl (London: Ellis Norwood Publishing, 1993).

by an experienced teacher who provides effective assignments on the basis of which students can discover musical relationships and build musical understanding.

Guidance in the use of the various analytic graphs, in particular, would be helpful, for such graphs are most valuable to those who understand how they are constructed and what they can—and cannot—illustrate about musical structure. One important, but not obvious, feature of the linear graphs in *MasterWorks* is that their layout is proportional, which makes them somewhat richer than a typical Schenkerian graph on which they are modeled. Timothy Koozin offers some valuable comments on the value of multimedia graphics in general, proportional graphs in particular, in an article “Graphic Approaches to Music Analysis in a Multimedia Environment,” written during the early development stages of *MasterWorks*.⁵

Koozin discusses two models for graphics representing the real time of a music performance, *static* and *dynamic*. A static model is represented by the sonata-allegro form chart of the Beethoven module shown in Figure 8. Here the listener follows the music as it unfolds with each highlighted region on the diagram representing a fixed time span. In Koozin’s words:

A static real-time model can be very effective in encouraging aural comparison of one audio segment to another, as the user deconstructs the piece into component parts for any number of varied rehearings. Objectifying the aural fabric into modular chunks in this way can provide a useful tool for developing awareness of large-scale musical processes, as the user samples themes and key areas normally projected across long time spans. While this function is effective as an informational model linking specified time spans to graphic representations, it is less useful in representing change or ambiguity. A single highlight routine cues the start of events, but cannot show movement through a segmentation. In directing attention to starts only, a series of such routines might actually encourage the user to shut down perceptually between cues while waiting for the next burst of visual information.⁶

⁵Timothy Koozin, “Graphic Approaches to Musical Analysis in a Multimedia Environment,” *Computers in Music Research V* (Spring 1995): 103-117.

⁶*Ibid*, 106.

Figure 8. Beethoven module: Sonata-Allegro Form chart

Motives and Themes	The Orchestra	Sonata-Alley 70 Form	Other Movements	Listening Guide
<i>Click on any item.</i>				
Exposition: (Introduction) First Theme Tonic Key Transition Modulation Second Theme Closing Theme Related Key Second Theme Group Click on any item.				
Development: Treatment of themes from the Exposition Various Keys Retransition No Modulation Second Theme Tonic Key Second Theme Group Closing Theme Retransition Dominant				
Recapitulation: First Theme Tonic Key Transition No Modulation Second Theme Tonic Key Second Theme Group Closing Theme Coda				
The FIRST THEME is generally introduced in the tonic key. If the first theme section has several distinct parts, all in the tonic key, the term, "first theme group" might be used. The TRANSITION, also known as a bridge passage, serves as a link between the first and second key areas. It usually introduces a modulation which is consolidated when the SECOND THEME appears.				

On the other hand, information gained from dynamic real-time proportional linear graphs

changes incrementally over time and varies qualitatively in response to user input. . . . [E]very point on the horizontal axis of the screen is proportionally linked to the CD performance (to a fine degree of accuracy limited by screen resolution, computer speed and the programming routine). Rather than showing fixed predetermined segmentation, a continuously moving arrow [see the cursor above the form graph in Fig. 6 as an example] shows motions toward and away from events depicted in the graphs. The user explores his/her own segmentations by choosing click points along the horizontal axis of the screen.⁷

Koozin believes that the dynamic model is more kinesthetic and engaging than the static model, and that it requires more decision making on the part of the student in the sense that the student controls the selection of entry points on the graph. He believes further that the fine control of temporal details, coupled with the analytic information embedded in the graph, invites study of musical detail that makes the user "an analytical partner, constructing the aural/temporal components of the analysis in real time."⁸ I suspect, however, that the intended use of proportional graphs in this application might be missed by most users without some introduction to the thought behind the graphs and their structure and without some guidance either on-line (the logical place for it) or in print. In volume 2 of *MasterWorks*, I urge the developers to add such information and guidance on-line.

For the Future

MasterWorks is an engaging software application, one that represents the augmentation stage of technology use that University of Colorado psychologist Thomas Landauer writes about as the second of three stages in the development of computing as it affects human productivity.⁹ At the same time, despite its apparent value,

⁷Ibid, 109.

⁸Ibid, 114.

⁹Thomas Landauer, *The Trouble with Computers* (Cambridge, MA: The MIT Press, 1995). The first stage is automation, and the third is user-centered design, development, and deployment.

MasterWorks lacks one ingredient that I believe must be built into software before computer technology can provide for the transformation of education that many educational technologists write about,¹⁰ namely, what Harvard's Leonard Rosen calls "high interactivity." Rosen views the kind of multimedia published by companies such as Voyager (in the case of music, think of the various contributions by Robert Winter, for example) as "low interactivity." For all that such software improves on textbooks and lectures, it is still a product of that instructional paradigm. In Rosen's words,

Whether a lecture is situated in a classroom or on a computer screen, the vision of education is the same: Experts have knowledge, and students should listen and receive it. Ironically, the navigational structure of the software attempts to give users control over information and implicitly says, "You are empowered." But all the while, the on-screen experts send the opposite message—that knowledge is theirs to dispense.¹¹

High interactive music software would enable students to compose pieces in the style of those included in multimedia literature study. It would allow students to orchestrate their compositions for playback as MIDI sound. It would enable them to be analysts themselves rather than simply learning about the author's analyses. It would enable overlaying authored graphics with student-created graphics by means of simple drawing tools for the purpose of comparison. It would provide a link to a World Wide Web browser to enable searches for alternative sources of information to supplement that found in the application, much as the commercial product *Lotus Notes* provides seamless linking with the Web. It would also provide for conferencing and for collaborative work among students and between students and teachers in the search for solutions to musical problems. In short, it would provide a completely integrated learning environment in which the student is immersed and is enticed to participate actively.

¹⁰See, for example, Michael G. Dolence and Donald M. Norris, *Transforming Higher Education: A Vision for Learning in the 21st Century* (Ann Arbor, MI: Society for College and University Planning, 1995).

¹¹Leonard Rosen, "Point of View," *The Chronicle of Higher Education* (June 5, 1995): A48.

To create such comprehensive learning tools will likely require the collaborative efforts of content experts, instructional designers, programmers, and publishers, all of which take time and financial support, both at present in short supply.¹² Publishers are reluctant to commit financial and other resources to untested approaches to learning, and the culture of scholarly communities does not presently support a reward structure sufficient to engage those who have the ideas and desire to create the kind of software that will involve students in high interactive contexts. Nevertheless, there is growing evidence of the need to change the culture of the academy,¹³ which in time will hopefully bring about improved environments for learning that take advantage of technology.

High interactive software is becoming commonplace in the sciences, especially in chemistry, physics, and mathematics in the form of interactive simulations and visualization. It is less common in the humanities, though we are beginning to find some models. Rosen describes software developed by the Laboratory for Advanced Technology in the Humanities at MIT for the study of the French language. In this application students interact with a narrative about a journalist who has been evicted from an apartment in Paris. The students listen to and leave messages on a virtual answering machine, keep notes on prospective apartments, use maps, and guide the journalist to one of seven possible outcomes. They thus participate actively in the solution of a problem from real life but within another culture and language.¹⁴ Another French language application is called *Nouvelles Dimensions* and is the conception of University of North Carolina professor James Noblitt, who is also head of the humanities division of the Institute for Academic Technology, an institute sponsored by the University. The software offers contextualized training using video clips of native French students engaged in everyday conversation. Via interaction with the clips,

¹²One might also add to this list researchers, who would provide some evidence of the viability of one type of pedagogical approach over another.

¹³See for example John Seeley Brown and Paul Duguid, "The University's Digital Future", *Change* 28.4 (July/August, 1996) and Robert B. Barr and John Tagg, "From Teaching to Learning: A New Paradigm for Undergraduate Education," *Change* 27.6 (November/December, 1995): 12-25.

¹⁴Rosen, "Point of View," A48.

users gradually gain insight into the pacing, inflection, and body language of French speakers, which helps them to develop sensitivity to the language, its syntax, and its semantics. An associated interactive dictionary, called *Système D*, allows students to construct French sentences and get feedback on their choice and use of the language. Databases of word families, guides to usage, and detailed assistance with verb forms help the student to write meaningfully at the elementary level of instruction.¹⁵ And a third application is described by Laurillard as a product developed by the Open University for art history study. In this application the students look at some twenty paintings on the computer screen and then experiment with grouping and classifying them. The program then compares what the user has done with how experts have classified the paintings in order to help users to understand alternative ways of analyzing paintings. "If you have the opportunity to take something like *Mona Lisa* and resize the head or remove the hands, you begin to get an idea of what compositional elements have gone into making that painting a classic."¹⁶

Though there do not yet appear to be any music equivalents of high-interactive software, nevertheless *MasterWorks* is a step in the right direction and is better than other multimedia music software that I have seen. Along with its successor volume, *MasterWorks* should provide an excellent starting point for future multimedia music learning development. The authors—and the publisher—are to be commended for their contribution.

¹⁵The software is published on CD-ROM by Heinle and Heinle, Boston.

¹⁶Laurillard, "Learning, Teaching, Technology," 6.

Reviews

David Damschroder, *Listen and Sing*. New York: Schirmer Books, 1995. 660 pp.

Reviewed by Michael R. Rogers

Listen and Sing, in one bold stroke, solves a long-standing problem for the teacher of undergraduate aural skills courses: namely, how to select and correlate textbooks for both sight singing and ear training. This publication by David Damschroder (University of Minnesota) combines practice materials for vocal performance and for dictation under a single cover. It's a small wonder that such a logical and efficient approach has not been tried more often in theory pedagogy. For decades, dozens of separate new sight-singing and ear-training texts have hit the market—sometimes separate books by the same author—but rarely have the two topics been conceived as part of the larger all-embracing subject of learning “eye/ear/brain” coordination. In this view, listening and singing are thought of as related and reinforcing dual aspects in the development of the perceptual/conceptual filtering systems used for hearing and performing tonal music with understanding.

This new book, I am happy to report, is successful at balancing the needs of both types of skills and at providing sufficient practice activities of genuine usefulness and merit. The thick and large paperback size (8.5" x 11") is packed with materials: 660 pages of clearly printed music, instructions, exercises, analyses, and explanations. In addition to the expected sight-singing melodies, rhythmic drills, and straightforward dictation patterns (melodic, harmonic, and rhythmic), a menu of other formats is offered for variety, contrast, and for differing pedagogical perspective: duets and accompanied solo melodies for singing; interval and arpeggiation workshops (sets of abstract exercises independent of notation often using scale-degree numbers); Quick Switch for singing (slight variational twists of a single pattern); and multiple-choice exercises for dictation. These

last two types of activities are especially well done. Finally, four 90-minute dictation tapes are made available for extra practice.

New keys are introduced very conservatively (i.e., only one key at a time is used, then a new key is added in a separate batch of exercises, and so forth). For example, Chapter 1 is restricted to C major, with F and G coming on board in Chapter 2. I call this arrangement the "saturation" approach. Not only is this an advantage, in my opinion, at the beginner's stage for ease of reading notation (not having to switch constantly to a different configuration of lines and spaces for tonic/dominant orientation permits energy to be dedicated to what the music sounds like rather than what it looks like), but even more importantly this approach imposes—and hopefully etches into the mind's memory grooves—the force of tonic's domain.

After singing entirely in C major, in other words, for about 10-15 minutes, the pitch class "C" begins to emerge with the power of a freight train bearing down on one's consciousness. Tonic gradually comes to feel like a brighter and brighter and larger and larger light coming down the track until finally the entire room overflows with its essence. These sensations of focus and illumination have a special quality when practiced in this unrelenting manner—a vivid example of what some have called "constructive brainwashing."

The slow incremental approach is evident in other areas too with Chapter 3 introducing the subdominant chord (after previous restriction to tonic and dominant), Chapter 4 introducing the bass clef, and Chapter 5 introducing the minor mode. Likewise the chord vocabulary is wisely restricted throughout the book at each stage of development so that students know exactly what choices are available for each slot of a given progression.

Dictation responses are encouraged in four different ways: a) sing back the stimulus; b) play back on the piano; c) play back on one's own instrument; and d) notate on paper. Flexibility of response type is echoed in the flexibility of analytical and solfège systems that are offered. Two Roman numeral possibilities for harmonic analysis are suggested: a) all upper-case symbols (as found, for example, in Aldwell/Schachter); and b) the more traditional distinction between major and minor qualities as symbolized by both upper- and lower-case numerals. Similarly, a variety of syllable

choices for sight singing is generously provided: a) numbers; b) letter names; c) fixed “do”; d) movable “do” with do-based minor; and e) movable “do” with la-based minor. [Experienced readers of this journal will breathe a sigh of relief to learn that I will not enumerate the pros and cons of these systems; for details see the hotly debated exchange series on solfège systems in recent issues between Houlahan/Tacka and Tim Smith.]

A stated goal of the text is to combine theoretical knowledge with aural perception. In this regard, a considerable amount of space is devoted to presenting the basic fundamentals of written theory including unusually detailed (for an aural skills book) discussions of harmonic theory (chords, symbols, inversions, progressions, etc.). Much of this information would probably duplicate material in the student’s written theory text. Some teachers will wonder whether this duplication clutters the book unnecessarily while others will likely appreciate the pedagogical reinforcement of harmony placed right beside the aural patterns.

Among the most beneficial and unique contributions of this book are the many insightful practice strategies. Directly underneath almost every sight-singing and dictation melody, for example, are brief written hints about how and what to listen for. These do not constitute a complete analysis but rather direct the student’s (and teacher’s!) attention to telling details of structure and organization.

For example, long-range connections or recurring patterns are often highlighted or identified (how to hear one note in relation to another; how to reduce a more complex grouping to a simpler one; or how even to recognize a combination of notes as a grouping in the first place). These many wonderful pedagogical tips alone are worth the price of the book. They are, of course, the lifeblood of any good classroom and the sort of thing that experienced teachers have always done automatically—mixing a kind of analytical banter along with instructions and other appropriate comments of support or information to mold students’ thinking and to create mindfulness of the recurrent underlying principles of musical coherence. The goal should always be to learn something from each melody studied that can carry over into the next new situation—extrapolating the universal from the particular and applying it back to the individual case.

One could question, in fact, whether all of this analysis is almost too much of a good thing, an embarrassment of riches. I can imagine that some students might become distracted by reading the printed analytical suggestions before hearing or singing the example as they try to keep the words of guidance and instruction in mind while they should be just listening. Perhaps the suggestions should have been included in a separate teacher's manual to be metered out at the opportune moment or to be withheld according to the needs of the pedagogical moment. Maybe the students should be "doing" more of the analytical work and focusing less on "receiving" a finished product of someone else's mind; maybe these are the kinds of hints that students should be asked to construct on their own during repeated hearings (in the case of dictation) or during repeated score perusals (in the case of singing) rather than being handed the hints in advance for free.

In any case, the analytical clues themselves are certainly exemplary models of the sort of thing that should be happening as part of the educational exchange in listening and singing environments. It will be up to individual teachers to decide how to maximize their effectiveness for each given setting—how and when to use them.

In spite of my overall favorable impression of this book and appreciation for the immense amount of genuinely useful practice material, something seems to be missing—although to be fair to Damschroder I must admit that this "something" is missing also from nearly every sight-singing and dictation book I have ever seen. This missing "X Factor" is what might have elevated an already good book to an even higher plane of excellence.

In short, this book lacks a point of view. There is no central conceptual framework through which the material is presented or through which students are encouraged to hear. I have searched for and failed to discover any unifying value system that informs how and why humans can make sense of tonal patterns. It's not clear whether Damschroder does this by design or by chance. He may have avoided a strong methodology on purpose so as to encourage many textbook adoptions; the more neutral, generic, and safe approaches that are used are less likely to offend. Or it could be that Damschroder simply does not have any comprehensive and coordinated methodology. We just don't know.

As it stands, the book is simply a collection of practice exercises with scattered helpful pointers applied to individual situations—pointers that often are only mildly related to one another. To have amassed such an amount of materials is in itself quite an accomplishment—and, up to that point, effectively done—but there could be more. The “helpful pointers”—like loosely rolling beads on a table—ideally should be strung together by some thread of connection if they are to participate in broader strands of meaning and artistic significance. As I read through this book I sometimes get the feeling that topics are merely succeeding one another rather than progressing in a more teleological manner. Isolated comments, even the “gems of wisdom” type found in this book, can acquire magnified value and richer pedagogical impact only when they are joined together in cumulative fashion. The fullest pedagogical synergy is only likely when all the bits and pieces of advice combine to produce some larger coherent universe of beliefs. Or perhaps it’s the prior existence of this universe of beliefs that makes the combining possible.

One part of the tonal credo that many experienced aural skills teachers pay homage to—but one not fully explored or properly exploited in this book—is the value of scale-degree function: i.e., learning the “rest” and “active” tone patterns that infuse tonal music with its dynamic properties of tendency and resolution, direction and arrival, movement and respite. Once students acquire tonal bearings (knowing where one is in the key at any given time—locations in relation to tonic) and once students grasp (memorize and make their own) a network of appropriate reference points (the pulls and attractions that pitches exhibit for one another), everything else falls magically into place. A tonal grid or template is then established that can be carried to each “new” situation (no melody is ever truly new since students will simply be recognizing, at this point, more or less similar archetypes). All of tonal ear training, then, boils down to pattern recognition.

But I see no special focus on the fundamental melodic patterns or the structural archetypes of tonality in this book—only lots of melodies with solitary pockets of listening (or performing) cues that are often unconnected to one another. I am talking about such simple patterns, among others, as scale degrees $\hat{7}-\hat{1}$, $\hat{4}-\hat{3}$, $\hat{2}-\hat{1}$, $\hat{5}-\hat{1}$, etc. I’m

not saying that these patterns are not found in the book but only that they are not singled out for centered attention. Scale-degree numbers are frequently employed but seemingly not the functional meanings that go with the numbers. The personalities and flavors of the notes are missing along with any recognition of how changing contexts affect their meaning (e.g., the fact that scale degree 4, while in the presence of 7, pulls downward to 3, but while in the presence of 6 tends toward 5). The teeming inner world of tugs and magnetism that defines tonality is unaccounted for in the flattened-out, nonhierarchical perspective of this text. The functions hover on the periphery rather than radiating from the hub; they are lost in the shuffle rather than spotlighted.

Two books that *do* incorporate this missing framework and that build pedagogically from it are, ironically, both also published by Schirmer: George Wedge, *Ear-Training and Sight-Singing*, 1921; and Jorgen Jersild, *Ear Training*, 1966. These books have been around so long they are rarely seen any longer in the classroom but they have never been outdone for beautifully judged pacing, additive learning, and holistic underpinnings.

Other things that could have been more strongly emphasized include: a) in harmony, use of the basic I-IV-V-I cadential formula (or predominant/dominant/tonic functional families) as the backbone for all progressions: teach the others as a variation of the model with extensions, substitutions, embellishments, prolongations, etc.; b) use of the tonality frame concept, as found in William Thomson's sight-singing books, *Introduction to Music Reading*, 2nd ed. (Wadsworth, 1981) and *Advanced Music Reading* (Wadsworth, 1969); c) contrast of structural pitches versus decorative pitches (as found in Leland Bland, *Sight Singing through Melodic Analysis*, Nelson-Hall, 1984); and d) general scanning techniques for analyzing a tune before singing it. Even such a basic task as identifying what key a melody is in is not addressed. Again, in fairness to Damschroder, I repeat that most other books are missing discussion of these vital issues as well.

The idea of using structural reductions for drawing attention to long-range connections could have been more effectively accomplished with greater use of musically notated examples rather than through verbal instructions (in the performance or listening strate-

gies)—a case of a picture being worth a thousand words. Likewise, a comparison of simplified or skeletal *notated* versions of more complex examples rather than trying to describe the differences through the “hints” would have helped to bring instant clarity to the analytical suggestions. Another instance of the verbal clues becoming clumsy involves identifying certain pitches that will occur in later measures. Why not just write those notes on the staff in the correct internal position instead of trying to describe them with words?

It could be argued that all of these “extras” I am describing are too much burden to put on a textbook. They are things that any good ear-training teacher will know to mention and to add to the course. I would counter by saying that many ear-training courses are taught by nontheory specialists or by inexperienced faculty or graduate assistants who would welcome, I think, all the help that a good book can provide. Other books, besides the ones mentioned above, that have in the past effectively incorporated these richer layers of pedagogical advice include: Richard Brooks and Gerald Warfield, *Layer Dictation: A New Approach to the Bach Chorales* (Longman, 1978); Lars Edlund, *Modus Vetus: Sight Singing and Ear-Training in Major/Minor Tonality* (Alexander Broude, 1974); and William Thomson and Richard P. DeLone, *Introduction to Ear Training* (Wadsworth, 1967).

Besides the lack of solid philosophical grounding, other smaller concerns intrude from time to time. The dictations (both melodic and harmonic) sometimes seem too long to exercise one of the main benefits of the task, development of short-term memory. A powerful relationship is not always apparent between the listening and the singing aspects (often this is two separate books running in parallel universes—a by-product, no doubt, of the weak pedagogical scaffolding already mentioned). The lack of twentieth-century materials will be problematic for some (only eighteenth- and nineteenth-century tonal repertoire is covered, although contrived and real literature examples are effectively blended). Starting pitches and neatly placed bar lines are always (somewhat artificially) provided instead of requiring students to infer tonic, infer length and meter, etc.—all tasks that mimic real-life musical situations. Some of the C-clef exercises plunge too immediately into complexity (rather than evolving from some introductory warm-up drills).

In addition, too much focus is placed on intervals (as opposed to scale-degree function): e.g., on page 154 three places where the M6 occurs are identified: in minor from $\hat{3}$ - $\hat{8}$ and in major from $\hat{1}$ - $\hat{6}$ and $\hat{5}$ - $\hat{3}$. However, the impression is left that they all sound the same rather than highlighting the role of context in differentiating the affective and psychological effects. In the analytical hints emphasis is often placed on where a given note is coming from (in identifying an interval, for example) rather than on where it is going: a goal note is more likely than a departure note to provide effective tonal orientation.

Finally, a particularly egregious misjudgment is the insufficient amount of practice material for modulation. Secondary dominants (in melodic study only, not harmony) are treated in some detail, but only a very few melodies (out of hundreds), and no harmonic progressions, include real examples of key shift. Such an omission is inexplicable to me.

Any of the problems I have identified—tiny or glaring—can be overcome with a suitable infusion of cognitively driven teaching (that is, teaching that engages both the ears *and* the mind). This book can be as potent (or as feeble) as the teacher who uses it. Moving mindlessly through the exercises page by page will not produce much of value with this or any book. The materials themselves (the exercises and suggestions) can all be put to good use just as the most pedagogically advanced aural skills book could be totally undermined by the rote-drill instruction of the unimaginative. Textbooks of any kind are just the starting point; the real teaching comes from the teacher.

Reviews

A Guide to Books on College Teaching: An Update

Reviewed by L. Dee Fink

In 1987 I wrote a review article in this journal about three books on the general theme of how to be a better college teacher (*Journal of Music Theory Pedagogy* 1/1, Spring 1987). Apparently that article proved valuable as a guide for busy professors. Many readers requested reprints and I have been asked to write an updated version.

This has proven to be a challenge, because many good books have been published on this subject in the intervening ten years. Consequently I will identify three books that are likely to be valuable to any professor. Then a number of other books will be described briefly that focus on more specific topics.

Barbara Gross Davis, *Tools for Teaching*. San Francisco: Jossey-Bass, 1993.

For anyone who wants a single reference book of good ideas on college teaching, this is the book I would recommend. It has forty-nine brief chapters (average length: eight pages), all of which focus on important topics.

This book is good for two reasons. First, the author has done a superb job of researching the material available on the various topics and of selecting and presenting numerous good ideas on each topic. Second, the organization and format of the book make it very easy to find the recommended practices on any given topic. The book is divided into twelve general sections, e.g., "Getting Under Way," "Lecture Strategies," and "Testing and Grading." Each section has three to five chapters. Each chapter has three to five easily recognizable subtopics, and then each subtopic has a series of recommendations, each of which starts with a sentence printed in bold type. This makes it very easy to scan the recommendations in order

to decide which ones you want to read and learn about in more detail.

The book does not advocate a general philosophy or strategy for college teaching. For that, I still recommend Joseph Lowman's *Mastering the Techniques of Teaching*, described in my 1987 article. But for people who want a good collection of suggested practices on a good list of topics, *Tools for Teaching* is, in my opinion, the best book available.

Thomas A. Angelo and K. Patricia Cross, *Classroom Assessment Techniques*. 2nd ed. San Francisco: Jossey-Bass, 1993.

This book is also a collection of techniques, fifty of them. But these techniques are all concerned with classroom assessment, i.e., activities a teacher can use to collect information about "what students are learning in the classroom and how well they are learning it." The different techniques have been sorted into three sets: (a) techniques for assessing course-related knowledge and skills, (b) techniques for assessing learner attitudes, values, and self-awareness, and (c) techniques for assessing learner reactions to instruction. About half of the techniques are in the first category, and these have been subdivided into categories based on the kinds of learning being assessed: recall knowledge, critical thinking, creative thinking, problem solving, and application.

The description of each technique is about four pages long and is presented in a very helpful format. Each description includes comments on several topics, e.g., suggestions for use, examples of use with different courses, limitations, and caveats.

When I have introduced this book to faculty members on my campus, they have almost always found both the concept and the specific techniques to be quite valuable. The concept of classroom assessment helps people realize that they can, with only a modest amount of effort, put themselves on a learning curve in terms of how specific students are learning material in a particular course. This is a strong and empowering realization. They have also found the descriptions of the individual techniques to be helpful and clear.

To exemplify what is in this book, let me briefly describe two techniques that many people have used and found worthwhile. One

is the “Minute Paper” (also known as the One-Minute Paper or the Half-Sheet Response). The idea here is to ask students, usually at the end of a class session, to respond briefly to the question(s): “What is the most important thing you learned today?” and/or “What important questions remain unanswered?” Teachers often find that initially students are “all over the place,” meaning that the teacher needs to help the class identify the main points more effectively.

A second technique is that of asking students to draw “Concept Maps” that relate concepts just learned to other concepts. Drawing such a map forces students to think about and identify the connections and relationship between concepts. Reading their maps allows the teacher to determine whether the students have connected central concepts to related concepts, and see whether the kinds of relationships seen by the students are the important and correct ones.

One of the challenges facing the reader of a book like this is that it can be overwhelming to be confronted by fifty different techniques to learn about and to decide which to try. However, the authors have provided some help. Having introduced and led the national classroom assessment (CA) movement since the publication of the first edition of this book in 1987, they have followed and collected information from people who have tried CA techniques since then. Based on this experience, they have done two things. First, they recommend that everyone start small. Just try one technique, any technique, and learn from it. Then try one more thing, learn from it, and so forth. In time, professors who do just this will find themselves on a significant growth curve in terms of learning how to teach more effectively, and learning how to better assess student learning.

Second, they have added two chapters to this edition that guide the reader. Chapter Five, “Twelve Examples of Successful Projects,” provides a quick look at techniques that would be good candidates for a first-time user. Chapter Ten, “Lessons and Insights from Six Years of Use,” reviews the benefits teachers have found from using these techniques and ideas to keep in mind when using the techniques.

In sum, I believe that learning how to get the right kind of feedback from students is crucial to effective teaching and learning, and this book is the right place to start learning how to do that.

Stephen D. Brookfield, *Becoming a Critically Reflective Teacher*. San Francisco: Jossey-Bass, 1995.

If we assume that our job as professional educators is not only to teach effectively but also to periodically reflect on how we teach and on how we might improve our teaching, then the subject of this book is of paramount importance.

For Brookfield, becoming a critically reflective teacher means "(identifying and scrutinizing) the assumptions that undergird how we work." He also believes that the best way to become aware of our own assumptions is to view our practice from multiple perspectives. Hence he proposes that we view our practice through four distinct though interconnected lens: through our own eyes, through our students' eyes, through the eyes of our colleagues' perceptions and experiences, and finally through the lens of published literature on teaching and learning. The heart of the book presents two chapters on each of these perspectives: one commenting on the nature of that perspective and the other describing specific activities we can use to learn about ourselves from that perspective.

Brookfield has several characteristics as a writer that make his books stimulating and enjoyable to read. One of these characteristics is his ability to explore the human dimension of both learning and teaching. His writing makes it absolutely clear that teaching is much, much more than the "transmission of knowledge," which would require little more than a clear, well-organized series of lectures. Teaching and learning are human endeavors that have lots of human emotion associated with them and that involve multiple and sometimes conflicting purposes.

A second valuable feature of this book is Brookfield's gifted ability as a story teller. Most people will remember a good "story with a point" better than they remember a treatise. Consequently readers will remember many of the central points in this book because they are associated with a memorable story. My own favorites are about Brookfield himself learning how to swim and learning how to use computers.

A third feature is Brookfield's ability to coin a new phrase for an important concept. An excellent example of this is chapter eleven, where he writes about the risks involved for anyone who is courageous enough to seriously engage in critical reflection. He identi-

fies four risks, for which he gives the following labels: the Impostor Syndrome, Cultural Suicide, Lost Innocence, and Roadrunning. (You will have to read the book to find out what these mean.) When I first read these, they befuddled me, and I wondered what in the world these have to do with thinking about teaching. But now that I have come to understand the ideas behind the clever labels, I see these patterns everywhere. I should also add that, in addition to noting that these risks do exist, Brookfield offers suggestions on how to negotiate and deal with them.

In contrast to the first two books, which are intended as practical tips for the "front line" action of teaching, this book can be seen as a practical book for the education of the "general behind the lines" who understands his own need to review his assumptions about effective principles and strategies.

Material on Specific Topics

For people who have questions about specific topics, the following material should prove helpful.

Books on Multiple Topics. One of the classics in the literature on college teaching is *Teaching Tips* by Wilbert J. McKeachie. It is somewhat similar to *Tools for Teaching* described above in that it represents a collection of chapters on very practical topics. However, the latest edition (9th ed., 1994, D.C. Heath and Company, Lexington, MA) contains several chapters on new topics that were written by people asked to collaborate on this edition. Four well-written chapters on important topics include the following.

- "Teaching in the Age of Electronic Information" (Chap. 19, by Robert Menges of Northwestern University)
- "Taking Student Diversity into Account" (Chap. 22, by Nancy Chism of The Ohio State University)
- "Ethics in College Teaching" (Chap. 26, by Marilla Svinicki of the University of Texas)
- "Teaching Students How to Learn" (Chap. 32, by Claire E. Weinstein of the University of Texas)

Teaching Portfolios. A teaching portfolio is a narrative statement, generally four to six pages in length, with accompanying materials that describe what one is as a teacher. The narrative statement typi-

cally includes (a) a description of what experiences one has had as a teacher, (b) the person's philosophy of teaching and the teaching strategies generally used, and (c) an assessment of the person's strengths as a teacher and where there is room for improvement.

People have found that the process of creating a teaching portfolio almost always clarifies their own sense of themselves as a teacher and that the product is a valuable way of communicating to others what they represent as a teacher.

Peter Seldin of Pace University is unquestionably the leader of the "teaching portfolio movement." His initial book was *The Teaching Portfolio* published in 1991 by Anker Publishing Company in Boston. In 1993 he published *Successful Use of Teaching Portfolios* (by the same publisher). This book contains several sample portfolios and talks about how several institutions have used and found value in the teaching portfolio concept. In 1996 Anker published a second edition of the 1991 book.

Writing and Thinking. In the concluding section of my 1987 article, I noted the unfortunate lack of attention to writing in the three books reviewed. Since then, many books have been published about the value of and kinds of writing assignments for students.

In 1996, John C. Bean, director of the writing project at Seattle University, wrote an exceptionally valuable book on this topic: *Engaging Ideas: The Professors' Guide to Integrating Writing, Critical Thinking, and Active Learning in the Classroom*, published by Jossey-Bass (San Francisco, CA). The author of the forward describes it accurately as an "owner's manual," that is, a well-organized book that describes the purpose for using writing assignments, practical guides for specific activities and assignments, and—best of all—troubleshooting guides.

Small Groups. The use of small groups, along with writing and technology, is one of the three most rapidly growing practices among college teachers that I see in higher education today. Used effectively, small groups can add a tremendous amount of energy, student out-of-class study time, and higher-level learning (e.g., problem solving, decision making, critical thinking) to a course. Used improperly, they can waste time, create unfair grading situations, and anger students.

To use small groups effectively, a teacher needs to think through five key issues. (1) How will you form the groups? (2) Do you intend to make the groups temporary or permanent, i.e., lasting the whole term? (3) Are you going to provide in-class time for the groups to work, or do you expect them to meet out of class? (4) Will the group assignments be graded? If so, will the group grades count as a significant portion of the course grade, and how will you provide for individual accountability? (5) What kinds of tasks do you intend to give the groups? This may look complicated. But once you work out your answers to these questions, the results will more than justify your learning time.

The people who have published their ideas on small groups have used different labels. Some write about "collaborative learning," others about "cooperative learning," and still others about "team learning." The various writers offer different answers to the questions above.

The best-known publication on this topic at the moment is *Cooperative Learning* by David W. Johnson, Roger T. Johnson and Karl A. Smith (1991 ASHE-ERIC Higher Education Reports, No. 4, published by The George Washington University, Washington, D.C.). But, in my view, a more sophisticated set of ideas is associated with the concept of team learning. The idea here is that, if a teacher can provide the time and structure necessary for a group of students to evolve into a cohesive, committed learning unit (i.e., a team), they can be a very powerful agent of higher-level learning. The best source of information on team learning is from Larry Michaelsen, a business professor at the University of Oklahoma. He has been using and studying small groups for two decades, and has a number of publications on this topic. The best two are: (1) "Team Learning: A Comprehensive Approach for Harnessing the Power of Small Groups in Higher Education," in *To Improve the Academy*, Vol. 11 (1992), published for the Professional and Organizational Development (POD) Network in Higher Education by New Forums Press, Stillwater, Oklahoma, and (2) "What Every Faculty Developer Needs to Know About Learning Groups," in *To Improve the Academy*, Vol. 15 (1996), by the same publisher. (Note: If your library has difficulty finding these books, you may contact the author for copies by mail, or by email at: lmichael@ou.edu.)

Changing Context of Higher Education. As most people have noticed, the decade of the 1990s is ushering in the age of electronic communication, and this has the potential for creating a major revolution in the structure of all of higher education. My own belief is that, although traditional institutions and traditional forms of learning will continue, many important alternatives will develop that will be very different from the present model of "gather all the students together in the same place at the same time."

A visionary book describing what these changes might look like is Michael G. Dolance and Donald M. Norris, *Transforming Higher Education, A Vision for Learning in the 21st Century*, published in 1995 by the Society for College and University Planning, Ann Arbor, Michigan. Appropriately the best way to contact them is electronically: Phone - 313-998-7832, by email <scup@umich.edu>, or via the Internet <<http://www.umich.edu/~scup/>>.

Monthly Newsletter. Some people may prefer to read a short, periodic newsletter rather than a book. A popular and high-quality national newsletter is *The Teaching Professor*, published by Magna Publications, 2718 Dryden Drive, Madison, Wisconsin 53704-3086. (Phone: 800-433-0499) The newsletter is six to eight pages long, and is published monthly (except July and August). The articles cover a wide range of topics but are very practical and come from a wide variety of sources.

One attractive feature of this newsletter is the sliding nature of the cost. For one person, the annual subscription is \$43. But if several people from the same campus subscribe and one person can take responsibility for local distribution, the cost can be reduced to as little as \$1.50-2.00 per issue per person.

When I look at this list of topics and imagine busy professors trying to learn about all of them, I feel (and can imagine them feeling) overwhelmed. Yet if we take our responsibilities as a teacher seriously, then it behooves us to set aside regular time for our own professional development as teachers, some of which can be used for reading. This is clearly a challenging task. But the good news is that, as the list above makes quite clear, there is now an abundance of good literature on college teaching that will reward us with big dividends on whatever time we can devote to this task.

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CONTRIBUTORS

Alexander R. Brinkman, Associate Professor of Theory at the Eastman School of Music of the University of Rochester, has done extensive work in computer applications, music encoding languages, data structures, and algorithms for music analysis. He is the author of *Pascal Programming for Music Research* (University of Chicago Press, 1990), and has written many programs for use in music analysis and synthesis. His articles have appeared in a variety of music theory, computer, and cognition journals. In addition to more traditional music theory courses, he teaches two programming courses at Eastman: Computer Applications in Music Research, and Multimedia Computing for Pedagogy and Music Cognition Research.

L. Dee Fink has served as director of the Instructional Development Program at the University of Oklahoma since the Program was established in 1979. He has taught courses on college teaching at Oklahoma as well as courses in Geography and in the College of Liberal Studies. His research has been primarily concerned with educational evaluation and with the design of effective learning activities. He received his Ph.D. from the University of Chicago in 1976 with studies in geographic education at the university level. He contributed to the first issue of the *Journal of Music Theory Pedagogy*.

Robert Gauldin is Professor of Music Theory at the Eastman School of Music of the University of Rochester and is a past president of the Society for Music Theory. In addition to his two counterpoint texts, he is the author of the recently-released *Harmonic Practice in Tonal Music* (W.W. Norton), a major undergraduate textbook package.

Richard Hoffman is an Assistant Professor of Music Theory at Ithaca College. He received his Ph.D. in music theory from the University of Kentucky. His current research interests include music theory pedagogy and the analysis of early music. He is also a conductor and a performer on the recorder.

Alice Main Lanning was a founding editor of the *Journal of Music Theory Pedagogy* and now serves as its managing editor, as well as a board member of the Gail Boyd de Stwolinski Center for Music Theory Pedagogy. As Coordinator of Lower Division Theory in the School of Music at the University of Oklahoma, she received numerous teaching awards, including the Amoco Award for Outstand-

ing Undergraduate Teaching and a University Associates Distinguished Lectureship. She is currently Coordinator of Freshman Programs in the University College at the University of Oklahoma.

Steve Larson is an Associate Professor of Music at the University of Oregon. His articles have appeared in a variety of journals of music theory and cognitive science, including the *Journal of Music Theory Pedagogy* and *Music Perception*. His compositions and piano improvisations are featured on the compact disc *Portfolio* (with flutist Cynthia Folio).

Justin London is an Associate Professor of Music at Carleton College in Northfield, MN. His research interests include rhythm and meter, speech-act theory and its relation to music, aesthetics, and the history and analysis of the Delta Blues. With his Carleton colleague Ronald Rodman he has written an electronic workbook for tonal and chromatic harmony.

Elizabeth West Marvin is Associate Professor and Chair of the Department of Music Theory at the Eastman School of Music of the University of Rochester. She has taught graduate courses in music theory pedagogy, multimedia computer programming, music cognition, analysis and performance, and analytical techniques, and is former coordinator of the undergraduate aural skills program. Her articles appear in the *Journal of Music Theory Pedagogy* and several other journals, and she is co-editor of *Concert Music, Rock, and Jazz since 1945: Essays and Analytical Studies*.

William Pelto is an Assistant Professor of Music Theory at Ithaca College. He received a B.A. in political science from Yale, an M.A. in music theory from San Francisco State, and a Ph.D. in music theory from The University of Texas at Austin. His research interests include nineteenth-century programmatic music and pedagogy. He has presented papers to regional and national meetings of the Society for Music Theory and the College Music Society. He is currently a member of the Theory Advisory Committee for CMS.

Michael R. Rogers is Chair and Professor of Music Theory at the University of Oklahoma. He is the first editor of the *Journal of Music Theory Pedagogy* and is the author of *Teaching Approaches in Music Theory*. He is currently working on a book, *Inspired Accidents: The Interaction of Intuition and Analysis in Teaching Musical Performance*.

John W. White is an Assistant Professor of Music Theory at Ithaca College. Along with skills pedagogy, his research activities include

the analysis of vernacular musics and improvisation. The freely improvised music of the chamber ensemble Oregon is the subject of his dissertation in music theory at Indiana University.

Gary Wittlich is Professor of Music Theory and Chair of the Music Information Technology doctoral minor program in the School of Music, and is Associate Dean in the Office of the Vice President for Information Technology at Indiana University.

GUIDELINES FOR CONTRIBUTORS

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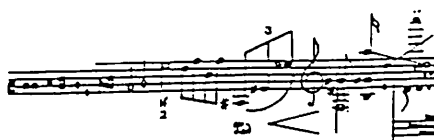


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