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The Structure of Chromatic Music

Third Edition

Third Edition

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1. Melodic Structure

Review of Harmonic Rhythm, Melody & Non-Harmonic Tones

Harmonic rhythm is the rate of chord change in music. This will vary inversely with the tempo and the character of the music. Some music has a slow harmonic rhythm (usually in a fast tempo) and other music has a fast harmonic rhythm (usually in a slow tempo). Chords may change on every beat or one chord may repeat for several measures before there is a change. Harmonic rhythm is a very important parameter to consider.

A *line* may be defined as a series of pitches with a rhythm. A *melody* is a line that has a clearly defined structure. It has shape, length, and direction. A melody is normally made of two things: chords and scales. Although it is monophonic, it is not uncommon to find arpeggiated chord structures within a melody. Generally, when a melody moves stepwise it follows a scale, and when it leaps it outlines a chord. (A *leap* is any interval larger than a second). However, it can be shown that even step (scale) structured melodies outline chords. Seen in this way, melody becomes an aspect of harmony, which is the way it commonly functions in our traditional music.

Therefore, we could say that all melodies outline chords. However, some of the notes of a melody will not belong to the chord that is outlined. These notes are called *non-harmonic*, meaning not part of the harmony. Through a study of the traditional literature, standard, recurring types of non-harmonic tones have been described and named. They include *passing tones*, *neighbor tones*, *suspensions*, *appoggiaturas*, etc. Here are their definitions:

Begin each definition with "a non-harmonic tone that":

passing tone (p). moves stepwise from a chord tone to a different chord tone.

neighbor tone (n). moves stepwise from a chord tone back to the same chord tone. Neighbors may be upper or lower.

suspension (s). is repeated or held from the previous chord, on the beat, and then resolves down by step to a chord tone.

retardation (r). is repeated or held from the previous chord, on the beat, and then resolves up by step to a chord tone.

anticipation (ant). is approached stepwise; then it is repeated when it resolves. Normally occurs in soprano off the beat.

pedal tone (ped). is repeating, usually in the bass, and normally switches between harmonic and non-harmonic.

appoggiatura (app). is approached by leap and resolves stepwise in the opposite direction; it normally occurs on the beat.

escape tone (e). is approached by step off the beat; then resolves by leaping oppositely to a chord tone.

cambiata or changing tones (cam). is actually a pair of notes separated by the interval of a third, approached by step and resolved to a note in between the third.

Occasionally, these non-harmonic tones may occur in pairs; i.e., one following another before final resolution. The following shows examples of most nonharmonic tones and how they

are labeled. The appoggiatura at the beginning is labeled such because its approach is unknown. The second suspension in the penultimate measure seems to be circled without a note, but the C is held where it becomes a suspension.

Self Test 1.1 (Answers to Self Tests are in the back of this book)

Phrase & Motive

Not all melodies are designed around the four measure phrase. What is astonishing is that so many are. In fact, most traditional tunes fall into the four-measure structure. Consult your Resource text for many examples. A *melodic phrase* may be defined as a complete linear statement with a beginning and a point of termination. Phrases are marked with slurs. Since the phrase is the basic structure of melody, we need to consider more closely how it is composed.

One of the most important structures in melody is the motive. A *motive* is the shortest identifiable repeating element in a composition. It can be anything from one note to several notes in length, although the usual length is only a few notes. The motive can have two aspects: 1. rhythm, and 2. interval contour. The motive is then used to make up the melodic structure of a composition. The motive forms the basis of compositional rhythmic and intervallic content.

The following is an example analysis of a simple dance by Beethoven. Play it for yourself.



It shows a total of sixteen measures divided into two sections, A and B (with the repeats it is 24 measures). Each section is divided into two phrases, 1 and 2, and each phrase is either a question (Q) or an answer (A). The key is shown as F major, and the Roman numerals indicate the chords and harmonic rhythm. Only two chords are used, tonic and dominant seventh. The harmonic rhythm is mostly one or two measures per chord.

The last phrase is the same as the second, A1. The first two phrases form a question-answer period of eight measures, as do the last two. Thus, the form is rounded binary, with a single period in each section, indicated (a). Also, each phrase begins on the third beat and ends on the second beat, making exactly four measures.

Music is often organized with *motives*, which are short rhythmic or melodic abstractions that are repeated and serve as structural building blocks. They are usually no more than four or five notes in length. A melodic *inversion* is one that is played upside down, so that what was up is now down and vice versa.

Subjects are longer than motives and are made up of two or more motives chained together. (See the example on the next page.)

Phrases are normally four measures, sometimes half (2 measures) or, less commonly, double (8 measures), in length. They are normally paired to form a complete sentence, or a question-answer *period*. These paired phrases imitate a conversation or dialogue. Tonal schemes may vary but the most common ones are:

I ----- V V ----- I or I ----- I I ----- I

In minor, III, the relative major tonic, typically takes the place of V in the first scheme. In a

repeated phrase, the two phrases of a period are identical. *Parallel phrases* begin with the same or similar material but they end differently. In *contrasting phrases* the two phrases begin differently. Periods can also be parallel or contrasting. A *double period* consists of two periods, four phrases in two pairs.

Most melodies are made of two or three motives, rather than just one. Each phrase or phrase segment has a basic shape. The most common is the arch 1. The opposite is the bowl C.

Others are the straight line up $_$ or down $\`$, and the wave \sim . The wave is only used in combination with one of the other shapes.

Along with shape, a phrase should have a clear direction and goal. This is often determined by a cadence, which normally is on a note of the tonic, dominant, or submediant or subdominant chord. A cadence on the subdominant is called a *semicadence*, which is also used to embrace half cadences. Here, we will use the term *semicadence* to designate a cadence on the subdominant exclusively, in order to distinguish it from the half cadence.

A good melody is made of scales and arpeggiated chord fragments, usually (but not always) both. Step motion indicates a scale fragment, while a leap is a fragment of a chord. Even if a melody has no leaps, it will have a harmonic background, i.e., with chords implied. The step motion always fills the gap between notes of a chord.

Last, but not least, a good melody should have variation to maintain interest. This often means changing the basic rhythm slightly, or changing the intervals or interval direction.

To summarize, the ingredients of a well-constructed melody are:

Checkpoints for Melodic Structure

1. rhythmic coherence
2. intervallic coherence
3. one or more motives
4. shape, direction, and tonal goals
5. terminations on notes of tonic, dominant, or submediant chords
5. harmonic and tonal background
6. four (sometimes two) measure phrases
7. variation

Consider another example:

The image shows a musical score for the folk tune "Hundred Pipers" in 6/8 time. The score is divided into four phrases, each consisting of two measures. The first phrase is labeled "subject" and contains three motifs: m1 (two sixteenth notes), m2 (a quarter note followed by two sixteenth notes), and m3 (a quarter note followed by a dotted quarter note). The score is numbered 1 through 16 across four staves. The first staff contains measures 1-4, the second staff contains measures 5-8, the third staff contains measures 9-12, and the fourth staff contains measures 13-16. The key signature is one flat (B-flat).

This is the "Hundred Pipers" folk tune. It divides into four phrases (a double period), numbered in the example. Notice that each phrase begins with an upbeat, or "pickup" of two sixteenth notes, rather than on the main beat. Many musical phrases begin off the main beats.

The subject that forms the basis of this tune is shown in the first two measures. The motives are marked with an "m" in brackets. The rhythm of this subject repeats throughout. Be sure to trace it for yourself.

The first phrase clearly outlines tonic and subdominant chords. It has a wave shape and cadences on G, a note of the dominant, in measure 4. The second phrase cadences on tonic. Then this pattern repeats in the third and fourth phrases. The first two phrases make a parallel period, as do the final two phrases, but the double period is contrasting since each has a different beginning.

Distinctive intervals that repeat are the sixth and the third, but most of this melody is made up of step motion, and is therefore scalar, outlining the F major scale and the F major chord (tonic).

Variation is also used in the "Hundred Pipers." The downward sixth near the start, is echoed in measure 2 with its inversion, leaping up. The rhythmic submotive $\dot{W}[Z$ is changed in the second period to $\backslash XZ$; the motive m3, a leap of a third followed by a repeated note, is sometimes changed to three repeating notes, and the initial two sixteenths pickups are sometimes replaced with a single eighth note, e.g., the last note of measure 2.

The following example is from the opera *Die Walkure*, by Richard Wagner.

The musical score shows a melody in 9/8 time, divided into four 4-measure phrases. The first phrase (measures 1-4) is marked with a fermata 'm' over measures 1-2 and ends with a cadence labeled 'III'. The second phrase (measures 5-8) ends with a cadence labeled 'V'. The third phrase (measures 9-12) ends with a cadence labeled 'i'. The fourth phrase (measures 13-16) ends with a cadence labeled 'I'. The key signature has one sharp (F#).

The singular motive is shown. Probably the most obvious thing about this melody is that it clearly outlines chords. Measures 1-2 is an A minor arpeggiation, while measures 3-6 comprise a C major chord. The melody is made up of four 4-measure phrases, with a cadence at the end of each. These are shown with Roman numerals indicating the implied chord at each cadence. Therefore, the general plan is: i ---- III , III ---- V , iv ---- i , iv ---- I.

Rhythmic and intervallic coherence is very strong and clear. The shapes of the first two phrases is each an arch. The last two are straight upward lines. Variation is primarily through transposition of the motive and the tonal changes.

Finally, we'll look at a theme from Haydn's String Quartet, op. 76, no. 3 by Franz Joseph Haydn, which later became the Austrian and German national anthem.

The musical score consists of three staves of music in F major, common time. The melody is divided into two phrases of four measures each. Roman numerals are placed below the staves to indicate the primary chords: F:I (measures 1-2), V (measures 3, 6, 9, 10, 13, 14), I (measures 4, 8, 16), and V7 (measure 15). The first phrase ends with a half-note cadence on the tonic (measure 6), and the second phrase is a repeat of the first.

The key is F major, and the tune is completely diatonic. We can notice that there is a half note pause every fourth measure, forming the cadence points. Each is on the tonic or dominant. Thus, each phrase is four measures in length, with a total of 16 measures. The second phrase is a repeat of the first.

The primary motive occurs in the second measure, which can be described as a descending line with a descending third embellishing the downward scale motion. This downward motive occurs in measures 3, 6, 7, 9, 10, 11, 13, and 14, sometimes without the embellishing third. The rhythmic aspect is L L VZ L which is repeated in measures 6, 9, and 10, and is varied somewhat in measures 3, 13, and 14. Another motive that is derived from measure 2 is L VZ N , which occurs in the cadential measures 4, 8, 16, and a variant in 12.

Although the melody is in F major, it does not outline chords as obviously as the other tunes we've examined. However, even this tune has leaps, and leaps outline chords; we identify them with the primary chords whenever possible. In measures 2 and 6 the leap of a third is part of the dominant chord, while measure 4 has a leap of a third which is part of the tonic chord. Measure 8 outlines a complete tonic chord. Measures 9 and 10 outline the dominant. Even the first measure, which has no leaps, contains the notes F and A on the strong beats, outlining tonic.

The general direction and shape of the phrases is an upward wave, but the last phrase inverts this shape to a downward wave.

By studying the structure of these melodies and others, you should be able to construct your own.

Self Test 1.2

In your anthology analyze the *Eccosaisen* no. 1 by Beethoven. Play the piece so that you know how it sounds and can remember (hear) it in your head as you are looking at the score. As you listen, mark the score with your own analysis of the formal structure, key, chords (with Roman numerals), phrase structure, cadences, and motives. Use upper case letters to indicate the largest sections, lower case to indicate periods, and numbers to indicate phrases, as above. Write a short verbal description of your analysis. Consult your *Resources* text, *Key to Formal & Motivic Analysis Symbols*.

2. Review of Small Scale Forms

The Four Bar Phrase

As previously noted, *Melodies* are lines that have a clearly defined structure. They have shape, length, and direction. Common melodic shapes include the arch, bowl, upward line, and downward line.

Melodic length is based on the four measure phrase. Most of us would agree that music is a form of communication, but it differs from speech in a number of ways. One way is in the length of statements. When we speak we do not expect sentences to be the same length; they come out in different lengths. But in music the four measure phrase is the standard length of a statement (analogous to a sentence). There are exceptions to this, of course, but surprisingly, the four measure unit is common throughout the world.

Four measure phrases are often paired in music to create a kind of dialogue that imitates speech. Commonly, the first phrase of a such a pair seems to ask a question and the second seems to answer. Thus, a conversation is created with pure tones. The following is an example of this very common structure consisting of a four bar question phrase, followed by a four bar answer. It is called a *period*. Notice that the phrases are nearly identical. Only their endings are different. This similarity of statements is called *parallel phrase structure*. Although the last phrase ends on tonic, the first phrase does not. This creates a sense of incompleteness at the end of the first phrase, i.e. a question, that is answered, or completed, by the second.

Consequently, the two linked four bar phrases add up to eight measures, forming a new unit that is commonly linked to another eight bar unit, making sixteen. Most of our traditional music is built in this manner, by linking four bar phrases. Even large symphonic works are made this way.

Form is the overall structure of music. The question-answer structure leads naturally to one of the most fundamental *forms* of music, called *binary*, or two part form, with two sections: A B. These may be symmetric (having the same length) or asymmetric (unequal lengths), but most of the time they are symmetric.

Cadence and Phrase Structure

The four bar phrase is so common in music that we have come to expect it; i.e. our minds assume that music will be organized this way. Therefore, it is not always necessary to define phrases with stops or pauses to mark their boundaries. However, this is often done, and becomes more necessary when phrases are not of the standard length. These stops or pauses are called *cadences* in music. They are formulas that act as punctuation marks, much like the period that ends a sentence.

The previous example has these cadences. Notice that the longest note in the melody is a quarter note, and it occurs at the end of the first and second phrases. This and our expectation of a four bar phrase tells us when one statement begins and another ends. Often this is shown in the

notation of music with a slur, serving as a phrase mark, as in our example above.

In music there are common ways to create the sense of phrase divisions. The most important way is through rhythm, i.e. by placing long notes at the end of a phrase. Placing the stable tones, such as tonic or notes of the tonic chord, at the end of a phrase also serves to identify cadences. We will call this type of cadence a *melodic rhythmic* cadence. It is articulated by a single line.

Since essentially all of our music is now polyphonic, melodic rhythmic cadences are linked with harmonic formulae. This takes the form of one or two chords at the cadence point. The most important harmonic cadence is called the *authentic cadence*, V to I. This cadence is analogous to a period punctuating the end of a sentence and is the most frequent cadence in music. There are two types of authentic cadences, called *perfect* and *imperfect*. The perfect cadence ends with the root of the tonic doubled in the soprano and both chords in root position. If either of these conditions does not exist, the cadence is imperfect. The perfect authentic is the most final of the cadence types and is nearly always found as the final cadence. (In the following examples a 6 next to a Roman number means the chord is in first inversion, and j means it is in second inversion.)

Other harmonic cadence formulae are the *half*, *deceptive*, and *plagal*. The half cadence is a pause on the dominant chord. The deceptive cadence moves from dominant to submediant (V vi). It is called "deceptive" because we expect tonic to follow dominant. The plagal cadence moves from subdominant to tonic. It is a soft cadence, used mostly for variety. The plagal cadence can be perfect or imperfect, just as the authentic.

Cadences can occur on any beat, but are found mostly on strong beats. Half cadences are commonly found on weak beats, because the pause on the dominant implies movement forward, rather than the stasis that is found on strong beats.

Short Forms

Short forms are those that are used to create small works of music, rather than those of symphonic length. Over ninety percent of the world's music falls into this category. Thus, these forms, even though simple, are very important.

The simplest and most common form is called *strophic*. This is a vocal form where a melody is repeated any number of times while the verse changes with each repeat. It may be diagrammed:

A1 A2 A3 A4 A5..... etc.

Each repetition has its own verse. Most folk songs fall into this category, as do many other musical types.

Binary is also a short form. Often, but not always, the binary sections are repeated and contain a tonal scheme.

$$\begin{array}{c} \text{---}1\text{---} \quad \text{---}2\text{---} \\ \text{||:} \quad \text{A} \quad \text{:||} \quad \text{---}3\text{---} \quad \text{---}4\text{---} \\ \text{I} \quad \quad \text{V} \quad \quad \quad \text{B} \quad \quad \quad \text{I} \quad \quad \quad \text{:||} \end{array}$$

Or, if in minor:

$$\begin{array}{c} \text{---}1\text{---} \quad \text{---}2\text{---} \\ \text{||:} \quad \text{A} \quad \text{:||} \quad \text{---}3\text{---} \quad \text{---}4\text{---} \\ \text{i} \quad \quad \text{III} \quad \quad \quad \text{B} \quad \quad \quad \text{i} \quad \quad \quad \text{:||} \end{array}$$

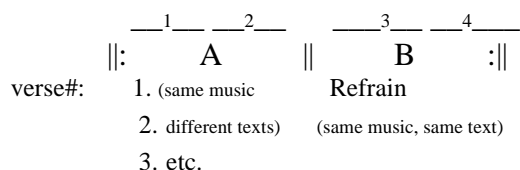
The numbers 1-4 represent phrases (or sections). Thus, a short, symmetric binary piece of, say, sixteen measures, would have an A section of eight measures and a B section of the same length. Each of these sections would have two four-measure phrases, probably of a question-answer

structure. The A section would move from the tonic to the dominant, if major, or to the mediant (relative major) if in minor. The B section returns to the tonic, usually in its second half. This is the classical *simple binary*. In short pieces sometimes the tonal changes do not occur, presumably due to a lack of time.

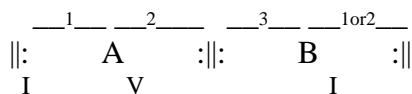
Many short pieces, especially dances, have this structure. Consult the anthology for examples; e.g., the *Gigue a l'Angloise* by Telemann, the *Six German Dances* by Beethoven, and the *German Dance* by Schubert. The Brahms *Waltzes* also use this form with small departures from the standard pattern.

The movement to the dominant at the end of the first section sometimes involves a *modulation*, i.e. a change of key. A sign of this is the use of accidentals, especially near the cadence at the end of section A. This happens, for instance, in the *Gigue a l'Angloise* by Telemann. Notice the C<s, which is the leading tone pointer to the key of D, where it modulates at the end of A. In B, however, there are no C<s, and it cadences back in the home key of G.

In vocal music there is an important mix of strophic and binary in the *verse-refrain* form. This is one of the most common vocal forms, called *strophic binary*.

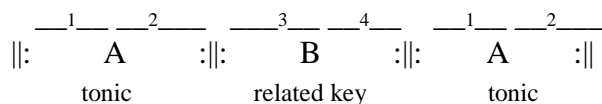


An important variant of the simple binary is the *rounded binary*. In this form the difference lies in the second half of the second section. Here, a part of the first section is restated. This may be the first or second phrase or a combination of both, although phrase 2 is the usual repetition.



An excellent example of this is the theme from Mozart's *Piano Sonata* in D Major, K.284 in the anthology¹. Notice that in the rounded binary the sections are not independent, but are linked due to the tonal scheme; i.e. the cadence at the end of A on the dominant implies motion forward.

The only remaining short form is *ternary*. It is a three part form: A B A, where the A section repeats at the end. The classical ternary carries some additional characteristics. Often each section is repeated (not obligatory), and the tonal scheme implies sectional independence. The A section is in the tonic key, and B is in some related, but contrasting key. Each section begins and ends in its own key.



All conventional marches, minuets, and scherzi are in this form. Many songs and other dances

¹The rounded binary is the embryonic prototype of *sonata form*, a long form and a subject for later study.

also use it. A good example is the Scherzo movement from Beethoven's Piano Sonata, op. 28 in the anthology.

Students often confuse the ternary with rounded binary. The difference lies primarily in the tonal scheme. The first section of a rounded binary ends away from the tonic, usually on the dominant or relative major. The first section of ternary ends on tonic. Thus, the rounded binary sounds incomplete without the second section, whereas each section of ternary sounds complete in itself (each section normally ends on the same chord). The rounded binary is a more organic form, therefore, because the sections are dependent.

The second difference has to do with the way the sections are balanced in length. The returning section (ritornello) of ternary is normally the same length as its initial statement. The ritornello of the rounded binary is usually half the length of the second section.

Self Test 2.1

Identify:

1. A pair of question-answer phrases: _____
2. The overall structure of music: _____
3. The cadence V I _____
4. The cadence V vi _____
5. A cadence on the dominant _____
6. Form with a repeating tune that changes verses _____
7. Two part form with a repeat of part of A at the end of B _____
8. Three part form, A B A _____
9. Binary normally cadences on the _____ at the end of A.
10. Concerning the Beethoven *Eccosaisen* in Chapter 1:
 - a. What is its form? _____
 - b. Is the form symmetric or asymmetric? _____
 - c. How many four bar phrases does it have in total? _____
 - d. Which measures do not contain the motive? _____

3. Large Scale Forms & Genre

Form may be defined as the overall structure. Forms, on the other hand, are pre-existing plans that are used to compose new music, like “pouring new wine into old bottles.” Small scale forms are used in music to make short pieces, usually five or less minutes in length. Compositions that are longer than this generally require more “glue”. This is the purpose of a large-scale form. Large scale forms are more complex than the short forms. There are only three common large scale forms: the rondo, the theme and variations, and the sonata.

Rondo

The rondo is really an extended ternary form. It begins exactly like a ternary A B A, but then continues in this fashion:

A B A C A D A B A

The principle of the rondo consists of the repetition of the A section alternating with new sections. Many last movements of sonatas use this form. A good example is the third and last movement of the “Pathétique” sonata of Beethoven, op. 13 (1798), in your *Anthology*. Other examples are the last movement of Haydn’s Symphony No. 101, and the last movement of Mozart’s Piano Sonata in B= Major, K. 333.

Theme and Variations

The Theme and Variations (T&V) is an instrumental version of the strophic form. Its structure may be diagrammed as follows:

A, A1, A2, A3, A4, A

Each of the numbers represents a variation of Theme A. In the Classical T&V, the theme is usually constructed in four-measure phrases and is often sixteen measures in length, a double-period. This theme is normally in rounded binary form. T&V are also often used in the last movements of sonatas. A good example of this is the theme of the third and last movement, of Mozart’s Piano Sonata, K.284, in your anthology. The form there consists of a rounded binary, 8+8, with a half cadence at the end of the first part. (The theme here has 17 measures because of the insertion of a measure of rest between the two phrases of the second half.) Each variation then has the same length and tonal structure, and is often marked so by the composer. There are hundred of examples of T&V in music literature. A few instances are: most titles that contain the word “Variations”, the last movement of most of Beethoven’s late sonatas and the Symphony

No. 9, and most cantus firmus compositions.

There are some special types of T&V that have the theme in the bass, called ground bass variations. The most important of these are the passacaglia and chaconne. The passacaglia begins with the bass theme, often as a solo, and repeats the theme in the bass. However, it may eventually rise into the other voices and descend again to the bass to finish. The passacaglia has some other obligatory features. It is always in triple meter, in a minor key, and has a slow tempo. It is often found in laments, e.g., the lament from Henry Purcell’s opera *Dido and Aeneas* in the *Anthology of Musical Structures*. Perhaps the most famous example is Bach’s *Passacaglia and Fugue in C minor*, for organ.

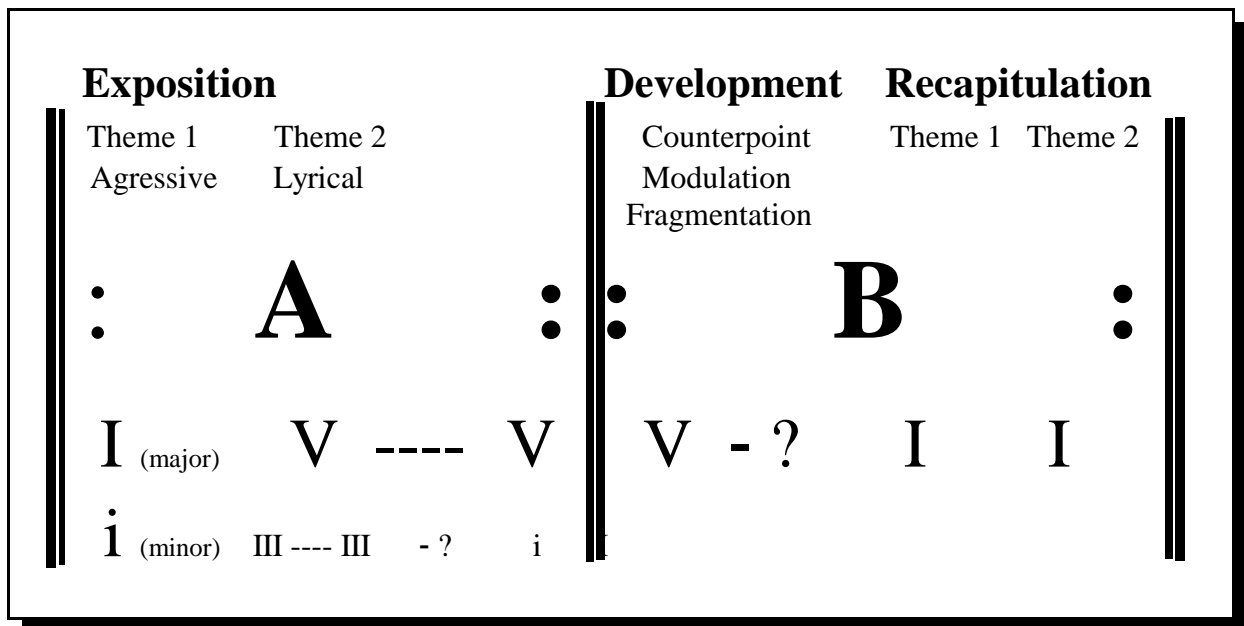
The primary distinction between the passacaglia and the chaconne is that in the chaconne the theme is believed to be a harmonic progression. But, since it is difficult to separate the bass from the harmony, some authorities believe that there is no clear distinction. A good example is Bach’s *Chaconne* from the *Partita No. 2 in D minor for Violin Solo*, in the *Anthology*. Another is the last movement of Brahms *Symphony No. 4*.

Ground bass compositions that, for one reason or another, are not passacaglias or chaconnes are simply called ground bass variations. Bach’s *Goldberg Variations* is a good example.

Sonata

The sonata is undoubtedly the most important large form in music. However, the term is often confused because of its multiple meanings. The etymology literally means “sound piece”, as opposed to the “cantata”, which is a “sung piece”. Thus, the sonata is an instrumental, as opposed to a vocal composition. In this sense, it is a *genre*, not a form, which will be discussed shortly.

There are two other meanings for the word “sonata”. The first is an abbreviation for “sonata form”, also called “sonata-allegro form”, or “first movement form”. The sonata form is an elaborate rounded binary, from which it evolved. It consists of two large sections, the first of which is called the *Exposition*.



The Exposition introduces two themes of contrasting character, the first aggressive and the second lyrical. The first is stated in the home key, while the second is stated in the dominant key (or, if the first key is minor, the second is in the relative major). The Exposition often ends with a closing idea, or codetta in the dominant key. The Exposition is analogous to the introduction of two protagonists in a novel, male and female.

The first half of the second section is called the Development. This is where “the plot thickens”. The two themes are played in counterpoint, modulating rapidly, and are typically fragmented. Our two characters are engaged in an adventure. Although there is modulation away from the home keys in the Development, there is normally a return to the dominant at the end of the this section.

Finally, the last part of the second section is called the Recapitulation. Here, the two themes are restated, but now both are in the tonic key (In the case of minor they are parallel keys).

Normally, both sections are repeated, but in the Romantic period this practice waned. In fact, in many of Beethoven’s sonatas and symphonies, there is no repetition of the second section. Instead, he writes out a new second section, which is a variant of the first B. This also may happen with the first (A) section.

The other meaning for the term “sonata” comes from the Classical (eighteenth century) practice. It is a three or four movement instrumental work whose first movement is in sonata form, and the other movements may also be in sonata form. This is the meaning that is embraced in works titled “Sonata”. The movements follow a definite plan. The first is fast in the home key, the second is slow, in a related key, and the last (in the three movement sonata) is very fast and back in the home key. Often all three movements are in sonata form.

In the four-movement sonata, another movement is inserted between the second and third of the three movement scheme. Thus, the third movement becomes the fourth. The new third movement is a stately court dance in triple meter, called a Minuet. It is back in the home key and is always in ternary form and a moderate tempo. From the time of Beethoven on, the Scherzo is often substituted for the Minuet. The only difference is that the character of the Scherzo is lighter and faster. Otherwise, it has the same attributes as the Minuet: ternary form, home key, and triple meter.

The four-movement sonata

I. Fast	II. Slow	III. Moderate	IV. Very fast
Home key (I)	Related key	Home key	Home key
Sonata form	Sonata form or Other form	Ternary Form Minuet or Scherzo	Sonata form, Rondo, or Theme and Variations

The sonata is immensely important in the literature of Western music. More large works use this form than any other. There are an enormous number of works that are titled “Sonata”. Beethoven wrote thirty-two for the piano alone. In addition, he wrote many other sonatas for violin, cello, and other instruments. A “sonata” for a monophonic instrument, like the violin, is normally

accompanied by a piano.

In addition to the obvious works, titled sonatas, there is an enormous body of instrumental music, called “chamber music”. Nearly all these works, trios, duets, quartets, etc., are sonatas. Additionally, all symphonies are sonatas for an orchestra. Solo concerti are sonatas for a featured solo instrument with an orchestra. This encompasses the majority of the body of notated large instrumental compositions.

Genre

Genre is a classification of music into types based on some one or a combination of the following:

1. Forms (just discussed)
2. Medium. The instrument/s and/or voices for which the music is written
3. Idiom. Special formulae that are used to explore the possibilities of the medium
4. Function. An extra-musical purpose that the music serves

A *symphony* is a sonata for orchestra, a genre that uses the sonata form and the medium of an orchestra. An *opera* is a play set to music that includes singing of the parts, action, staging, orchestra, singers, and costumes. It serves a dramatic function. An *etude* is an exercise that is intended to development a skill on an instrument. The following is a list of some important genres and the periods in which they flourished:

ballet. Stylized dance/s that mimes a story, set to music with an orchestra (Classical-Modern)
cantata. A “sung piece”. The Baroque cantata is the prototype. A miniature oratorio having a more allegorical character, usually on a sacred topic, for singers and an orchestra.
concerto. A sonata for a featured solo instrument and an orchestra (Baroque-Modern)
dance (Scherzi, minuets, polonaises, waltzes, marches, etc). Music that is to be danced or is in the style of a dance.
dirge. Music for a funeral or death
mass. Setting of the Roman Catholic church service (Medieval-Renaissance)
motet. A “piece with words”, usually, a sacred, *a capella* composition that uses imitative counterpoint (Renaissance)
nocturne. A night piece, to be played, heard at night, or is about the night (Romantic)
opera. a play set to music that includes singing of the parts, action, staging, orchestra, singers, and costumes (Baroque-Romantic)
oratorio. A sacred “opera” without action (Baroque)
overture. Introduction to a work, usually a dramatic work, and normally for orchestra (Baroque-Romantic)
prelude. An instrumental piece having an introductory or informal character
song. A vocal piece
string quartet. A sonata for two violins, viola, and cello (Classical-Romantic)
suite. A set of dances (Renaissance-Romantic)
symphony. A sonata for orchestra (Classical-Romantic)
toccata. Literally “touch piece”; a virtuoso keyboard piece, intended to show off the ability of a performer (Baroque)

tone poem. A programmatic, narrative work for orchestra, without words (Romantic)

4. Nondominant Seventh Chords & Secondary Dominants

Nondominant Seventh Chords

The dominant seventh chord is the only major-minor seventh chord in a key. Therefore, it is recognizable outside of a key context. All other diatonic seventh chords are minor sevenths,

Diatonic seventh chords in major keys with their symbols

	CM7	Dm7	Em7	Fm7	G7	Am7	B \flat 7
C:	I7	ii7	iii7	IV7	V7	vi7	vii \flat 7

Diatonic seventh chords in minor keys with their symbols

	Cm7	D \flat 7	E \flat M7	Fm7	G7	A \flat M7	B \flat 7
c:	i7	ii \flat 7	III7	iv7	V7	VI7	vii \flat 7

diminished sevenths, half-diminished sevenths, or major sevenths. All of these resolve as the dominant seventh, with the seventh moving down by step. Let us consider the most common harmonic resolutions of these seventh chords.

Part-writing the resolution of the common types of seventh chords

1. Dominant seventh 2. minor seventh 3. Major seventh 4. half-dim.7th 5. dim.7th

	G7	C	Dm7	G	Fm7	G7	C	B \flat 7	C	B \flat 7	C
C:	V7	I	ii7	V	IV7	V7	I	vii \flat 7	I	vii \flat 7	I

The supertonic seventh most often moves to dominant and is frequently found before an authentic cadence. The *iii7* is most often followed by *vi* or *IV*. *IV7* is most frequently followed by *V*, but when the major seventh moves up, the supertonic is a logical goal; *vi7* is commonly followed by *ii*. The only common resolution for *vii^{o7}* is to *I*. These may be summarized as follows for both major and minor keys:

<i>ii7</i>	L	<i>V</i>
<i>iii7</i>	L	<i>vi</i> or <i>IV</i>
<i>IV7</i>	L	<i>V</i> or <i>ii</i>
<i>vi7</i>	L	<i>ii</i> or <i>IV</i>
<i>vii^{o7}</i>	L	<i>I</i>
<i>I7</i>	L	<i>IV</i>

The following is an example of the use of these chords in a sequence. Be sure to study and play this for yourself. What is the nonharmonic tone in the last measure? Note the *I7*, a major seventh chord. How does its seventh resolve? How does this compare with the *IV7* chord resolution?

C: I7 ii₆ I_{4/3} ii₆ iii₆ IV₆ ii₆ V7 iii7 IV7 ii_{3/4}
 a: iv_{3/4} Vb9 I

The diminished seventh chord has a strong tendency to resolve in a specific way, because it contains three dissonant intervals, two diminished fifths and the diminished seventh. These normally resolve by contraction.

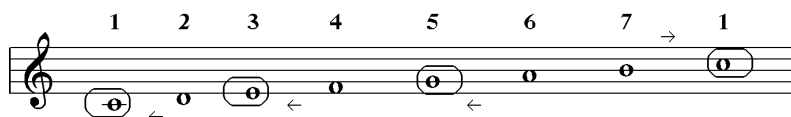
Examples of the four most common seventh chords

1. dominant seventh
2. minor seventh
3. half-diminished seventh
4. diminished seventh

C: V7 V7 I ii7 ii7 V vii^{o7} vii^{o6/5} I6 vii^{o7} vii^{o7} I

Tendency Tones & Chromatic Nonharmonic Tones

Scales and keys contain pcs that are both stable and unstable. The stable tones are degrees 1, 3, and 5 in major and minor keys. The other tones have degrees of instability and are called tendency tones. The most unstable tone is the leading tone, which has a very strong tendency to move up to tonic. Degrees 2, 4, 6 and 7 have the following tendencies:



That degree 4 "wants" to move to 3 is seen in the example of the dominant seventh chord, where the seventh of the chord is degree 4, and its proper resolution is down to degree 3.

Although these tones have these tendencies, only in special circumstances *must* they move in the direction of their tendency. Such is the case in an authentic cadence with the leading tone in the soprano, when it must move up. In most cases the notes can and do move in many different ways. However, it is best to know their natural tendencies.

Chromatic notes will now be additionally defined to mean any notes that are outside of the key. Only one type of chord has been introduced so far which has chromatic notes, the secondary dominant. Chromatic notes, however, are very common in our traditional music, and they may not occur as parts of secondary dominants. Chromatic notes are usually (but not always) notes with accidentals, or, more generally, notes that are raised or lowered from their normal, diatonic position. These notes have a strong tendency to move in a specific direction. Raised chromatic notes move up, while lowered ones move down. Exceptions to this are rare. The two most common chromatically altered notes in a scale are the raised fourth (which moves to 5) and the lowered seventh (which moves to 6).

One way that chromaticism is used is through nonharmonic notes, such as passing tones, neighbors, suspensions, etc. A chromatic passing tone may occur between two chord tones. The simplest example of this is achieved in altering a chord tone, moving it up or down chromatically, usually by a semitone, as in example 1 below.

A musical score for piano showing six measures of music. Measure 1: p. Measure 2: p. Measure 3: p. Measure 4: p. Measure 5: app. Measure 6: n.

The first chord is IV (in C major) which moves to V on the third beat. By moving from F to F< in the soprano, the line moves chromatically. The F< is a chromatic passing tone.

However, the chromatic note does not have to be preceded by its diatonic partner. It may proceed as in example 2, where the F< comes from a E and moves to G. It is still a passing tone, and as all passing tones, it must move by step motion. The only difference between example 1 and 2 is that the first moves by half steps, where the latter moves by both half and whole steps. Play all these examples at a keyboard.

Example 3 is similar to example 1, and example 4 is similar to example 2, except that they show downward motion. Example 5 is a chromatic appoggiatura, i.e., a nonharmonic tone approached by leap and resolved by step in the opposite direction. Finally, example 6 is a chromatic neighbor note. Virtually any type of nonharmonic tone can be chromatic instead of diatonic.

Self Test

A. Identify the tendency of each circled note with an arrow for direction and the note of resolution. Assume all are in C major.

example: \uparrow C 1 2 3 4 5

B. Identify the nonharmonic notes circled with their abbreviations:

6 7 8 9 10

Secondary Dominants and Leading Tone Chords

Chromatic chords are those that have notes that are not in the key. Thus, secondary-dominants are good examples of these chords. A secondary-dominant normally resolves (moves) to the chord of which it is the dominant; E.g., V7/IV normally resolves to IV. However, the chord may occasionally resolve to a chord substitute; E.g., V7/IV may go to ii, since ii substitutes for IV. The note having the accidental is either the leading-tone of the chord to which it resolves, or it is the seventh that resolves down by step. If the accidental is a sharp, or raised, it is a leading-tone function, but if it is a flat, or lowered, it is a seventh that wants downward step resolution. Play the following at a keyboard.

1

C: I V7/vi IV7 V⁶/V I⁶₄ V7 I

2

C: I V⁴₃ I V⁶/ii ii vii⁹/iii iii IV I⁶₄ V7 I

A secondary V or V7 is a dominant of some chord other than tonic in the key, e.g., the dominant of the submediant, symbolized V/vi, or dominant-7th of the dominant, symbolized V7/V. These chords always contain notes that are chromatic to the key and are called chromatic chords. *Never double chromatic notes or sevenths of the chord.*

A secondary-leading-tone chord is a chord based on the leading-tone of a diatonic degree other than tonic. These chords are normally diminished, e.g., vii° of ii, written vii°/ii, or vii°7/V, etc.

C1 vii[°]/ii ii vii[°]/iii iii vii[°]₅/vi I V7 I

Diminished-seventh chords are chromatic to major keys. Like secondary-dominants, they always contain a note with an accidental in the key.

5. Borrowed Chords & Other Chromatic Chords

Harmonic Progression, Retrogressions & Voice Leading

Now that the rules of harmonic progression and voice leading are familiar, certain special freedoms will be allowed that were previously forbidden. However, the student should understand that these freedoms do not mean that "anything goes."

Harmonic progressions, by definition, establish or strengthen a key. These have been defined by root movements. The student should now be familiar with root movements that strengthen or weaken a key. The latter are called retrogressions. Retrogressions are not "bad" in themselves if they are used for a purpose. They are normally applied sparingly.

Music that reasserts a key over and over can become tedious. Always moving in progressions can make the key sound hard and the music sound predictable. Retrogressions can add variety and soften the effect of a key. They can add suspense and surprise to compositions, and these are desirable characteristics. Extended retrogressions can even suspend the key indefinitely, but these should not be used as yet. As we will see later, such extended retrogressions are usually used with some logical foundation, such as in a harmonic sequence. Suspense and surprise are desirable in music, but if everything becomes a "surprise," then nothing is a surprise. So the following should be used with discretion and with reason, and the student should give the reason for each usage. "I like it" or "It sounds good" are insufficient, yet necessary, reasons for such usage. These need not be stated, but are assumed.

Retrogressions include root movements up by thirds, down by fourths, and such chord changes as V to IV. These will now be permitted if used sparingly and *marked with an R* between chord symbols. The mediant has also been used only in a very restricted way so far. These restrictions are now lifted with the same conditions. Additionally, it is important to test the use of retrogressions through listening. Generally, if the motion doesn't sound **convincing**, or doesn't **make sense** the first time around, it shouldn't be used. The instructor must be the final judge of correctness, and this judgement may be based primarily upon experience rather than upon rules. Most often retrogressions sound okay if there is some logical basis for their use. Play the following.

C: I iii V ii IV V I c: i III V ii^o i⁶₄ V⁷ i

 ↑³ ↑³ ↓⁴ ↑³ ↑² ↑⁴ ↑³ ↑³ ↓⁴ ↓² ↓⁴ ↑⁴

 R R R

The retrogressions are marked and are used here to soften the effect of the key and provide variety from the usual, expected progressions. As such, they are especially useful when modulating.

Voice leading has also been confined to the most ordinary types up until now. The perfect fourth was considered a limit of leaps in the upper three voices. Larger leaps will now be permitted, but must be used infrequently, and such large leaps must be labeled, and a reason for doing so should be provided. The limit in any voice, however, will be an octave. No leaps larger than an octave will be permitted. Unusually large leaps must be notated with an arrow in the direction and voice having the leap with its size indicated. A note should accompany the leap indicating its reason or purpose. These leaps are more common in instrumental music than in vocal music.

Large leaps are often dramatic elements in music, used to highlight a voice or melodic idea. Sometimes they are used to illustrate a dramatic idea in an accompanying text. These add surprise and variety to melodic lines; thus, they can be a positive attribute. Lines that always move by step or repeat, however, can become lifeless and boring. Leaps (not necessarily large ones) add spice and interest to melodic voice lines and should be used for this purpose. Good lines will have a balance of step motion and leaps (step motion still prevails), with large leaps being rare. Large leaps of a fifth are the most common, and sixths are less common. Seventh leaps are rare. Octaves, on the other hand, occur about as often as sixths (except in the bass, where they are fairly common).

An exception to the rarity of large leaps occurs in instrumental music when a repeating motive is built around a large leap. In such a case, large leaps may be quite common in the composition, but this is due to a structural purpose.

Overlapping voices can now be used, if infrequent. They should occur mainly between phrases, if at all, and marked.

Tritones should still be avoided melodically, although they are occasionally used as part of a melodic motive, as in the "Maria" motive from *West Side Story*. If they are ever used as a diminished fifth, the interval should contract to an implied third. If they occur as an augmented fourth, they should expand to an implied perfect fifth. If you wish to use these, consult with your instructor first.

Borrowed Chords & Modal Mixture

Borrowed chords are chromatic chords that are taken from the *parallel* major or minor key. The simplest and probably the first borrowed chord was the major tonic occurring in a minor key cadence, otherwise known as the picardy third. This is the major tonic substituted for the minor tonic at a cadence in a minor key.

It turns out that any chord may be borrowed from the parallel key, and sometimes this borrowing leads to a modulation. To use borrowed chords in a natural and logical way, simply follow the principles of logical part writing and voice leading. Identify borrowed chords by enclosing their symbols in parentheses.

Borrowed Chords

Example 1: Musical notation showing borrowed chords in C major and F major. The notation includes treble and bass clefs, a common time signature, and various chord symbols. The chord symbols are: C: I (bVI) IV ii I F: V (bVII) I (iv₄) I.

Notice that when the root of the chord is chromatically altered a flat or sharp is placed before the Roman number. Borrowed chords can also be seventh chords. Play the following examples.

Example 2: Musical notation showing borrowed chords in c minor, C major, and C minor. The notation includes treble and bass clefs, a common time signature, and various chord symbols. The chord symbols are: c: i III (IV) V i C: I (bVI7)(iv) I C: I (iv) (ii^o) I.

In example 2 there is a =VI7 chord that is borrowed from the parallel minor key. This is a major seventh chord, but the seventh (G) moves up rather than its normal resolution, down by step. Major seventh chords sometimes resolve this way, but it is the only seventh chord that may have this type of resolution. Study these examples carefully.

The use of borrowed chords results in what is often called *modal mixture*. It is easy to see the reason for this, since it appears that parallel keys are being used simultaneously, which is actually the case. For this reason the rule against doubling “chromatic notes” does not apply to borrowed chords. However, there is usually one key that serves as the focus, beginning and ending in that key. On the other hand, borrowed chords can serve as points of modulation into the parallel key, or into a more remote key, using the borrowed chord as a pivot. This will be taken up later in the chapter on chromatic modulation.

Chromatic Chords in Minor Keys

Up until now we have considered the most common chords in a minor key. Most of these conform to the harmonic minor scale, which is taken as the normative form for minor harmony. The exception is the mediant, which is considered normal in its major form. However, other chords are possible in minor, due to the three different types of minor. The following chart shows

the different forms that the triads can have. Study this chart carefully to be sure that you understand how each chord is formed and its corresponding symbol. Note especially the chords which are common and which are rare. Most of the ones formed by the harmonic minor are common, the exception being the augmented mediant. Those that are rare are formed primarily from the melodic minor (the exception is the major mediant, which is common) and should only be used in special situations that justify their usage. Justification normally comes from melodic considerations that influence the formation of the harmony. In fact, these rare forms can usually be accounted for in ways that are really not harmonic, coming from the use of nonharmonic tones, which is why they are almost never labeled as chords. Note also that some of the chords are labeled as borrowed from the parallel major key.

	rare	
harmonic		
	<i>symbol:</i> i ii° III+ iv V VI vii°	
	borrowed from parallel major; usually followed by V	borrowed from parallel major; usually followed by V
ascending melodic		rare
same as harmonic except:	<i>symbol:</i> (ii) (IV) #vi° or vii°/bVII	
	very common usually preceded by I, sometimes by VI or VII	rare usually preceded by i or III, and followed by iv or VI
descending melodic & natural		
same as harmonic except:	<i>symbol:</i> III v♭ bVII or V/III	

Seventh chords can also take on many different forms in minor keys. These are shown below, with asterisks on the common ones.

*	*	*	*	?	*	*	?	*
<i>symbol:</i> i7 i#7 ii°7(ii7) III7 III7 [♯] iv7 V7/bVII v7 V7 VI7 [↑] bVII7 bVII#7 ii°7 [↑] (vii°7)		<i>borrowed</i>				<i>vii°7/bVII</i>		<i>borrowed</i>

Notice that all the common forms are from the harmonic minor, except for the mediant-seventh. The others are rare and normally come from melodic motion. The chords marked with question marks are actually secondary dominant types that can be formed by melodic motion in minor.

Augmented Chords

Augmented chords rarely occur in our traditional music until the end of the nineteenth century. Even then they are still uncommon, except in special works that begin to explore their harmonic potential, e.g., Liszt's *Faust Symphony*. Often what appears to be an augmented chord is the result of chromatic voice leading, i.e., with chromatic passing, neighbor, appoggiaturas, etc. These occurrences are not truly augmented chords, since they don't occur independently as sustained harmonies.

The augmented chord is a natural occurrence in the whole tone scale. In fact, *all* the chords built diatonically in the whole tone scale are augmented. Thus, we find them commonly in music which uses this scale, e.g., the impressionist music of Debussy and Ravel at the turn of the 19th to 20th centuries. This use will not be considered here since it falls into a different category, called "color chords".

When the augmented chord is rarely found as a truly functional harmony, its resolution is determined by the dissonant augmented fifth. Augmented intervals normally expand; thus, in the augmented chord the raised note forming the augmented fifth resolves by moving up to the next chord tone. In the key of C major, for instance, G B D[<] would commonly resolve to tonic with the D[<] moving up to E. Notice that G B D[<] is an "altered" dominant chord, having an "enhanced" dominant function. Identify augmented chords with a plus sign next to the chord symbol.

Augmented chords

C: I I₆⁺ IV IV₆ I₄⁶ V⁺ I

When augmented chords are used, they serve as focal points of the musical structure. Examples of this are found in the *Faust Symphony* and *Nuages gris* of Liszt as well as in the late works of Scriabin and Debussy.

Chromatic Mediants

Chromatic mediants are major or minor chords whose roots are a third above or below a diatonic chord. These chords are usually a pair of the same quality: major--major or minor--minor, but may switch quality, as in the last example below. Be sure to play these.

The musical notation consists of three staves. The top staff shows chord symbols with arrows indicating root movement by a third: $\uparrow 3$ and $\downarrow 3$. The middle staff shows the chords in a grand staff. The bottom staff shows the chord symbols: C: I III I VI d:i iii i vi C: I \flat vi I \flat iii.

Notice that these are not borrowed chords, but chords that are related by root movement in thirds. Of course they may also be used as pivots to modulate into remote keys. Chromatic mediants are most often found in late Romantic music (Wager, Liszt, Mussorgsky) and in twentieth century music (Hovhaness, Britten).

6. Altered Subdominants

Neapolitan Chords

Most other chromatic chords not thus far described are altered subdominant functions, i.e., they serve to prepare the dominant. Most often these are altered supertonics, and are most often derived from minor keys (although they can occur in the parallel major as well).

The supertonic in C minor is D F A=. It normally moves to the dominant or tonic six-four chord. By altering the chord slightly it becomes D= F A=, a D= major chord in the key of C (C minor or major)! This chord has a strong subdominant function, and is, therefore, found mostly in first inversion (with F in the bass in C major). It normally moves to the dominant or tonic six-four. The A= moves down to G, and the D= moves down to B, or to C of the tonic six-four. The remaining F is doubled in four parts, and both Fs move to D (or E in tonic six-four) and G. This chord is called the Neapolitan, after its frequent usage in eighteenth century Neapolitan (Italian) opera. It served quite a dramatic function at that time. Since it occurs normally in first inversion, it is often called the Neapolitan sixth chord and is identified with the symbol N6, or simply N if in root position. (Another symbol that is sometimes used is =II.)

Neapolitan chord

The musical notation shows a progression of chords in C major. The chords are: I (C4-E4-G4), vi (A3-C4-E4), IV (F3-A3-C4), N6 (D3-F3-A3), I₆₄ (C4-E4-G4), V₇ (D3-F3-A3), and I (C4-E4-G4). The N6 chord is shown in first inversion with F3 in the bass. The I₆₄ chord is shown in first inversion with C4 in the bass. The V₇ chord is shown in seventh inversion with D3 in the bass. The final I chord is in root position with C4 in the bass.

Augmented Sixth Chords

Augmented sixth chords are also altered subdominants and supertonics serving to enhance motion to the dominant. They were again first used in dramatic music of the seventeen and eighteenth centuries and probably evolved from chromatic voice leading to the dominant.

There are three types of augmented sixth chords, called the Italian, French, and German Sixths. The simplest is the Italian Sixth. It is formed from the subdominant, most naturally in the minor key, in first inversion. For example, in c minor, the subdominant is F A= C, and in first inversion it is A= C F. The motion of this chord is usually to the dominant G B D G. Consider the introduction of a chromatic passing tone on the F, moving to F<, then to G. This enhances the motion to the dominant. If the F< is used without the F>, a new chord is formed, the Italian sixth. This chord has a peculiar spelling in thirds, F< A= C, an altered triad. This triad has no diatonic root in the key! As such, it has been the subject of debate. How do we designate such a chord? What Roman number does it have? Various solutions have been suggested, but none has

universal agreement: $\langle iv^\circ=3, =VI^{a6}, It^{+6}, etc.$ We will use the above-staff symbol: (bass-note of $a6$)+6/It and the below-staff symbol: It+6. Note that the bass-note of the $a6$ is the note that would form the interval even if it is not in the bass. The Italian sixth is enharmonically equivalent to an incomplete dominant seventh chord, and as such it may be used to modulate to foreign keys.

Augmented sixth chords are almost always built with the minor sixth degree of the scale in the bass. The remainders are usually built on the minor second degree as the bass. The pop-chart symbol for the Italian sixth shown below is $F\langle^\circ=3/A=$.

Italian Sixth example Ab+6/It

C: I vi IV It+6 I_{6/4} V7 I

German Sixth example Ab+6/Ger

C: I vi IV Ger+6 I_{6/4} V7 I

In part writing all the augmented sixth chords, the most important thing is to resolve the dissonant interval of the augmented sixth by expansion to the octave, normally on the dominant. Thus, in C major, $A= F\langle$ resolves to the octave G G. The other voices normally move to the closest notes of the dominant chord or the tonic six-four. Never double the chromatic notes. The Italian Sixth doubles the fifth.

The German Sixth is the same as the Italian with the addition of one note, which appears to spell a seventh, e.g., from the previous example, $F\langle A= C E=$. Notice the chord name symbol above the staff. However, it is a very peculiar seventh chord -- in fact it is not a seventh chord at all, but an augmented sixth chord. Again, it usually occurs in first inversion, as $A= C E= F\#$, and it resolves in the same way as the Italian Sixth, normally to the dominant, or tonic six-four. When it goes to the dominant, sometimes the part writing results in parallel fifths. These are acceptable only if they do not occur between the soprano and bass or the tenor and bass.

The German Sixth has the special property of being enharmonically equivalent to a dominant seventh chord. As such, it can be used as a powerful modulatory chord. Its above-staff symbol is: (bass-note of $a6$)+6/Ger. Below the staff it is Ger+6. (See examples.) This use will be shown under the chapter on Chromatic Modulation. (The pop-chart symbol is the same as the enharmonic dominant-seventh; e.g., the one above would be $A=7$.)

The French Sixth is the most dissonant augmented sixth chord. It is like an Italian Sixth

Eb+6/Ger Gb+6/Ger

g: i iv Ger+6 V7 i Bb: I IV6 Ger+6 V7 I

with an additional note, the supertonic. In C major or minor it can be spelled tertially as D F< A= C, but, like the other augmented sixth chords, it normally occurs with the flat sixth degree in the bass: A= C D F<. It resolves in a similar manner to the other augmented sixth chords. Identify the French Sixth with (bass-note of a6)+6/Fr above the staff Fr+6 below the staff. The pop-chart symbol is D7-5/A= for the following example.

French Sixth example Ab+6/Fr

C: I vi IV Fr+6 I₄⁶ V7 I

7. Sequences

Harmonic Sequence

Any pattern of root progression can be used to modulate to a remote key, or simply to create the effect of modulatory variation. For example, roots may be moved constantly downward in thirds, mixing major and minor, without regard for the prevailing key. Another sequence can be made by repeating root movements down by fourths and up by seconds. Such a pattern sounds like a series of modulations.

This pattern of repeating root movements creates a suspension of the tonality, where the key is lost, either temporarily or permanently. As long as the harmonic sequence continues, it makes no sense to call a key. This leads to the interesting question: are harmonic sequences examples of atonality?

Harmonic sequences should be identified and analyzed with chord names, rather than Roman numerals, and with the root progressions as shown.

Harmonic sequence, identified and analyzed with chord NAMES and root movements

	C	G	A	E	F#	C#	E♭	B♭	C
--	---	---	---	---	----	----	----	----	---

C:	I	V	V/iii	[these chords can't be analyzed with Roman nos.]				I
	↓4	↑2	↓4	↑2	↓4	↑2	↓4	↑2
	har. seq.							

Melodic Chord Sequence

Chord generating sequences may also be melodic, which we will call a *melodic chord sequence*. The most common melodic chord sequence occurs in the bass. Play this.

C E Gm Am Fm G Ebm F Am Cm D Bbm C

Bass seq: ↓2

This sequence is a chromatic line descending in the bass. The chord qualities do not fit into any particular key, so that the tonality is suspended during the sequence. Notice how the sequence is symbolized with the "bass: 92" and a line indicating the length of the sequence. The chord names are placed above the staff. Here is another sequence, defined by the soprano line.

sop. seq.

↓3 ↑2 ↓3 2 0 ↓2 ↓3 ↑2 ↓3 ↑2 ↓3 2 0 ↓2

C F D Em F Am Em CM7 Dm Bb C Am D Bb C

C: I IV V/V iii IV vi iii I7 ii6 (bVII) I vi V/V (bVII)I

This one is more complex. Note the repeating pattern of intervals in the soprano. These are general interval sizes. The second 2 shows no particular direction when the pattern repeats, so it can be up or down. The second sequence is also extended somewhat by repeating the first two movements three times instead of twice. Any voice may define such a sequence. This particular sequence does not suspend the key, but can be analyzed within the key of C major. If this is possible it should be done.

8. Chromatic & Enharmonic Modulation

Common chord modulation can be used only to modulate to related keys. To modulate to remote keys, other techniques must be used. The basic principles remain the same, however: 1. establish first key, 2. pivot, 3. establish the new key. The primary difference in remote modulation lies in the pivot.

Chromatic modulation is the use of chromaticism to get from one key to another. Any of the previously discussed chord functions may be utilized for this purpose. The most common types are named by the method of the pivot:

Types of Chromatic Pivots

1. Secondary-dominant (or secondary leading-tone) pivot
2. Modulatory-sequence pivot, such as a harmonic sequence or melodic transposition
3. Chromatic-mediator pivot
4. Borrowed-chord pivot
5. Direct, or Phrase pivot
6. Common-tone pivot
7. Enharmonic pivots

Secondary Dominant Pivot

Instead of using a common, diatonic chord as a pivot, chromatic chords can also be used as pivots, if they are used logically (following the principles of good harmonic progression and voice leading). Secondary dominants and leading tone chords are often used for remote key modulations. For example, the dominant of the mediant in C major is a B major chord. This chord may be used as a link to get into the key of B major, five sharps away from C major.

The musical notation shows a chromatic modulation from C major to B major. The key signature changes from C major (no sharps or flats) to B major (five sharps). The progression of chords is as follows:

C: I iii IV V7 I vi V/iii

B: I IV I⁶₄ V7 I

Enharmonic Pivot

Some chords have special modulatory powers due to their enharmonic functions. For example, the German Sixth is enharmonically a dominant seventh. In C major a German Sixth would be A= C E= F<, which would normally resolve to the dominant of C. However, since it is enharmonically A= C E= G=, a dominant seventh, it could resolve to the tonic of D= major, effecting a modulation from C major to D= major, which is also C< major, enharmonically! Neapolitans also have this kind of power. Play this example.

C: I IV V₆/V V7 vi V Ger+6
 D_b: V7 V7 I

Probably the most powerful modulatory chord is the diminished seventh. This is due to its ambiguity. Let us take C# E G B= as an example. This would be the vii^o7 of D. But it is enharmonically E G B= D=, the vii^o7 of f minor. It is also G B= D= F=, the vii^o7 of A=. Additionally, it is A< C< E G, the vii^o7 of B major! Each note of a diminished seventh chord can be thought as the leading tone to a new key, major or minor. Play the following example.

C: I IV V7 I vii^o7
 F#: vii^o7 I V7 I

Furthermore, since the diminished seventh can act as a secondary leading-tone chord, it does not have to resolve to the tonic of the new key, but could resolve to any chord in the key, from which the new key could be established. This means that the diminished seventh can move to almost any chord that is major or minor!

Common Tone Pivot

The Common-tone pivot occurs when the musical texture is reduced to one pc which then serves as a link into the new key, as in example 1 below.

①

②

C: I V E: (7) (5) I V I C: I vii° V7/vi vi V7/iii E:V7 I

The repeating B in the third measure serves as the pivot into E major.

The second example is that of a secondary-dominant pivot. The B7 chord in the second measure is V7 of iii in C major and is V7 of E major.

Sequence Pivot

A modulating sequence pivot may take several different forms. The most common is a series of secondary dominants that function as "transient modulations." These are not true modulations, however, since the new key is not established; instead we move on to another key or return to the original key. Example 3 shows this procedure.

③

④ C E G B \flat F \sharp D B

C: I V7 I V7/iii F \sharp :V7 I C:I \uparrow 3 \uparrow 3 \uparrow 3 \downarrow 3 \downarrow 3 \downarrow 3 B: I V7 I

E: V7 I V7/iii

The B7 chord in the second measure is V7/iii and V7 of E, and it resolves to E major, but E major is not established. Instead, the next chord is a secondary dominant in E major, V7/ii, the dominant of f</F<, resolving to F< major, which could then be established. In this way, tonality is actually suspended until a new key is established or the old key reaffirmed. Notice that the transient key or keys are enclosed with square parentheses to indicate its temporary status.

Example 4 is a chromatic modulation using a harmonic sequence. The roots are moving up by

third from the key of C major (establishment of C is not shown, but is assumed), suspending the tonality until the B major chord in measure 3, whereby the key of B major is then established. This type of modulation should be indicated with the root movements below the staff and the chord names above the staff, as shown.

Borrowed Chord Pivot

Borrowed chords can also be used to modulate. Example 5 shows such a modulation combined with the enharmonic type.

⑤

⑥

C: I IV V (=VI) F: I V7 I C: I V7 I (=bIII)
 D \flat : V 1 \flat IV E \flat : I IV6 V I

First, there is a modulation from C major to D= by means of the borrowed chord (=VI) in C, becoming V in D= major. The chords continue to IV in D=, which is enharmonically an F< major chord, serving as a pivot into the key of F< major.

Example 6 is a simpler example of a borrowed chord modulation. The =III borrowed from c minor serves as a common chord pivot into E= major.

Phrase Pivot

A phrase, or direct pivot occurs between two phrases. The second phrase begins in a new key without any apparent common link between the keys.

g: i v $\frac{6}{5}$ i ii $\frac{6}{5}$ V F#: I IV ii V7 I

9. Extended Tertian Chords

Ninth, Eleventh and Thirteenth Chords

Building tertian chords does not stop with sevenths. By piling another third on top of a seventh chord we get a ninth chord. The various common types of ninth chords and their symbols are tabulated in the *Resource* text under "Chord Symbols." A synopsis of the most important types table is shown.

1	Dominant ninth F9	2	Lowered ninth F-9	3	Minor ninth Fm9	4	Major ninth FM9	5	Dominant eleventh C11	6	Augmented eleventh C+11	7	Dominant thirteenth C13
---	-------------------------	---	-------------------------	---	-----------------------	---	-----------------------	---	-----------------------------	---	-------------------------------	---	-------------------------------

An easy way to remember these lies in the recognition that all but the major- and minor-ninth chords are based on the dominant seventh chord, and the added notes are in the major scale of the root unless "augmented" or "lowered" is in the name. Those names tell what interval is to be altered above the root. The minor-ninth is built on the notes of the natural minor scale of the root, and the major-ninth is built on the notes of the major scale of the root.

The ninth of these chords resolves down by step, just as the seventh. Example 3 below shows the normal resolution and voice leading for a ninth chord. They can be incomplete as well, with the fifth omitted, or sometimes with the fifth and seventh omitted.

Ninth chords are relatively rare in our traditional music. Eleventh and thirteenth chords are even rarer (See *Resources* for types). Extended tertian sonorities, such as these, begin to have an identity crisis when inverted. Take, for example, the dominant eleventh chord in example 1 below.

One inversion of this results in the second measure, which appears to be (and really is), a secundal chord! Another inversion creates the third measure, which is a quartal chord. So, which is it? The answer is it could be any of these. Even the ninth chord shown in example 2 begins to look like a secundal chord when inverted.

In order to prevent this kind of confusion, such chords are rarely inverted. Eleventh chords should show at least part of its tertian structure when it is voiced, and preferably all or most of it.

The identity crisis is crucial though, even when these chords are not inverted, which is possibly why they became used in a different way in the early twentieth century by composers like Maurice Ravel.

10. Liszt and the Harmony of the Future

The chromatic relations discussed above evolved primarily in nineteenth century Europe, during the Romantic period. These relationships, developed by composers of the period, stretched the limits of tonality. Some of them even predict the developments of the twentieth century.

In 1832, Franz Liszt, at the age of 21, attended a series of lectures given by the composer-theorist Francois J. Fetis. Fetis described a new system of tonal connections, which he called *ordre omnitonique*, in which the boundaries between the diatonic, chromatic, and enharmonic would be swept away. He showed that any harmonic combination of notes could resolve into any key or mode, thus casting away all strictures of harmonic motion, a notion far in advance of its time. Liszt was especially struck by this and its impression remained with him for the rest of his life. He even wrote a *Prelude omnitonique* (now lost, last seen in London in 1904) and the recently discovered *Bagatelle Without Tonality*.

Liszt experimented with new harmonic relations throughout his composing career, but these experiments intensified in his later life. Arthur Friedheim, Liszt's personal secretary and pupil, wrote the following, after finding the composer poring over old books and manuscripts at an early hour one day.

Catching sight of one manuscript, which particularly drew my attention, I picked it up saying: "This will make you responsible for a lot of nonsense which is bound to be written someday." I expected a rebuke for my remark, but he answered very seriously: "That may be. I have not published it because the time for it is not yet ripe." The title of this little book was *Sketches for a Harmony of the Future*.²

This manuscript is also lost, and so we are left to search the music itself for evidence of this "Harmony of the Future." Even today, Liszt is not regarded as a great musical thinker and innovator, but rather as a showman and virtuoso performer of the piano. This public image of him has led to a distortion of his contribution to music history, and an easy denial of his significance as a composer. Instead, the late works of Liszt have been ignored, and credit for his remarkable harmonic innovations has been attributed to other, mostly later composers.

Consider, as an example, Richard Wagner's famed *Prelude* to the opera *Tristan und Isolde*, touted as the cornerstone to twentieth century atonality. Perhaps it does represent a turning point, but it is seldom known that the opening to the *Prelude* may have been "borrowed" from a song by Liszt. Wagner and Liszt were good friends, carried on an extensive correspondence, and shared one another's manuscripts. The following is the beginning of *Die Lorelei*.

²Friedheim, Arthur. *Life and Liszt*, p. 161, NY 1961

Liszt: Die Lorelei

The image shows two systems of musical notation for Liszt's 'Die Lorelei'. The first system consists of a grand staff with a treble clef on the upper staff and a bass clef on the lower staff. The time signature is 3/4. The key signature has one flat (B-flat). The first system includes a dynamic marking of *mf* and a fermata over a chord in the bass. The second system continues the piece with various chordal textures and melodic lines in both hands.

Compare this with the following excerpt from the beginning of *Tristan*, begun a year after *Die Lorelei*.

Wagner: Prelude to *Tristan & Isolde*

The image shows two systems of musical notation for Wagner's 'Prelude to Tristan & Isolde'. The first system is in 6/8 time and features a key signature of two sharps (D major). It includes dynamic markings of *pp* and *p*, and ends with a *dim.* marking. The second system continues the piece with dynamic markings of *pp*, *sf*, *piu f*, and *ff*, followed by a *p* marking. The notation is dense with complex chords and melodic lines.

The resemblance seems hardly coincidental, yet Wagner is given all the credit for its harmonic and tonal innovation. But Liszt's experiments were more far-reaching than this. He anticipated the tonally ambiguous chords of the French Impressionists, such as Debussy, and their use of the whole-tone scale. The following example is from the beginning and end of Liszt's *Nuages gris* for piano solo.

Nuages gris
beginning *Andante* ending

p
tremolando

p

8-----

Notice the tonal ambiguity here. What key is this? A tritone occurs at the beginning, and a quartal chord appears in measure 3. The final chords are not tertian or quartal but could only be identified with twentieth century set theory. There is no sense of finality, but rather a suspenseful hovering at the end. The following example is from Liszt's song *Der Traurige Mönch*.

Der Traurige Mönch
Mässig bewegt

mp *sotto voce*

This may be the first consistent use of a whole tone scale in the history of music. In addition, the words are declaimed rather than sung, anticipating Schoenberg's *sprechstimme*.

Perhaps the most remarkable of all is the opening to Liszt's *Faust Symphony* (1857), which is based on the augmented triad. The theme is stated as a twelve-tone row starting with the G, perhaps the first in history, coming seventy years before Schoenberg's discovery.

Lento assai

ff \Rightarrow *p*

11. Chromatic Harmonization

To put our knowledge of chromatic harmony to use, we will now learn how to do a chromatic keyboard style harmonization. A review of simple diatonic keyboard harmonization is contained in the *Music Fundamentals* text.

In instrumental music parallel octaves and fifths are sometimes used to reinforce a line, especially in the bass. These are permissible if they are obvious and consistent in usage. If they are used, however, the student will need to make a special note of their location and purpose. Notice the example on the previous page of Liszt's *Der Traurige Mönch* where the bass is doubled in octaves. An unusual example of parallel octaves is in Brahms's *Romanze* (see anthology), op. 118, no. 5, where the inner voices are doubled in octaves. The same piece later doubles the soprano in octaves. Another example of this is found in Liszt's *Liebstraum* 3. Parallel fifths are found less often but are generally acceptable in the bass when arpeggiated. It is important to understand what parallel fifths do to the musical texture before using them. They add nothing to the music and they reinforce lines. As such they should be used with special care.

Let us examine a sample melody to harmonize.

The key is A minor. Next we analyze the phrase structure and possible chords:

Schifrin: Theme from *The Fox* (A Warner Bros. Seven Arts Movie)



The musical score consists of five staves of music in A minor. The first four staves show a melody in 7/8 time, starting with a quarter rest followed by eighth notes. The fifth staff shows the end of the phrase with a double bar line and a final chord.

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1 Am 2 Dm7 3 G7 4 CM7 5 F 6 Dm7 7 E7
 a: i iv7 V7/III III VI iv7 V7

8 Am 9 Am 10 Dm7 11 G7 12 CM7 13 FM7 14 B[♭]7 15 E7-5 B[♭] bass
 i i iv7 V7/III III7 V17 Fr+6

16 Am9 17 C[♯]07 18 A7 19 C[♯]07 Dm 20 A7 21 F[♯]07 22 B7
 i9 vii[♭]7/iv d:vii[♭]7 V7 vii[♭]07 V7 a:V7/V vii[♭]7/iv V7/ii

24 B[♭]7 25 E7 Am 26 Dm7 27 G7 28 CM7 29 FM7 30 B[♭]7
 vii[♭]7/III V7 i iv7 V7/III III7 V17 V9

31 E7-5 B[♭] bass 32 Am Dm 33 Am
 Fr+6 i iv i

Of course this is not the only way to harmonize this melody. Other chords are possible. The phrases are all four measure lengths. The extra measure (33) at the end is due to a prolongation of the final chord. Many seventh chords have been chosen for the harmony, and there are two French sixths, secondary dominants, and a modulation to D minor. A simpler version could have been constructed first with chords without sevenths. Generally, if the melody can be harmonized with a simple triadic chord, the seventh can be added to enhance its color and function, especially in modern harmonizations. The French sixths here are in a somewhat unusual position, because they resolve to tonic, rather than to the dominant. Thus, they are actually built on the dominant note (E G[♯] B = D). Be sure to examine this analysis so that you understand the chords chosen and how each works.

The next step is to write preliminary chords voicings, shown below. Notice that smooth

voicing is maintained. Even though this is to be an instrumental, keyboard harmonization the same principles of voice leading are maintained as in vocal harmony at this stage, except that the number of voices does not have to remain constant. The chords are written in the bass clef. Notice, though that sevenths resolve down by step and are not doubled, leading tones are not doubled, and parallel octaves and fifths are avoided. A triad never moves to another triad. The augmented sixth chords resolve as they should, and the modulations are by common chords.

The Fox, first draft

1 Am 2 Dm7 3 G7 4 CM7 5 F 6 Dm7 7 E7

8 Am 9 Am 10 D 11 G7 12 CM7 13 FM7 14 E7

15 E7-5 Bb bass 16 Am9 17 C#o7 18 A7 19 C#o7

21 A7 22 F#o7 23 B7 24 Bb7 25 E7 Am 26 Dm7

27 G7 28 CM7 29 FM7 30 Bb7 31 E7-5 Bb bass 32 Am Dm7 33 Am

Chord symbols: Am, Dm7, G7, CM7, F, Dm7, E7, Am, Am, D, G7, CM7, FM7, E7, E7-5 Bb bass, Am9, C#o7, A7, C#o7, A7, F#o7, B7, Bb7, E7, Am, Dm7, G7, CM7, FM7, Bb7, E7-5 Bb bass, Am, Dm7, Am.

Analysis: a: i iv7 V7/III III7 VI iv7 V7 i iv V7/III III7 VI7 V7 Fr+6 i9 d:vii07/III vii07 V7 vii07/iv a:V7/V V7/ii V7 vii07/III III7 VI7 V9 Fr+6 i iv7 i

Next, we arpeggiate the chords and voice them for the piano in a manner that is practical for the instrument. This step uses only single bass notes, voicing the chords high except for the lowest bass notes. You should play this for yourself to hear and comprehend the process. Compare this version to the previous example of blocked chords. Some changes in the voicing have been made to make the accompaniment more melodic.

Finally, the accompaniment is “fleshed out” in eighth notes to give more rhythmic movement and flow. Non-harmonic tones are added to enhance the melodic nature of the bass line, and an alto line has been added in the treble clef, with repeating motives in both the bass and alto lines.

12. Schenkerian Analysis (Hierarchical Voice Leading)

An Algorithm for Graphic Analysis

In the world of analysis it is rare to find rigorous theoretical systems that provide reasonably consistent and precise results in the hands of analysts of different persuasions. Even set-analysis, which is possibly the most rigorous of all, can give inconsistent results in different hands depending upon how sets are partitioned. Set and Roman-numeral analysis are probably the most widely used analytical systems. They are logical systems in themselves, but when applied, results can and often do vary. This is not quite the same situation for scientific theory, as in physics, where a theory predicts a certain result and, in order to be accepted, skilled experimenters of different persuasions must find the same result, namely that which the theory predicts. This is a part of the scientific method.

It seems improbable that we will ever have a theory of music as rigorous as that of the physical sciences. However, we do demand that the theory predict with reasonable accuracy and reliability. A serious problem with Schenkerian analysis is its lack of consistency, which, in turn, is due to a need for rigor. I am speaking here not of occasionally variant results. Analyses of the same music by different analysts *always* produce different graphs, different results. Reactions to this usually fall into two categories: 1. the theory is wrong and must be scrapped, 2. the theory is incomplete, with partially correct results, but needs more work.

In order to construct accurate and consistent graphs of a Schenkerian type, a logical methodology is necessary. The purpose here is to provide a standard through a method that facilitates the creation of graphs of greater consistency.

A dictionary broadly defines an algorithm as "a step-by-step procedure for solving a problem or accomplishing some end." Although this term is most often connected with computer programs today, it is not meant here to be so confined, since humans can and frequently do carry out step-by-step procedures to solve problems. However, the algorithm does provide the means to create a computer program capable of carrying out such analysis with the current technology. Musical scores can be input with scanners or midi-transcribers and then analyzed with this algorithm.

Theory

Perhaps the most important principle held in the construction of the algorithm is the notion of line as step progression, a fundamental premise of voice leading. Linear motion here is defined as diatonic or chromatic step motion. Therefore, a voice part is located by virtue of its step movement. A search is made for this type of motion and no motion to link a note to another that follows it as a "line". The only justification for this is that cognition of musical lines is apparently conducted through the perception of such step progressions, since these are the smoothest and easiest connections for a mind to make; thus, the step progression becomes very important to the identity of voice parts and lines. This is a basic premise of our algorithm, which searches for

these step progressions, and serves the primary aim of this type of analysis, to trace the immediate and large scale voice leading. If step progression cannot be located for a note, then a search is made for possible octave displacements of the line (octave displacement here includes the leaps of a seventh and ninth). Other leaps, therefore, are excluded from the concept of line. Linear motions are displayed on the graphs with beams and slurs. Beams are also used in the schematic diagrams to show chord arpeggiations.

The bass voice serves not only a linear function, but lays the harmonic foundation. Consequently, the bass may have leaps when no linear path is possible, and such leaps are assumed to have a harmonic, rather than a linear, function. Flagged notes are used to show these movements.

A second premise is that musical structure is perceived on more than the immediate level, *i.e.*, more than on the note-by-note movement that is immediately perceived in hearing a performance of music. This is also a familiar premise behind the use and study of musical forms, such as rondo, sonata, key structure, etc. The premise is here extended into ever longer and larger levels of voice-leading. Thus, it is essential to show these levels in the analytical graphs, and it is this aspect that makes this type of analysis so unique and illuminating. Special symbols are used to display these levels of voice-leading. A black-note is employed to show immediate levels of structure, with an unstemmed one indicating the most immediate level. Flagged black-notes are also used, from the fastest durational value, indicating the most immediate level of structure, to the longest, the eighth note, used for the highest immediate level. Next are unflagged black-notes (quarter notes), the most common note used to display intermediate levels. White notes are used to show remote, or large scale, voice-leading. It should be remembered that these notes do not signify durations and are relative to each diagram in which they occur. The half-note and quarter-note are chosen as the normal starting values for each graph, to which other values may be added when it becomes necessary to show greater levels of structure. In most cases three or four values are sufficient. Dotted notes are not used.

Immediate levels of structure are called foregrounds in our graphs, intermediate levels are called middlegrounds, and remote structures are termed backgrounds. Structure is analyzed starting with the most immediate levels and proceeds to the most remote level, where the only domain is tonic. As we proceed from one diagram to the next, up the structural hierarchy, the immediate levels of structure in the previous graph are deleted, making way for ever larger levels of structure. The immediate levels of each diagram are represented as black-notes in each diagram, and the white notes become the basis for the next higher level of structure.

The third premise is that of the "harmonic domain". This is also known to our perception, but previous to this paper was called by more than one name. Domains are the harmonic functions that a section, or segment, of music focuses upon. It may be a repeating chord, a key center (modulation), a chord emphasized by transient, or secondary dominants, cadential movements, etc. These may also be perceived on different levels, from immediate units of harmonic rhythm, to large scale harmonic regions of the form. There are various ways that these domains may be prolonged. If a modulation occurs, the domain is prolonged by keeping the focus on the new key. A domain may also be prolonged, and thereby dominate a section, by the repetition or arpeggiation (unravelling) of a single chord, perhaps in conjunction with secondary leading-tones or transient dominants. Domains are symbolized with Roman numbers in the graphs. These are often used with horizontal brackets to show the length of a prolongation.

The Choice of a Model

In illustrating a systematic approach to graphic analysis, a model was chosen. A specific musical piece serves as an example for the model, on the assumption that a method that works for such an example will have wider applicability.

The example for the model was chosen with the following criteria: (1) that the composition be complete, but short and uncomplicated, (2) for purpose of comparison, the composition should be one that Schenker also analyzed (although this should not be construed as an attempt to duplicate his graphs or methods), and (3) the music should clearly illustrate most of the general principles important to the method. The example chosen is J.S. Bach's C major *Prelude* from book I of *The Well Tempered Clavier*. Schenker's analysis is found in a widely available collection, *Five Graphic Music Analyses* (Dover:1969). The algorithm consists of a series of concisely described steps for constructing the graphs, followed by a more detailed explanation of each, specifically referring to examples. As such, it is not a comprehensive model since not all aspects of domain determination, chromaticism, etc., occur in our example.

The Algorithm: Foreground

Foreground Verticalization, step 1 (Ex 1): Determine the key and prevailing harmonic rhythm from the score. Construct a graph notating all harmonic tones (chord tones) as verticalized half notes or white notes, and all non-harmonic tones as black-notes. Barlines and bar numbers are used at regular intervals for the purpose of location. Chord arpeggiations within each unit of the harmonic rhythm are verticalized.

A methodology for determining key and harmonic rhythm is foregone here since these methods are well known. In our example, the harmonic rhythm is one chord per measure, as shown in Ex 1. Only every fourth barline is retained, which helps to provide a framework for ordinary phrase structure. The actual phrase structure does not have to coincide thereof. The chord structure, as in this example, is tertian. For the sake of consistency, the normalized *maximum* number of pitch-classes for a chord is assumed to be four, *i.e.*, the number of pitch-classes for seventh-chords. There are almost twice as many seventh-chords (22) in the Prelude as there are triadic harmonies (12). The tetrachord of the seventh, then, is used as the basis of verticalized chord-tones in the foreground, *i.e.*, each white-note used in graphing must be part of a tertian structure of three or four pitch-classes and is shown vertically as such. All notes other than repetitions within a unit of the harmonic rhythm are included in Ex 1.

Foreground Chord Identity, step 2 (Ex 1): Label all harmonies with composite chord symbols (Roman numbers with figured bass), staying within the home key whenever possible.

Again the methodology is common knowledge and is therefore excluded here. In the Prelude

these harmonies consist entirely of triads and seventh chords. Secondary-dominants and leading-tone chords are shown with a V/ or vii/ followed by the chord that each one "tonicizes". All chord-tones are drawn as half notes. Stems may be used to clarify voicings. In Ex 1 the bass clef stem includes tenor and bass voices, and the treble stem encompasses first and second soprano and alto voices. Non-chord tones are shown as black-notes. Notes are placed on the graph to show their relative temporal positions.

Foreground Domains (Ex 2): Determine and notate the foreground *harmonic-domains* with Roman numerals.

This crucial step involves the concept of the harmonic-domain

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