

The Twilight of the Tonal System

INTRODUCTION

Before beginning our study of the materials of music since 1900, we will first look back briefly at what happened to the system of triadic tonality, the primary organizing force in the music of the preceding three centuries. In the course of doing this, we will find it convenient to introduce a few terms that may be new to you. Throughout this book, new terms will appear in **boldface** type the first time they are used in the text.

Tonal music and the principles that govern it did not develop overnight, of course, nor did they decline overnight. In fact, tonal music still thrives today in music for television and film, commercials, jazz, and some popular music, and it has even seen a limited revival in the past few decades in the "serious" music of some postmodern composers. Nevertheless, it is safe to say that by around 1900 the tonal system had become so strained by chromaticism and by the desire for originality that further development of the system seemed impossible.

We will use the term **post-tonal** in this book to refer to music that does not follow the traditional conventions of tonal harmony. This does not necessarily mean, however, that the music being referred to is without a tonal center. The whole issue of tonality in post-tonal music will be discussed more thoroughly in Chapter 5.

DIATONIC TONAL MUSIC

Almost all of the music of the seventeenth and eighteenth centuries is essentially diatonic on all levels.¹ "Of course, diatonic tonal music does not lack accidentals or altered tones; after all, a tonal piece of any length will almost certainly contain altered tones. But

EXAMPLE 1-3 Liszt: *Les Préludes* (1854), mm. 35–42 (simplified texture)

ff

C a F d

B \flat < m > G C < m >

A \flat < m > F C

the notes of a single diatonic scale are used, thus reproducing the pattern only approximately. A real sequence has the effect of quickly throwing the music out of one key and into another, even if only for the duration of a few chords. Real sequences contribute a good deal to the **brief tonicizations** that are typical of much chromatic harmony.

EXAMPLE 1-4 Wagner: *Siegfried* (1871), Act II, Scene I, mm. 238–245

WANDERER

Durch Ver - tra - ges Treu - e Ru - nen band er dich Bö - sen mir nicht.

p

f

C $^{\flat}$ < m > A \flat < t > D G $^{\flat}$ < m > B \flat < m > C \flat < t > C f

A real sequence begins Example 1-5 (mm. 1–4), using only dominant 7th chords (the last one enharmonically spelled) from the keys of D \flat , B \flat , E, and D \flat again. The root movements involve two chromatic mediant relationships and one tritone. Notice that in each case the dominant 7th chords share exactly two pitch classes. This is true only of dominant 7th chords whose roots are separated by a minor 3rd or a tritone. Example 1-5 illustrates two more characteristics of chromatic harmony—**suspended tonality** and **non-functional chord successions**. The first term is used to refer to passages that are tonally ambiguous. The dominant 7th chords in Example 1-5 do little to establish any key, because they are both unexpected and unresolved, and the A \flat 7–C–A \flat progression that ends the excerpt is of little help. Presumably Liszt had the tonality of A \flat in mind, since the piece ends similarly to mm. 5–6. Play through the example and see what you think. To say that the chords in Example 1-5 form a nonfunctional chord succession does not imply that it is useless, but rather that the chords do not “progress” in any of the ways commonly found in diatonic tonal harmony.

EXAMPLE 1-5 Liszt: “Blume und Duft” (“Flower and Fragrance”) (1862), mm. 1–6

Zeimlich langsam, innigst bewegt. *p*

In

pp

una corda

A \flat $^{\flat}$ < m > F $^{\flat}$ < t > B $^{\flat}$ < m > A \flat $^{\flat}$ < m >

5

Früh - lings Hei - lig - tu - me.

(simile)

sempre dolcissimo

pp

Leg

C $^{\flat}$ < m > A \flat $^{\flat}$

Nonfunctional chord successions are often the result of what we shall call **voice-leading chords**. Such chords are the result of goal-directed motion in the various voices, rather than an attempt to express some traditional harmonic progression. (Voice-leading chords such as the augmented-6th chord and the so-called omnibus progression³ also may be found on occasion in tonal harmony.) This goal-directed motion is usually stepwise, often chromatic, sometimes in similar motion and sometimes not. The resulting verticalities are usually tertian (triads and 7th chords), but the chords form nonfunctional successions or brief tonicizations. For instance, play through Example 1–6. The essential elements are a chromatic descent from B4 to E4 in the top voice and B2 to E2 in the bass to make a convincing cadence.⁴ The soprano and alto move in parallel major thirds until the last two beats, the alto stopping its descent on reaching the leading tone, which eventually resolves. The tenor enters on a C4 and moves in parallel motion with the upper voices for three beats, stops momentarily on B♭/A♯3, and then moves to the 7th of the dominant chord before resolving to G3. The bass enters last, doubling the soprano momentarily before moving into its cadential figure. On a higher level, the progression in this excerpt is simply tonic–dominant–tonic, beginning with the incomplete tonic triad at the opening of the phrase. But on the surface, the chords created by the various voices, beginning with beat 2 of the first measure, are as follows (the c°7 and the F7 are enharmonically spelled):

F–E–E♭–c°7–F7–B7(♭5)–e

Although there is a IV6–ii°7–V₃⁴ progression in B♭ here, it is doubtful that anyone would hear it that way. The only traditional harmonic progression in the excerpt is the final authentic cadence (with a lowered 5th in the dominant 7th creating a French 6th sonority). The music preceding the cadence makes use of voice-leading chords and creates a nonfunctional chord succession.

The voice-leading chords in Example 1–6 were created primarily by parallel or similar motion. Three independent gestures combine to produce the voice-leading chords

EXAMPLE 1–6 Grieg: “Gone,” Op. 71, No. 6 (1901), mm. 1–2 (From Edition Peters.)

Andante doloroso

e: (i) V₇ i

in Example 1–7. The first gesture is a chromatic ascent in the melody from F♯4 to G5 (doubled at the octave above). The second element is an augmented triad in the inner voices (beginning in the third measure of the excerpt), which moves, more slowly than the soprano, chromatically downward through a minor 3rd. The final element is the ostinato in the bass, swaying back and forth from B♭2 to A2, finally settling on A. The nonfunctional voice-leading chords created by the combination of these three gestures are sometimes tertian and sometimes not; some of them are highly dissonant (mm. 38–39, for example). Suspended tonality is the result, even at the end, where the final sonority does little to confirm the presumed tonality of G.

EXAMPLE 1–7 Liszt: “Gray Clouds” (“Nuages gris”) (1881), mm. 33–48 (© 1952 Schott & Co., Ltd. London all rights Reserved. Used by permission of European American Music Distributors, LLC, sole U.S. and Canadian agent for Schott Musik International.)

rallent

8va

Tea * Tea *

Unresolved dissonances, as in the Liszt example, are typical of some late nineteenth-century music. In many cases they come about through the juxtaposition of apparently independent musical ideas (melodies, sequences, and so on) with no attempt being made to put those dissonances into any traditional context, and they often contribute to a feeling of suspended tonality.

Augmented triads and diminished 7th chords are both examples of **equal division of the octave**. Real sequences frequently divide the octave into equal parts, usually by transposing the pattern by a minor 3rd or a major 3rd. This is closely related to the concept of the **interval cycle**, which is the transposition of a pitch class two or more times by the exact same interval. We mentioned earlier that pitch classes are sometimes represented by the numbers 0 through 11, with 0 usually representing C. The other numbers⁴ are assigned chromatically upward, so that C#/D♭ is represented by 1, D by 2, and so on:

0 = C 1 = C# 2 = D 3 = D# 4 = E 5 = F

6 = F# 7 = G 8 = G# 9 = A 10 = A# 11 = B

The chromatic scale can be created by an interval cycle that moves by ascending a half step, which we will call a **C1 cycle**: 0 1 2 3 4 5 6 7 8 9 10 11. An augmented triad results from a **C4 cycle**, as in 0 4 8 or 1 5 9 and so forth, and a diminished 7th chord results from a **C3 cycle**, as in 0 3 6 9 or 1 4 7 10, etc. All of these divide the octave into equal parts. We will learn about other interval cycles in the next chapter.

SUSPENDED TONALITY AND ATONALITY

Earlier in this chapter we used the term “suspended tonality” to describe a passage with a momentarily unclear or ambiguous tonality. This term is appropriate only when used in the context of a tonal composition. It is not the same as **atonality**, a term that will appear frequently in this text, and which needs to be defined at this point.⁵

In a very general way, atonality means music without a tonal center. More specifically, it refers to the systematic avoidance of most of those musical materials and devices that traditionally have been used to define a tonal center. Those materials and devices would include, among others, the following:

- Diatonic pitch material
- Tertian harmonies
- Dominant-tonic harmonic progressions
- Dominant-tonic bass lines
- Resolution of leading tones to tonics
- Resolution of dissonant sonorities to more consonant ones
- Pedal points.

Although chromaticism led historically to atonality, chromatic tonal music is not the same as atonal music. A more thorough study of atonality will have to be postponed until later chapters, although the term will come up from time to time throughout this text.

SUMMARY

The decline of the tonal system as the primary organizing force in music coincided with and was largely due to the ascendancy of chromaticism. Diatonic tonal music is essentially diatonic on all levels, whereas chromatic tonal music is based to a much greater extent on the chromatic scale. Some of the characteristics of chromatic tonal harmony are listed here in the order in which they are introduced in the chapter:

- Chromatic (and double chromatic) mediant relationships
- Tritone relationships
- Real sequences
- Brief tonicizations
- Suspended tonality
- Nonfunctional chord successions
- Voice-leading chords
- Unresolved dissonances
- Equal division of the octave (interval cycles).

Atonality is not a characteristic of music of the nineteenth century. Atonal music avoids the use of most of those musical materials and devices that traditionally have been used to define a tonal center.

NOTES

1. “Diatonic” here simply refers to the notes in a given key. The notes and chords diatonic to C major are all drawn from the scale C–D–E–F–G–A–B–C.
2. Gregory Proctor, “Technical Bases of Nineteenth-Century Chromatic Harmony: A Study in Chromaticism,” p. 131. (See the Bibliography at the end of the book for complete citations.)
3. The omnibus progression is discussed in Robert Gauldin’s *Harmonic Practice in Tonal Music*, pp. 599–602, and Stefan Kostka and Dorothy Payne’s *Tonal Harmony with an Introduction to Twentieth-Century Music*, pp. 477–480.
4. Some prefer to use T and E (or t and e) for 10 and 11.
5. There are various well-founded objections to this term. Nevertheless, it has by now attained a permanent place in our theoretical vocabulary, whereas possible improvements, such as “pantonicity,” have not. Also, though “atonal” is used by some writers only in reference to the preserial works of the second Viennese school, it is used in this book in its broader meaning of “not tonal.”

EXERCISES

Part A: Fundamentals

- For each triad below, list the four triads that are in a chromatic mediant relationship to it.
B \flat major C minor F major D minor E major
- Name several traditional chord progressions in tonal harmony that make use of chromatic mediant relationships. Use Roman numerals.
Example: IV–V/V
- Which of the following progressions involves dominant 7th chords that share two pitch classes?
V7–V7/vi V7/ii–V7/V V7/IV–V7/IV
- For each dominant 7th chord below, list the three dominant 7th chords that share two pitch classes with it.
E \flat 7 G7 F7 C \sharp 7
- Complete this C3 cycle: 2 _____
Show the same cycle with letter names: D _____
And this C4 cycle: 2 _____
Show the same cycle with letter names: D _____

Part B: Analysis

- Berlioz: Requiem (1837), mm. 66–78.

This passage modulates from B \flat major to G minor.

- Are the keys of B \flat major and G minor in a chromatic mediant relationship?
- Still another tonality is implied in mm. 71–74. What is it, and what is the relationship between that key and G minor?
- Explain the construction of mm. 66–68.
- Provide a Roman-numeral analysis in G minor of mm. 68–70 and mm. 75–78.

2. Grieg: "Summer's Eve," Op. 71, No. 2 (1901), mm. 9–19.

- Label the root and chord type of each of the numbered chords (e.g., "G7," "f#," etc.).
- List the tonalities implied by these chords.
- Which of those tonalities is confirmed by a tonic triad?
- The 16th-note figures use pitches from what tonalities?
- What single tonality is the most important in this passage?
- How many pitch classes are shared by chords 9 and 11? Chords 12 and 14? Chords 15 and 16?
- Do these shared pitch classes appear in the same register?
- Discuss the use of sequence in this passage.

poco mosso

cresc. e stretto

f

3. Brahms: "Der Tod, das ist die kühle Nacht," Op. 96, No. 1 (1884), mm. 7–10.

- Analyze the first and last chords in the key of C.
- Label the roots and qualities of all of the others chords.
- Assuming that second-inversion triads tend to be heard as tonic $\frac{6}{4}$ chords, list all of the keys implied by dominant 7th chords or $\frac{6}{4}$ chords.
- The tonalities other than C are weakly implied, at best. Explain in your own words what is really going on in this passage.

4. Wagner: *Siegfried*, Act I, Scene 1, mm. 193–200.

Explain this passage as best you can in your own words, following the approaches used in the previous exercises and in the chapter text. Incidentally, would there be any justification for hearing the B \flat in chord no. 7 as an A \sharp ?

Heftig beschleunigend

SIEGFRIED

Was frommt sei-ne hel-le Schnei-de, ist der

MIME (Er hält das Schwert ängstlich in der Hand fest, das Siegfried ihm heftig entwindet.)

f

fp

cresc.

Stahl nicht hart und fest?

6 7 8

Part C: Composition

1. Continue this example, using chromatic mediants above the asterisks and employing conventional voice leading.

C * G * C * F D⁷ G

2. Wagner: *Siegfried*, Act I, Scene 2.

Use the first two measures of this accompaniment as the first part of a three-part real sequence, moving down a minor 2nd each time. Place an <m> between each pair of chords in a chromatic mediant relationship.

e - wig ge - hor - chen sie al - le des Spree -

ff sf

3. Using only augmented triads in a four-voice texture, see if you can combine a chromatically ascending soprano line with a circle-of-5th sequence in the bass. Continue for several chords.
4. Compose a passage similar to Example 1–7, using a chromatically descending melody with chromatically ascending half-diminished-7th chords as an accompaniment. The accompaniment chords should be in second inversion and should ascend faster than the melody descends. Let the dissonances fall where they may.
5. Compose an example in four-part texture using a conventional harmonic progression and employing mostly stepwise motion in all of the voices. Then elaborate with a generous application of stepwise nonchord tones, especially chromatic passing tones, neighbors, and suspensions. The added tones, in most cases, should not create sharp dissonances (minor 2nds, major 7ths) with the chords tones or with each other. Be sure to do this work at a piano! The excerpt below can serve as an example.

etc.

FURTHER READING

The suggested reading assignments are intended to help you obtain a broader exposure to the subject of this chapter. The approach and terminology used in the texts will probably differ from each other as well as from this text. Complete bibliographical information is provided in the Bibliography at the end of this book.

- ALDWELL, EDWARD, AND CARL SCHACHTER. *Harmony and Voice Leading*. See Chapter 31, Chromatic Voice-Leading Techniques, and Chapter 32, Chromaticism in Larger Contexts.
- BENWARD, BRUCE, AND MARILYN SAKER. *Music in Theory and Practice*, Vol. 2. See Chapter 12, Chromatic Mediants.
- KOSTKA, STEFAN, AND DOROTHY PAYNE. *Tonal Harmony with an Introduction to Twentieth-Century Music*. See Chapter 27, Tonal Harmony in the Late Nineteenth Century.
- SAMSON, JIM. *Music in Transition*. See Chapter 1, The Nineteenth-Century Background.
- SIMMS, BRYAN R. *Music of the Twentieth Century*. See Chapter 1, Tonality in Transition.
- STEINKE, GREG A., AND PAUL O. HARDER. *Bridge to 20th-Century Music*. See Chapter 4, Expanded Tonality; Chapter 5, Ultrachromaticism I; Chapter 6, Ultrachromaticism II; and Chapter 7, Denial of Harmonic Function.

TWO

Scale Formations in Post-Tonal Music

INTRODUCTION

The music of the Baroque, Classical, and Romantic periods was based almost exclusively on the major and minor scales with which we are all familiar. Though these scales have not been discarded altogether, composers since the early twentieth century have also made use of a large number of other scale formations. Not all of these scale formations are new—in fact, some of them had been used long before the tonal era and had since fallen out of fashion. But new or old, these scales were all unfamiliar to audiences accustomed to major/minor tonality, and so they helped composers to distance themselves from the older style.

It is unusual in post-tonal music to find an entire piece that uses only a single scale (with the exception of chromatic and microtonal scales). Instead, one typically finds that only a few measures will use a particular scale, or the melody may conform to the scale while the accompaniment does not, or the music may include only a few notes that seem to imply the scale.

The organization of this chapter is based on the number of notes in the scale; that is, five-note scales are discussed first, then six-note, and so on. (In counting the number of notes, we do not include the octave, so the major scale, for instance, is a seven-note scale.) Examples have been chosen to illustrate clearly the scales being discussed, but the reader should be aware that in much music it would be difficult to say with certainty what scale formation is the basis of a given passage.

FIVE-NOTE SCALES

“Pentatonic” is a generic term for all five-note scales, but when one refers to *the* pentatonic scale, the scale in Example 2-1 is usually the one that is meant. Notice that the intervals between adjacent notes of the scale are all major 2nds and minor 3rds. Because

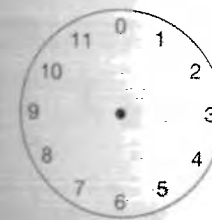
this version of the scale contains no half steps, it is sometimes called the **anhemitonic pentatonic scale**.

EXAMPLE 2-1 The Anhemitonic Pentatonic Scale



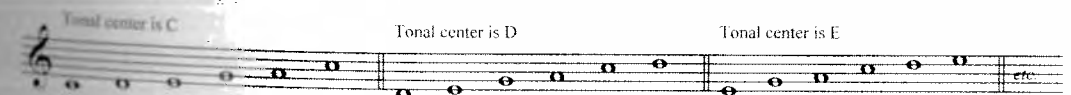
Five steps through any C5 cycle will generate an anhemitonic pentatonic scale. In the case of Example 2-1, the steps would be E–A–D–G–C or, in pitch-class numbers, 4–9–2–7–0. Pitch-class arithmetic may be easier for you to understand if you visualize it on a clock diagram, substituting 0 for 12, as in Example 2-2. From that diagram you can see, for example, that for a C5 cycle to move past 9, one has to move clockwise five steps from 9 to 2.

EXAMPLE 2-2 A Clock Diagram



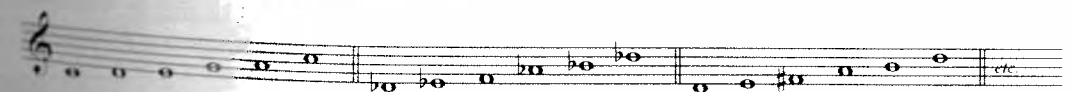
Any member of a pentatonic scale can serve as the tonal center; thus, five “modes,” or rotations, are available.

EXAMPLE 2-3 Modes of the Pentatonic Scale



And, of course, the pentatonic scale can be transposed.

EXAMPLE 2-4 Transpositions of the Pentatonic Scale



The pentatonic scale is obviously a limited source of melodic pitch material, and it is also limited in its tertian harmonies. The only tertian chords that could be constructed from Example 2-1 are triads on C and A and a minor 7th chord on A. This means that the accompaniment to a pentatonic melody will probably be either nontertian or nonpentatonic or both. In Example 2-5 Bartók harmonizes a pentatonic melody (top line in the example) with major triads, using the melody note as the root of the triad in each case. The accompaniment here uses no particular scale, although the tonality is certainly C. A few measures later, the same melody is harmonized again with major triads, but this time each melody note is the 5th of its triad. The last melody note is changed to a D, resulting in a “half-cadence” on a G chord.

EXAMPLE 2-5 Bartók: *Bluebeard's Castle* (1911) (piano reduction), mm. 765–770 (© Copyright 1921 in the USA by Boosey & Hawkes, Inc. Copyright Renewed. Reprinted by permission.)

Larghissimo (♩ = 66) poco allarg.

Other versions of the pentatonic scale are possible—versions employing minor 2nds and major 3rds—but they occur less often in Western music. One example is the scale sometimes known as the **Hirajoshi pentatonic**—as in A–B–C–E–F—which occurs in the closing section of George Rochberg's *Slow Fires of Autumn* (1979) and in the second movement of Janice Giteck's *Om Shanti* (1986); another, sometimes called the **Kumoi pentatonic**—as in D–E–F–A–B, was used by Ralph Vaughan Williams for the opening theme of his *Concerto for Bass Tuba* (1954) and by Jonathan Kramer in his *Moving Music* (1976).

SIX-NOTE SCALES

The only six-note scale to see much use in post-tonal music is the **whole-tone scale**. It is constructed entirely from major 2nds (although one of them has to be notated as a diminished 3rd). In terms of pitch-class content, only two whole-tone scales are possible; any other transposition or “mode” will simply duplicate the pitch-class content of one of the scales in Example 2-6. Whole-tone scales may be labeled according to a convention that identifies the whole-tone scale that contains C (pitch class 0) as WT-0 and the scale that contains C♯/D♭ (pitch class 1) as WT-1. Enharmonic spelling of the scales is common. For instance, WT-0 might be spelled as C–D–E–G♭–A♭–B♭–C.

EXAMPLE 2-6 Whole-Tone Scales

Whole-tone scales can be generated by any C2 cycle.

The whole-tone scale is often associated with Impressionism, and especially with Debussy, but it is also found in the music of many other composers. Interestingly, it is even more limited than the pentatonic scale, both melodically and harmonically. No triads other than augmented ones are possible, and the only complete 7th chords available are the major-minor 7th chord with the 5th lowered (the traditional French augmented-6th sonority) or raised.

Example 2-7 begins with three measures using WT-0 followed by two measures using WT-1. The tonality or tonalities of the passage would be open to some interpretation.

EXAMPLE 2-7 Paul Dukas: *Ariadne and Bluebeard* (1906), Act III

A more recent use of the whole-tone scale is seen in Example 2-8. Here the whole-tone scale (WT-0) is in the vocal duet, except for the A at the end of Toni's melody. Notice that the pitch class G \sharp /A \flat is spelled one way in Hilda's part in m. 984 and another way in m. 986. The tonal center of this excerpt, if there is one, would be difficult to determine. The accompaniment will be discussed in more detail later in this chapter.

EXAMPLE 2-8 Hans Werner Henze: *Elegy for Young Lovers* (1961), Act I, Scene 12, mm. 984–986 (© by Schott Musik International, Mainz, 1961 © renewed. All Rights Reserved Used by permission of European American Music Distributors, LLC, sole U.S. and Canadian agent for Schott Musik International.)

The **augmented scale** (also called the “hexatonic scale”), which has been used in both concert music and jazz, consists of alternating half steps and minor 3rds (perhaps spelled enharmonically). Two related instances are seen in Example 2-9, in both of which four-note figures are transposed down a minor 6 \sharp to create an augmented scale. Notice that the pitch-class content of the two scales is the same: 0–1–4–5–8–9.

EXAMPLE 2-9 Ellen Taaffe Zwilich: *Piano Trio* (1987), III (piano only) (Reprinted with permission of Carl Fischer, LLC.)

SEVEN-NOTE SCALES: THE DIATONIC MODES

Seven steps through a C5 cycle will result in a seven-note diatonic collection. For example, the pitch classes of the C major scale can be produced by this C5 cycle: B–E–A–D–G–C–F. Rotations of the major scale produce the seven diatonic modes.

Modal scales had been largely out of favor with composers since the beginning of the Baroque period, although interesting exceptions, such as the Phrygian opening of Chopin's *Mazurka in C \sharp Minor*, Op. 41, No. 1 (1839), do occur. But modality was enthusiastically rediscovered by a number of early twentieth-century composers. Though the modal theory of the Renaissance recognized both authentic and plagal modes, the distinction is not important in modern usage. One way to present the modes is to notate them using the pitches of the C major scale.

EXAMPLE 2-10 The Diatonic Modes

The **Ionian** mode is the same as the major scale, although some writers find it useful to use “Ionian” to refer to major-mode passages that do not employ traditional harmonic progressions. The **Locrian** mode has rarely been used, probably because it lacks a consonant

tonic triad and a perfect fifth between scale degrees $\hat{1}$ and $\hat{5}$.^{*} An unusually clear use of the Locrian mode occurs in the opening of Shostakovich's String Quartet No. 10, Op. 118 (1964), second movement.

It is most efficient to learn the modes in relation to the major and natural-minor scale patterns. The following information should be memorized:

Major Modal Patterns

Lydian—same as major with raised $\hat{4}$.^{*}

Mixolydian—same as major with lowered $\hat{7}$.

Minor Modal Patterns

Aeolian—same as natural minor.

Dorian—same as natural minor with raised $\hat{6}$.

Phrygian—same as natural minor with lowered $\hat{2}$.

Locrian—same as natural minor with lowered $\hat{2}$ and lowered $\hat{5}$.

You will not always be able to identify the scale being used just by determining the tonal center and looking at the key signature because not all composers use modal key signatures. Instead, a composer might use the conventional major or minor key signature and add the accidentals necessary to produce the modal scale desired. This is the case in Example 2-11, where we see a G minor key signature used for a G Phrygian

EXAMPLE 2-11 Debussy: String Quartet, Op. 10 (1893), I, mm. 1-3

Animé et très décidé

^{*}The caret over a number indicates scale degree.

theme. Notice the leading-tone $F\sharp$ in the viola part. Such nonscale tones are as common in modal music as they are in major/minor music, and we should not let them confuse us in our analysis.

There is no key signature at all for Example 2-12, the opening theme of a movement in A. The accompaniment to this Lydian tune consists only of A major triads in second inversion.

EXAMPLE 2-12 Bartók: Music for String Instruments, Percussion, and Celesta (1936), IV, mm. 5-9 (melody only) (© Copyright 1937 in the USA by Boosey & Hawkes, Inc. Copyright Renewed. Reprinted by permission.)

In Example 2-13 the music drifts easily from D Aeolian (mm. 1-4) into D Dorian (mm. 5-7). A change in modal flavor such as we find here is a frequently encountered device. Note that this is *not* a modulation, because the tonal center is unchanged.

EXAMPLE 2-13 Debussy: Preludes, Book I (1910), "Footprints in the Snow" ("Des pas sur la neige"), mm. 1-7

Triste et lent (♩ = 44)

pp *p* *più pp*

expressif et douloureux

Ce rythme doit avoir la valeur sonore d'un fond de paysage triste et glacé.

m.d.

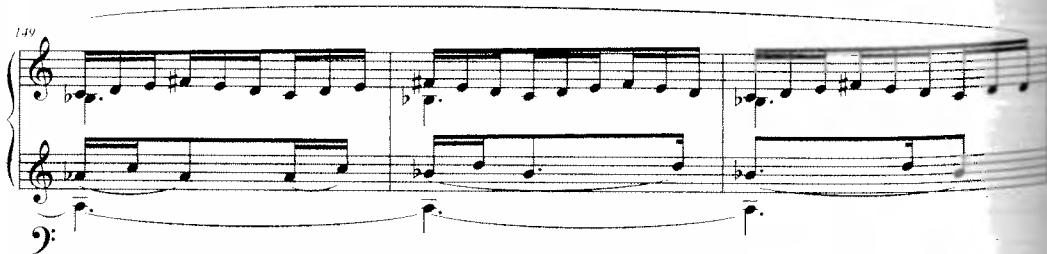
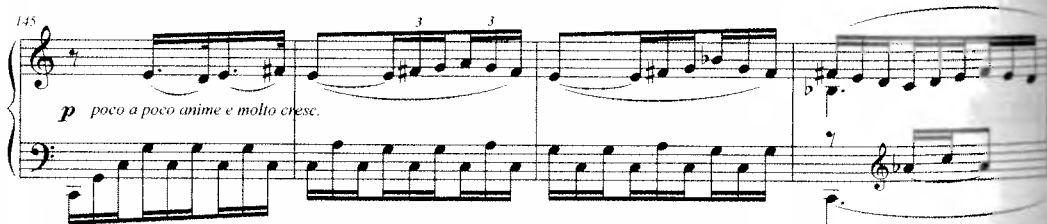
OTHER SEVEN-NOTE SCALES

Many other seven-note scales are possible, although none of them have been used as frequently as the diatonic modes. Fourteen modes can be derived from the scales shown in Example 2-14. All of them use major and minor 2nds exclusively, yet none of them is identical to any of the diatonic modes. These two scale systems, along with our familiar diatonic modal system, exhaust the possibilities for seven-note scales using only major and minor 2nds.

EXAMPLE 2-14 Two Seven-Note Scale Systems



You may expect to encounter these scale formations occasionally in post-tonal music. The scale in Example 2-14a (a mode of the melodic minor scale) was used several times by Bartók, and it has acquired the name Lydian-Mixolydian because of its combination of raised 4th and lowered 7th scale degrees. Debussy makes momentary use of this scale on C in the first three measures of Example 2-15. Then the G and A are replaced by A \flat in m. 148, resulting in the WT-0 whole-tone scale.

EXAMPLE 2-15 Debussy: *The Joyous Isle* (*L'isle joyeuse*) (1904), mm. 145-151

Some seven-note scales make use of one or more augmented 2nds. A familiar example is the harmonic minor scale. Example 2-16 would seem to be constructed from a G Aeolian scale with a raised fourth scale degree.

EXAMPLE 2-16 Grieg: "Shepherd Boy," Op. 54, No. 1 (1891), mm. 1-8 (From Edition Peters.)

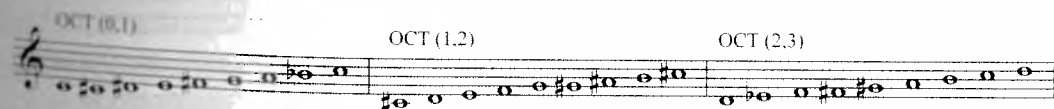


To list all of the possibilities would be impractical.¹ It is enough to be aware that a particular passage must be approached on its own terms, not with the assumption that only certain scales are allowed.

EIGHT-NOTE SCALES

Octatonic, like pentatonic, is a generic term that has nevertheless come to refer to a specific scale. This scale, illustrated in Example 2-17, consists of alternating whole and half steps (or half and whole steps), so another name for this scale is the **whole-step-half-step scale**. Yet another name for it is the **diminished scale** because it can be partitioned into two diminished-7th chords. In terms of pitch-class content, there are only three transpositions of the octatonic scale—the three shown in Example 2-17—but they can begin with either a half step or a whole step, and they may be spelled enharmonically.

EXAMPLE 2-17 The Octatonic Scale



By convention we label the three transpositions of the octatonic scale as shown above Example 2-17. For instance, if the scale contains the pitch classes 0 and 1, no matter where they occur in the scale, we label it as OCT (0,1).

The octatonic scale is a rich source of melodic and harmonic material. It contains all of the intervals, from minor 2nd up to major 7th. All of the tertian triads except for the augmented triad can be extracted from this scale, as can four of the five common 7th chord types (the major-7th chord cannot). If it has a weakness, it is its symmetrical construction, a characteristic it shares with the whole-tone scale, which can make establishment of a tonal center more difficult.

Certain nineteenth-century Russian composers, notably Rimsky-Korsakov, were among the first to make use of the octatonic scale. An excerpt from a twentieth-century Russian work appears as Example 2-18. In this passage Scriabin uses OCT (0,1). The tonal center here, if there is one, would seem to be E♭.

EXAMPLE 2-18 Alexander Scriabin: Prelude, Op. 74, No. 5 (1914), mm. 14-17 (Excerpted from the International Music Co. edition, New York, NY 10018.)

In Example 2-19 Messiaen is using OCT (1,2). The passage is headed toward a cadence on F#, so these measures may be functioning as a kind of dominant on C#.

While the use of whole-tone and modal scales declined as the twentieth century progressed, the opposite seems to have been true of the octatonic scale. The octatonic scale has also found a home in contemporary jazz, where it is especially useful in improvisation over diminished 7th chords and altered dominants.

EXAMPLE 2-19 Messiaen: *Vingt regards sur l'enfant Jésus* (1944), "Le baiser de l'enfant Jésus," mm. 54-57

THE CHROMATIC SCALE

Many passages in post-tonal music avail themselves of all or nearly all of the tones of the chromatic scale. In some cases it is only the harmony or only the melody that is chromatic, while in other cases both are. In Example 2-20 Hindemith omits only the pitch class D in the course of an 18-note melody. Hindemith's melody is obviously a tonal one, beginning strongly on F and ending with a convincing melodic cadence on A. We could even "explain" the chromaticism in terms of diatonic scales—F major (notes 1-6), G♭ major (notes 7-14), and A minor (notes 14-18)—but such explanations of chromatic passages are not always helpful. Turn back to Example 2-8 and consider the accompaniment. The voices, you will recall, are confined almost entirely to a whole-tone scale, but the accompaniment uses the chromatic scale as its pitch source. All 12 notes of the chromatic scale are used in the first 1½ measures of the accompaniment, and though there are some conventional sonorities

(an A major triad in m. 984 and a D \flat major triad in m. 986), it makes no sense to attempt to discuss the accompaniment in terms of any scale other than the chromatic.

EXAMPLE 2-20 Paul Hindemith: *Sonata for Trombone and Piano* (1941), I, mm. 1–5 (trombone only) (© Schott & Co., Ltd., London, 1942. © renewed All rights Reserved. Used by permission of European American Music Distributors LLC, sole U.S. and Canadian agent for Schott Musik International.)



MICROTONAL SCALES

In modern usage, **microtone** means any interval smaller than a minor 2nd. Though we might assume that microtones are a very recent discovery, they actually were used in the music of ancient Greece and were mathematically defined by the theorists of that time. Nevertheless, microtones, like the diatonic modes, were rediscovered in the twentieth century by composers who used them in new and varied ways.² Though in most cases the microtones employed have been quarter-tones—that is, an interval half the size of a minor 2nd—other microtonal intervals have been used as well.

A number of methods have been derived for specifying microtones in musical notation. In his *Chamber Concerto* (1925), Alban Berg notated quarter-tones by placing a “Z” (for “Zwischenton”) on the stem. The “Z” means the performer must raise the tone if the musical line is ascending chromatically and lower it if it is descending. Julián Carrillo, in his *Dos Bosquejos* for String Quartet (1926), used a slanted line after the notehead to indicate a quarter-tone alteration up or down, whereas Bartók used ascending and descending arrows above the notes in his *Violin Concerto No. 2* (1937).

Other methods have typically involved variants of the traditional system of accidentals. György Ligeti used microtones of various sizes in his *String Quartet No. 2* (1968). In his system, an arrow is attached to a flat, sharp, or natural sign, pointing up or down. The resulting intervals are no larger than quarter-tones and may be smaller, the precise size being determined partly by context and partly by the choice of the performer. Krzysztof Penderecki in several works uses variants of the traditional sharp sign to indicate tones a quarter-tone and three quarter-tones higher, and variants of the flat for a quarter-tone and three quarter-tones lower. Traditional accidentals are used for half-step intervals.

A method used by Witold Lutoslawski is seen in Example 2-21. In this work he employs four special accidentals:

- ♭ \downarrow = lower the note by a quarter-tone
- ♭ $\downarrow\downarrow$ = lower the note by three quarter-tones
- ♯ \uparrow = raise the note by a quarter-tone
- ♯ $\uparrow\uparrow$ = raise the note by three quarter-tones

In each of the two phrases in Example 2-21, Lutoslawski fills in the quarter-tone chromatic space between A4 and E5, cadencing first on C, then on D \flat . The midpoint, of course, would be the quarter-tone between these two pitches.

EXAMPLE 2-21 Witold Lutoslawski: *Livre pour orchestre* (1968), mm. 1–4 (first half of violin I only) (Copyright © 1969 Chester Music Limited for the World, excerpt Poland, Albania, Bulgaria, the territories of former Czechoslovakia, Rumania, Hungary, the whole territory of the former USSR, Cuba, China, North Vietnam, North Korean where the Copyright, 1969 is held by Polskie Wydawnictwo Muzyczne-PWM Edition, Krakow, Poland. International Copyright Secured. All Rights Reserved. Reprinted by permission.)



Microtones smaller than a quarter-tone have been used on occasion. One example by Ligeti was mentioned above; another is Ben Johnston's *String Quartet No. 2* (1964), employing a scale with 53 tones to the octave. Harry Partch advocated microtones of various sizes, especially a 43-tone scale using unequal intervals, and he designed instruments to play them.³ In her *Acrostic Wordplay* (1991), Unsuk Chin leaves the details of the microtones to five of the ten instrumentalists, instructing them to tune anywhere between a sixth of a tone and a quarter-tone sharp.

Stringed instruments would seem to be the most suited of all traditional instruments for playing microtones, pianos and organs the least. Nevertheless, microtonal works for specially tuned pianos have been composed. Examples include *Three Quarter-Tone Pieces for Two Pianos* (1923–24) by Charles Ives, Henri Pousseur's *Prospection* (1952) for three pianos, using sixth tones, and Johnston's *Sonata for Microtonal Piano* (1965). The most natural environment of all for microtones is the electronic medium, where the entire pitch spectrum can be precisely partitioned into intervals of any size or combination of sizes; however, a discussion of electronic music will have to be postponed until a later chapter.

OTHER POSSIBILITIES

The reader should not assume that everything there is to know about scales in post-tonal music has been discussed in this chapter. There are always other possibilities. Olivier Messiaen, for example, was interested in what he called “modes of limited

transposition." These are scales of from six to ten notes that have fewer than 12 transpositions without duplication of pitch-class content.⁴ He identified seven such scales, including the whole-tone and octatonic scales, and used them in various compositions (as in Example 2-19). This quality, known as "transpositional symmetry," is discussed in more detail in Chapter 9.

Another possibility is the simultaneous use of more than one scale type. We have already seen this in connection with Example 2-8, where a whole-tone vocal duet was provided with a chromatic accompaniment. In Example 2-22 an E Phrygian melody is set over an E major ostinato.

EXAMPLE 2-22 Bartók: *Mikrokosmos* (1926-37), No. 148, "Six Dances in Bulgarian Rhythm, No. 1," mm. 4-8 [Copyright © 1940 by Hawkes & Son (London) Ltd. Copyright Renewed. Definitive correction edition © Copyright 1987 by Hawkes & Son (London) Ltd. Reprinted by permission of Boosey & Hawkes, Inc.]



SUMMARY

Though the major and minor scales of the tonal era have by no means become extinct since the nineteenth century, they have to some extent been supplanted by a variety of other scales, some of them quite old, others recently devised, using from five to dozens of notes within the octave. The scales most often encountered in post-tonal music are included in this chapter, but you should not be surprised to encounter still others, some of which may not even have names.⁵ The scales discussed in this chapter include the following:

- Pentatonic scale (with modes and variants)
- Whole-tone scale
- Augmented scale
- Diatonic modes
- Other seven-note scales using only major and minor 2nds
- Seven-note scales using augmented 2nds
- Octatonic (diminished) scale
- Chromatic scale
- Microtonal scales
- Modes of limited transposition.

The distinctive character of a particular phrase or melodic figure may often be explained by reference to some scale type that is only hinted at. For instance, Example 2-13 was seen to conform entirely to the Aeolian and Dorian modes, but Debussy chose to begin the melody in a manner that reminds us of yet another scale, the whole-tone scale: B \flat -C-D-E-D-C-B \flat .

NOTES

1. Vincent Persichetti illustrates and names several on p. 44 of his *Twentieth-Century Harmony*.
2. Joseph Yasser, in *A Theory of Evolving Tonality*, attempted to show that a 19-tone scale would be the logical historical successor to the chromatic scale.
3. Harry Partch, *Genesis of a Music*.
4. Olivier Messiaen, *The Technique of My Musical Language*, pp. 58-62.
5. Several dozen scales are named and defined by Robert Fink and Robert Ricci in *The Language of Twentieth Century Music*; see especially the list on p. 114.

EXERCISES

Part A: Fundamentals

1. Taking the pattern C–D–E–G–A–C as the model, notate pentatonic scales starting on the following notes:

G F# B E♭

2. Notate whole-tone scales starting on the following notes, and label each one as WT-0 or WT-1:

E C# A♭ F

3. Notate the following modal scales:

- | | | |
|---------------------|-------------------|-------------------|
| (a) Dorian on F | (e) Phrygian on A | (i) Lydian on D♭ |
| (b) Mixolydian on E | (f) Aeolian on A♭ | (j) Dorian on C |
| (c) Lydian on E♭ | (g) Aeolian on G | (k) Phrygian on B |
| (d) Mixolydian on D | (h) Locrian on F# | (l) Ionian on B♭ |

4. Notate the following octatonic (diminished) scales, and label each as OCT(0,1), etc:

- | | |
|-------------------------|----------------------------------|
| (a) One beginning F#–G | (d) One combining a°7 with b°7 |
| (b) One beginning A♭–B♭ | (e) One combining d#°7 with e°7 |
| (c) One beginning D–E♭ | (f) One combining a#°7 with e#°7 |

5. Notate and label every major, minor, augmented, or diminished triad available in the following scales:

- | | |
|---------------------|-----------------------------|
| (a) Pentatonic on A | (d) Mixolydian on A♭ |
| (b) Whole-tone on B | (e) Octatonic beginning E–F |
| (c) Phrygian on C# | (f) Augmented beginning B–C |

6. Of the scales listed in the Summary section:

- (a) Which one(s) consist of two augmented triads?
 (b) Which one(s) contain no whole steps between adjacent notes?

Part B: Analysis

1. Puccini: *Turandot* (1926), Act I, Rehearsal 42, mm. 1–7 (voice only).

The tonal center of this excerpt is G♭. Name the scale.

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2. Debussy: *Six Antique Epigraphs* (1914), I, mm. 4–7.

- (a) Name the scale found in the melody.
 (b) The melody at the beginning of the excerpt suggests G as a tonal center. If it is, the melody combined with its accompaniment uses what G scale?
 (c) The cadence at the end of the excerpt suggests C as a tonal center. In that case, the melody combined with its accompaniment uses what C scale?

3. Anton Webern: Symphony, Op. 21 (1928), I, mm. 1–14.

This is a “concert score”—all of the instruments sound as notated. What scale is being used?

Ruhig schreitend (♩ = ca 50)

Klarinette*
Hörner
Harfe
2. Geige
Bratsche
Violoncell

KL
Horn
1. Geige
Br.
Vcl.

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4. Alfredo Casella: *Eleven Children's Pieces* (1920), “Siciliana,” mm. 1–19.

This excerpt suggests several scales, all with D as a tonal center. Be sure to consider the accompaniment when answering the following questions:

- What scale is used in mm. 1–9 of this excerpt?
- And in mm. 9–11?
- What scale is hinted at in m. 12?
- And what scale is used in mm. 13–17?
- There are eight pitch classes in mm. 18–19. Do they form a diminished scale?

Allegretto dolcemente mosso
(il ritmo sempre molto preciso)

p espressivo, semplice, come una melodia popolare

6

11

pp dolcissimo

16

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5. Joan Tower: *Island Prelude* (1988), m. 135 (oboe cadenza).

The first note in this excerpt is a D \sharp , held over from the previous measure, and all of the Bs in the second system are B \flat s. Given that information, what scale is used here?

Cadenza

meno mosso

aggressive and wild

slowly and freely

poco accel.

cresc.

ff

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6. Ravel: *Valses nobles et sentimentales* (1911), II, mm. 1–12.

- What scale is used in m. 1 of this excerpt?
- And in m. 2?
- What scale would account for mm. 1–2 combined?
- After a transitional cadence in mm. 7–8, a new scale is introduced in mm. 9–12. If G is the tonal center (it could also be D), what is that scale?

Assez lent, avec une expression intense $\text{♩} = 104$
on débute

p

Rit.

a Tempo
doux et expressif

11

7. Debussy: Preludes, Book I (1910), "Sails" ("Voiles"), mm. 38–44.

(a) Two scales are used in this excerpt. The first is in mm. 38–41. What is it?

(b) The second scale is found in mm. 42–44. Name it.

Part C: Composition

1. Compose short melodies illustrating the pentatonic, whole-tone, octatonic, and chromatic scales.
2. Compose short melodies illustrating the Dorian, Phrygian, Lydian, Mixolydian, and Aeolian modes. In each melody, try to emphasize the tonic note as well as those notes that are especially characteristic of that scale.

3. Continue this example, using the G Mixolydian mode.

4. Continue this example, using the F Dorian mode.

5. Compose an example that makes use of several different scales, using the Casella excerpt (Example 2-B-4, that is, the excerpt from Chapter 2 exercises, Part B, Exercise 4; please make note of this format because it will be used throughout the book) as a model. Label each scale you use.
6. Compose an example of two-voice counterpoint using the octatonic scale. Start with a slow, rather simple tune, unaccompanied, and bring in the second voice after a measure or two. Continue to a cadence on an octave. Compose for instruments in your class, or be able to play it at the piano.

FURTHER READING

- DALLIN, LEON. *Techniques of Twentieth Century Composition*. See Chapter 3, Modal Melodic Resources, the section titled "Additional Scale Resources" in Chapter 4, and Chapter 16, Microtones.
- DAY-O'CONNELL, JEREMY. *Pentatonicism from the Eighteenth Century to Debussy*.
- KOSTKA, STEFAN, AND DOROTHY PAYNE. *Tonal Harmony with an Introduction to Twentieth-Century Music*. See the section titled "Scale Materials" in Chapter 28.