

# CHAPTER 5

## SCALES AND TETRACHORDS

### SCALES

A scale (from the Latin *scala* - ladder or staircase) is a graduated series of musical tones ascending or descending in order of pitch according to a specified interval scheme. An *interval* is the difference in pitch between tones. Music depends on the succession of pitches and certain measurable patterns of intervals used with regularity. These patterns may be extracted from musical examples, arranged in order, and expressed as scales.

The basic intervals used for scale analysis are the half step (*semitone*) and whole step (*whole tone*). Any two adjacent keys on the keyboard sound a half step. The interval of two half steps sounds a whole step. A whole step (two half steps) occurs between *C* and *D*, *D* and *E*, *F* and *G*, *G* and *A*, and *A* and *B*. Observe that there are no keys between *E* and *F*, and *B* and *C*; these intervals are half steps.

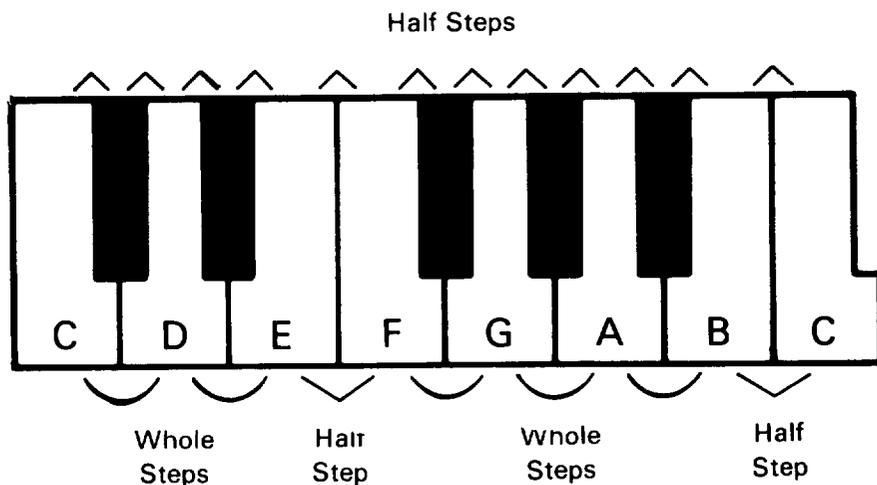


Figure 5.1: Keyboard Half Steps and Whole Steps.

The note a whole step above  $E$  is  $F^\sharp$ , not  $F$ . The note a whole step above  $B$  is  $C^\sharp$ , not  $C$ .  $E^\flat$  and  $B^\flat$  are both whole steps below  $F$  and  $C$  respectively.

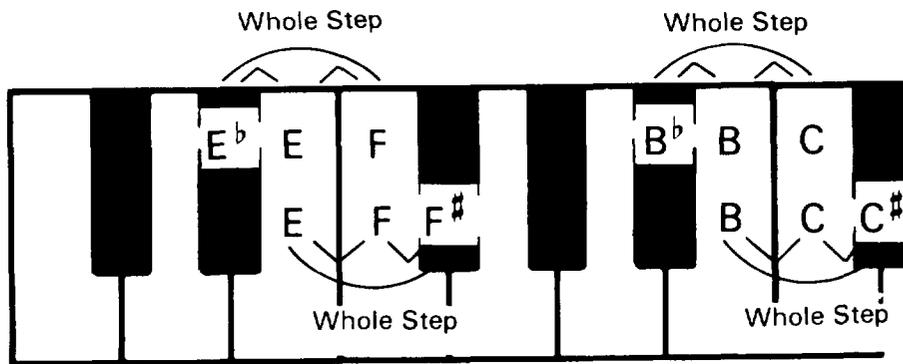


Figure 5.2: Whole Steps.

## TETRACHORDS

The tetrachord is a device used in the construction and analysis of scales. A *tetrachord* is a series of four tones on successive degrees of the staff with an interval of five half steps between the first and last tones. Tetrachords used are the major (M), minor (m), natural (N), and harmonic (H). Any tetrachord may be constructed on any pitch and will retain the interval relationship of the tetrachord.

### Major Tetrachord (M)

The *major tetrachord* is composed of two half steps, two half steps, and one half step ascending on four successive staff degrees.

(M - 221)

Figure 5.3: Major Tetrachords.

### Minor Tetrachords (m)

The *minor tetrachord* is composed of two half steps, one half step, and two half steps ascending on four successive staff degrees.

(m - 212)

The figure displays four examples of minor tetrachords. Each example consists of a musical staff with a treble or bass clef, a keyboard diagram, and fingerings. The tetrachords are: 1) D-E-F-G (treble clef, 2-1-2), 2) E-F-G-A (treble clef, 2-1-2), 3) G-A-B<sup>b</sup>-C (bass clef, 2-1-2), and 4) A-B<sup>b</sup>-C-D (bass clef, 2-1-2). The keyboard diagrams show the corresponding keys on a piano keyboard, with the tetrachord notes highlighted and connected by a bracket labeled 'm'.

Figure 5.4: Minor Tetrachords.

### Natural Tetrachord (N)

The *natural tetrachord* is composed of one half step, two half steps, and two half steps ascending on four successive staff degrees.

(N - 122)

The figure displays four examples of natural tetrachords. Each example consists of a musical staff with a treble or bass clef, a keyboard diagram, and fingerings. The tetrachords are: 1) E-F-G-A (treble clef, 1-2-2), 2) F-G-A-B (treble clef, 1-2-2), 3) D-E-F-G (bass clef, 1-2-2), and 4) C-D-E-F (bass clef, 1-2-2). The keyboard diagrams show the corresponding keys on a piano keyboard, with the tetrachord notes highlighted and connected by a bracket labeled 'N'.

Figure 5.5: Natural Tetrachords.

## Harmonic Tetrachord (H)

The *harmonic tetrachord* is composed of one half step, three half steps, and one half step ascending on four successive staff degrees.

(H - 131)

Figure 5.6: Harmonic Tetrachords.

## SCALE CONSTRUCTION USING TETRACHORDS

Scales constructed with tetrachords combine two tetrachords and a link (abbreviated L). The link is always composed of two half steps (a whole step) on adjacent staff degrees. The link may be placed at the bottom, in the middle, or at the top of the scale. The combination of two tetrachords and a link form a scale that encompasses an octave. An *octave* is an interval containing twelve half steps. It is the distance from any pitch of a given letter name to the next higher or lower pitch with the same letter name.

The figure illustrates the construction of three scales using tetrachords and links. Each row shows a musical staff with notes, a sequence of numbers (fingerings), and a keyboard diagram with brackets indicating intervals.

- Row 1:** Musical staff shows notes C, D, E, F# (sharped), G, A, B, C. Fingerings: 2 2 2 1 2 2 1. Keyboard diagram shows intervals: L (C-D), M (D-E), M (E-F#), L (F#-G), M (G-A), M (A-B), L (B-C).
- Row 2:** Musical staff shows notes C, D, E, F, G, A, B, C. Fingerings: 2 2 1 2 2 2 1. Keyboard diagram shows intervals: M (C-D), L (D-E), M (E-F), L (F-G), M (G-A), M (A-B), L (B-C).
- Row 3:** Musical staff shows notes C, D, E, F, G, A, Bb (flattened), C. Fingerings: 2 2 1 2 2 1 2. Keyboard diagram shows intervals: M (C-D), M (D-E), L (E-F), M (F-G), M (G-A), L (A-Bb), L (Bb-C).

*Figure 5.7: Tetrachords and Link in Scale Construction.*

