Music 11, 7/18/06

In a piano, we can test the presence of overtones in the vibrating monochord. If we "free-up" certain piano strings (by dislodging the damper), and then play the relevant low note, the overtones produced by that low note will stimulate the free strings. If the free strings are overtones for the low note, they will, without being touched, vibrate *sympathetically*. In this way, we can validate the overtones that are already present in the fundamental. Cool, eh?

The main notes of the overtones, that is, those that are proportionally closest to the fundamental, are:

The octave
The fifth
And the third.

If a String vibrates at C, then the prominent overtones (heard in the above piano demonstration) are C, G and E.

This group of notes is the foundation of what we call in Western music, *harmony*. This combination of pitches is prefigured and preferred because of the natural occurance of the vibrating string. Remember early in the course we explained that the string produces all its overtones *at the same time*—by this logic, we say that the vibrating string (fundamental) produces *harmony*.

Harmony is the building block of the vertical dimension in music, and is called the *triad*. (*trias harmonica*, or triad of harmony). Let's look at the specific configuration of the triad…

The triad (C-E-G, for example) is built as a perfect fifth (external interval C-E) and a major third (internal interval, C-E). Another way of looking at the triad is a "stack" of thirds. The lower 2 tones are a major third apart (C-E), and the upper two triads are a minor third apart (E-G).

There are different types of triad in Western music practice:

| Type | external + internal | stacked intervals | example |
|---|---|---|---|
| The major triad | P5 + M3 | M3 + m3 | C-E-G |
| The minor triad | P5 + m3 | m3 + M3 | D-F-A |
| The diminished triad | d5 + m3 | m3 + m3 | B-D-F |

The parts of the triad:

The lowest note (fundamental or octave) = the *root*
The middle note = the *third*
The top note = the *fifth*

Notice that the intervals between pitches in the above different types of triads are different. Since we know how to alter intervals, we can now change a triad from one type to another. For example, a major triad, C-E-G can be made minor by lowering the middle note: C-Eb-G.

Triads in the scale

If we build a triad on every note in the major scale, we see that there are exactly three major triads, three minor triads, and one diminished triad. They are distributed as follows:

The major triads are built on ^1, ^4 and ^5.
The minor triads are built on ^2, ^3 and ^6.
The diminished triad is built on ^7.

In practice, composers will make melodies with the notes of the scale, and they will make harmony to accompany the melody with these chords.

(FYI, there are other three-note configurations, but they will not be discussed in this class.)

Labeling and Naming chords

Iin traditional music theory, we label chords built on two characteristics: the scale degree they are built on, and in reference to the note that is in the bass (lowest position). As a way of being more clear about chords, we will typically distinguish major and minor chords in our notation, too.

The roman numeral in a chord name refers to the scale degree on which the triad is rooted. If it is upper-case, the chord is understood to be major. If it is lower-case, the chord is understood to be minor. (This distinction is not always practiced because a learned musician knows the qualities of chords without having been told).

| Major scale degree: | ^1 | ^2 | ^3 | ^4 | ^5 | ^6 | ^7 |
|---|---|---|---|---|---|---|---|
| Chord label: | I | ii | iii | IV | V | vi | vii° |

Since the I chord represents the key (the fundamental scale) of a piece, we know all the triads in a key when we know only this. The other chords have a hierarchical relationship with the I chord, just as there is a network of dynamism among scale degrees relative to the stability of the tonic.

$7^{th}$ chords

The $7^{th}$ chord has 4 members (the triads all have only 3). The extra note is that which is a $7^{th}$ away from the root, and is appropriately called, the "seventh." It can also be understood as yet another third stacked onto the others.

Like the triad, there are different types of $7^{th}$ chords distinguished by the configuration and quality of its intervals. There are a bunch, but we will discuss a few of the more common types:

1. G-B-D-F major triad with m7
2. F-A-C-E major triad with M7
3. D-F-A-C minor triad with m7

Inversions

Like an interval, entire chords can appear inverted. The process of inverting is familiar: we take the bottom note and place it an octave higher, or somehow above the others. The result is the same chord, but a *different* note now appears in the bass (lowest position). **THIS IS CRUCIAL**. Knowing which note is the lowest note, that which is in the *bass*, is crucial.

If the lowest note is the root of the chord, the chord is in *root position*.
If the lowest note is the third of the chord, the chord is in *first inversion*.
If the lowest note is the fifth of the chord, the chord is in *second inversion*.
If the lowest note is the seventh of the chord, the chord is in *third inversion*.

Why invert a chord? There are lots of good reasons. We will explore them in context of *functional harmony*.