

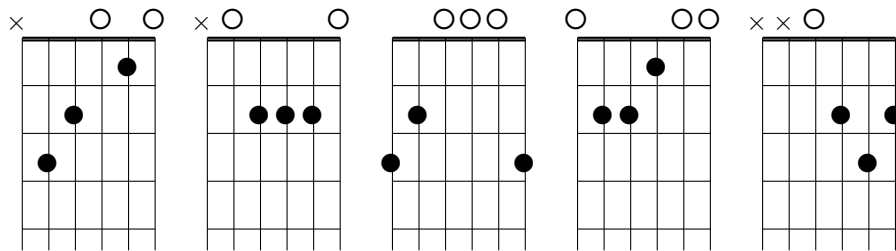
Introduction to the CAGED System, Part One: Basic Scales and Chord Types in the e- and a-Forms

S. Lyle Raymond

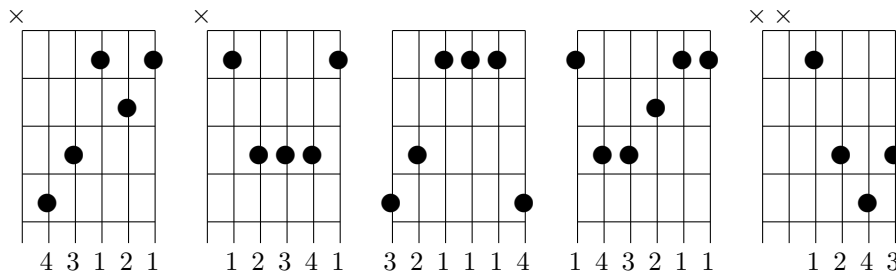
July 17, 2007

1 The Five Major Chord Forms

There are only five chords from which all other chords on the guitar can be derived. They are the **open position** major chords C, A, G, E, and D:

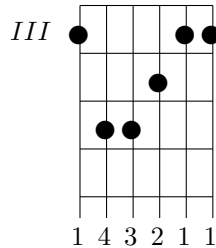


The term **open position** is used to describe chords that use open strings. These same chord shapes can be moved farther up the neck:



We refer to these fingering shapes as **Chord Forms**. A chord form is not an

actual chord until we establish a **position**. For example, the *e-form* becomes an “e-form, G major” chord when played in third position:



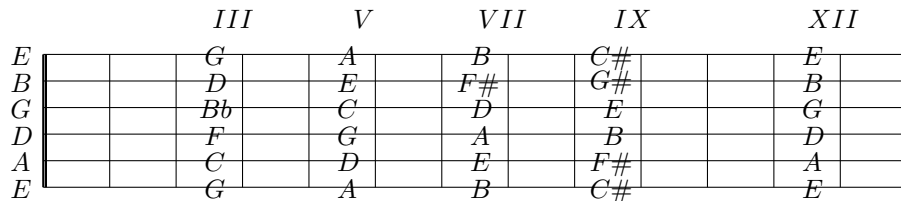
We know this is a *G Major* chord because of where the chord’s **root** is located. The root of a chord is the note upon which a chord is based. In the above example, there are G’s at the third fret on the first and sixth strings, and on the fifth fret on the third string. The table below lists the strings upon which the root of each chord form may be found.

Root Placement Within Each Chord Form

Chord Form	Strings
<i>c-form</i>	5, 2
<i>a-form</i>	5, 3
<i>g-form</i>	6, 3, 1
<i>e-form</i>	6, 4, 1
<i>d-form</i>	4, 2

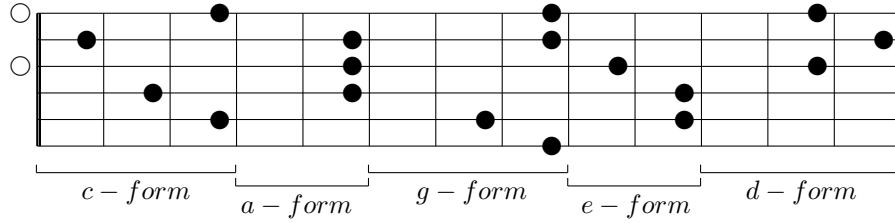
1.1 Finding Moveable Major Chords by Form

In order to locate chords anywhere on the neck, one must naturally be familiar with the notes on the fretboard. The following diagram shows which notes are located at the fretboard markers built into most guitars. Every intermediate student must have these note locations memorized. Finding any note outside of the marked frets should then be a simple matter.



If one wanted, for example, to find a B-flat major chord with the root on the 6th string, he would have the choice of using either the e-form (6th position) or g-form (3rd position).

Another way of understanding the five chord forms is by knowing how they interconnect. Here is a map of the fretboard, with fingerings indicated for each of the five forms of C major:



Notice how each of the chord forms are linked: The root of the open C major chord is shared with the root of an a-form C major chord. The middle three notes of the a-form chord are also three of the middle four notes of a g-form chord. The highest and lowest notes of the g-form chord are also the highest and lowest notes of an e-form chord, and so on.

The g-form is especially difficult to play without omitting a string. When confronted with a g-form fingering, consider either removing the top string or the bottom two strings.

2 Learning the a- and e-Forms

The a- and e- forms are the most commonly used by guitarists, so we'll deal solely with them in this article. Part Two will complete your introduction to the CAGED system by summarizing the remaining forms.

2.1 The Major Scale

The Major Scale is the basis for almost all material in Western music – even other scales. Take a look at the first page of the accompanying exercise sheet entitled “E-form Scales, Chords, and Arpeggios (key of A).” On the first music staff you will find an A Major scale exercise. Above the staff is a title describing the name of the scale: “A Major,” with its alternate name, “Ionian,” in parenthesis.¹ Take note of the numbers to the right of the title. What they are basically telling you is that the Major Scale consists of seven notes. You've surely learned them long ago as “Do, Re, Mi, Fa, Sol, La,” and “Ti.” You may have also heard the Major Scale described as having eight notes, but the eighth should actually be considered as the first note in a repetition of the scale, one octave higher.

The A major scale in the exercise begins at the 5th fret of the sixth string and continues up to the 6th fret of the fourth string, then begins anew, one octave higher, at the the 7th fret of the fourth string. It begins once again at the 5th fret of the first string, but can only climb up to the second note of the scale (or second *Scale Degree*) in that octave before running out of space. Upon descending to the lowest A, you can go one note lower, to the 7th scale degree of the octave beneath, before having to return to the root and end the exercise. Thus, this particular fingering pattern for the A major scale covers a distance of almost two and a half octaves.

Note the roman numeral IV above the tablature staff indicating that your first finger is best placed at the fourth fret when playing this scale exercise.

¹Ionian is one of the Greek Modes, a discussion of which would take us far outside the scope of this article.

Watch where the roots fall: Your second finger plays an A at the fifth fret on the first and sixth strings, and your fourth finger plays one on the fourth string.

Keep in mind that you can use this fingering for a major scale in any key, by finding the root on the first, fourth or sixth string. For example, if you placed the root on the 8th fret of the sixth string, you'd have a C major scale.

So what does all this have to do with the CAGED system? Take a look at the barre chord diagram above the major scale exercise. You should recognize this as an e-form, A major chord. Closer inspection will reveal that every note in the chord maps onto the scale fingering in the same position. If you were to define every note in the chord shape, from the lowest note upward, as a scale degree, you'd have a root, followed by a fifth, root, third, fifth, and root. Now compare the a-form, D major scale exercise to its accompanying major chord, and you'll notice that the pattern is the same: 15135 (you won't find a 1 on top this time, because it's only a five-note chord).

Practice

Memorize the e-form and a-form major scale fingerings. Incorporate them into your daily practice routine. Here are some tips:

1. Use a metronome when practicing the scales. Keep track of the fastest metronomic tempo at which you can play each exercise comfortably and cleanly. Strive to gradually increase the tempo.
2. Use *alternate picking* in every exercise. In other words, utilize a steady down/up motion without repeating picking direction. *Sweep Picking* is another option, but it would require a rearranging of the left hand fingerings. For a full discussion of sweep picking, consult Jack A. Zucker's *Sheets of Sound for Guitar*.
3. Memorize the location of each scale degree. You could do this by counting "one, two, three," and so on up to seven while playing each scale. Drill yourself by randomly selecting a number between one and seven and locating all occurrences of that scale degree. For example, all occurrences of the sixth in the D Major exercise are located at the 7th fret, sixth string, the 4th fret, third string, and the 7th fret, first string.
4. Once you've familiarized yourself with the scale fingerings, practice them in all twelve keys. I suggest running through the major scales in order of the Circle of Fourths: Start with an e-form, G Major scale in 14th position, then continue the keys C, F, B \flat , E \flat , A \flat , D \flat , G \flat , B, E, A, D, and finally G in 2nd position. You should notice that in performing this exercise you'll be alternating e- and a-form scale fingerings, and that the lowest root of each scale fingering alternates between the 6th and 5th strings.

2.2 Major Triads

As far as chords go, we've only discussed how to use the CAGED system to find *Major Triads*. This doesn't help you much as a performer, since most music uses a combination of various chord types, like Major and Minor Triads, Minor Sevenths, Dominant Sevenths, and so on. In the following sections, we will discuss the most commonly used chord types and how they are constructed.

Let's begin with a review of major triads. These are the chords whose fingerings you encountered in Section I, "The Five Major Chord Forms." As previously mentioned, a major triad is constructed using the first, third, and fifth notes of a major scale. Thus, we can say that its formula is "1, 3, 5."

2.3 Major Triad Arpeggios

In both sets of exercises, below each major scale, there is a major arpeggio exercise. An *Arpeggio* is an iteration of the scale degrees in a chord, one at a time. Observe how arpeggios differ from chords. In each of the a- and e- form major triad arpeggios, the third and fifth scale degrees share a common string. Because it is impossible to play both notes simultaneously, the chord fingerings omit one of the two notes, favoring the fifth.

Arpeggios need not be organized in a particular order. If, for example, you were to play the notes of a major chord form one at a time, you would technically be performing an arpeggio, only with the omission of a third.

Note the inclusion of an extra fifth scale degree in the a-form major arpeggio. We don't usually play this note in the chord, because it replaces the root and destabilizes the sound of the chord. In arpeggio exercises, however, it's best to play all possible notes, from root to highest to lowest, and back to the root, just as in scale exercises.

Why practice scales and arpeggios? Because together they form the basis for all single-note musical lines. Inspect a fragment of any given melody, and you will find that it contains some combination of *steps* (i.e. scale-wise motion) and *skips* (i.e. arpeggiation of a chord). We practice scales and arpeggios diligently to increase our proficiency at handling single-note melodies.

2.4 Minor Triads

The formula for a minor triad is 1, $\flat 3$, 5. In other words, to construct a minor triad, start with a major triad and flatten the third by a half-step (one fret nutward). Remember how we figured out which scale degree lands upon which string in each form (section 2.1)? This comes in handy now: In the e-form, the third falls on the third string, 6th fret. Thus, to convert an e-form, A major chord to an A minor chord, we must flatten the third, moving it to the 5th fret. In the diagrams labeled "A Minor triad" and "D Minor triad," this has already been done for you. Intermediate guitarists might already have both major and minor triad fingerings memorized, but now you should understand how they are derived.

2.5 The Minor Scale

The formula for a minor scale is 1, 2, $\flat 3$, 4, 5, 6, $\flat 7$. In other words, to construct a minor scale, begin with a major scale and flatten the third and seventh scale degrees.

Classical theorists will argue that there is also a flattened sixth in a minor (or “natural minor,” as they call it) scale, but that particular scale has fallen into relative obscurity during recent times. In modern music styles, like Rock, Jazz, and Blues, the most commonly used minor scale has a natural sixth. This scale is technically called the *Dorian Mode*, but outside of academia, especially among Jazz musicians, the terms “Minor Scale” and “Dorian Mode” are interchangeable.

For examples of the Dorian Mode, listen to Miles Davis’s solo in “So What,” Carlos Santana’s solo in “Oye Como Va,” and the vocal melody in “Little Sister,” by Queens of the Stone Age. As with all other scales and harmonies in these worksheets, try to spot examples in the music you hear everyday.

The minor scale is your primary scale of choice when improvising or composing a melody supported by a minor triad or minor seventh chord (see “Minor Seventh Chords and Arpeggios,” below). The third scale degree is what we most commonly look at when ascertaining whether a chord or scale is major or minor. Major scales and chords share a natural third and minor chords share a minor (flat) third. Usually, melodies should be built from scales containing all the notes of the underlying chord. This ensures a harmonious sound. There are, of course, exceptions. But, in the words of bassist Billy Sheehan, you must “know the rules before you can break them.”

2.6 Minor Triad Arpeggios

As with the major triad arpeggios, minor arpeggios contain an extra note that cannot be played as part of a chord. Also, don’t forget that the a-form contains a note beneath the root of the chord.

2.7 Dominant Seventh Chords

Now we’re exiting the realm of triads and exploring chords with more than just three component notes. Triads, you will recall, contain a root and some kind of third (natural or flat) and fifth (Always natural so far, but in augmented and diminished triads, not the case: This topic is for another day). Seventh chords contain, in addition to a basic triad, some kind of seventh.

The formula for a dominant seventh chord is 1, 3, 5, $\flat 7$. In other words, to construct a dominant seventh chord, begin with a major triad and add a flattened seventh. Look at the A and D Dominant Seventh Chord diagrams and spot the locations of the flat sevenths. Note how in each case, space was made for the flat seventh by removing a root. See if you can come up with an alternative fingering for each form (Hint: The flat seventh is three half-steps higher than a fifth).

If you were to take inventory of all chord types played by electric guitarists, regardless of style, you would probably find dominant seventh chords to be the most common in all modern music. Blues and Jazz guitarists are rarely content to play straight triads; usually they substitute triads with chords containing sevenths. In fact, sevenths are the minimum most Jazz musicians will add to their chord voicings. Many Jazz harmonies include 9ths, 11ths, and 13ths. Several Jazz chord voicings have to completely omit the root and fifth to accommodate their extensions. Rock musicians don't avoid triads with such fervor; rather, they often pepper triadic arrangements with the occasional "spice" of a dominant seventh chord. Bluegrass and folk guitarists might find it difficult to avoid playing D7 in place of a D major triad when performing in their favored key of G. D7 is one of the first three chords learned by students of the five-string banjo. Although there are other chords containing sevenths (see the Major and Minor Seventh chords, below), the dominant seventh chord is so ubiquitous that modern musicians will often refer to it generically as a "seventh chord."

Perform the following experiment: Play one bar of A major, one of D major, and repeat several times. Now, convert each triad to a seventh chord. Doesn't the transformed chord progression sound "hipper?" This chord progression, by the way, is the basis for the vamp behind the guitar solos in The Beatles' "The End." You can hear an E7 at the beginning of The Toadies' "Possum Kingdom." Pay attention to the C7 in "Good," by Better than Ezra, and how it affects to overall mood of the progression. In Stevie Ray Vaughan's "Mary Had A Little Lamb," observe how he laces E7, A7 and B7 chords in-between his single note lines. If you write your own music, try replacing some major triads with seventh chords, and see what happens. Often, you may find the inclusion of a seventh chord a bit too jazzy in contrast to surrounding harmonies. In other cases, however, a seventh can lend some sophistication to an otherwise bland arrangement. The choices are up to you, and even the best songwriters can make poor decisions. I recently heard a tune by Jack Johnson that contains a seventh chord, which I felt was inappropriate in its context. On the other hand, I always felt that the G, C, and D triads in Tracy Chapman's "Gimme One Reason" should have all been seventh chords instead. These are matters of personal taste; your opinions are likely to differ.

2.8 The Dominant Scale

For melodies performed over dominant seventh harmonies, the Dominant, or *Mixolydian* scale is often preferred. As with the minor/dorian scale, the terms "dominant" and "mixolydian" can be used interchangeably. The formula for the Mixolydian scale is 1, 2, 3, 4, 5, 6, b7. In other words, to construct a Dominant scale, begin with a major scale and flatten the seventh.

The Mixolydian scale is a favorite of progressive rockers like Steve Vai. Listen to the theme in the opening of "Here and Now," from the album, "Sex and Religion." The melody is a good example of the heroic quality of the mixolydian mode. Joe Satriani's "Summer Song" melody is Mixolydian. Jimmy Page gave us a harmonized Mixolydian lick just before the second chorus of "Ramble On."

The lead guitar lines in Blind Melon's "No Rain" are drawn from E Mixolydian.

2.9 Dominant Seventh Arpeggios

Play around with the placement of the third in these arpeggios. It could lie on the same string as the root, or on the same string as the fifth (as in the major arpeggios). Note that by placing it on the same string as the root, you avoid having to shift positions.

2.10 Major Seventh Chords and Arpeggios

The formula for a major seventh chord is 1, 3, 5, 7. As with dominant seventh chords, major seventh chords are built upon a major triad base, except with a natural seventh instead of a flatted seventh. You may think of a major seventh chord as containing the first, third, fifth, and seventh notes of a major scale.

Major seventh chords are rarely used in guitar-based rock music, except in the case of lighter rock, as played by groups like America and Air Supply. There is an Emaj7 chord at the end of each verse in "Under the Bridge," by the Red Hot Chili Peppers. Major sevenths are very common in Jazz music. If, when reading a Jazz chart, a guitarist encounters a major triad, he often substitutes a major seventh chord.

2.11 Minor Seventh Chords and Arpeggios

The formula for a minor seventh chord is 1, b3, 5, b7. Think of a minor seventh chord as containing the first, third, fifth, and seventh notes of a minor scale.

Minor sevenths are more common in all styles of music than major seventh chords. The first chord in the riff at the beginning of Weezer's "Say it Ain't So" is a C#m7. "So What" and "Impressions," by Miles Davis and John Coltrane respectively, each are based entirely on minor seventh chords. The first chord in ZZ Top's "Cheap Sunglasses" is a G minor seventh chord.

2.12 Diminished Seventh Chords

Diminished chords and scales are *symmetrical*. In other words, the notes of a diminished chord or scale divide an octave into equal parts. This creates interesting patterns on the fretboard, making diminished scales and chords easy to learn.

The formula for a diminished seventh chord is 1, b3, b5, bb7. You'll probably find it easier to think of the double-flatted seventh as a natural sixth. Thus, for example, a C diminished chord is spelled C, Eb, Gb, Bbb (or A). Notice that the distance between each note in a diminished seventh chord is three half-steps, dividing the twelve steps of an octave into four equal parts.

The equal division of an octave is what makes the diminished seventh chord symmetrical, which results in there being only three possible diminished chords. Build a chord one half-step above our example above and you have C#dim =

C \sharp , E, G, B \flat . At one half-step higher yet, you get Ddim = D, F, A \flat , B. Now, if we try to build an E \flat dim7 chord we get E \flat , G \flat , B $\flat\flat$, C, a chord which contains exactly the same notes as Cdim7. After constructing three dim7 chords within three half steps of each other, every other dim7 chord is merely an inversion of one of the original three.

This property of diminished seventh chords results in simple fingerings. Four possible dim7 fingerings are given in the e-form worksheet, and three fingerings in the a-form worksheet. When working with diminished seventh chords, it doesn't matter where in the chord the root is positioned, as long as it is present.

Diminished harmony is common in Jazz and Classical music. Jazz musicians often choose to replace a diminished chord with a seventh chord whose root is a major third lower. For example, a G7 can substitute for a B diminished chord. The diminished sound is less frequently encountered in Rock music. The Beatles have used it occasionally; for example, a D^O chord appears in "Michelle."

2.13 Diminished Seventh Scales and Arpeggios

Let's jump ahead for a moment and start with the arpeggios. Diminished seventh chord arpeggios are simple to construct; they are merely series of minor thirds. Study the fingerings of the e- and a-form diminished seventh arpeggios; you may discover a fingering that works better for you. For example, in the e-form, A Diminished arpeggio, I often prefer to play the low F \sharp on the fourth string instead of the fifth.

Neo-classical rockers like Yngwie Malmsteen are masterful in their use of diminished arpeggios. The diminished scale, on the other hand, is almost completely exclusive to Jazz improvisers.

The diminished scale is easy to construct: You simply precede each note in the arpeggio by a half-step. This is often referred to by Jazzers as a "whole-half" diminished scale, because of the recurring whole-step, half-step pattern. Note that the diminished scale contains one more note than the *diatonic*, seven-note scales, making it *octatonic*. As you may have guessed, there is also a "half-whole" diminished scale, but that one is usually played over altered dominant chords – another subject for another time.

2.14 The Minor Pentatonic Scale

The formula for a Minor Pentatonic Scale is 1, \flat 3, 4, 5, \flat 7 – five notes total. This is by far the most commonly known scale among modern guitarists. It works in so many improvisational situations: Because it contains a flat third and seventh, it can substitute for a minor scale. Yet, in spite of its relation to minor harmonies, it sounds quite nice over major chords as well. Even when there is a clash between the flat third in the scale and a natural third in the underlying harmony, our modern ears are accustomed to the sound; to us, it just sounds "bluesy."

There isn't really much to say about this scale except: Know it like you know your alphabet. It's the bread and butter of every working guitarist. Some pros,

like B.B. King and Albert Collins, have relied almost entirely on the Minor Pentatonic Scale. Others, like Stevie Ray Vaughan and Billy Gibbons, have used it as the basis for most of their solo work, with only occasional exceptions.

Pentatonic scales generally possess the property of not containing any wrong notes. For example, sometimes the natural sixth of the Dorian scale doesn't work well in certain minor chord progressions (whereas the flatted sixth would – that would imply the Natural Minor, or *Aeolian* scale, which isn't covered in this article). Because the minor pentatonic scale contains no sixth, there is no need to worry about a possible clash with the underlying harmony. More on this in the next section.

2.15 The Major Pentatonic Scale

The formula for a Major Pentatonic Scale is 1, 2, 3, 5, 6. Think of it as a major scale with no fourth or seventh. This scale is very popular for improvising over major chords, specifically major triads. You will hear country and bluegrass guitarists use this scale a lot.

One of the remarkable things about the Major Pentatonic scale (and pentatonic scales in general, as mentioned above) is its lack of ***Avoid Notes***. An avoid note is a note in a scale which sounds awkward when stressed. In the major scale, the fourth is usually thought of as an avoid note. The seventh is not quite as awkward, but it can create a lot of unwanted tension. By omitting the fourth and seventh altogether, we create a situation in which *there are no "wrong" notes*. It is for this very reason that Orff bells, used in improvisation exercises in General Music classes, are tuned to a Major Pentatonic scale. Many sets of wind chimes are tuned to a Major Pentatonic scale, because any random sounding of more than one note in the scale tends to be somewhat harmonious. You can see this for yourself in an experiment: Randomly strike any number of keys on a piano. Then do the same, but using only black keys. Because the black keys are members of a pentatonic scale, they should much less uncomfortably dissonant.

The notes in the main guitar riff from Pink Floyd's "Wish You Were Here" are taken entirely from G Major Pentatonic, or E Minor Pentatonic. Why both? Because every major key is related to a minor key three half-steps lower. We could say that in this instance, G major and E minor are *relative*. This has implications for improvisation: Say you're soloing in A major. For a bluesy sound, use the A Minor Pentatonic Scale. If you instead prefer a more consonant, "happy" sound, you could use either the A Major Pentatonic scale fingering, or simply *slide the A Minor Pentatonic Scale fingering down three frets*, so that you're thinking "F# Minor Pentatonic," but the listener hears A Major Pentatonic. This is a common trick; playing minor licks three frets lower converts them to major, without any change in the fingering.

2.16 The Blues Scale

The formula for a Blues Scale is 1, $b3$, 4, $\sharp 4$ (or $b5$), 5, $b7$. This is a Minor Pentatonic Scale with an added sharp fourth or flat fifth, depending on how you look at it. This note also commonly referred to as a *tritone*. The presence of the tritone adds a bit of dissonance which enhances the already bluesy character of the Minor Pentatonic. Be careful with the tritone, though; it's best used as a passing note.

3 Putting it All Together

Just having theoretical knowledge does you no good as a performer, composer, songwriter, or improviser. Put these ideas into use as often as you can. Here are some ways you can incorporate these ideas into your musical mind:

1. When listening to music, try to identify each chord by its sound alone. Is it major or minor? Does it contain a natural or flatted seventh? Is it diminished?
2. If you hear or write a guitar riff that contains no strummed chords, can you place that riff within a specific chord/scale context? For example, what chord or scale does the verse riff in Led Zeppelin's "Whole Lotta Love" imply? Minor? Dominant? If you were to sustain a triad or seventh chord over the riff, what would sound best? Compose a single-note riff, record it, and then write a second part which sustains either a single chord or a series of chords that are related to the riff through common tones. This arranging technique was used in "Deeper Shade of White," by Avengers Assemble!²
3. When listening to a lead guitarist's solo lines, identify the scale or scales being used. You may have to sort out actual scale tones from accidentals and approach notes. In the Guess Who's "American Woman," for instance, the lead melody is mostly E Mixolydian, except for a G-natural, which is just an unaccented passing tone anticipating the G \sharp . Some simple examples you could start with: "Birthday" (the Beatles), "Possum Kingdom" (the Toadies), and "Magic Man" (Heart).
4. Record backing tracks that use the types of chords discussed above, then improvise over the tracks. Start simple, by vamping on a single chord. For example, record a vamp using only A minor, then improvise over the vamp using A dorian, minor pentatonic, blues, or any combination thereof. As your confidence improves, try more complex chord progressions. Look for Jamey Aebersold play-along CDs at jazzbooks.com, which focus mostly on tunes with slow-moving chord progressions, like "So What," "Little Sunflower," "Canteloupe Island," and so on. For more suggestions, go to forums.allaboutjazz.com and ask about modal tunes.

²...whose debut album is currently in production.

5. If any of the above chord shapes are unfamiliar, try to incorporate them into your own original material. Even if you decide not to use them in your existing work, they could come in handy later.
6. Practice the following arpeggios in order: Cmaj7, Dm7, Em7, Fmaj7, G7, Am7, Bm7^{b5}³. Keep position shifts to a minimum. What's happening here is you're harmonizing a major scale; more on that subject later.
7. Devise your own exercises using this material. Challenge yourself. Use your own creativity to come up with ways to reinforce knowledge of these concepts that also are valuable in real-world situations. If you come up with something that works well for you, your colleagues, or your students, please email me at sly_raymond@mac.com. I'd love to hear your ideas.

4 Next Time:

We'll wrap up our survey of the CAGED system by taking a quick look at the C, G, and D forms. They're less frequently used, but a complete knowledge of all forms will give you a comprehensive view of the fretboard. Put these principles into practice, and every zone on the guitar neck is yours to utilize.

³We didn't go over this, but it's as indicated – a minor seventh chord with a flatted fifth.