

# *Scales at a Glance*

*Setting Music Theory  
on Its Ear*



*Clea Saal*

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*Scales at a Glance, Setting Music Theory on Its Ear*  
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*To my mom, for more things  
than I can count, but mostly  
for her undying love and support*

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*Part One:  
A Few Basics*





## Chapter 1: *A Short History of This Book*

**A**s you can probably guess by reading its title, this book is all about scales, and since you are reading this I will go so far as to assume that you are at least somewhat interested on the subject... either that, or a teacher gave you no choice on the matter.

To begin with I want to point out that even though this book begins at the beginning, it does eventually reach a fairly advanced level. That means that even if you are already somewhat familiar with the subject you are still likely to find some additional information here, not to mention a fresh, and hopefully more enjoyable and understandable perspective.

Being dyslexic I tend to rely on a visual approach when it comes to the understanding of scales (and by 'scales' I mean those music thingies, not the ones you are likely to encounter on a fish). This approach enables me —and with a little luck it will also enable you— to figure out their inner structure quite literally with a single glance.

So where does this book come from?

It all started in a fairly simple way: I was trying to figure out an exotic scale one afternoon, minding my own business and working out its structure—if you don't have a clue as to what that means, don't panic, I'll explain it later— when, as I was trying to visualize it, I stumbled upon a way of expressing it that was both unbelievably simple and applicable to any scale, in fact it could even be extended to the study of scales that were not based on the octave as it is understood in Western music. It seemed to me a very practical system, and I had never seen anything like it used in a book, though I freely admit that, within the context of all music theory books ever

published, that is not saying much. Anyway, the more I thought about it, the more I liked it.

This system had already become my *de facto* approach in my own studies —and I had already confirmed how effective it could be— when I realized that it could also serve as a way of fighting one of the main problems confronting music students everywhere: the fact that most music theory books seem to have been conceived as a sort of anti-theory vaccine (if you have studied music before, you probably know what I mean). The thing is that this is not an irreversible condition. Even though tradition dictates that one must enjoy the study of music —and especially of music theory— in spite of one's teachers, I still believe that it can be made into an enjoyable experience. In fact I am even convinced that it is *less* painful than going to the dentist for root canal!

Anyway, the idea for this book was already rattling in my head when I tried to explain something about a scale to someone very dear to me —that would be my mom— who knew nothing of music theory and used to look at me as if I were speaking to her in Chinese whenever I mentioned anything having to do with music. To my surprise, when I explained it this way I finally got her to understand what I meant. That was what sealed it for me.

So much for the lame personal anecdote, now let's turn our attention back to the subject at hand: scales. Seeing how they are, together with rhythm, one of the basic building blocks of music, getting to know them is not optional... and that means that we can't afford to hate them or even to turn a lovely shade of green whenever someone dares to mention them in our presence. The first problem we must overcome then is the fact that learning them has traditionally been based on memorizing rules, intervals and structures (if you were lucky, otherwise you were merely presented with a considerable stack of staff paper and left to your own devices).

The idea of resorting to memory may not sound so bad at first glance, but when you consider that, if we use the diatonic scale as an example (C, D, E, F, G, A and B), with its twelve tones and its seven modes we come up with a grand total of 84 'different' combinations, you will probably agree with me when I say that there are better ways for you to use your memory resources... and the diatonic scale is just one among many, so this number must then be

multiplied by the number of scales that you deem to be necessary for your goals. As you can see the task itself is formidable, but the good news is that there is an easier way of going about it.

Our goal here will not be so much to memorize every conceivable scale, but rather to understand the basis of the theory governing their construction. Let's be perfectly clear: scales are really built by combining a mere handful of different intervals, and the structure of any given scale is simply the result of putting a subset of those intervals together in a particular sequence.

In this book you will become acquainted with some of the most important scales, and you will also get to play with others that are less familiar, so that you can learn how to apply those principles to any scale you happen to come across. You will also learn what the different modes are, and how to take advantage of them, plus you will come to understand the basic principles of chord construction. In addition to that you will also learn how chords relate to scales, how do you figure out which chords go with which scale, and how can you find a scale to fit a given chord, but the most important thing is that you will hopefully learn enough to be able to work with the scales rather than against them.

Even though this book is very specific, it assumes no previous knowledge of anything having to do with music, and it does not require any knowledge of musical notation either, though it does include a chapter on the subject. Seeing how this book is intended for a general audience, it does not focus on a specific instrument, but if you play one you may want to try out each scale to hear how it sounds. Remember that while theory is important, music is not about theory. Theory is just a tool, and it must be treated as such. This is merely a book of scales that will hopefully guide you, but in the end it is up to you to learn from it, understand its contents and put them to use.

And now for a word of caution: while some of this book's chapters are ridiculously short in terms of word count, this doesn't necessarily mean that they are short in terms of content. Take your time, make sure you understand one concept before you move on to the next one, and feel free to go back as needed. Remember that it doesn't pay to speed the

construction process along by cheating on the foundations. The goal here is to learn, and when it comes to doing that there is no hurry.

Well, that's it for the history of this book, or at least it should have been... only it isn't because this book wasn't written just once but rather three times. In a way it has become like one of those scabs I can't quite manage to leave alone. I wrote the first draft of this thing some twenty years ago. That one went exactly nowhere. I rewrote it and actually got it published a little more than ten years ago, and now I've decided to revise it yet again. In fact my mother, who encouraged me to write this thing in the first place and to whom this book is dedicated, passed away more than fifteen years ago. That's how long I've been at it. Here's hoping that this will actually be the final version.

## Chapter 2: Glossary

**Y**es, I am aware that the glossary is usually found at the end of the book, but seeing how this book does not assume any previous knowledge, I figured that we might just as well get some basic definitions out of the way. Some of these will probably seem obvious even to the uninitiated, but they make for an effective starting point. As a reader, you can always skip the ones you find redundant. I would also like to point out that defining any given term in a few words is bound to be somewhat problematic because it always leaves plenty of loose ends, so I want to warn you that most of these definitions are extremely simple, and will be complemented later on.

1.0) **Note-** Notes are to music what letters are to words. This means that they are the minimum identifiable sounds. Just like letters, notes have names, unfortunately these names have little or nothing to do with the sounds they represent. What I mean by that is that the name of *F* is just as similar to the sound it represents as the shape of the character commonly known as *A* is to the way in which we pronounce it.

1.1) **The Names of the Notes-** There are two main systems for naming the notes. One of them uses names, the other letters. The first system, the one using names, is used throughout most of the world. In it the names of the notes are *Do(Ut)-Re-Mi-Fa-Sol-La-Ti(Si)*. This system was created by Guido d'Arezzo (for the trivia question of the day, he was an Italian monk and he lived between 990 and 1050). The second system is used mostly in English and German speaking countries. This system is in fact older, and it uses

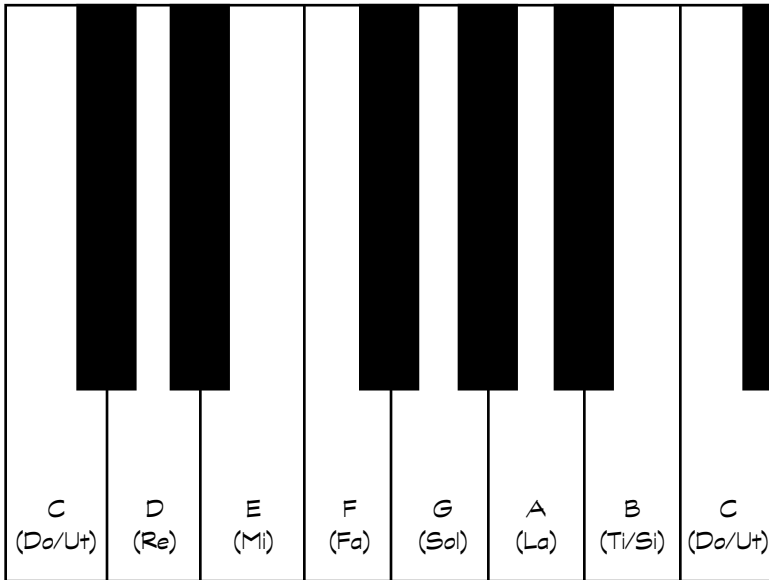
letters rather than names to identify the different notes. It relates to the previous system in the following way  $C=Do/Ut$ ,  $D=Re$ ,  $E=Mi$ ,  $F=Fa$ ,  $G=Sol$ ,  $A=La$ ,  $B(Ger. H)=Ti/Si$ . It is important to keep in mind that both systems present a couple of regional variations, such as the use of *Ut* instead of *Do* in France —though *Ut* was the original name for that particular note— or the use of *H* rather than *B* in Germany (a note of caution, in Germany,  $B=B\flat$ ). Later on it will become clear why is it that the letter-based-system begin with *C* rather than with *A*, but for the time being I am afraid you are just going to have to trust me on this one.

2.0) **Tonic**- The tonic is the note that lends its name to the entire key. It is the note that sets the tone, hence its name. It can, in fact, be any note, that is to say the octave can begin at any point, since it represents a convention that indicates how a particular piece of music is to be written, played and so on. The tonic is the starting point for the scale in which the music is written, regardless of what kind of scale is being used.

2.1) **Octave**- From the Latin word for eight, the octave represents the eighth note, and it has the same name as the tonic. The octave doubles the frequency of the tonic. To understand this I am afraid that you will need to understand something about the nature of sound, so here it goes. Sound travels in waves, these waves are measured in *Hertz (Hz)*. Pitch is directly proportional to the number of Hertz (more Hertz, higher pitch). Now, combining what we have so far, we have that the octave doubles the number of Hertz of the tonic, so, using *A* as our basic example, we have that 110 Hz, 220 Hz, 440 Hz and so on, all represent the sound we know as *A*, although obviously in its different octaves. For the record, the human ear can perceive sounds with frequencies ranging approximately from 20 Hz to 20 kHz (20,000 Hz), a range of approximately ten octaves, although, for the most part, only seven or eight of these are actually used to produce music.

3) **Whole step/Half step (Tone/Semitone)**- Steps and half steps enable us to measure the distance between two notes. One of the easiest ways to visualize them is through a piano keyboard. If between two white keys there

is a black one, then those white keys are separated by a whole step—or whole tone—and the black key represents the half step—or semitone—in between. If between two white keys there is no black key, then the white keys themselves are separated only by a half step. So, as we can see in the following figure, the octave is made up of twelve half steps, or six whole steps.



the octave as seen on a keyboard

4.0) **Sharp and Flat**- As you can see in the previous figure, in addition to the seven white keys representing the ‘natural’ notes, there are also five black keys representing the half steps in between. These notes have their own names, derived from those notes that are found on either side of them, unfortunately this also means that they have two possible names each. Using C as our example, we find that the sound that is to be located half a step above it is known as ‘C sharp’, this is usually indicated as follows: C $\sharp$ , where ‘ $\sharp$ ’ is the symbol used to indicate that the note is sharp, and therefore its pitch is half a step higher than the note used as a reference. That same key is also located half a step below D, and so it can also be known as ‘D flat’ which is usually represented as ‘D $\flat$ ’, ‘ $\flat$ ’ is the symbol used to indicate that the note

is flat, and therefore its pitch is half a step lower than the note used as a reference.

4.1) **Enharmonic**- Enharmonic is the word used to indicate that one note or interval has really the same sound, or pitch, as another. This is precisely the case with C $\sharp$  and D $\flat$ . Both names represent in fact the same note, which in a keyboard is to be found in the black key separating C and D. You have to keep in mind that, even though enharmonics represent the same sound, it is very important to learn to give them their proper names because in the context of a given scale, an augmented second is not the same thing as a minor third, even though both intervals are enharmonics (intervals, seconds and thirds are explained later on). To further complicate matters, you may also encounter cases such as E $\sharp$ , which, even though it is an enharmonic of F, must sometimes still be referred to as E $\sharp$  (the explanation for this will be found in a future chapter, if you want a sneak peek, I'd suggest you look for it in the chapter dealing with the basic rules of scale construction).

4.2) **Double Flat and Double Sharp**- As if everyday enharmonics were not enough of a headache, sometimes a note can be modified by two flat or two sharp symbols, thus it sometimes becomes an enharmonic to more than one sound. For instance F $\flat\flat$ , is an enharmonic not only of E $\flat$  but also of D $\sharp$ . If it makes you feel better, it really sounds a lot more complicated than it is. Once you understand the reasoning behind it, you will realize that there is a method to this particular bit of madness.

5.0) **Scale**- Here we are. Now if you were to look this word up in a dictionary you would find that it has several associated meanings, ranging from fishes, to measurements, to climbing over stuff, but here we will focus only on musical scales, that narrows it down. To keep it short, a scale is nothing but an orderly sequence of notes, usually spanning one octave, which is then used to create a melody, harmonize it or improvise over it. There are many kinds of scales, but they can be divided according to some basic traits. These are some of the most common groupings:



5.1) **Basic Pattern Scales**- These scales are extremely simple, since they are built around a single pattern. It can be by half steps (Chromatic scale), whole steps (Whole Tone scale), or by combining both kinds of intervals regularly (whole step/half step, or half step/whole step). With the exception of the Chromatic scale, these scales are not used all that often in the real world.

5.2) **Major Scales**- There are plenty of scales that can be included in this group, since its name only means that, between the tonic and the third degree there are two whole steps, but the name is usually reserved for the scale that is known as the diatonic major scale, which lies at the root of most Western music, or, when so stated, to one of its variants such as the harmonic major scale. All other scales beginning with a major third are usually classified as exotic scales.

5.3) **Minor Scales**- Just as with the major scales there are numerous minor scales since technically the name only means that from the tonic to the third degree there are one and a half steps, but the name is usually reserved for the relative minor of the diatonic major scale, or one of its variants, such as the harmonic minor scale, with all others being classified as exotics (we will get to those relatives later, don't worry, but I can promise that they are not the scale's aunts and uncles). There is also a sub-group of these scales: that of the semi-diminished —also known as half-diminished— or even diminished, scales. These scales have not only a minor third, but also a diminished fifth.

5.4) **Pentatonic Scales**- Pentatonic scales have only five notes, or tones. They are fairly common, especially in popular and Eastern music. They come in many forms, but the name is usually reserved for a five note scale that is derived from either the major or the minor scale. All other pentatonics are classified as, you guessed it, exotic scales.

5.5) **Exotic Scales**- We have encountered them often enough, so here we are with the exotic scales. The name is used to describe all of those scales that are foreign to traditional Western music, regardless of their structure, and more often than not these refuse to play nice with traditional music theory.

5.6) **Scales by Style**- These scales have come to be so intimately associated with a particular kind of music that they have taken on its name. This is the case with the scales known as the blues scale, the jazz scale and the bop scale.

5.7) **Diatonic Scale**- Okay, so this is a single scale rather than a whole category of them, but it is important enough to be analyzed separately. In a nutshell, this is the scale that lies at the heart of Western music. It features five intervals of a whole step and two intervals of a half step each, with the half steps separated by either two or three whole steps. In other words, those half step intervals are kept as far apart from each other as they can be. There are a bunch of other definitions out there, but they are far more complicated, and tend to come across as being cobbled after the fact. In its major form the diatonic scale is: C-D-E-F-G-A-B.

6.0) **Degrees**- The degree is the position of a particular note within the context of the scale. Using our true and tried example of C Major, we have that C is the tonic, D represents the second degree, E the third, F the fourth, G the fifth, A the sixth, B the seventh, and C is the octave which, as you probably already noticed, has the same name as the tonic.

6.1) **The Names of the Degrees**- Just as the notes may be referred to by either name or letter, so can the degrees be referred to by either number or name, so, just for the record, the names of the degrees are: for the first degree, tonic. For the second degree the corresponding name is supertonic. For the third degree the name is mediant. For the fourth degree the name is subdominant. The fifth degree is the dominant. The sixth is the submediant, and finally the seventh is the leading (the minor seventh, which in the case of the C Major Scale would be B $\flat$ , is also known as subtonic). Of these the names that you are most likely to come across are tonic (first) and dominant (fifth).

7.0) **Interval**- An interval is the distance between two notes. Unless otherwise specified, it is usually ascending (that is it goes from lower to

higher pitch). Intervals can be expressed in two different ways: by steps or by degrees.

7.1) **Interval in Steps**- Intervals can be defined in terms of steps and half steps, for example, from E to A we have an interval of two and a half steps (this will be further explained later on, but for now the figure representing the keyboard that was included above may provide you with an answer).

7.2) **Interval by Degrees**- An interval can also be defined in terms of degrees by counting how many notes there are in between. Getting back to our previous example, we may also say that the interval between E and A is a perfect fourth. This means that from E to A there are four named notes (E-F-G-A). As for the perfect bit, that one is coming up next.

7.3) **Kinds of Intervals**- This one is going to sound complicated, but here it goes. When we define an interval in terms of degrees we can find several words used to describe it (such as a perfect fourth, as we saw in the previous instance). These words are major, minor, perfect, augmented and diminished, we won't get into details when it comes to double augmented and double diminished here, but you should also be aware that these intervals *do* exist.

These intervals relate to each other in the following way: if you reduce a major interval by a half step you get a minor interval. If you reduce a minor interval by a half step you get a diminished interval. If you increase a major interval by a half step it becomes augmented. By reducing a perfect interval by a half step you get a diminished interval. If you increase a perfect interval by a half step you get an augmented interval. In the major and minor scales both the fourth and fifth degrees are perfect, as are the tonic and the octave.

8) **Structure**- The structure of a scale is merely the way in which the different degrees relate to each other. This relationship can be found in the way in which whole steps and half steps are combined, producing a specific sequence of intervals between them, one that enables you to recognize the scale as a distinct whole.

9) **Mode**- The different modes are really the same scale with different starting points. In this system any degree can become a tonic, for instance, D-E-F-G-A-B-C-D would be the second mode of the major scale (though in the modal system each mode, including the first, has its own name, the major scale is known as the Ionian mode, the second mode is known as the Dorian mode). In each one of the different modes we encounter a different sequence of steps and half steps, even though we are not really modifying a single sound.

10) **Chord**- A chord is made up of three or more notes played simultaneously (or almost simultaneously, depending on the instrument). It is usually constructed by piling up thirds. C-E-G, using the most traditional example, make up the chord, or triad, known as C major.

11) **Rhythm**- Rhythm itself has absolutely nothing to do with scales, yet without it we would have no music at all, seeing how this is the first element that allows us to identify the sounds we know as music as such. It breaks down time, and it is around this basic division that the sounds themselves are organized.

12) **Melody**- Think of the melody as the basic tune. Together with rhythm it represents the main line around which the other elements, those that complement it, such as harmony, are arranged.

13) **Progressions**- A progression is a series of chords that harmonizes , or accompanies, a melody. There are three main kinds of progressions. We will learn a little about them in this book, but this is not a book about harmony. Anyway, these three types are: the progression by fifths, the diatonic progression and the chromatic progression.

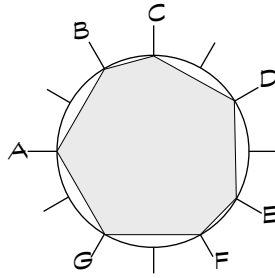
14) **Improvisation**- The improvisation is a place within a particular piece of music in which the musician has the opportunity to create something new right on the spot by coming up with a melody to accompany a known progression... well, at least that is supposed to be the general idea.

## Chapter 3: *How To Use This Book*

**A**s I have already stated, this book takes a visual approach to scale construction. The system itself is extremely simple, but it is also highly effective, as it will literally allow you to understand the structure of even the most complex scale with a single glance. As we have seen, the octave is usually divided into twelve half steps, and the different combinations of these twelve well-defined sounds are the foundation on which Western music itself has been built.

What we will be doing here is not all that complicated. We will begin with a circle divided into twelve equal parts, you can think of it as a sort of clock, and then we will use each one of those divisions to represent a half step. Using these divisions as our starting point we will then draw a polygon by joining together the notes, or to be accurate the intervals, that are to be found within a specific scale. This figure will not only allow us to visualize any scale regardless of its complexity, but also —using the cut-out rings that are to be found at the end of this book— it will enable us to identify, almost instantly, which sounds can be found in any given scale from any starting point we may choose. In addition to that there is also a ring featuring the different kinds of degrees. The use of this ring should enable us to understand the scale's inner structure, and it should also make it possible for us to see how two scales relate to each other, and what the similarities and the differences between each of their modes happen to be.

Now, before we go any further, let's see an example of just how such a representation would look like, using our traditional example: the C Major Scale, which we will examine in more detail in a future chapter.



*C Major Scale*

Here you can see, in addition to the seven 'natural' notes that make up the scale as such, a clear representation of the distribution of the five remaining half steps. Have a good look at it because this is the scale that serves as the basis for most of the music you have ever heard.

**To purchase this book please go to:**

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