

# The Fine Art of Tuning a Hammered Dulcimer

By Jerry Read Smith (March 2016)

## INTRODUCTION

If you've ever wanted to play the Hammered Dulcimer, believe me, I understand. I'll never forget the very first time I heard one back in 1974 being played by, a very young, John McCutcheon. I was transfixed by the sound and the, seemingly, magical way the notes danced and flew off the strings. To say that single experience changed my life forever would not be an exaggeration. For over 40 years now I have been designing, building, playing, re-designing, playing some more, performing and recording with this remarkable instrument. I have had a very full and satisfying life in this endeavor and because I never intend to "retire" I am entering a new stage of life ... and that is one of "teacher." I have been blessed since May of 2014 by the company of a young man interested in building "my" instruments. He has proven to be dedicated, industrious, passionate and capable. As he continues to progress in learning the requisite skills necessary, as well as the thought behind my idiosyncratic designs I have found myself "freer" to dive deeper into the finer aspects of what makes a Hammered Dulcimer "tick." The ultimate "dance" in the making of a Hammered Dulcimer is between Structure and Tone! It is a delightful dance indeed ... and one that has kept me continually interested since the completion of my first instrument in 1974.

I was never the best Hammered Dulcimer player. I was fortunate, I suppose, that I was one of the "only" Hammered Dulcimer players around where I lived ... and even throughout the expanding region of my travels. Although not blessed with incredible technical skill on the instrument ... I was consumed with "that sound" and hence Tone ... and, hence, Tuning. I would work for hours to learn just the right notes to play and as I practiced I became increasingly "picky" about tuning. What I realized was that the better in tune I was ... the more people were attracted to my playing. I didn't really have to be super "fast" ... or highly skilled at runs or complicated arrangements. I found that if I was merely "in tune" and hit (mostly) the right notes people tended to "Ooh and Aah" and they would comment on how beautiful it was or how talented I was. Now I sincerely appreciated the compliments and adoration (as it were) but I always believed that it was the instrument ... namely ... the Hammered Dulcimer that folks were impressed by ... even though I was the one getting the accolades. So ... that is why I've decided to write this short treatise on "The Fine Art of Tuning a Hammered Dulcimer." If you play or decide you'd like to play the Hammered Dulcimer ... the better you are "in tune" ... the more enjoyable the experience will be for both you ... and the listener(s). And ... if you so desire ... you can concern yourself with blazing speed and acrobatic "runs" later!

## A LITTLE ABOUT THE EARLY LIFE OF A HAMMERED DULCIMER

One thing I came to understand early in my building career was that the wood that I was constructing these instruments from had spent most of its life ... as a tree! It was a living thing ... receiving nourishment, growing, swaying in the wind. All of that came to a halt the moment it was cut down. Next it was cut into various pieces or ground to a pulp. In my way of thinking ... the lucky pieces ended up as valuable parts of a musical instrument. At least now ... they could "live on," in a manner of speaking, to vibrate and sing to the heavens. Okay ... I know I'm being a little melodramatic but I've had a lot of time to think about the magical nature of music and tone and it reaches deeper than black and white ... there's color and depth and mystery! All this to say that when I finish building a Hammered Dulcimer and it's all strung up ... that is really the beginning ... a new beginning ... and it needs proper attention if it's ever going to its full potential as a musical instrument.

I have various techniques that I employ to get a brand new Hammered Dulcimer off to a good start. It is a rather complicated instrument with many strings that exert a lot of pressure to the soundboard, frame and body. In fact ... one of my 5 Octave models (which has 100 strings) creates nearly a "ton" of pressure. That's 2000 lbs. into an instrument that weighs around 17 lbs. As you begin to string and tune it the body will "conform" to that force. Part of the "trick" in building is to engineer the design to absorb and use that force without degrading the structure ... while at the same time transferring vibrations and projecting the tone in the most pleasing possible way ... to "the ear." A piano, which literally requires professional moving men and employs a cast iron frame to assist with this problem, works ... but renders the instrument non-portable. Unless you own stock in "Two Men and a Truck" this solution won't work in the case of a Hammered Dulcimer.

I, as a general rule, keep every new instrument I finish here in my Workshop for at least two weeks. I do that to accurately "set" the bridges and the strings. After a first tuning some adjustment is often necessary. As the instrument acclimates to its newly acquired "stress" ... finer and finer adjustments are necessary to assure

perfect placement of the bridges and strings (especially where they pass over the side bridge caps). The strings will stretch for a period of days or weeks until they stabilize. During those early days I will physically stretch the strings as I'm tuning to aid in the stabilization process. In my view it's pretty important to spend the time to "set" the strings and bridges because they will "seat" themselves where you have them and it's best if you've done this work as accurately as possible. The bridges will "seat" themselves in the soundboard. The strings will "seat" themselves in the side bridge caps as well as the center bridge caps. I believe that this process will enable the instrument to achieve it's maximum sonic and tonal potential.

## THE THEORY OF (TUNING) RELATIVITY!

It is, BY FAR, of primary importance to tune your Hammered Dulcimer "relative" to ITSELF! If you have not played in some time and it is really badly out of tune ... then it's best to tune it "relative" to Concert pitch (A440). If you are playing regularly then you, not only, don't need to tune it to Concert pitch ... but **you shouldn't unless you absolutely need to**. That can be a colossal waste of time and not even the best for the instrument. I do happen to believe that a person who aspires to play the Hammered Dulcimer should spend as much time paying attention to tuning as playing but let me explain! What I mean here is NOT to start at a particular note, try to get it absolutely perfect, go on to the next and the next until you've exhausted yourself being hyper-particular with every little vibration. That would absolutely be NO FUN at all. But rather ... play a tune or scale you're working on listening very carefully to the tuning .... the sound. If you hear a note or two here or there that don't sound quite right ... try to identify them and bring them into tune with the rest! The thing you're working on here is keeping the instrument in tune with itself ... not some exact pitch such as A440. You can concern yourself with that exercise when you have a performance or some situation that necessitates being in "Concert" pitch. For the most part ... that is pretty much the ONLY TIME you should concern yourself with it. A Hammered Dulcimer can, in fact will, go slightly sharp ... or slightly flat depending on atmospheric conditions. It is BEST to simply "let it" do so. Just identify those notes that don't sound quite right ... and tune them "relative" to the others. And you can do that during the course of your practice. Most tuners these days have a "calibration" feature that will allow you to use the tuner to tune variations of sharp or flat ... very handy indeed. In my opinion a very bad habit is to ignore those "funky" notes when you hear them ... and just keep practicing. The better "in tune" your Hammered Dulcimer is to itself ... the more enjoyable your listening and, hence, playing or practicing experience will be. When I find a "rogue" note I will bring it into tune with the rest of the instrument by playing identical notes, octaves and 5ths along with it ... until they whole group sings in harmony. This will help familiarize yourself with your particular instrument and it's tone. It will also train your ear to be able to better identify "what sounds good." And, as you get better at this, it will begin to banish any fear of tuning. You cannot ignore tuning and expect it correct itself. If you commit to this practice you will eventually not think much about it at all ... and you'll be free to work on music!

## NOW TO THE ACTUAL TUNING

Different folks use different methods to tune their Hammered Dulcimers. What I will outline here is the way I have come to tune a Hammered Dulcimer. I've done thousands upon of thousands of complete tunings! I have tuned new instruments, old instruments, just before a "gig" or before recording in the studio. When I tune I start with the Treble bridge and the lowest marked course. For the purposes of this outline I am going to use a 3 Octave 16/15 instrument as the reference. I will make references to larger instruments with Chromatic bridges as I go along. I tune each marked course moving up the Treble bridge to the top ... all the time checking the 5<sup>th</sup> interval. These notes are (from the bottom to the top) A/E then D/A then G/D, C/G and finally F/Bb (see Tuning Diagram #1). The first note is on the right side of the Treble bridge and the second note in each grouping is the perfect 5<sup>th</sup> directly across the bridge to it's left. \*Important to understand\* ... there is friction across the Treble bridge so if your tuning pins are on the left side of the instrument as you pull the right side up to pitch it is possible that the left side 5<sup>th</sup> interval might be a little sharp. In that case you just need to "back off" just a nudge to equalize the tension on both sides. This phenomenon only occurs on the Treble bridge who's placement is absolutely critical! There are a couple things you can do to "micro-tune" the Treble bridge that I will talk about later.

After I've tuned all the Treble marked courses I start at the top Bass marked course and tune all of them down to the bottom of the Bass bridge. These notes on a 16/15 are Bb, F, C, G and D (from top to bottom). Lastly, if my instrument has a Super Bass bridge, I tune the marked courses on that bridge. My objective in this approach is to increase (or decrease if the instrument is sharp) the pressure evenly across the entire range of the instrument. Now I have all the marked courses in tune and the Treble bridge set at a perfect 5<sup>th</sup> interval. I can now begin to

fill in all the remaining notes.

I now begin a “pattern” (see Tuning Diagram #2) of tuning and double checking as I go. I start with the left side of the Treble bridges lowest marked course. Again, in the case of our 16/15 example, that note is an E. I use that note as a reference to tune the right side of the course just above the second marked course on the Treble bridge which is also the very same E. These two notes are identical in pitch. I will use both the battery powered chromatic tuner ... AND my ear to match these two notes. As I'm accomplishing this I will constantly check the 5<sup>th</sup> interval or the B on the left side of the Treble bridge. Next I'll use that B and tune the B four courses down on the right side of the Treble bridge while checking the F# just across on the left side of the Treble bridge. Now I'll take that F# and match the F# five courses up on the right side while checking it's 5<sup>th</sup> interval or the C# across the Treble bridge. Next I'll take that C# and tune the C# four courses down on the right side of the Treble bridge while checking the G# directly across the Treble bridge. And, finally, I'll take that G# and tune the G# four courses down, once again, on the right side of the Treble bridge and make sure the 5<sup>th</sup> interval or D# across the Treble bridge is correct! Whew!!!! I know that probably sounds complicated but it's actually much simpler than it sounds and it's a very easy pattern to commit to memory.

Now we need to finish tuning the rest of the Treble bridge. First tune the D, on the right side of Treble just above the C, matching it to the D, on the left side of Treble, 5 courses down. Do the same with the E on the right of the Treble by matching it to the E on the left of the Treble 5 courses down. Likewise tune the G (right) by matching it to the G (left) 5 courses down. And, finally, the A (right) by matching it to the A (left) 5 courses down. You now have the entire Treble bridge “in tune” both left side and right side. **\*Note – if you have trouble getting that perfect 5<sup>th</sup> interval across the bridge please refer to the section on “Micro Tuning.”**

We already have all the “marked” courses in tune on the Bass bridge so now we need to finish all the notes in between (see Tuning Diagram #3). I start with the D just above the marked C on the right side of the Treble bridge and tune the corresponding D on the Bass bridge. These two notes are identical in pitch. Next move down one course to the C on the Treble and tune the corresponding C on the Bass bridge. Simply continue this pattern all the way down the Bass until you get to the A on the Treble and corresponding A on the Bass. As you can see we are now filling in all the notes in between the marked courses on the Bass bridge. For the last two notes ... the F# and E on the Bass you'll need to match with the F# and E on the right side of the Treble realizing that those two Bass notes are actually One Octave lower in pitch.

I am hoping that you are gleaned enough from these patterns to be able to extrapolate them to any larger size instrument you might have. One of the things I always do is play repeated notes, octaves, 5<sup>th</sup>'s, 4<sup>th</sup>'s, 3<sup>rd</sup>'s, etc. all over the instrument ... specifically seeking harmonious rather than dissonant tones. You want to train yourself to KNOW when your instrument sounds it's very best. And ... likewise ... to “hear” when something isn't quite right. The more finely tuned ... the better your overall listening experience will be ... and the more you'll enjoy practicing and the more you'll want to become a better player.

## THE MOST DIFFICULT NOTES

The most critically difficult notes to tune are the ones at the extreme ends of the instruments range. It can be a little tricky to get them so that they add those dynamic finishing touches to the piece you're playing. In my experience I have found them to require the most attention. The highest couple notes, in particular, on the Treble bridge (and high chromatic notes if you have them) are probably the most “finicky.” I use the word “critical” because if you pay extra attention to these notes it can really pay dividends in your performance. Likewise ... the very lowest notes need a little extra attention as well. This applies to the bottom of the Treble bridge, the Bass bridge and the Super Bass Bridge (if your instrument has one).

## MICRO-TUNING

Your bridges are NOT glued down to the soundboard. This is a good thing. It is entirely possible that with time, atmospheric changes, travel, setting up and tearing down your bridges can “microscopically” move! This is of little consequence with regard to your Bass and/or Super Bass bridges but it is critically important with regard to the Treble bridge. The reason is that you play on both sides of the Treble bridge and for both notes to be in perfect tune (most commonly a 5<sup>th</sup> interval) ... that bridge needs to be dividing the string courses at an exact point. For 5<sup>th</sup> interval Hammered Dulcimers this means the bridge divides the courses with two 5<sup>th</sup>'s of the strings

total vibrating length on the left side ... and three 5<sup>th</sup>'s of it's vibrating length on the right side. This 1/5<sup>th</sup> difference is what gives a Treble course it's 5<sup>th</sup> interval tuning. Examples: A to E, D to A, G to D, C to G, F to C and so on.

#### WHAT IF YOU HAVE A SINGLE STRING OR COURSE THAT WON'T TUNE CORRECTLY?

Sometimes you will have just one particular string, or course, that once you have it in tune on one side of the Treble bridge ... you just can't seem to get that perfect 5<sup>th</sup> on the other side. When you tune the "bad" side ... now the original side is out! Frustrating!!! If it's just a single note or course ... here's what you can do. Let's say you have the right side perfectly in tune but the left side is always "sharp." That means that the vibrating length on the left side is too short thereby raising the pitch ever so slightly! You can lengthen that string or course by repositioning the string(s) where they go over the left side bridge cap ... DOWNWARD toward the bottom rail. You only need to move them 1/16" or so. Now try tuning and see if that did it. If not ... you can now shorten the opposite side, thereby raising it's pitch, by repositioning that string or course where it goes over the right side bridge cap UPWARD, just a little, toward the top rail. What we are trying to do is achieve that perfect two 5<sup>th</sup>'s to three 5<sup>th</sup>'s ratio in that string or course so that it will tune to a perfect 5<sup>th</sup> interval.

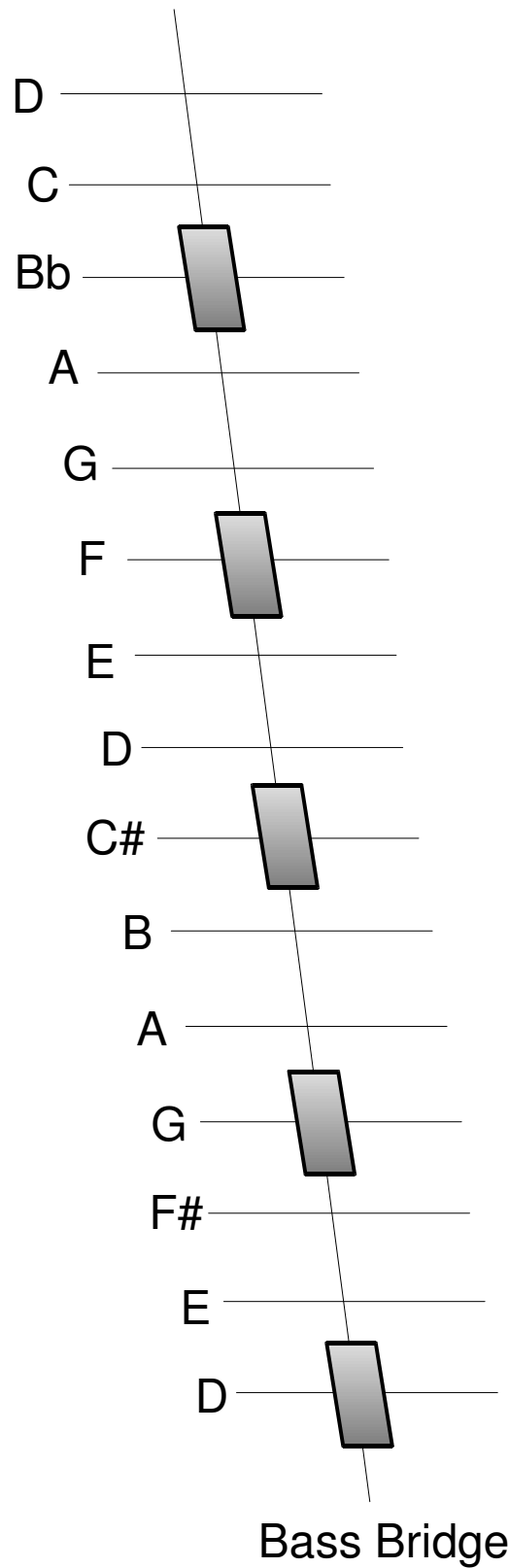
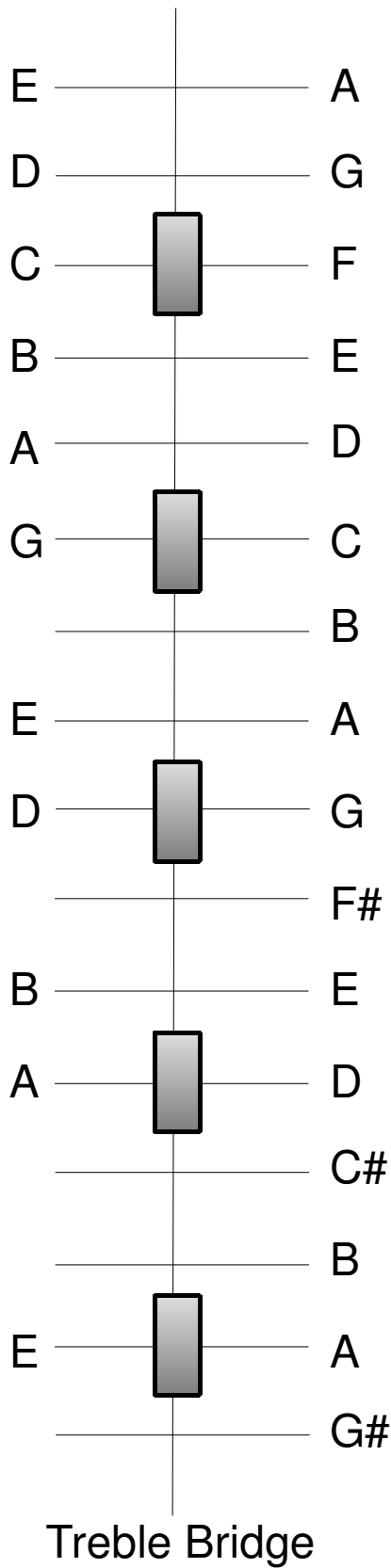
#### WHAT IF YOU HAVE A "SECTION" OF STRINGS THAT WON'T TUNE CORRECTLY?

It is possible that you could have a section of the Treble bridge where several notes in a row fail to come into perfect tune. Now it's time for a "gang" adjustment! For that you'll need to "microscopically" move the whole bridge in that section. You will only need to move it a very small amount. With movement to the soundboard it could have thrown the bridge in that section just slightly off that perfect 5<sup>th</sup> interval. We have a tool we've delicately named a "Bridge Banger" that was created expressly for this purpose. Ok ... so you have a short section ... say 3 or 4 courses where the right side is perfectly in tune but the left side is "sharp" ... and when you lower the left side the right side goes "flat." Again ... frustrating! This means that two 5<sup>th</sup>'s to three 5<sup>th</sup>'s ratio is just slightly off. In this scenario you slide the Bridge Banger between the courses in the troubled area on the left side (or sharp side) right up against the bridge ... and "bang" ... or firmly tap it ... with a hammer. You'll likely hear an adjustment. The BB is angled slightly and has felt along the bottom and end so as not to damage the soundboard or bridge as you "tap" it. You might need to do this in between several courses to make the full adjustment. Again, re-tune and see if this has solved the problem.

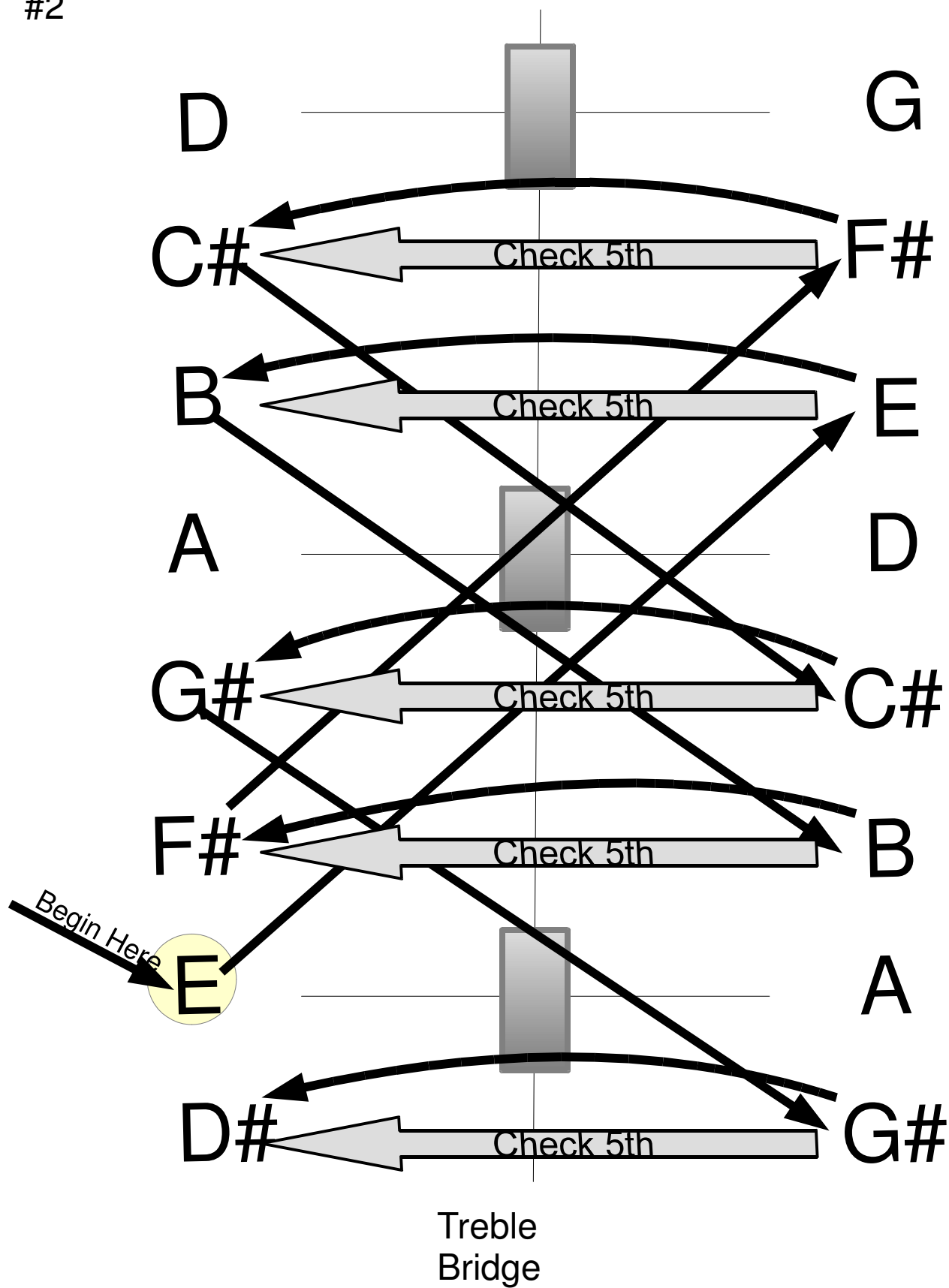
**I AM ALWAYS AVAILABLE TO WALK YOU THROUGH THIS OVER THE PHONE – 828-301-1622.**

# Tuning Diagram #1

\*I always begin tuning by getting all the marked courses tuned first.



Tuning Diagram  
#2



# Tuning Diagram #3

