

Some thoughts related to learning how to tune aurally.

1. Anything worth doing is hard. Your ears, your arms, your hands, your whole body has to do some aural and physical heavy lifting, and expecting to handle heavy weights right away will just lead to frustration. Practice and patience are the basic keys to success. Practice gives your ears and muscles the strength, stamina and patience to make fine, stable adjustments.

2. Don't neglect the book learning. The more you know about the acoustics and physics of things, the more professional you'll be. Knowing more about the process helps and is helpful in dealing with musicians and other tuning folks. William Braid-White's book *Piano Tuning and Allied Arts* is a good basic start, if you don't mind dated language. Some more recent texts also are good but have problems with the language/description of the tuning process; they tend to make tuning more complicated to understand than is necessary, IMHO. Learning the physics is helpful to the brain but doesn't translate into ears and muscles that have to actually do the work.

3. It is my opinion that recent temperament sequences put too much emphasis on the stacked major thirds. Getting three thirds in an octave to be slow/medium/fast beating is a very difficult task, especially for beginners. I find the wider intervals can't be neglected. One of the unrecognized and neglected beauties of the old Braid-White temperament is how he used fourths and fifths. In most cases he tuned the top note of the fifth to the already tuned bottom note. And he tuned the bottom note of the fourths to the already tuned upper note. This is a great strategy for beginners. Tuning the top note of a fifth allows you to hear a note move into pure. Then as the tuning hammer is released the note relaxes into a tempered fifth. And the same things applies when tuning the bottom note of a fourth. This simple procedure uses the natural tendencies in a person's ear and arm to move toward a properly tempered fifth or fourth. There's nothing wrong with a temperament that is heavy on fourths and fifths, but fourths and fifths won't get a great temperament by themselves.

It takes practice to hear fourths and fifths correctly and get the feel of the tuning pin and string. But there's help: the checks for fourths and fifths. After tuning the top note of the fifth or the bottom note of the fourth, use the fifth check (M6th:M10th) and the fourth check (M3rd:M6th). The beauty of those checks is that the sixth always is faster than the other half of the check. If the two intervals of each check beat at the same speed, the fourth or fifth is pure. If the sixth is slightly faster, the fifth will be narrowed or the fourth will widened. But for all this to work, you have to be sure you're working with the top note of the fifth or the bottom note of the fourth. And you have to know the basic temperament physics that dictate that fourths must be wide from pure and fifths must be narrow. Incorporating Braid-White's ideas makes tempering fourths and fifths somewhat easier.

The tricky part is knowing how much faster the sixth has to be. "Slightly" is a word that is at the heart of good tuning. And for our profession I'd define slightly this way: If you can say to yourself, "Well, I think that the sixth is faster but I'm not sure," then you've probably got the right amount of "slightly." If the sixth is slower, you're totally wrong. You're on the wrong side of pure. But if you can definitely say the sixth is faster, then "slightly" is probably too much. It's that little bit of difference that you're looking for.

4. Every tuner is looking for a temperament sequence that gets the first three or four notes perfectly set. There is no such temperament. Yes, the stacked thirds seem to be able to do that,

but getting the three stacked thirds right is more often from luck, not ability. You'll probably have to alter those notes as you continue to finish out the rest of the sequence. By the same token, a good temperament is one that allows you to be reasonably confident after the first six notes, or roughly halfway through the sequence.

5. Most temperament sequences will work. Where some beginners run into problems is that they keep switching. Temperament hopping doesn't help. Stick with one sequence long enough to really memorize the steps. If you have to keep asking yourself what comes next, then you're not there yet. Good aural tuners eventually get to the point that the sequence of steps is almost irrelevant. It's being able to work with each note, bounce around from note to note, use many checks/tests, and keep the final result in mind that works best.

6. Use the checks that have two intervals that are the same beat speed. The best of these is the so-called "inside-outside" test. In this case, the inside interval is a M3rd and the outside interval is a M6th. That is, as an example, the M3rd, G3 to B3, is the same as the M6th, F3 to D4. Moving up or down gives the same result; the inside major third will always be the same beat speed as the outside major sixth in the temperament and midrange areas of the piano. And if you can make this test come out right, you've done an excellent job. It takes a good tuner to get the inside-outside test to work out throughout the temperament. The four notes of that test have to be exactly right.

7. Neighboring major thirds differ by only half a beat. That is, for example, the F3:A3 is only half a beat slower than F#3:A#3. That's really the definition of "slightly." It's also the point of compromise. Sometimes you end up with neighboring thirds essentially beating at the same speed; trying to get them perfect will not necessarily make your temperament any better and may actually affect the stability of your tuning of the string. Maybe you're having a bad day. Or maybe the notching of the bridge or the placement of the bridge pins was just not ideal. Actually you should expect that. Piano manufacturers try to get things right, but wood is not metal. It's shifty and forces compromise. Tempering is compromise right from the get-go. A good tuner knows when to just let go and move on to the next note.

8. Pianos don't lend themselves to some arbitrary definition. Each piano tells you what is going to work for that instrument. Let the piano speak to you, and follow where it's telling you to go.

9. Speaking of letting go, your tuning speed or pace is important. Don't dwell on one interval too long. Tune a note quickly, then jump to the appropriate checks for the note. Keep moving. That not only helps you to tune faster but can actually help your accuracy. You're not really trying to get each interval perfect; you're trying to tune each interval and then keep making adjustments as you go so that the final result of your completed temperament is as good a compromise as you can get. You are essentially trying to tune all the notes at the same time, everything at once. That's impossible, of course, but by bouncing from interval to interval you can make adjustments as you keep adding each note of the sequence. As you add a note, you add a check to use to keep improving the notes that you've already worked on.

10. Once you've finished a temperament sequence, you're not done. In some ways, the real tuning skill comes into play. After the first pass you'll find that corrections will have to be made. An experienced tuner won't just start over from the beginning, although that's certainly an option. A good tuner will find the biggest problems, listen to many related intervals, and find a

compromise that solves the problem without ruining other intervals. Let's say, for example, the major third, G3-B3, is slower than F#3-A#3. If you check other intervals, some compromise will pop out. There could be four options--lower G, raise B, raise F#, or lower A#, or any combination of those four options. It's a puzzle that requires careful listening and analysis to figure out which note or notes need to be changed without screwing up another related interval. And making the change requires fine motor skills to actually move a string the tiny amount that might be needed to get the job done. All that can be the fun part: Working out the puzzle to find the best compromise and being able to put the string where it needs to be, and, most importantly, have it stay there.