Tuning Problems

There won't be a guitarist who hasn't sat in a guitar concert in which there has been endless fiddling with the tuning pegs.

There will be quite a lot, and I'm one of them, who's sat in a guitar concert and positively willed the performer to stop and tune up!

One of the emphases of these teach-ins is to include ensemble playing, and one of the most debilitating problems to affect any large ensemble is that of keeping in tune.

Why does it notice?

In any consonant chord, there is a very simple relationship between the frequencies of the component notes. For example, notes an octave apart vibrate at nHz and 2nHz. Notes a perfect fifth apart vibrate at nHz and 1.5nHz (yes, I know that equi-temperament corrects the latter a tiny bit, but the correction is tiny). If this exact relationship is broken by more than a minute margin, the effects become very audible and very uncomfortable on the ear.

Why does it notice so much?

On a solo guitar, one string can sometimes be a long way out before tuning problems notice. Try a chord of E on a well-tuned guitar, and then see just how far flat you can tune the G string and it still seems fine.

By contrast, in an ensemble, 2 unison strings on different guitars have to be very accurately in tune for them not to sound "honky-tonk".

Does an electronic tuner help?

Yes it does, but it only tells you what is wrong if you use it! It doesn't replace a musical ear, which will tell you what is wrong *during* the piece - a tuner tells you afterwards...

Why is it hard to tune by ear in an ensemble?

When two guitars in unison have a tuning problem, it's much harder than on a solo to determine what is wrong - the fault may be on "the other" guitar, or "this" guitar, or both can be out in opposite directions.

I vividly remember a (nameless) professional trio tuning frantically to each other and often correcting the wrong guitar, so that as the evening wore on, the guitars got lower and lower in pitch!

I recommend Intellitouch electronic tuners so that players can retune at the same time. I use them in the Hampshire Guitar Orchestra, and the different tuners on different guitars are always dead in step.

Why does a string go "out"?

Variations of pitch with temperature are well-known, and so is the drooping of pitch on new strings. But there are factors that make different guitars drift in different ways.

1. Makes of string
   I prefer D'Addario, which are very stable under changes of temperature. Other strings I've tried, such as La Bella, have a more "open" tone but require constant attention.
2. The state of the nut
   Rough nuts, pardon the expression, make wound strings jump suddenly in pitch as they re-seat. Graphite from a pencil improves this, and ensures all the wound strings on all the guitars change smoothly with temperature.
3. The amount of string on the peg-box rollers.
   Minimising the amount of string here will improve tuning stability under changes of temperature. See a neat knot to help with this in my Restringing article.

Why do strings go out more often in a guitar orchestra?

They probably don't, but it's easier to hear tuning problems because a guitar orchestra has different sizes of guitar. Different sizes of guitar have the same note on different strings - a note on the G string (notoriously difficult to tune - see below) of a prime will be on the D string of an alto (much more stable) - changes in temperature affect one more than the other, leading to that honky-tonk sound again.

A perennial problem

It's quite common for guitarists to have particular problems tuning the G string and there are a couple of reasons why ...

1. A lot of guitarists check their tuning by playing the chords of C and E. A guitar that is perfectly in tune will not sound "out" playing the E chord, even if the G string is flattened a massive amount. But a flattened G string will sound dreadful playing the C chord. Playing two chords is not enough to check that a guitar is in tune.
   Some professionals find that playing D and A is a good way to check string 3 (A) against string 4 (D) and string 1 (A)
2. In most string sets, the G string is one of the least taut strings, as well as being the least flexible. These two attributes combine to make the G string go sharper and sharper the higher up the neck one plays, because the edge effects of a stiff, thick string, get larger (in proportion to the active length of the string) higher up, making the active part of the string disproportionally short.

More recent string sets, such as the D'Addario Composite set, have a high-tech G string that is thinner and tauter, and the problem is not only solved but there is often a greater stability against changes in temperature too.

See also my Equal Temperament article