

A just cause and impediment to singing in tune

Many remedies are suggested for *a cappella* choirs which lose pitch: for example bright vowels, smiley faces, good posture, controlled breathing. Whilst all of these supposed cures are laudable, and should surely be upheld as good singing practice, I do not believe that they tackle the root cause of why choirs go flat, and why tuning is always a problem in *a cappella* choral singing.

My experience is that the problem goes far deeper than posture or breathing. It is rather a fundamental and immanent aspect of the relationships between the notes of the scale. That this is a problem has been known since Pythagoras' time, when he found that the circle of fifths did not get you back to where you started. This created such difficulties with tuning that thirds and sixths were regarded as dissonances in mediaeval times, and it was many years before the seventh really found its place in the scale. The problem was also described like this: "Tonus enim in duo aequa dividi non potest" ("A tone cannot be divided into two equal parts").¹

Since then, many attempts have been made to resolve the problem, and the solution favoured at present is equal temperament – which uses more modern technology to do precisely what was previously impossible: to render all semitones equal. To achieve this, equal temperament makes all the intervals on the keyboard slightly wrong (except for the octave), on the grounds that this slight out-of-tune-ness is a) barely noticeable and b) outweighed by the advantage of being able to play in lots of different keys and to use exciting harmonies.

However, the intervals on the keyboard and other fixed-note instruments are not the natural intervals. The harmonics clash. **The fourths and fifths are slightly less than perfect, and as for the other intervals: the major third is too major, the minor third too minor, and the major seventh most unstable.**

When a choir sings with instrumental accompaniment, the problem is mostly solved by the instrument leading the voices, which follow the prescribed intervals. But when the choir is singing *a cappella* (or, worse, is performing one of those pieces when the accompaniment pops up again at the end to check whether the choir is still in tune...) there is nothing to guide the voices any more.

¹ A. Ornithoparchus: *De arte cantandi micrologus*; Cologne, 1535, C2v.

It is perhaps possible to try and force the *a cappella* voices to stick to the notes dictated by the keyboard, but ultimately the choir will want to do what comes naturally, and that is not to sing in equal temperament. **Instead, the singers listen to and are guided by one another.** The voices will want to follow natural harmonics and natural intervals. This natural system of tuning is known as “just intonation”. In German, it is called “reine” or “pure” intonation.

Left to itself, a major chord will be sung with the third slightly below that on the keyboard; a minor one with the third slightly higher. Because the harmonics no longer clash, the choral sound is much more wholesome.

Example 1:

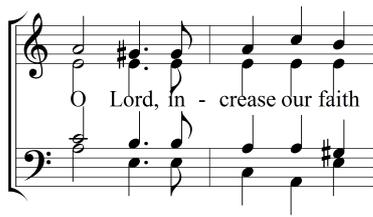


But the problems come when a note which fulfils a particular function in one chord fulfils a different function in relation to the next chord. In example 1, the third at the top of the first chord of a perfect cadence “Amen” is also a leading note to the tonic in the next chord. And when we think melodically, rather than harmonically, we tend to sing a leading note slightly high: somehow, it makes the melody sound brighter. We expect the interval in the melody between the leading note and the tonic to be “narrow”. If, however, the F# in the example has been sung naturally as a just intonation third, singing a narrow interval to the G will produce a flat G.

So the choir is left with several choices: to try to sing *a cappella* in equal temperament – pretty much an impossible task; to sing the third naturally and risk being flat on the tonic; to sing the third a bit higher, making it clash with the harmonics of the rest of the chord; or to make the interval from the (flat) leading note to the tonic a bit bigger.

I believe the latter solution is the best one for this simple problem. Both notes then fit in with the underlying harmonies and the harmonics; it is quite simply the “natural” way to sing. All the director needs to do is to draw awareness to the sopranos’ need to sing a “large” semitone, and they will get to where they want to go.

Example 2:



Another example: the opening of Loosemore’s *O Lord, increase our faith* (example 2). When I was singing the tenor part of this piece in a choir recently, I observed how the sopranos were going flat in the first two bars when all four parts were singing. This was because they were naturally taking the G# as a third rather than a leading note, and failing to get back up to the A again. The director also noticed the problem, stopped the piece and had the sopranos sing the section on their own – and now they stayed in tune, since their intervals **were melodic** and not affected by the harmonies provided by the other voices. But when they sang the passage again with the other parts, the problem naturally returned. The solution: once they learn that the semitone back up has to be a “big” semitone, the problem is resolved.

I have taken two examples of the tension when the same note functions as a third and a seventh; similar problems exist of course **with other intervals**.

Obviously, these are simple examples, and things quickly become very complicated, since any note in one chord will have its particular function and a specific relationship to the next chord – all the more so in music which modulates all over the place or uses rich harmonies. So how can a choir cope with the complexities of these relationships and stay in tune?

I don’t believe it is possible for a choir to work out or be taught every interval of a piece in this way; choir members are alert, intelligent and interested members of society, but cannot be expected to analyse all the harmonic relationships so that they can cope with tuning problems on their own. Nor is this necessary. What is rather necessary is that the director is aware of the pitfalls of intonation. He or she can then advise the choir to make a certain interval larger or smaller as required – with a brief explanation of why this is the case. Sometimes it is sufficient to focus on one recurring interval. For example, when my choir performed Pearsall’s *In dulci jubilo* last Christmas, I made sure that the choir took the third of the melody slightly higher throughout, and we stayed perfectly in tune.

I myself have sung in many choirs since I was a small boy, but had never heard of just intonation until 35 years into my choral singing career (and 15 years after I started directing choirs).

The question I ask myself is: why is something so fundamental not generally known and taught? Ross Duffin begins his book *How Equal Temperament Ruined Harmony (and Why You Should Care)* with an anecdote about one of the world's leading orchestral conductors who couldn't get a chord progression played "in tune" by his orchestra and, being ignorant of the effects of equal temperament, couldn't understand why. I actually found the anecdote rather reassuring: whilst musicians are taught that equal temperament exists, and possibly also told that other temperaments used to be used, no-one seems to teach the implications of such intervallic distortion for practical music-making. I was clearly in good company during my many years of ignorance.

And yet, like many singers with a good sense of pitch, I was actually acutely aware of the distortions of equal temperament the whole time. I intuitively knew when to sing a larger or smaller interval; it came naturally to me and I didn't even realise I was doing it. But I couldn't teach it to others until I had some self-awareness and theoretical grounding.

I gained this theoretical underpinning by chance a few years ago when I stumbled on a book called *Just Intonation in Choral Singing*². I simply devoured it and found that it expressed and explained everything I already knew but didn't know how to say. Some of the maths was a bit complicated for me, but the upshot was that I now consciously understood why people sing intervals wrongly, and how this impacts on a choir's tuning.

I am now able to teach my choir³ to sing the intervals which will keep it in tune. I am not saying we never go out of tune any more, and some tonally complex works (like Britten's *The Evening Primrose*) still defeat us, but we can now sing entire *a cappella* concerts and remain bang on throughout. And if we do go out of tune, I can usually pinpoint an interval where a brief loss of concentration or a lack of awareness took us out.

² Before you get too excited, you should know that I found it in the Staatsbibliothek in Berlin, and that it is in German and is actually called *Die reine Intonation im Chorgesang* by Bettina Gratzki, Bonn, 1993, 300 pp.

³ The Embassy Singers in Berlin, Germany: www.embassysingers.de

The fundamental shift in perspective between other methods and this approach is that the focus is no longer on the note which is sung, but on the interval between the notes to be sung.

I believe that the relationship between equal temperament and just intonation should form part of the standard knowledge of every choir director. If I can teach intervals to my mixed-ability choir, it must be possible to do it with any interested choral group. It would be wonderful if others do not have to live in ignorance as I did for many years, or have to chance on a scholarly German text before they find the way. There is a need for a simple manual on the implications of equal temperament and just intonation for *a cappella* singing aimed at choir directors.

Now I just need to work on the choir's breathing, posture and vowels, and to keep them smiling!