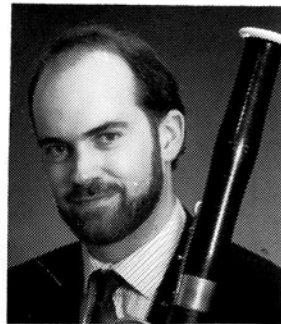


SOME THOUGHTS ON INTONATION

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One of the most important aspects of performing on non-fixed-pitch instruments like those of the woodwind family is learning to play in tune. This article is intended to outline some general concepts of good intonation, without going into specifics for the different instruments.

Learning to play in tune involves several different tasks: using a correct embouchure, correct fingerings, good support and air management, having well functioning equipment (instrument, mouthpiece, reeds), playing in tune with oneself, and playing in tune with others. In this article, I will only address the latter two of these.

Playing in Tune with Oneself

I sometimes have students ask why they have to always learn and play scales. My answer is that scales and arpeggios form the basis of the vast majority of music that they will be playing. Learning to play our scales makes us more technically fluent on the instrument in the different keys, helps us to recognize the different and familiar patterns present in our music, and, finally, helps us to learn to play in tune with ourselves. Early on in our musical training we learn what a major scale sounds like and perhaps its structure of whole and half-steps. When playing a scale, the performer should be checking what they play against their memory of what the scale is supposed to sound like. This concept of mentally "hearing" or even "singing" the notes before and during playing is an extremely important aspect of playing in tune.

If possible, I try to encourage students to actually physically sing scales, and even passages or entire songs for their instrument. This removes all problems of fingerings, reeds, etc. and allows them to hear where the notes are supposed to sound. When they get the pitches correct I then have them try to recreate what they just sang on the instrument, listening to the (hopefully still correct) pitch in their heads and matching the physical pitch on the instrument to it.

If the students have difficulty doing this then there are a few ways that I have found to help. You can find a tuner capable of playing pitches and have them play the scale slowly while the tuner plays the tonic note. This allows them to refer to the tonic, and can increase awareness of intervals. Another way is to play along in unison or octaves with them so that

they have a moving external pitch source to try and match. Over time when they learn to do this then have them try to internalize the pitch source that they are matching by "singing" inside their heads. Now, when I hear this singing inside my head it does NOT mean that I am crazy and talking to myself! As stated above, I am memorizing and internalizing a reference pitch source to match on my instrument. The singing in my head is not even in my own voice, but is my ideal voice — perfectly in tune, with wonderful tone, excellent vibrato (if applicable), exceptional dynamic control, and appropriate phrasing. I then try to recreate this ideal voice on my instrument. The fact that I can never be as perfect only makes me try harder.

Of course, there is a wonderful tool in helping us to learn to play in tune — the electronic tuner. I have already suggested using the abilities of many tuners to play pitches. All of them also have a visual cue to guide intonation. I believe that a tuner is a necessary and most useful tool, but it has some potential traps. Many players come to lean too much on the visual feedback from the tuner, they are only in tune if the needle on the gauge is straight up or the circle stops spinning. It is vital for a player to **hear** and even **feel** where a note is in tune, rather than to just see it.

The best tuners in the world need to become the ones on either side of your head — your ears. Have students play games or challenges, play a note with their eyes closed, when they think that the note is in tune then open their eyes to see what the tuner says. If it is in tune then they can go on to another note, if not they should try again. The better a player learns to **hear** in tune the more often they will be correct with the tuner.

Eventually, they will not really need the tuner to know if they are in tune or not. As stated above, a certain degree of this process can be aided by feel. One should learn what it feels like to play each of the notes on the instrument in tune. Often there are slight differences in the combinations of embouchure, support, oral cavity, etc., as well as fingering changes. If these are memorized for each note then it becomes a lot easier to find the correct pitch every time. Each player should also learn to compensate for their own instruments' idiosyncratic pitch tendencies. For example, there are

certain pitch tendencies of most flutes and clarinets which must be learned and adjusted for appropriately, but the scales of specific instruments vary a lot. No two flutes, for example, play with exactly the same intonation.

Playing in Tune with Others

If one learns to play well in tune with oneself then playing in tune with others is usually not a huge problem. However, there are some tips and suggestions that I would like to make. The first suggestion relates somewhat to the concept of internal singing mentioned above. When trying to match someone else's pitch, listen much more to the other person than to myself. I hear their note and picture it as a large round object with a hole in the center like a donut or bagel. I then try to fit my note inside the hole to make a solid circle.

To do this, I listen perhaps 90% to the other person and 10% to myself. The process is very similar to the ideal voice in that I simply try to emulate their sound — pitch, and even tone so that it will blend well. I do not think of flat or sharp usually, just trying to be the same. Sometimes how my ears tell my brain what changes to make to get the note in tune. I have found that if someone thinks only in terms of being flat or sharp, that they often do not make the right amount of adjustment, often over-compensating.

A golden rule of intonation that was drilled into me from an early age is that **if there is an intonation problem, assume that you are the one who is wrong and try to fix it!** If everyone assumes that someone else is at fault then nobody will move and the problem will remain. If everyone tries to fix it, it can also lead to problems (see below) but often will help. If you try to fix it by moving in every conceivable direction and the problem persists, then go back to where you think that your note belongs and hope that someone else will move to fix it. It is usually best if one person keeps their note steady and the other tries to match it, otherwise it is hard to hit a moving target.

Again, games can be devised with two players taking turns to be the one

who keeps the note steady while the other moves to match. Obviously, the complexity of this game is altered depending on the note being played, the instruments involved (2 clarinets is pretty different than flute and oboe, for example), and how many players are trying to match pitches. This game can be done in unisons and octaves, then branch out to 5ths, 3rds, 4ths, 6ths, etc. Get students used to constructing chords and making them in tune. Most people advocate building either from the bass upwards, and/or tuning all the roots, adding fifths, and finally thirds to triads.

Students should be made aware of the acoustic principle of "beats" or "waves". Every note that we play has a specific frequency. $A=440$ means that the pitch resulting from a sound vibration oscillating 440 times per second (440Hz) is called A. If one player plays the note at 440, and another plays it at 441 or 438 cycles per second then the notes are out of tune and this will set up an additional sound which is often referred to as "beats" or "waves." The beat is created by the two notes being out of synchronization. The further out of tune the note is, the faster the beats will become.

Conversely, the closer to being in tune the notes are, the slower the beats will become until there is absolutely no beating heard when the note is in tune.

This signifies that the notes are oscillating at the same frequency and are now synchronized. Games can be played having students deliberately play in and out of tune so that they can hear and identify these beats. Then have them use them to know if they are in tune or not by trying to make the beats go away.

Playing in tune with others involves a lot of compromise. If your note would be perfectly in tune with the tuner, but everyone else in the band is higher in pitch, then you will be the one who is out of tune! Intonation is not absolute, it is continually shifting, and the better players are moving along with it.

In the woodwind family we also face an intonation problem not found amongst the strings or brass. The woodwind instruments are all so different from one another that they can have opposite tendencies. An important example is that when a clarinet or saxophone crescendos, it tends to go flatter. Flutes, oboes, and bassoons on the other hand will tend to go sharper. This means that if we get a woodwind chord in tune at one dynamic it can fall to pieces if the chord crescendos (or diminuendos for that matter!)

There is also the issue mentioned above of each different instrument having different pitch tendencies. Clarinets have the flat throat notes and chalameau,

flutes a flat low register and sharp high register, etc. Even if these flat or sharp notes occur at the same place on different instruments it is unlikely that they will be the same amount flat or sharp.

There are various methods of altering intonation on the woodwinds. Of course if the instrument is sharp overall then it can be lengthened by pulling out. On the fly there are other methods of altering intonation, some good, some not-so good such as: changing fingerings, rolling a flute in or out, moving the jaw up or down, taking more or less reed/mouthpiece in the mouth, etc. A technique which is fairly well established in the double reeds and the flute, and which some single reed players also advocate is the use of different vowel-sound configurations in the oral cavity.

Essentially, the more that you think towards an E sound, the higher the pitch. More towards a U or O the lower the pitch. I like to use this method a lot because it is unobtrusive, having little effect on air, embouchure and fingerings; and it allows for small, delicate changes, which should be all that are needed to adjust if the player really knows their instrument well and has placed the note close to where it should be. The more that students learn their own instruments, and then learn to listen and adjust, the better in tune they will be.



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