A PRIMER ON TRANSPOSITION FOR COMPOSERS, ARRANGERS, AND ORCHESTRATORS

By Jim Williams

During the initial run of the Rimsky-Korsakov course, I received numerous emails asking why and how certain instruments *transposed* when they read music…why does the middle C on his page sound like an F when he plays it, and why does the middle C on her page come out as a B flat? In this lesson, I'll explain a bit of the history behind transposition and explain why it is still logical today, in scores and in parts. We'll also look at *how* transposition works and how to make sure your scores and parts look and sound right! Since I am a brass player, I will stress brass instruments, but the principles of transposition are universal and apply to members of the reed family as well as to the brasses.

PART 1--BV: Let's travel back to the BV (before valves) era…If you were a brass player, you couldn't really play a chromatic scale. While you didn't have to worry about what valves to push, you did have to have a keen ear to make sure the right pitch came out of the horn. Additionally, if you wanted to be fully prepared for any gig, you had to carry around a bunch of *crooks* that changed the fundamental pitch of your horn to accommodate the most common keys of the day (probably D, Eb, E, F, and G). Composers usually did you a favor by sticking to those common keys and not straying very far from them, so you didn't have to swap crooks too often during a piece or spend too much money on a complete "any-key" crook set. While this angered crookmakers, they still made out OK. A good horn player could change a note a little bit by moving his or her hand into or out of the bell and/or "lipping" a pitch slightly up or down, but you can imagine how it sounded. Even if it sounded OK pitch-wise and didn't "frack," it wasn't real loud and didn't project, so composers didn't write too many of the "hand-adjusted" notes. As it turned out, horns in Bb alto were very bright and tended to cut through too much, and horns in Bb basso (an octave lower, hence twice as long) were too mellow and muffled (and the crook hit an awkward place on most hornists)…that's why the horn was keyed in Eb or F, even with valves…Eb and F were nice balance points between "too piercing" and "too mellow!"

Figure 1: Natural (Valveless) Horn with crooks

Without valves, the horn was limited to the notes of its overtone series, about which you read in the R-K material. The most usable notes were the second through eighth/tenth members of the series. They are root, fifth, root, major third, fifth, minor seventh (but quite flat), root, second (iffy), and third (also iffy—instruments then weren't as well-built as they are now!). The Maynard Fergusons of the day might have had an extra overtone or two, but such notes would be very piercing and would certainly have covered the strings and singers up. If you get the impression that valveless horns were mostly limited to roots, thirds, and fifths in orchestral playing, you are right, and composers of the day mostly agreed with you.

Here's the start of transposition…to make life easy for the horn player (they were as neurotic then as they are now), composers got the brilliant idea to just tell the horn player which crook to use. Since they were playing mostly roots, thirds, and fifths, the convention became to call the notes Middle C, G, C, E, G, Bb, C, D, and E. A written Middle C on *any* horn part simply meant "play the second member of the overtone series of whichever horn you happen to be playing right now," so it meant E for an E horn, G for a G horn, etc. Likewise, a written E on the top space meant "play the fifth member of your horn's overtone series, and so on. (If you have been paying attention so far, you'll

note that I haven't mentioned the first note of the overtone series, the fundamental or "pedal tone." It can be really flatulent and irritating in the hands and lips of a poor player. (A good horn player can make it sound nice, though)

PART II—AV: The biggest single breakthrough for brass players came when the valve was invented in the 1830s. Originally, the valve was designed solely as a device for quick crook change, but several instrument makers quickly realized that they could make *fully chromatic* brass instruments by using three valves instead of one. The first valve would extend the tube length by one step, the second by a half-step, and the third by one and one-half steps. That allowed valved brass players to play chromatically throughout the range of their instruments. At this point, since you are so intelligent, you are likely thinking...*aha...no more need to transpose! Fully chromatic!!* Sorry, WRONG!!! If anything, the switch to fully chromatic valved brass *strengthened* the case for transposition

PART III—WORKIN' IN A COAL MINE: Let's move forward a few years to the 1850s-60s and go down into the collieries in Great Britain...their equivalent of the company bowling team was the brass band...kept the miners out of the pubs and steady on the job. Here's a colliery band from the 1930s. Think about all the instruments EXCEPT the trombones...

Figure 2: Colliery Band, 1930s style. See the cornet player at the left of the back row? If he had to switch to tuba or horn tomorrow, he could…because of TRANSPOSITION!!

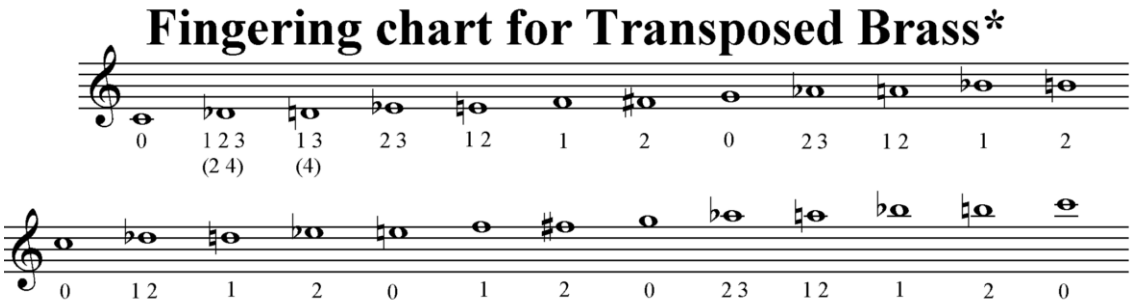
Unfortunately, there was frequent personnel turnover in the mines...a great tuba player in one mine would move or pass away, which would force a baritone, cornet, or euphonium player to switch to the tuba to keep the band going. Additionally, many bands started local youngsters playing in order to keep the supply of players ready and able. This, too, required transposing...let's see why!

PART IV: IT'S 2007...WHY ARE WE STILL TRANSPOSING?? Enough history, already!! Even though the day of the colliery band is long past, the system of transposition is still with us...WHY? The answer lies in the benefits transposition offers for performers, composers, arrangers, and conductors. Let's look at each of those groups in turn:

FOR PERFORMERS--ONE NOTE, ONE FINGERING...REGARDLESS OF INSTRUMENT: Very often, brass performers have to switch between instruments in the same family. So do saxophonists and clarinetists. This is a carryover from the brass band days as well as the concert band days.

Return to our colliery band above...It could be traumatic for a baritone or trumpet player to have to move to the tuba if we did not have the system of transposition above. For valved brass, the brass band rule was/is as follows: MIDDLE C IN TREBLE CLEF IS THE "MAIN" NOTE OF THE INSTRUMENT, THE SECOND MEMBER OF THE OVERTONE SERIES. So any valved brass instrument could have a common instruction book as well! One book would work for cornet, tenor horn, baritone, euphonium, or tuba!! (On a side note, I maintain that's why the UK and its brass bands produce such virtuoso euphonium and tuba players—they can and do read off the same music as trumpets without thinking twice about what it's written for—all preconceived notions of what low brass can/can't do are cast aside!)

So, in a Brass Band, ANY valved instrument will read the treble clef and transpose (even the tubas!). When the performer sees the notes below, s/he automatically knows what buttons to push...see how that makes switching as easy as it can be? Now, we don't do *all* of this in a modern orchestra—tubas don't transpose, but all other valved brass *can*.



* Well, the French Horn is odd. Its pattern starts on middle C but uses the fingering an octave above...so for F horn starting on written middle C, it would be 0, 12, 1, 2, 0, etc.

This is also helpful to the high school band director. Frequently, school bands will have an excess of trumpets but few euphoniums. A director can move a trumpet player to euphonium and the player can be productive as soon as s/he learns how to blow into the euphonium—no need to learn a different fingering as well.

IT'S NOT JUST FOR BRASS: Though I don't outline it here in as much detail, the same principle holds true for much of the woodwind families...our school band director above is likely to have an excess of Bb clarinets but few alto clarinets in Eb or bass clarinets in Bb, etc. The director, thanks to the concept of transposition, can move a Bb clarinet player to any other member of the clarinet family, and the player can become productive almost instantly. Same holds true for the saxophones—one note, one fingering, and virtually instant productivity regardless of which saxophone the player goes from or to.

FOR PERFORMERS: WHAT THE (&^*&%*$&^ NOTE IS THAT??? Transposition also helps to avoid writing excessive leger lines. That helps sightreading and keeps the layout of parts and scores neat and intact (which has the spillover benefit of preventing excessive arborcide and thus is an environmentalist's delight).

For me as a euphonium player, the F above middle C is two leger lines above the bass staff, but is written as the G on top of the treble staff in a transposed part. The B flat four leger lines above the bass staff is the C two lines above the treble staff in a transposed part.

FOR CONDUCTORS, COMPOSERS, AND ARRANGERS: SIGHT IS SOUND AND TONE COLOR!! Most conductors I work with and for prefer transposed scores, because the transposed lines indicate not only what pitches are to be played but also a TONE COLOR that the conductor expects...the general rule for transposing instruments (especially brass) goes like this:

1. From about Middle C to the G on top of the treble staff is a transposing instrument's "CASH REGISTER"—the range where it spends most of its normal time and produces its "most characteristic" sound.
2. Notes ABOVE the staff are in the instrument's upper register, and we should expect a different timbre from the cash register.
3. Notes BELOW the staff are in the instrument's bottom register, and we should expect a different timbre from the cash register.

For example, consider a trumpet in Bb. If the conductor sees a written F# below the treble staff on the trumpet line of the score, s/he knows not only that the actual note is an E concert, but also knows that the note can not pierce through a dense texture—it's a LOW note for that trumpet. Likewise, seeing the written C two octaves above Middle C on that trumpet line sends the conductor a message that a Bb will sound, AND that the Bb will be somewhat piercing. For saxophones, a written Bb below middle C for ANY sax is at or near the bottom of the range and is going to HONK relative to notes above it. ALL arrangers, orchestrators, composers, educators, and conductors should know the ranges of the instruments they deal with and how each instrument sounds in each of its registers. Transposing allows these people to use one system of "sight=sound+tone color" to apply to ANY transposing instrument! How logical and efficient!!

On a more immediate and practical level, it's also useful for a conductor and performer to be on the same page (or at least on the same note) musically…Precious rehearsal or studio time can be wasted if a conductor is talking to a clarinetist about the F# in measure 19 and the clarinetist is saying "What F#?" The conductor is reading from a C score, but the clarinetist's part is transposed. The general rule is: The conductor looking at a score should see exactly what the player sees on his/her part.

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TRANSPOSING IN THE MODERN ORCHESTRA AND WIND ENSEMBLE: Here are some general rules to follow when writing parts for orchestral and wind ensemble instruments. For a quick summary, see the table at the end of this primer. All instruments that transpose will read TREBLE CLEF on their transposed part. DO NOT transpose ANY part INTO bass clef, regardless of where it started in concert pitch. The rule is that a transposing instrument's "main" note is written as middle C in the treble clef.

STRINGS:

*Violins never transpose. If notes are really high, use an 8va. NEVER use an 8vb sign in a treble clef part for ANY instrument.

*Violas never transpose. They normally read alto clef, but if parts are very high for protracted periods, a switch to treble clef is OK.

*Cellos never transpose (see a pattern emerging here?). They normally read bass clef, but high passages can use tenor clef, and VERY high passages can use treble clef.

*Basses **never** TRANSPOSE. Of course, they read bass clef, but to avoid excessive leger lines below the bass staff, you should write bass parts AN OCTAVE HIGHER than you want them to sound. Basses also use tenor clef for extremely high parts and make a very rare excursion into the treble clef for some solo literature. No matter which clef is used, the "write an octave higher than the note you want to hear" rule applies! Remember…basses don't transpose…they see an E, they play an E…it just sounds an octave lower than the E you wrote. Remember that!

*Please don't engage in "clef hopping"…don't change clefs just for a couple of notes. Use clef changes for passages that are high for a while…and NEVER use an 8vb instruction in a treble clef part or an 8va instruction in a bass clef part for any instrument.

REEDS: (This will be a little more exciting)

*C Flutes (the standard orchestral flutes) don't transpose (OK, I lied…not exciting.). In fact they are used to reading multiple leger lines above the treble staff, so the 8va marking is not necessary except in extreme cases or if score room is tight.

*The piccolo also does NOT transpose…it sounds the note ONE OCTAVE ABOVE what the player sees on the page.

*The **ALTO FLUTE** is "in G"—its main note is the G a perfect fourth below the standard C flute. Any written note will result in the tone a fourth lower being produced when the player sees the part.

*The **BASS FLUTE** does not transpose…it sounds the note ONE OCTAVE BELOW what it sees. Don't write for this instrument in bass clef even though it's a "bass" flute.

CLARINETS: The three standard "small" clarinets in the orchestra are in Eb, Bb, and A. There are also alto, bass, contra-alto and contra-bass clarinets that provide a middle and bottom range for the clarinet family. They will all transpose, in order to maintain the "one note, one fingering (for the most part; nothing's perfect)" rule that allows easy switching between members of the clarinet family…

*The Eb Clarinet is the smallest of the three and adds some high-frequency energy to the clarinet section. When it sees a middle C on a part, it sounds the Eb above middle C.

*The Bb clarinet is the most common in the orchestra or wind ensemble. When it sees a middle C on a part, it sounds the Bb a step below that middle C.

*The A clarinet is part of the professional clarinetist's arsenal for orchestra playing. It is not used in wind ensembles. When it sees a middle C on a part, it sounds the A a minor third below the middle C.

*The alto clarinet is in Eb, a fifth below the Bb clarinet. When an alto clarinet sees a middle C on a part, it sounds the Eb a major sixth BELOW the middle C.

*The bass clarinet is in Bb, an octave below the standard Bb Clarinet. When a bass clarinet sees middle C on a part, it sounds the Bb a NINTH below the middle C.
SPECIAL WARNING: Instruments in this pitch range often pose unnecessary difficulties for composers and orchestrators when transposing. Let me simplify your life:

1. Never write for bass clarinet in bass clef—use the Bb treble transposition. It is the least common denominator and is universally readable.
2. Never write ANY part for ANY instrument in "transposed bass clef"!! Yes, I know that some famous composers did it for bass clarinet, but don't YOU do it. Yes, I know some composers also did "Bass Clef in A" as well. Just because earlier composers and arrangers committed travesties doesn't mean that you have to continue the tradition. A real pro CAN read transposing bass clef, but won't necessarily love you for writing it. A college student may or may not read transposing bass clef. Why tempt fate? Write the universally understood transposition—treble clef at the ninth. Do you wanna get your stuff played right, Or do you wanna prove to the world that you know esoteric transpositions?

*The contra-alto clarinet is in Eb, one octave below the Eb alto clarinet, 2 octaves below the small Eb clarinet. A written middle C will sound as an Eb an octave and a sixth below the Middle C—the Eb one line below the BASS staff.

*The contrabass clarinet is in BBb, an octave below the bass clarinet and two octaves below the "standard" Bb clarinet. A written middle C (always treble clef, remember??) on a part will sound as the Bb two lines below the BASS staff.

SAXOPHONES are, of course, a staple of the wind ensemble, but an infrequent participant in the orchestra. The common saxes are soprano, alto, tenor and baritone. A wind ensemble sax section usually consists of two altos, a tenor, and a baritone.
*The **SOPRANO SAX** is in Bb. When it sees middle C, the Bb a whole step below will sound.
*The **ALTO SAX** is in Eb. When it sees middle C, the Eb a sixth below will sound.
*The **TENOR SAX** is in Bb When it sees middle C, the Bb a NINTH below will sound.
*The **BARITONE SAX** is in Eb an octave below the baritone, so a written middle C will sound the Eb below the bass staff.

*The **BASS SAX** is in Bb an octave below the tenor, so a written middle C will sound the Bb two lines below the bass staff.
*Don't write bari sax or bass sax parts in bass clef at pitch, and don't even contemplate writing a part in transposing bass clef, remember?

DOUBLE REEDS:

*The oboe doesn't transpose. What you write is what you'll hear.

*The English Horn is neither English nor a Horn, so it better transpose, and it does. It is "in F," a fifth below the standard oboe. When it sees a middle C on a part, it will sound the F a fifth below.

*The bassoon doesn't transpose, either...but like the cello, you can feel free to use the tenor clef for extended passages in the upper register. Remember not to "clef hop," though.

*The contrabassoon does not transpose, but follows the string bass rule of "write the note one octave above the note you want to hear," since both of these instruments play notes so far below the bass clef.

BRASS:

The "standard" orchestral trumpet is in C (or Bb) these days...Other common orchestral trumpets come in piccolo Bb, piccolo A, Eb, and D. The piccolo instruments are used mostly for baroque repertoire, as are the D and Eb. The Eb is the modern-day equivalent of the instrument for which Haydn wrote his concerto. The vast percentage of orchestral playing will be done on a Bb or a C instrument. Wind ensembles use mostly Bb trumpets, but C trumpets are not uncommon

GENERAL RULE FOR TRUMPET PART WRITING: Write orchestral trumpet parts in concert pitch (in C) and let the performer choose the instrument!! Professional and good college players are trained in the art of transposition, so just write what you want to hear, but be sure to put "TRUMPET IN C" on the part. Write wind ensemble trumpet parts in Bb.

*The C trumpet does not transpose. What you write is what you'll hear.

*The Bb trumpet transposes as the Bb clarinet does. When it sees a middle C on a part, it sounds the Bb a step below that middle C.

*The D trumpet transposes. When it sees a middle C on a part, it sounds the D a step above that middle C.

*Similarly, the Eb trumpet transposes so that the Middle C on the part will sound as the Eb above—just like the Eb clarinet.

*The piccolo trumpet in A, seeing a middle C on its part, will sound the A above that middle C, and the Bb piccolo will sound the Bb above middle C when it sees middle C on the page. Piccolo trumpet players can pull out or push in a slide to change from A to Bb or vice versa. Orchestral and brass quintet lore is rife with stories of picc players who forgot to push or pull...and the resultant cacophony.

HORN: Oy! The instrument works in odd ways. No wonder the players are so neurotic! First thing you have to realize is that the modern horn in F has the same overall tubing length as the TUBA in F. The horn player is always playing on the upper partials of the instrument, which are very close together. That's why it's so easy to "frack" notes, in addition to having tubing that is relatively narrow for the pitch range and a small mouthpiece.

Furthermore, the horn player is playing TWO instruments in one. The thumb valve (you can't see it; the horn player wants you to think she has good high chops) switches the instrument from the main (longer) tubing in F to a smaller and shorter set of tubing pitched a fourth higher in Bb. Obviously, it is possible to play most notes on either "side" of the horn, but don't be misled into thinking that the Bb side is ONLY for high range. The decision of which side to use is a function of not only range, but:
*Tone color desired...the Bb side may be a bit brighter, the F side a bit mellower for the same note (or vice versa). The hornist will choose the correct sound (and fingering) for the musical context.
*Intonation...some notes that may be off on one side are perfect on the other side
*Fingering...some passages where fingerings might be awkward on one side only are facilitated by switching sides.
*Confidence...some notes may be squirrely for a player on one side but solid on the other.

GENERAL RULE: Do NOT tell the horn player what side of the instrument to use. Just write the part and let the performer sort out the fingering.

Horns are "In F." A written middle C in treble clef produces the F a fifth below the middle C. For horn, always write a pitch that is a fifth above the one you want to hear.

HORNY ISSUES: A few notation issues are unique to the horn. Here's how—and why--I do them.

***KEY SIGNATURE OR NOT?** If the rest of the music has a key signature, I say write one for the horns as well. Why do I say this? The use of key signature-less horn parts is a throwback to the days of the valveless horn with crooks, when horns played 90+% roots, thirds, and fifths. Modern horn players are perfectly capable of reading a key signature, so I see no need to use a throwback system of notation. Additionally, having parts with otherwise "normal" accidentals written in is bound to lead to additional copying mistakes. In wind ensemble music with a key signature, ALWAYS give one to the horns. Of course, if music is in open key signature, the horns will follow that pattern in both orchestra and wind ensemble.

***BASS CLEF HORN?** Sure, but reserve it for low notes, AND KEEP THE SAME TRANSPOSITION...Write the note A FIFTH ABOVE the note you want to hear. In the past, horn notation in bass clef was inconsistent between the usual "write the note a fifth above" rule and a rule of "write the note a FOURTH BELOW the one you want to hear." PLEASE do not contribute to the confusion! So if you want to hear a Bb two lines below the bass staff, write the F above it. NOTE: This bass clef notation is an outgrowth of the historical use of the horn as a "bass pad," often for the woodwinds. You'll also find that use of the horn in chamber music. The instrument has little agility in that range, so no sixteenth note runs, please...pad, remember?

***STOPPED HORN**: In addition to the regular open horn, and muted horn, stopping the horn (stuffing your right hand in the bell even further than normal) produces an interesting sound, BUT it changes the pitch. If you know what a stopped-horn passage sounds like, and want to hear one, write the normal horn transposition a fifth above the pitch you want to hear. Let the performer sort out how to produce it, usually involving a different fingering and/or a change of side while the right hand changes position.

***1st & 3rd, 2nd & 4th?** It used to be the case that the 1st and 3rd horns were "high note specialists" and the 2nd and 4th were "low note specialists." Today, a competent serious amateur, college student, or pro will be capable of both ranges. Low and high horn playing may require slightly different techniques, but they are far from mutually exclusive. I don't observe the 1/3, 2/4 rule but some people do.

HORN in Eb? Well, in the days of Mozart, yes, for reasons outlined above. In the earlier wind ensemble, yes, but please not today, in any setting. Most all competent hornists can transpose an Eb part on an F horn, but there is no need to write that transposition today for a modern french horn. NOTE—the "Eb horn" found in british brass bands and the old "peck horns" found in older American bands are NOT French horns as we know them.

TROMBONES: After all that horn stuff, I am glad to report that trombones do not transpose. What you write is what you get. Good players can read bass and tenor clefs.

*The **ALTO TROMBONE** is rarely a member of the modern orchestra or wind ensemble. Write parts for it in alto clef, but know what you're doing...it's not only a range issue, it's also an issue of tone color.

*The **TENOR TROMBONE** is the main instrument in the orchestra and wind ensemble. In orchestra, write the part at pitch in tenor or bass clef, heeding earlier advice about avoidance of clef-hopping. No tenor clef in jazz band and wind ensemble parts, though.

*The **BASS TROMBONE** is one of the two most acoustically pungent instruments in an orchestra, the other being the bass drum. It is the same basic tube length as the tenor trombone, but wider. It also has additional plumbing for those ripping low notes that send the viola players scurrying for cover, and is played with a deep cup mouthpiece with a

large throat. Write for it in bass clef at pitch. Some bass trombones have two triggers that can be used in varying combinations to produce low notes.

NOTES: In Rimsky-Korsakov's day, tenor and bass trombones were MUCH SMALLER than they are today, didn't have a trigger, and weren't fully chromatic at the bottom of the instrument. The trigger on a trombone is like the 4th valve on a euphonium or tuba—it makes some passages easier to play or play more in tune, and it allows for some extra low notes. There are seven slide positions that correspond to the seven valve combinations on a three-valve instrument. On a triggerless trombone, a change from Bb (in the bass staff second line from bottom) to B natural would be a rough slide from 1st position to 7th. With a trigger, the slide becomes trivial, from 1st to T+2nd. It will be easier to play at fast tempos and will have better intonation.

The **EUPHONIUM**, the king of instruments, is a staple of the wind ensemble but a relatively infrequent visitor to the orchestra. Writing for the instrument has evolved into two common styles:
1. "Euphonium in Bb"—a written middle C will produce the Bb a ninth lower. This is an outgrowth of school wind bands, in which trumpet players frequently are moved to euphonium or baritone horn and need to become productive immediately.
2. Bass clef at pitch. Write what you want to hear.
A serious amateur or pro player will be comfortable with either system. It is also possible to write euphonium parts for pros in tenor clef, especially if they are trombone doublers, but don't do it for school or community bands. Stick to bass clef at pitch and Bb treble. Due to the inherent excellence of the euphonium, you will be seeing a special tutorial on it in the near future.
DO NOT WRITE FOR THIS INSTRUMENT IN TRANSPOSING BASS CLEF. DO NOT WRITE FOR ANY INSTRUMENT IN TRANSPOSING BASS CLEF. I DON'T CARE WHAT'S BEEN DONE IN THE PAST BY WHOM, AND I **PARTICULARLY** DON'T CARE WHAT THE ALTERNATE PARTS FOR ALPHONSE LEDUC EDITIONS LOOK LIKE. I'LL KNOW IF YOU DO TRANSPOSING BASS CLEF PARTS, AND YOUR COPY OF GPO WILL BE DE-LICENSED BY THE EUPHONIUM POLICE IF YOU DO.

TUBA: Doesn't transpose. Yes, there are F tubas and Eb tubas and CC tubas and BBb tubas, but none of them transposes. In the USA, the standard orchestral tubas are the CC and F. In Germany, the tendency is to use BBb and F. Wind ensembles may use any combination; school ensembles use BBb tubas almost exclusively.
For tuba, follow the general rule **WRITE WHAT YOU WANT TO HEAR**...and let the performer choose the appropriate instrument. It's not solely a question of range; it also deals with tone color, weight of sound, musical context, fingering, etc. If you want to hear the Bb below the bass staff, write it. On the BBb tuba, it will be fingered open, on the CC tuba it will be fingered 1, on the Eb tuba the player will use 4, and on the F tuba it will usually be 1&4. No matter what tuba the player chooses, though, you'll get the Bb you want with the appropriate tone color. The tuba is so cool that you're gonna get a special primer for it in the near future, by the way.

Well, that does it for the standard instruments of the wind ensemble and orchestra. Below is a summary in notation form of all the points discussed above. Hope you enjoyed the history lesson; understanding why the system exists and how it evolved should help you to appreciate it and see that it really is quite logical and beneficial! If you have any questions, please PM me on the Northernsounds forum!