Transposition by Changing Clef

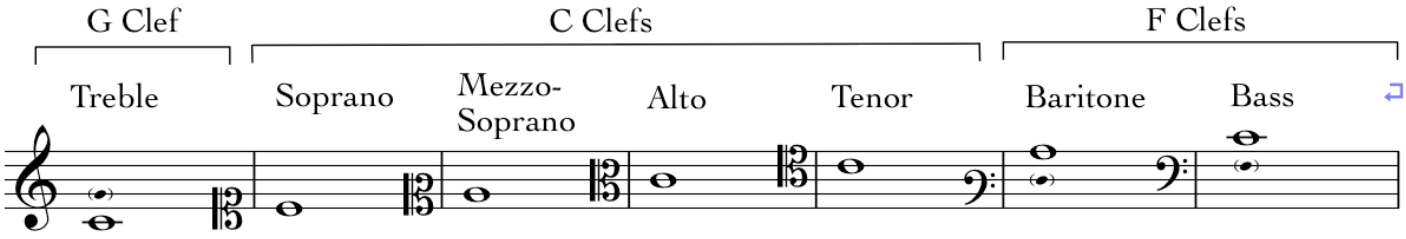
by Derek Remes

Transposition is a valuable skill in many situations: a vocalist needs their accompaniment played down a step; an organist wants to transpose the last verse of a hymn up a step; a composer wants to read an orchestral score with transposing instruments. All of these problems can be solved by changing the clef and key signature of the music on the page so that it can be read in a different key.

The following essay will give some guidelines for learning to transpose using clefs, as well as some general suggestions for learning to read new clefs. My thanks to Dr. Mark Shapiro, who taught score reading, and Dr. Teddy Niedermaier, who taught musicianship at the European American Musical Alliance in Paris, France. Much of this material is based on their classes.

Part 1: Learning the Seven Clefs

Learning to read the various clefs is useful in itself, without trying to transpose, since many instruments are commonly written in them. For instance, viola is written in alto clef; cello, trombone, bassoon, and double bass use tenor clef in the upper part of their range; and older vocal scores often use a variety of C clefs. Here are the seven clefs in descending order, with middle C shown as a whole note:

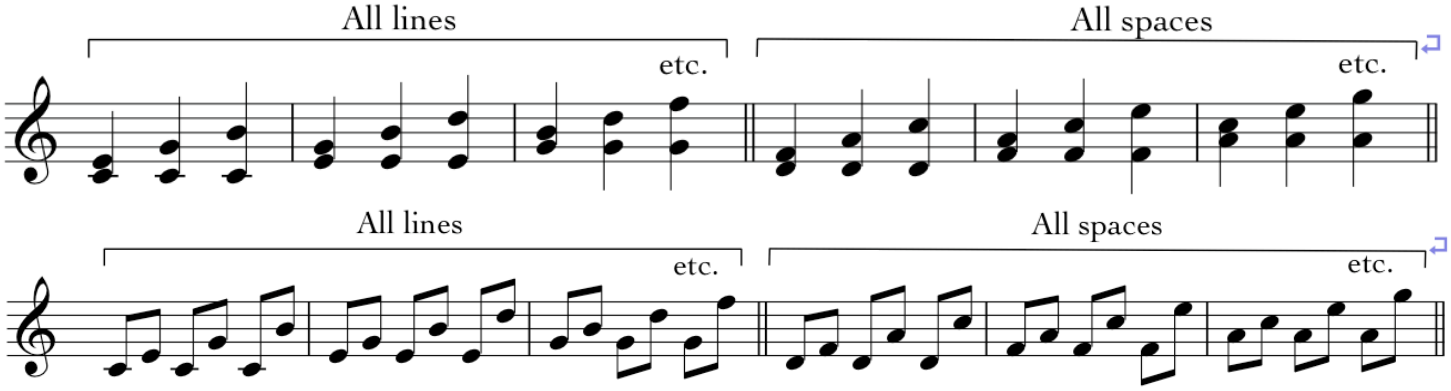


In English, clefs are identified by the vocal parts that originally used them, (soprano clef, tenor clef, etc.). They can also be described by the umbrella terms of G clef, C clefs, or F clefs, because the clef itself centers around the position of that particular note, shown here in parenthesis.

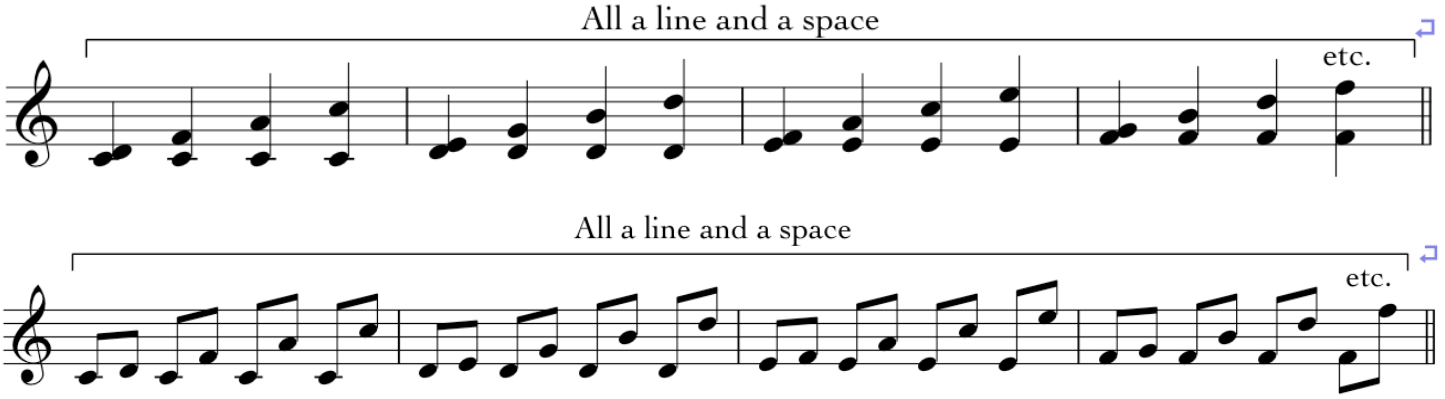
In French, clefs are identified by these umbrella terms and the line they refer to, except in solfège. Treble clef is therefore "la clef de sol deuxieme ligne," or "the clef of G second line." The advantage of the French system is in the C clefs, where they are labeled "clef of C first line," "clef of C second line," and so on, rather than being named based on arbitrary voice parts, as in English.

Here are a few tips that may make learning new clefs easier.

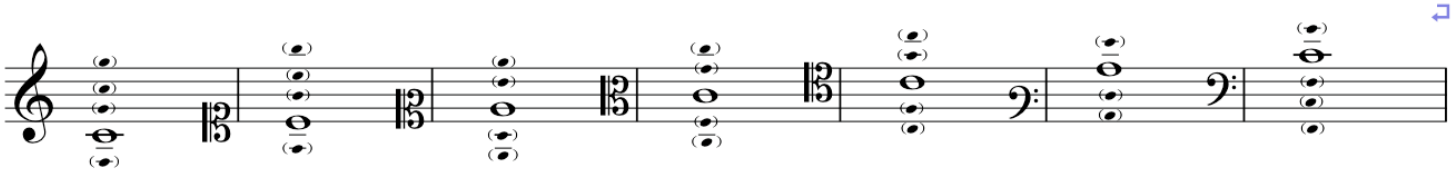
1. **Utilize Reference Points:** Rather than trying to memorize every line and space on the staff, use reference points to measure intervals quickly.
   a. <u>Other Pitches as Reference Points</u>
      - All intervals of a 3rd, 5th, and 7th are always on either two lines or two spaces, regardless of the clef. Of course this is true of simultaneous pitches or consecutive pitches.



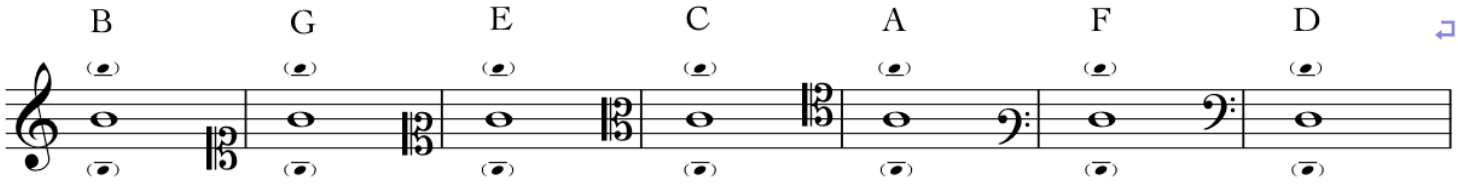
      - Similarly, all intervals of a 2nd, 4th, 6th, or octave are always on a line and a space.



   b. <u>Imaginary Reference Points</u>
      - Middle C is a good choice here. I like to add a 5th and an octave as well, but you should use whatever works best for you.

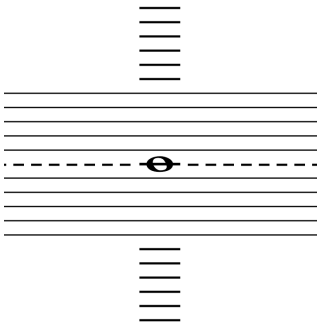


- Another option for reference points is to use the center line of each clef with the octave above and the octave below, since these three notes will always be the same pitch for that particular clef.

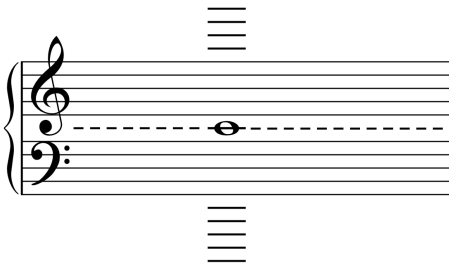


2. **Imagining the "Big Clef":**

A useful mental trick for me is to imagine that middle C is the x-axis of a mathematical graph, with ledger lines extending infinitely above and below.



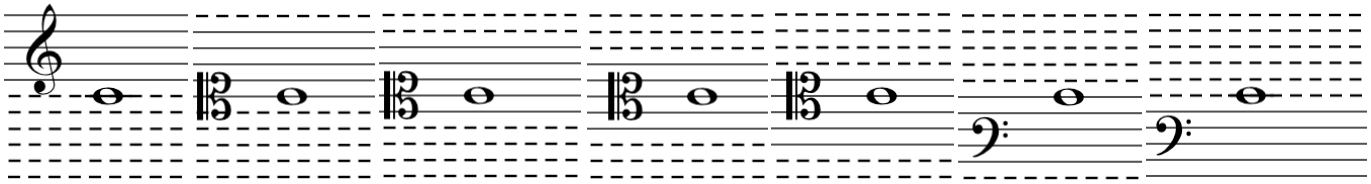
The grand staff approximates this idea already.



We can see why the grand staff used a treble and bass clef. The treble clef shows the greatest number of lines above middle C, and the bass clef shows the greatest number below it. This minimizes the need for ledger lines.

The way I imagine it, middle C is always stationary and the clef shows just a few of the lines that surround it - only a 5-line cross-section of the "Big Clef." But the imaginary ledger lines extend infinitely above and below, shown in the next figure as dotted lines. This way, the clef can change, but the notes will remain fixed relative to the central middle C axis (or any other reference pitch that you may choose).

This picture shows how I like to imagine the various clefs, and is the most useful tool for me when trying to switch quickly between clefs. It works especially well if you use middle C as an imaginary reference point.



3. **Take an Active Role:**

I believe the more active we are in our practicing, the more we will retain. Ideally, this means we should practice clef reading while playing our instruments. Conceptualizing the new clef when combined with physical motions will facilitate faster progress than if you are taking a more passive role. If you are a vocalist or don't have your instrument at hand, sing aloud in solfège rather than simply looking at the notes.

4. **Resources for Practice:**

In the past, I have purchased two manuals on clef reading and found that they were not very useful. I believe the reason is that they just had random series of pitches. There was no musical context. When reading music, one can infer a lot about where the music might go next, especially for music in the common-practice style. I progressed faster when reading actual music than just exercises.

Therefore, I would recommend that you use the resources at your disposal already, and simply change the clef and key signature mentally. Start with music that has a single line on a staff (violin, flute, etc.) and move on to simple homophonic music, such as in a hymnal. A good beginning resource is *Music for Sight Singing* by Robert W. Ottman and Nancy Rogers, since many undergraduates are required to buy this anyway. If you don't already have it, don't bother getting the most recent edition, since it's quite expensive.

Orchestral scores are invaluable as a resource to practice changing transposed music back to concert pitch. The score will say on the first page whether it is a transposed or concert score. You will want to make sure it is a transposed score. (Some 20th century Russian scores and many band scores are concert scores.) In the next section we will investigate why orchestral scores are so useful.

Part 2: Reading Transposed Music

Transposition requires three steps:

1. Change the clef.
2. Add or subtract accidentals from the original key signature.
3. Correct some, not all, of accidentals in the original music after the clef has been changed.

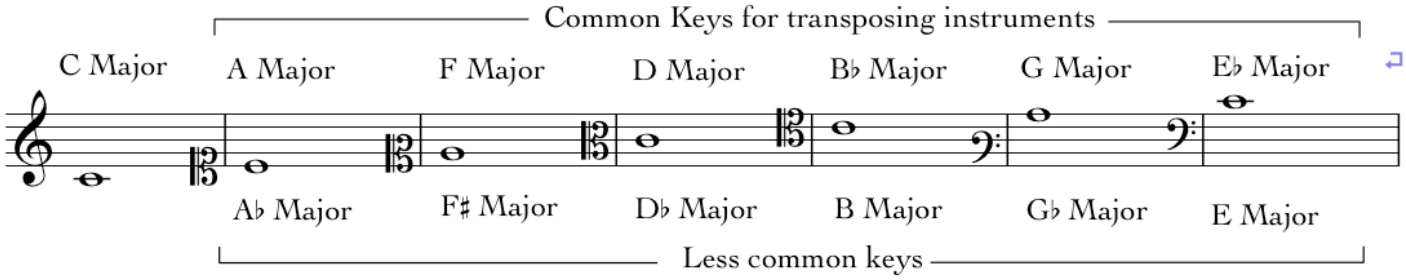
I suggest that you read through the following three steps (pages 5-7) and immediately continue to the musical examples. The three steps will be greatly clarified by showing their application to actual music.

1. Changing the Clef:

It is not a coincidence that there are seven clefs and seven notes in the diatonic scale. Each clef is perfectly suited to transpose music to a particular key. (Actually there are more than seven clefs, but this is the reason only seven are commonly used.)

Here are the keys that are associated with each clef *if the original music is treble clef.* Notice that the keys begin on the left with C Major and proceed down in 3rds. This makes sense because each clef moves middle C up by one line.

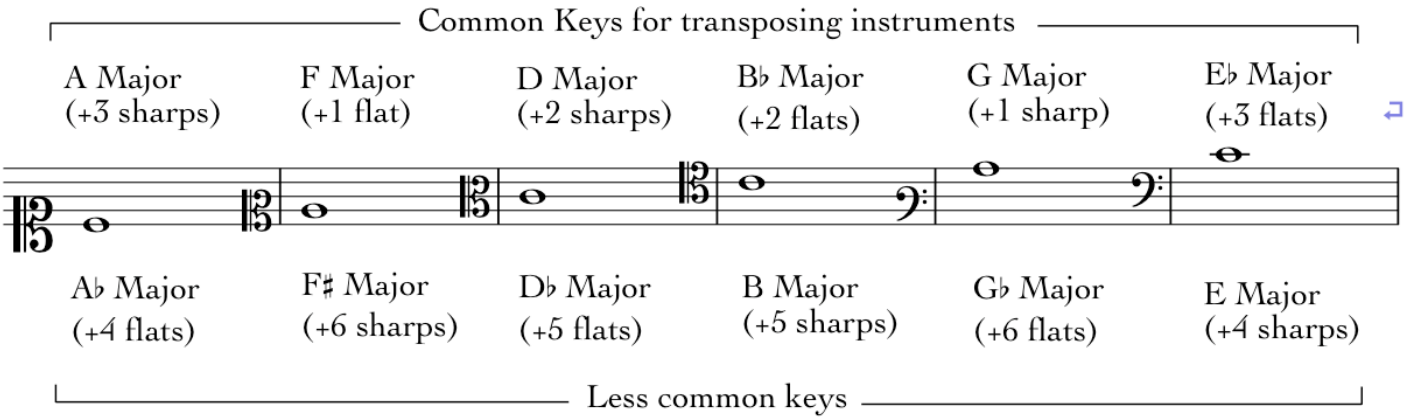
I prefer to think of the clefs as arranged in a circle rather than a line (like the circle of fifths, but with clefs), because the pattern of 3rds can continue back to the beginning. We will see why this is a useful idea later.



For example, if the original music is for Bb trumpet, change the treble clef to tenor clef (and read up one octave). If the original music is for F horn, change the treble clef to mezzo-soprano clef. If the original music is for alto flute, change the treble clef to baritone clef (and read up one octave).

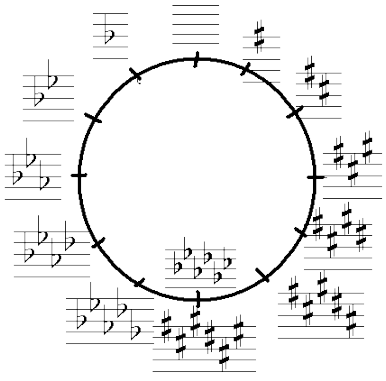
2. Add or subtract accidentals from the original key signature.

Here is a table showing the number of sharps or flats that must be added to the key signature when transposing. It is the same number of accidentals as the key signature of the transposing instrument. Notice that the total number of accidentals for the two keys of any clef always adds up to seven.



It may be helpful to think of the key signature as the result of turning a "key signature dial" - turning the dial clockwise adds sharps (or subtracts flats) and counter-clockwise adds flats (or subtracts sharps), similar to the circle of fifths.

For example, if the original key is D Major (2 sharps) and music is for F Horn, you will add 1 flat to the key signature. That is, you will turn the dial one "click" to the left, leaving 1 sharp, and therefore a key of G Major.



3. **Correct some, not all, of the accidentals in the original music <u>after the clef has been changed.</u>**

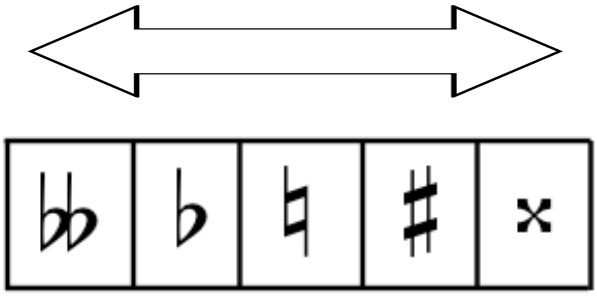
This is the most difficult step to conceptualize. Therefore, I like to break it into two parts.

a. <u>First, determine which pitches in the original music will be affected.</u>

If you added 3 sharps in the previous step (perhaps for clarinet in A), the affected pitches will be F, C, G. If you added 3 flats in the previous step (perhaps for Eb horn), the affected pitches will be B, E, and A.

As a rule: always begin on either F or B - F if you are adding sharps, and B if you are adding flats - and follow the circle of fifths to include as many pitches as the accidentals you added in the previous step. This step refers to the pitches *<u>after the clef has been changed.</u>*

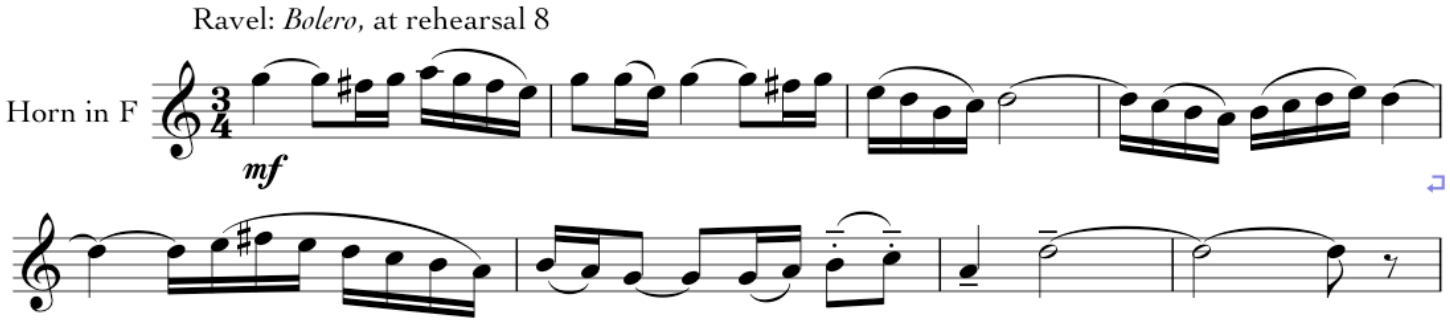
b. Then, use the following box to shift accidentals in front of the pitches in the previous step either one box to the right or one box to the left:



As a rule: <u>if you added sharps to the key signature in step 2, shift accidentals to the right. If you added flats in step 2, shift accidentals to the left.</u>

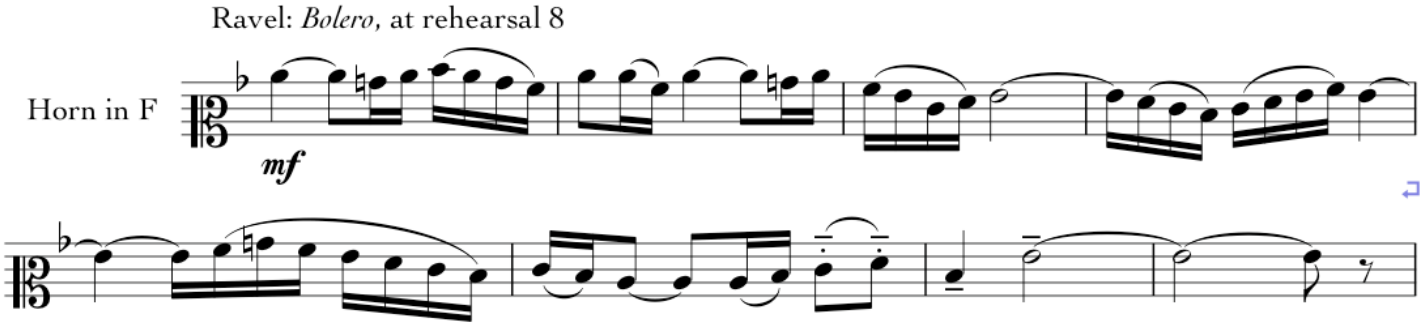
For example, if you are transposing an Bb trumpet, all accidentals in front of B and E will move to the left: sharps become naturals, and naturals become flats, etc.

Let's apply the three steps to some actual music to see how it works.



1. **Change the clef** - Since the music is for F Horn and is written in treble clef, we will change the treble clef to mezzo-soprano clef.
2. **Add or subtract accidentals from the original key signature** - There are no accidentals in the original key signature, so when we add 1 flat (turning the dial counter-clockwise) the resulting key is F Major.
3. **Correct some, not all, of the accidentals in the original music <u>after the clef has been changed</u>** - F Major has 1 flat, so we change accidentals in front of B (*<u>after</u>* the clef has been changed) one box to the left. Therefore, the sharps in this example become naturals.

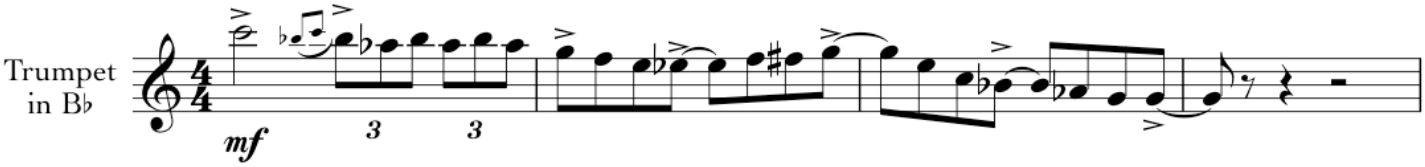
Here is what we imagine when we read the passage after applying the three steps:



This is a good example for another reason. Often the horn parts in orchestral music will be written without a key signature, as they are in *Bolero.* Since the piece is in C Major, the horn part should have been written in G Major. Don't be fooled into thinking it is a concert score - the part is still transposed. Notice, however, that it wouldn't matter either way. If the horn part had 1 sharp in the key signature, it wouldn't require any accidentals. Adding 1 flat to the key signature would make the part in C, and the result would sound the same as it would in the above example.

Let's try another example.

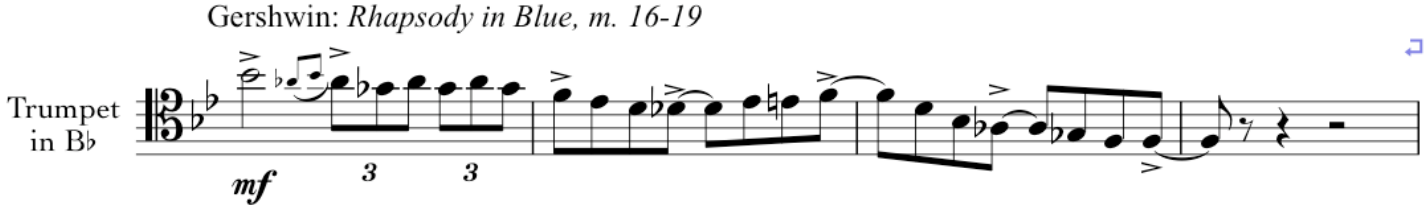
Gershwin: *Rhapsody in Blue, m. 16-19*



1. **Change the clef** - Since the original music is for Bb trumpet and is written in treble clef, we will choose tenor clef.
2. **Add or subtract accidentals from the original key signature** - There are no accidentals in the original key signature, so we just add 2 flats because we are transposing a Bb trumpet part.
3. **Correct some, not all, of the accidentals in the original music <u>after the clef has been changed</u>** - Since we added 2 flats in the previous step, our affected pitches will be B and E. Accidentals in front of these pitches (*<u>after</u>* the clef has been changed) will be moved one box to the left - therefore, sharps become naturals, naturals become flats, etc. but only those accidentals in front of B and E.

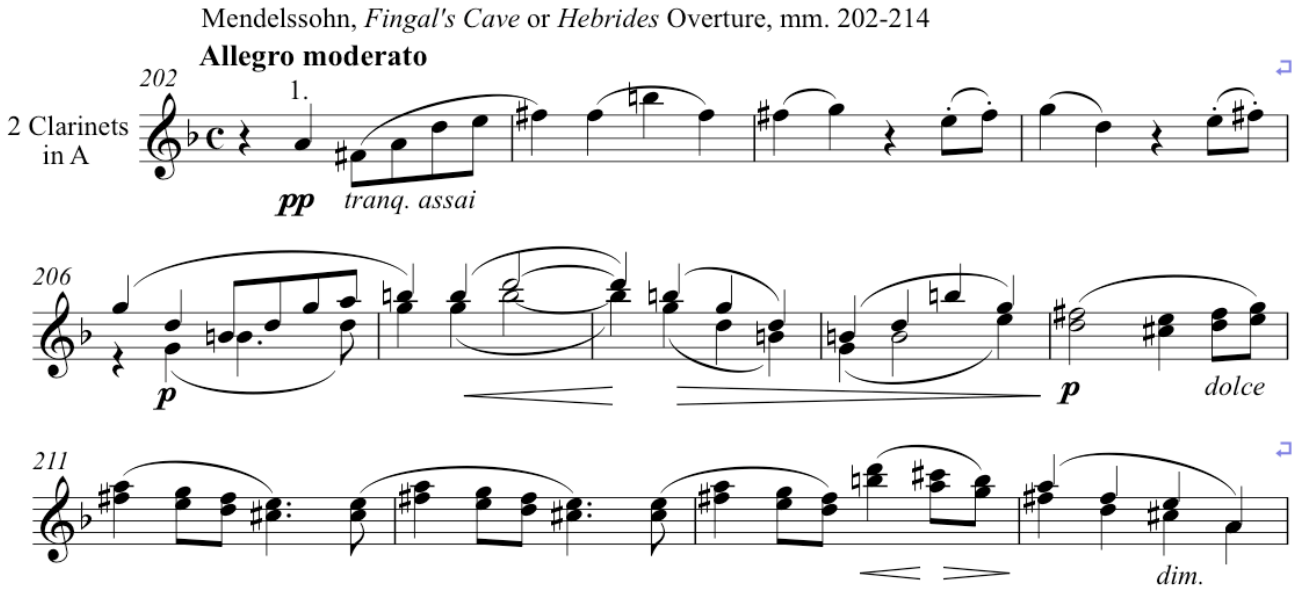
Here is what the passage looks like after applying the three steps:

Gershwin: *Rhapsody in Blue, m. 16-19*



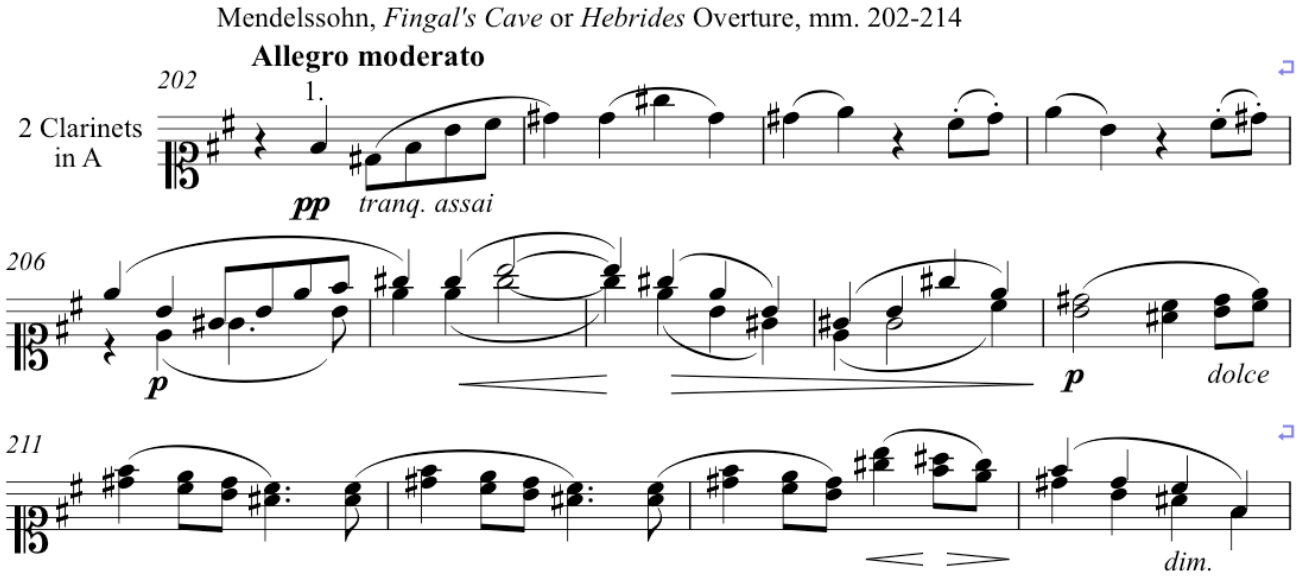
Notice that there is a problem with this example - it is an octave too low. This is one drawback of using the clef system to transpose. Sometimes the resulting passage will be an octave too high or an octave too low. However, this problem can be solved easily with practice and knowledge of the intervals of transposition of the various instruments. In this case, you just have to know that a Bb trumpet transposes down a major 2nd. I recommend purchasing Samuel Adler's *The Study of Orchestration*, which is now in its third edition, to learn more.

Let's try a more difficult example.

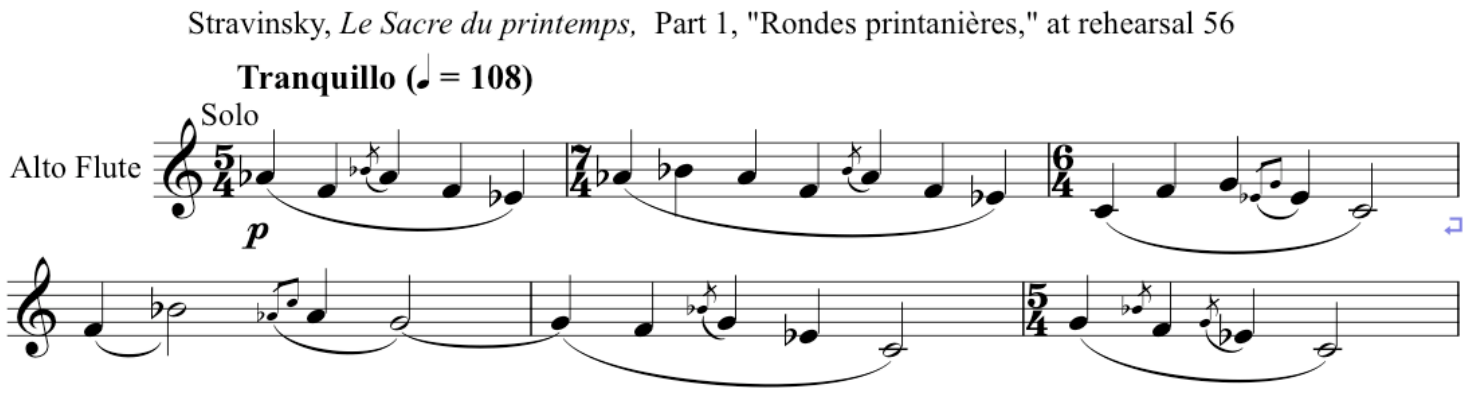


1. **Change the clef** - The original music is for A Clarinet and is written in treble clef, so we change the treble clef to soprano clef.
2. **Add or subtract accidentals from the original key signature** - Soprano clef requires us to add 3 sharps, we imagine turning our dial 3 clicks to the right. Since we started with 1 flat, we have a total of 2 sharps left over.
3. **Correct some, not all, of the accidentals in the original music <u>after the clef has been changed</u>** - We added 3 sharps in the previous step, so the affected accidentals are F, C and G. Accidentals in front of the these pitches will be shifted one box to the right.

   Here is what we imagine after applying the three steps:

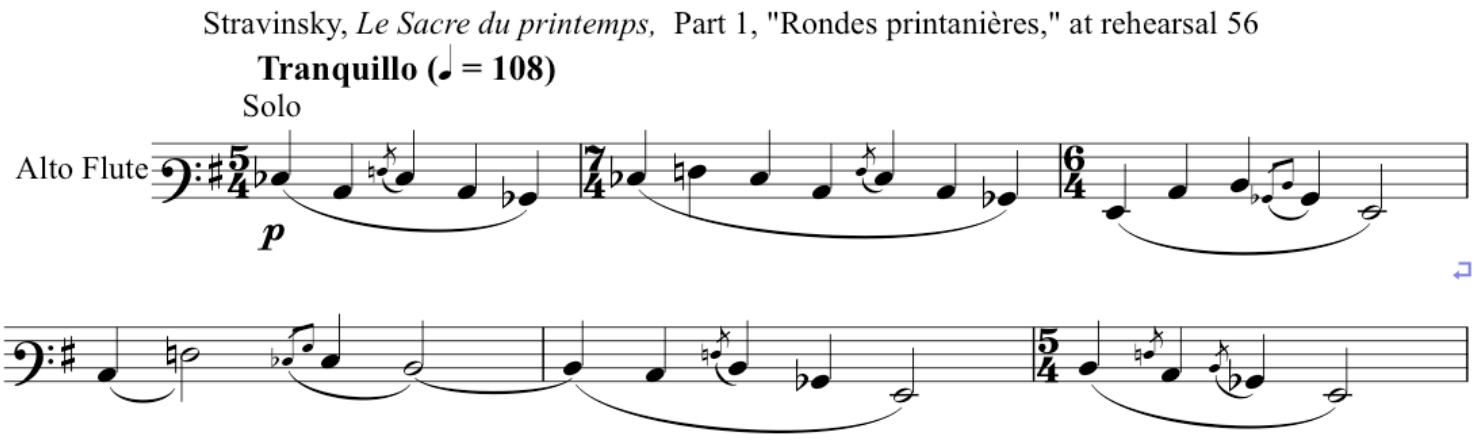


Here is one last example from orchestral music:



1. **Change the clef** - Alto flute a G instrument (transposing down a perfect 4th, not up a perfect 5th) and this passage is in treble clef, so we change the clef to baritone.
2. **Add or subtract accidentals from the original key signature** - Alto flute in G requires the addition of 1 sharp to the key signature, or turning the dial clockwise 1 click.
3. **Correct some, not all, of the accidentals in the original music <u>after the clef has been changed</u>** - Since 1 sharp was added, accidentals in front of F will be shifted right one box.

Here is the same part after applying the three steps:



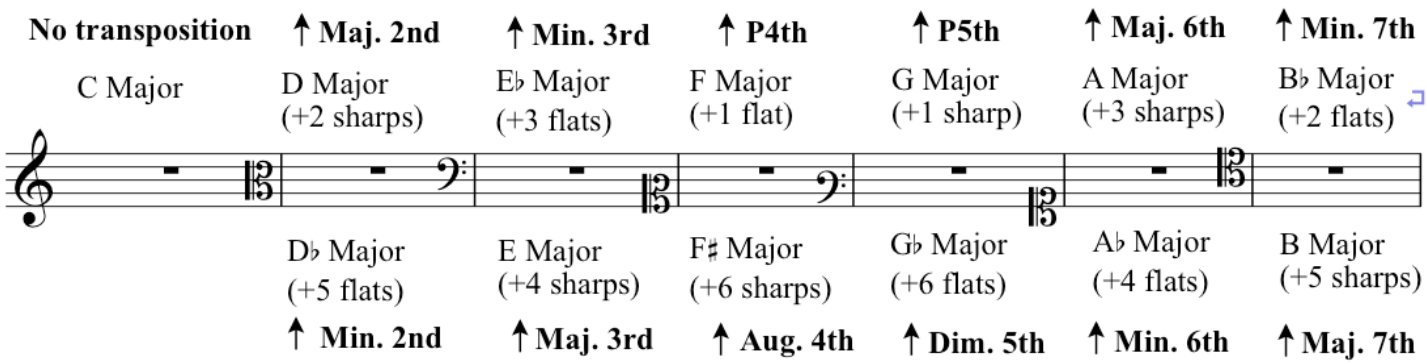
All of the F's have their sharps turned to naturals. Again, this example shows the problem of octave displacement. The part must be transposed up an octave after it is put in baritone clef in order to sound in the correct register.

Part III: Transposing Music from Concert Pitch

This process is similar to previous section in that it involves the same three steps. The difference is that the music you are reading is already in concert pitch - that is, it is not for a transposed instrument - but you want to play it in a different key than it is written. This problem would arise when a vocalist needs an accompaniment played in a different key, or an organist must transpose a hymn.

In some cases, transposition by half-step can be done easily by changing the key signature. For instance, if a piece of music is in E Major, change the key signature to E-flat Major to transpose down a half-step.

Here is the same set of clefs as before, but arranged in ascending order of the intervals you will modulate by *if the original music is in treble clef.* I left the key areas there just for reference. Of course they do not indicate that you will always modulate to that key.



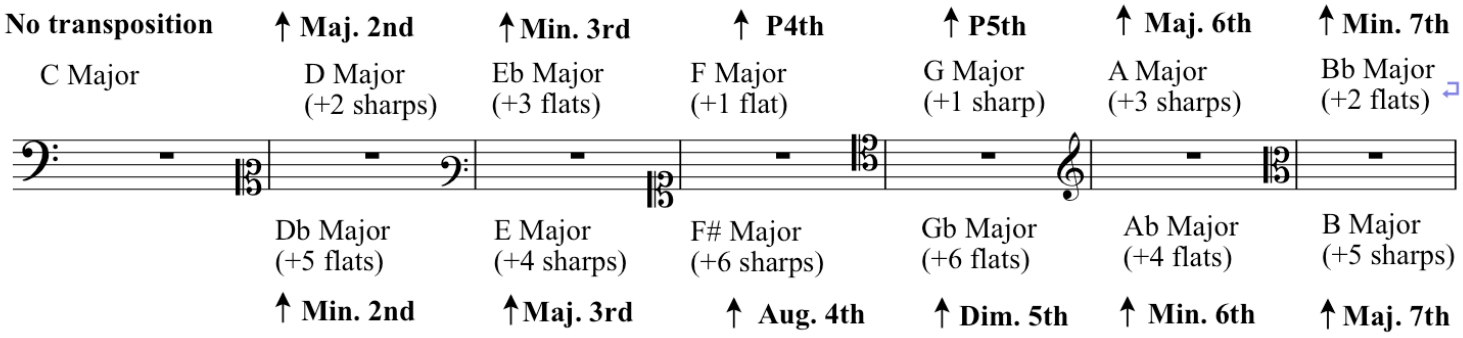
For instance, if you are reading a piece of music that is in A Major, in treble clef, and you want to transpose it to F Major, first identify the interval between the two tonic pitches. In this case it would be a minor 6th since we are only dealing with ascending intervals. Soprano clef allows modulation up a 6th, and it will be a minor 6th if you add the correct number of accidentals - in this case, you would move the accidental dial 4 clicks to the left, leaving a total of 1 flat, or F Major.

If you accidentally added 3 sharps instead of 4 flats, the key signature would have 6 sharps total and you would be in F# Major instead of F Major.

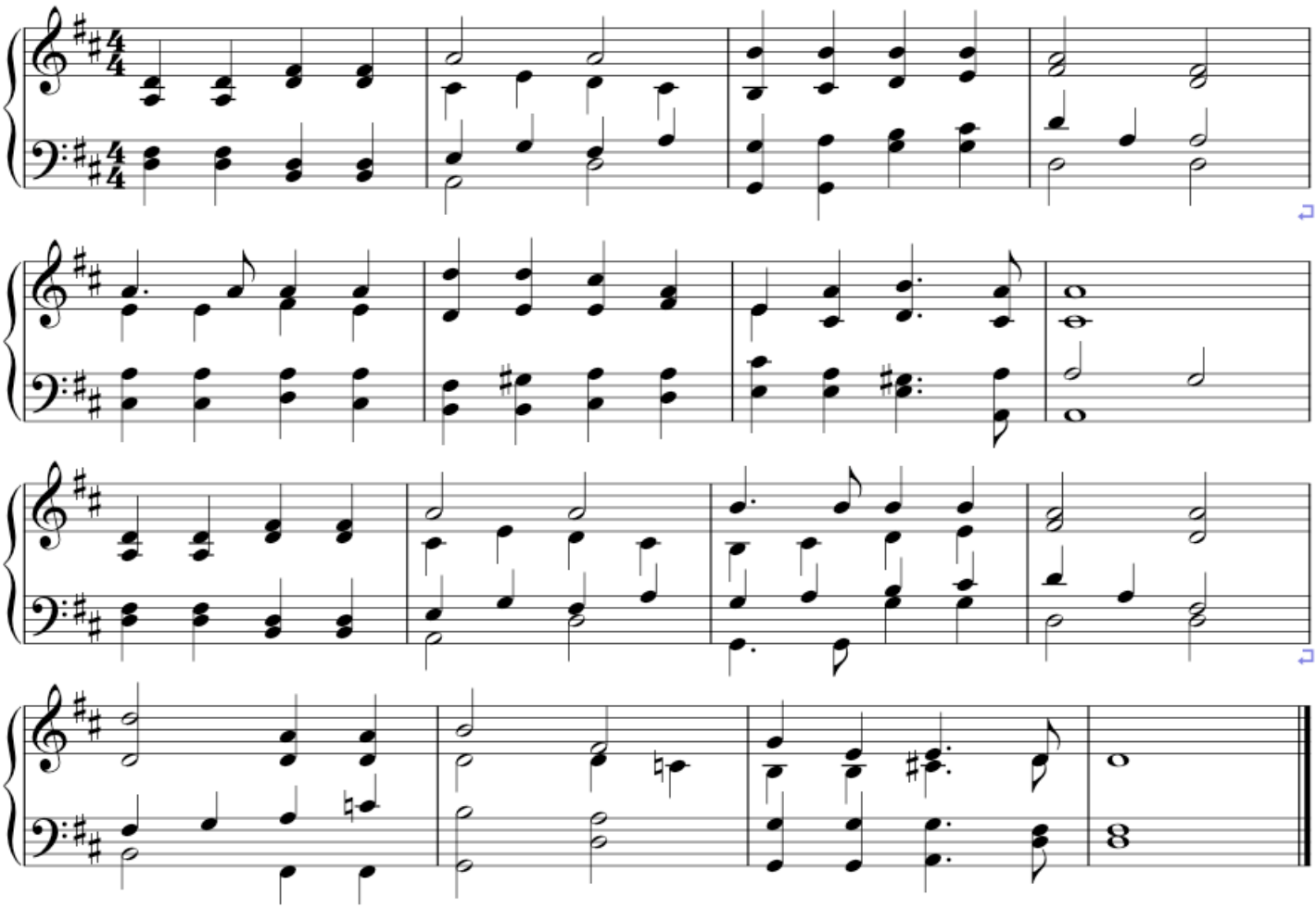
An alternate way of thinking about this is to think of which transposing instrument would play the pitch F whenever the player read the pitch A - a clarinet in A would. Then find the key of that transposing instrument in the table above, apply the clef, and add the associated accidentals to the signature.

Let's try applying this principle to a grand staff, since many keyboard players are required to transpose on sight.

The immediate problem we face is that the table of clefs above is only valid if the original music is in treble clef. We need another table if the original music is in bass clef:



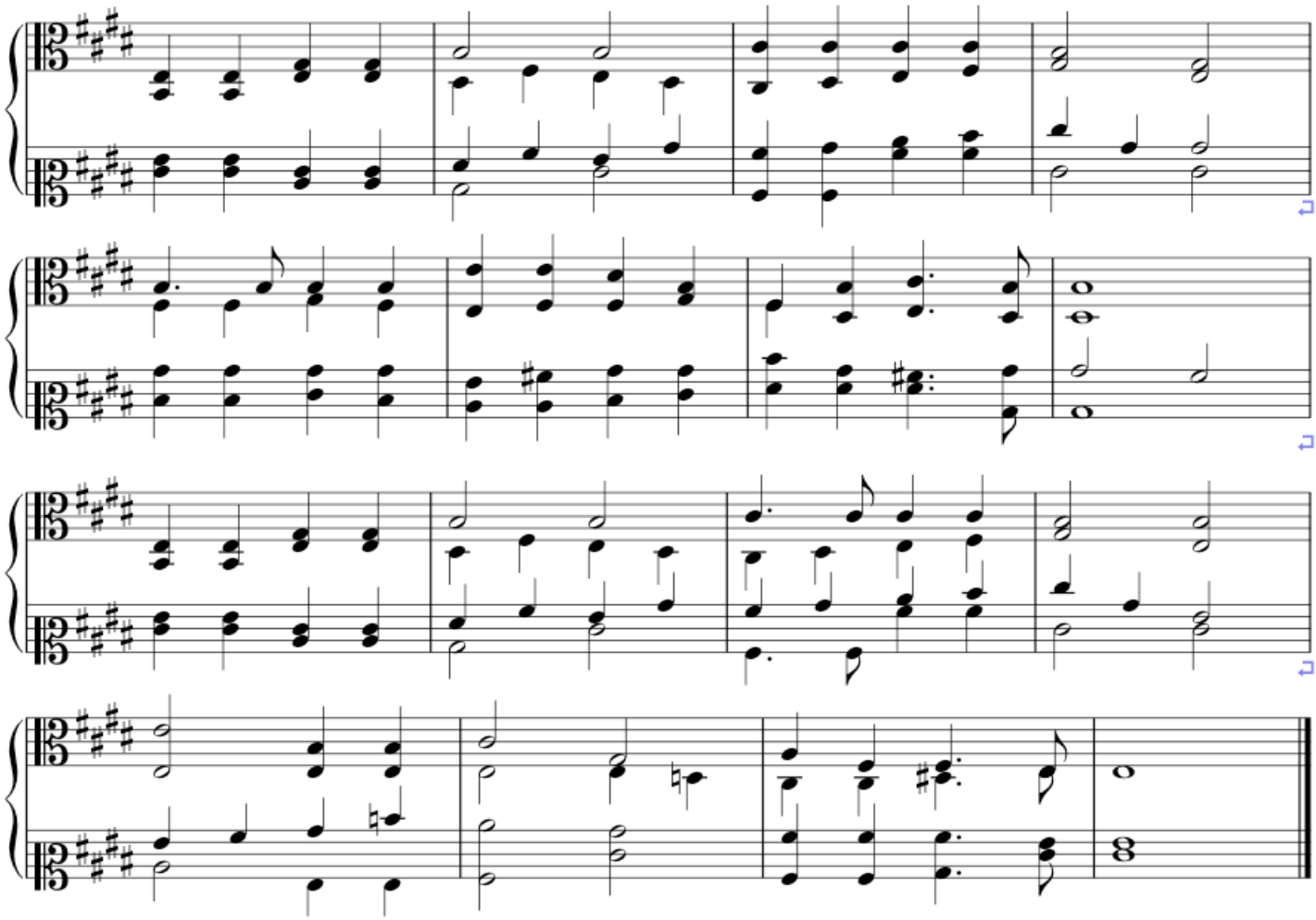
Now we are ready to transpose the following hymn, *Nicea*, from D Major to E Major.



We need to apply the three steps to each of the staves separately. First we identify the interval by which the two tonic pitches are related - a major 2nd. The clef that allows transposition up a major 2nd from treble clef is alto clef. Alto clef requires the addition of 2 sharps to the key signature, and a shift right all accidentals in front of F and C.

For the bass clef, transposition up a major 2nd is accomplished by changing to mezzo-soprano clef. The next two steps are the same as for treble clef - add 2 sharps to the key signature and shift right all accidentals in front of F and C.

Here is what we imagine when we change the clef and key signature:



Both staves require on octave transposition. The top staff needs to be an octave higher, and the bottom staff an octave lower. With enough practice this can be done easily. There are no accidentals that are changed in the transposition.

The reason I like to imagine the various clefs arranged in a circle rather than a line is because a transposed grand staff will always have two adjacent clefs if we are using the figure on page 1. For me, this is easier to visualize if I think of a circle.

Conclusion

Learning to transpose by changing the clef and key signature is a process that takes many years to master. To me, the appeal of the clef system is that there is no guesswork involved. All aspects of the transposition are accounted for by following the three steps and adding the required octave adjustments.

Please contact me with any comments or suggestions you may have about the material. There are more essays about various music theory topics available on my website, shown below. I appreciate your feedback, both positive and constructive. I hope you have found this introduction to be useful, and that they skills you gain will open new avenues for growth in whatever your field may be. Good luck transposing!

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