

A staff notation without flats and sharps

1 Introduction

The staff notation originates from the eleventh century when music was almost entirely diatonic. During time, there were some changes but the present shape is already rather old. The present staff notation has some clear advantages like: The use of notes which can be black or white and which can have yes or no sticks and flags with which the length of the tone is shown properly. The use of a staff with five lines. This gives a clearly recognizable picture of the note position. The use of bar lines gives a good insight in the type of bar. However, according to me, the present staff notation also has some important disadvantages.

The tones of a chromatic scale don't have an unequivocal name. In the past it is chosen to give the names A, B, C, D, E, F and G to the tones which have a white key on the piano. The name of the tones in between, which have a black key on the piano, are not unequivocal. It differs if the tone is seen as a sharp or as a flat. This is determined by the logic of the circle of fifths for which a sharp is added when the fundamental tone of a scale is taken a fifth higher and for which a flat is added when the fundamental tone is taken a fifth lower. For sharps, the black key tones are called Ais, Cis, Dis, Fis and Gis (for certain English speaking countries one uses "sharp" instead of the "is" ending). For flats, the black key tones are called Bes, Des, Es, Ges and As (for certain English speaking countries one uses "flat" instead of the "es" ending). Even the white key tones can get another name for double sharps or double flats. A D sometimes can be seen as a Cisis or an Eses.

On the staff, there is only place for the white key notes and the black key notes are therefore indicated by flats or sharps. These accidentals can be placed just before a note or at the beginning of the staff if the flat or sharp is valid for the whole piece of music. Accidentals just before a note make the piece disordered. Accidentals at the beginning of the staff are even more difficult because continually one has to realise that the concerning tone is sharpened or flattened. People who are working with the present staff notation for a long time are familiar with this system but for beginners this is a big disadvantage and it results in a preference for playing pieces with only a limited number of accidentals.

If a piece is written in Fis, there are six sharps at the beginning of the staff. This means that one reads an F but one plays a Fis, one reads a C but plays a Cis, one reads a G but plays a Gis, one reads a D but plays a Dis, one reads an A but plays an Ais and one reads an E but plays an Eis. Assume we would do the same with the normal writing. So one speaks the letter in the alphabet which is one higher than the written letter. The Dutch town UTRECHT then becomes TSQDBGS with six sharps. It would be ridiculous to write UTRECHT this way. However, almost anybody sees it as normal that this method is used for the staff notation.

Another disadvantage of the present staff notation is that different staves are used. The staves for the G-clef and the F-clef are most current. The names of the tones for certain positions on the staff differ for both staves. Someone who has learned to read in the G-clef can't read automatically in the F-clef. This is because there is only one auxiliary line in between both staves. If there would have been two auxiliary lines in between the staves, both staves would have been identical. It is a great failure that one has not chosen for this option in the past. For two auxiliary lines, it would have been very easy to add extra staves above or below the staff of the G-clef for instruments with a very large range.

In a Dutch notice dated 17-2-2011, I have investigated if the disadvantages mentioned above, can be eliminated by starting from twelve equal chromatic tones a up to l and by taking identical staves. This appeared to be possible but then there is only place for one octave on one staff and that is too little. Therefore, I have maintained the present staves and the present names of the white key tones.

2 New name and note shape for the black key tones

The seven white key tones A, B, C, D, E, F and G are derived from the Aeolic minor scale in A. The same tones are also used for the major scale in C. In between the B and the C and in between the E and the F, there is a halve tone distance (a minor second). In between the other tones there is a whole tone distance (a major second) and therefore there are five black key tones. For the equal temperament tuning, which is standard for current music, an Ais sounds the same as a Bes, a Cis sounds the same as a Des, and so on. For a new staff notation, it is therefore illogical to use the present tone names with an is or es ending for the black key tones. I have considered several names and finally I have chosen a name which is a contraction of the names of the white key tones in between which the concerning black key tone is lying. If the name found this way is difficult to pronounce or if the name may give confusion, an O is inserted.

The names of the twelve chromatic tones found this way then are: A, AB, B, C, COD, D, DOE, E, F, FOG, G and GA. For the present system, a number is placed behind the tone (except for tones below the C1) to specify the octave in which the tone is lying. The same is done for the new system. Table 1 gives the relation in between the present and the new tone names for the normal range of a trumpet from the low Fis or FOG up to the E3. If distinction of the octave is not necessary, the number is mostly omitted.

Present	New	Present	New	Present	New	Present	New
B	B	B1	B1	B2	B2		
Ais / Bes	AB	Ais1 / Bes1	AB1	Ais2 / Bes2	AB2		
A	A	A1	A1	A2	A2		
Gis / As	GA	Gis1 / As1	GA1	Gis2 / As2	GA2		
G	G	G1	G1	G2	G2		
Fis / Ges	FOG	Fis1 / Ges1	FOG1	Fis2 / Ges2	FOG2		
		F1	F1	F2	F2		
		E1	E1	E2	E2	E3	E3
		Dis1 / Es1	DOE1	Dis2 / Es2	DOE2	Dis3 / Es3	DOE3
		D1	D1	D2	D2	D3	D3
		Cis1 / Des1	COD1	Cis2 / Des2	COD2	Cis3 / Des3	COD3
		C1	C1	C2	C2	C3	C3

Table 1 Present and new tone names for the normal range of a trumpet

The notes belonging to the black key tones can't simply be inserted in an existing staff because all positions, on or in between the lines of the staff, are already occupied by the white key notes. This could be solved by using staves with more lines but in this case, the new system deviates too much from the present system and will therefore never be implemented.

Therefore it is chosen to give a black key note another shape and to give it a specific position on the staff. The heart of a black key note is lying just in the middle of the heart of the adjacent white key notes. For recognition, the shape of the black key notes must deviate strongly from the round white key notes. Many shapes were viewed and after consultation of a pianist, finally a rectangle was chosen with a width equal to the distance in between the lines of the staff and a height equal to half the distance. The advantage of this choice is that a black key note is always touching a line of the staff. Figure 1 shows a chromatic scale from C1 up to C2.



Figure 1 Chromatic scale from C1 up to C2 for the new staff notation

With the new staff notation, as described here, all flats, sharps and natural signs are cancelled and therefore each scale, chord and piece of music becomes compact but clear, in whatever key it is written. Chords can also be displayed and a black key note can, because of its small height, even be inserted at a place where only half a line distance is available. The chord C dim, which is an accumulation of minor thirds, is given in figure 1. Rests of two and four counts are also line touching rectangles but they are black and have no stick. For extra distinction with a whole black key note, rests are drawn somewhat smaller.

For the present staff notation, it isn't necessary to accurately view all accidentals given at the beginning of the staff to know what tones have to be sharpened or flattened. One only counts the number of accidentals and an experienced musician then directly knows the key. If there are four sharps at the beginning of the staff, an experienced musician knows directly that the key is E or C^{is} m and which notes have to be sharpened. For the new system the key can be placed at the beginning of the staff and so the same information is available. But those who don't know from experience which tones have to be sharpened for the given key, still can play the piece directly without making errors because every tone is played how it is written. Another advantage is, that for transposing, every note shifts that many positions, equal to the number of minor seconds of the upwards or downwards shift of the melody.

For the present staff notation and the key F^{is} with six sharps, the E is sharpened to E^{is} which sound equal to an F. For the key C^{is} with seven sharps, a B becomes a B^{is} which sounds equal to a C. For the key G^{is} with eight sharps, a F^{is} becomes a F^{is}^{is} which sounds equal to a G. Analogue, one gets for the key F^{es} with eight flats, a C^{es}, a F^{es} and a B^{es}. Because of this logic, one always gets scales for which the names of the tones begin with consecutive letters. Even if the piece of music has less than six accidentals, this kind of tone names can happen if local notes are sharpened or flattened. To mention this in the staff notation, one uses double sharps and double flats.

The fact that black key tones have double names is bad enough but that white key tones may have three different names is very disturbing to my opinion. So I think that for the staff notation, one has to write the white key note belonging to the shortest name, even if the logic of the circle of fifths would result in another name. This has the consequence that names of scales will not always begin with consecutive letters but I don't see that as a problem for the new staff notation.

Even if one is unwilling to introduce the new names which I have invented for the black key tones, the new staff notation can still be used. An AB then can be called an A^{is} or a B^{es} as usual, but if it is displayed like the AB out of figure 1, we still have a staff notation without flats or sharps.

The staff notation with the chromatic scale of figure 1 is a first, hand written example of how the new staff notation may look like. It is advised to draw the notes also again on a computer to make the notes more precise and the black key notes will then probably be recognised even better.

I think that not much time will be required to become accustomed to the new display of the black key notes. It would be good to transfer a piece of music like Round Midnight which has many accidentals, to the new staff notation and to verify if, after some habituation, this piece can be read.

I think that for a computer specialist it is possible to write a program with which a piece of music can be written in the new staff notation and with which a present piece, which is already written on the computer, can be changed to the new system by one button press.

The present staff notation is established in the whole world. A new staff notation has only a chance to replace the present system in future if it can be read much more easily and if it isn't necessary to learn everything again from the beginning. I think that this new staff notation meets this goal but people who have spent years to master the present staff notation, probably will not agree with me.

About the new staff notation as given up to here, a discussion is hold in 2013 on the Dutch trumpet forum. Most people are against the idea to change whatever on the existing staff notation because it is very established and it functions well for them. The professional trumpet players who are working with the present staff system and are very familiar with it simply refuse to see that it has important disadvantages for someone who wants to learn it. But even people who can read music rather well, always have to realise which tones have to be sharpened or flattened if there are many accidentals at the beginning of the staff. For me it is still tricky but I have learned reading notes when I was already 24 years old and before that, I only used chords (on guitar). Fortunately there were also people who agreed with me at some points. There was even a person (whose name I have forgotten) who came with an alternative which might be even better than the shape of the notes as given in figure 1. His proposal is described in the next chapter.

3 Triangular note shape for the black key tones

The normal names of the black key tones are maintained. The shape of a note is changed such that it is clear if the tone is sharpened or flattened. This is done by using no circular note for the black key tones but a triangular note which has the shape of an equilateral triangle. If the point of the triangle is pointing upwards, the tone is sharpened. If the point of the triangle is pointing downwards, the tone is flattened. Just as for a normal circular note, a triangular note can be black or white, can have a stick or no stick or can have flags or no flags.

So a Cis is a triangular note at the position of the C with the point upwards. A Des is a triangular note at the position of the D with the point downwards. For this system it is even possible to write a Ces, a Bis, an Eis and a Fes. Writing white key tones with a double sharp or a double flat isn't possible but these tones are seldom used and it is much clearer to use the normal white key name even if the name should have a double extension according to the logic of the circle of fifths. An example of chromatic tones from C1 up to C2 using quart notes with a triangular shape is given in figure 2. The staff notation as given in figure 2 deviates only a little from the current staff notation and therefore it can easily be learnt, also for those who are familiar with the current staff notation.



Figure 2 Chromatic tones from C1 up to C2 with triangular notes for the black key tones

For the black key tones there are still two options which I find confusing. One can make the choice to use only the option with flats and this cancels the Cis, the Dis, the Fis, the Gis and the Ais. The point is that one plays the correct tone if one is reading a piece of music. It isn't important that this tone has the wrong name according to the logic of the circle of fifths if the piece is written in a key with sharps. There are even modern pieces of music which modulate that much that one can't say in which key it is written and then it is easy that every tone has an unequivocal name.

4 Idea for a very compact new staff notation

The tone scale as given in figure 2 of chapter 3 gave me the idea of a very compact staff notation for which every tone has only one name. To prevent confusion with the current staff notation, Greek letters are used for this new staff notation. For a chromatic tone scale, the four tones which are separated by a small third get the names α , β , γ and δ pronounced as alpha, beta, gamma and delta. The tone α corresponds to C at the lowest auxiliary line of the staff with the G-clef of the normal staff notation.

The tones, lying in between, are seen as a sharp or a flat. An advantage of the four chosen tone names is that all end on an a. For a sharp, the last a of the name is changed into an i. The sharpened tones then are alphi, beti, gammi and delti written as αi , βi , γi and δi . For a flat, the last a is changed into an o. The flattened tones then are alfo, beto, gammo and delto written as αo , βo , γo and δo . A chromatic tone scale starting and ending with α then has the following tones: α , αi , βo , β , βi , γo , γ , γi , δo , δ , δi , αo , α . The relation in between the names of the old and the new staff notation is given in table 2.

C	Cis Des	D	Dis Es	E	F	Fis Ges	G	Gis As	A	Ais Bes	B	C
α	αi	βo	β	βi	γo	γ	γi	δo	δ	δi	αo	α
alpha	alphi	beto	beta	beti	gammo	gamma	gammi	delto	delta	delti	alfo	alpha

Table 2 Chromatic tones for a compact staff notation with four basic tones α , β , γ and δ

The four tones α , β , γ and δ are given in the new staff notation as round notes. A staff is used with five main lines, one auxiliary line below the staff and one auxiliary line above the staff. The low α is positioned at the auxiliary line below the staff. If there is a need to distinguish a low α from an α one octave higher, one can put the number 1 behind the low α , the number 2 behind α one octave higher, the number 3 behind an α another octave higher and so on, so in the same way as it is done for the normal staff notation. However, these added numbers aren't used in this note because the position of the note in the staff already specifies which tone is meant.

The four tones αi , βi , γi and δi are given in the new staff notation as triangular notes with the point upwards. The four tones αo , βo , γo and δo are given in the new staff notation as triangular notes with the point downwards. The αo , the α and the αi are positioned at the same height in the staff.

The advantage of the use of the chosen tone names, the chosen note shape and the chosen positions of the notes in the staff are that, for a chromatic tone scale, only a little part of the staff is used and therefore three chromatic tone scales can be put on one staff with one auxiliary line below and one auxiliary line above the staff. This option is given in figure 3.

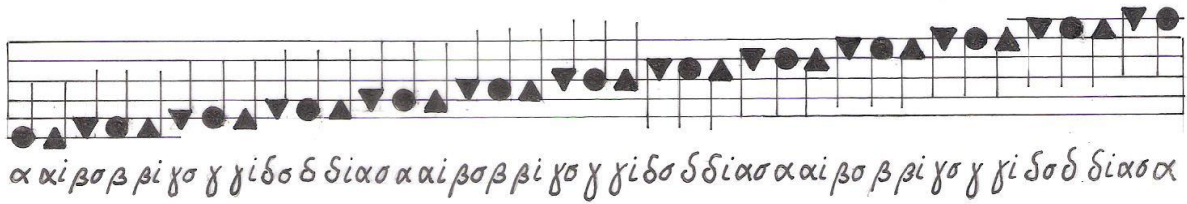


Figure 3 Chromatic tones for three octaves and one staff

If one uses three auxiliary lines below the staff instead of one and if one uses three auxiliary lines above the staff instead of one, one gets an option for which five octaves can be given with only one staff. This would be a realistic option for a keyboard with five octaves.

For instruments with a very big range like a piano or an organ, two staff can be used separated by one auxiliary line. The notes on both staff are identical. For this option, six chromatic tone scales can be used if one auxiliary line is added below the lowest staff and one auxiliary line is added above the highest staff. If three auxiliary lines are added below the lowest staff and three auxiliary lines are added above the highest staff, it is even possible to use eight to scales. This option is given in figure 4 for which only the tones α, β, γ and δ are used.

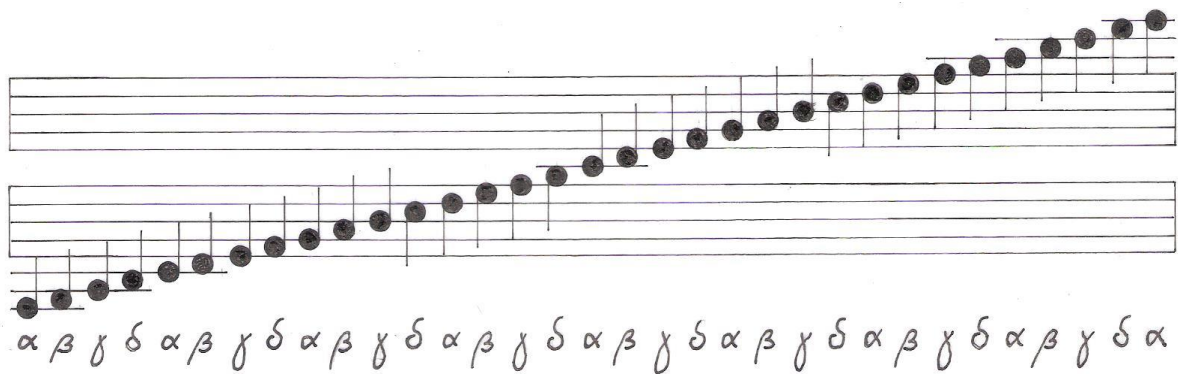


Figure 4 Tones α, β, γ and δ for eight octaves and two identical staves

The disadvantage of this new staff notation clearly is that it deviates strongly from the current staff notation and so one has to learn to read music from the beginning if one wants to use this new staff notation. But still it seemed to be useful to me to present this idea as a separate chapter 4 because the current staff notation clearly has certain disadvantages and it will never improve if one isn't willing to look at it with a critical mind.