

To understand staff notation aurally

In higher music education we spend a lot of time trying to teach students to understand staff notation aurally. At least a few hours a week are scheduled for sight-singing and ear-training lessons. It is considered an important skill for a musician to be able to hear what they see in staff notation and to see in notation what they hear in music¹. After years of studying their instrument it turns out that most of the students entering the classical music departments in conservatoires have not developed these skills at the same level as their instrumental playing or singing.

Next to understanding staff notation aurally it is important that students understand their instrument aurally. This is a different, but also important topic, which I will not really address in this article, but also this seems to be a problem that mainly exists for classical musicians who were trained from their early years reading from staff notation².

Most music theory teachers would say that the development of inner hearing and aural understanding of staff notation is the goal of *solfège and ear-training lessons*. But often it is assumed that students already understand staff notation aurally, given the nature of assignments like sight singing and dictation. Aural understanding of staff notation and inner hearing are prerequisite skills for singing a melody at sight (a *prima vista*) or writing down a dictation. Students who lack these skills, make many mistakes in singing or writing the music. In a way, solfège and ear-training lessons are too often about testing literacy skills, showing the flaws, and if there is any learning, it is by trial and error.³

¹ Zoltán Kodály made many comments about these musical skills, which he considered musical literacy, in several writings and speeches (Bónis, 1974). Karpinski defines musical literacy skills in the introduction of his book *Aural Skills Acquisition* (2000) and refers to several authors, saying that listening, reading, and performing skills are closely connected. Gordon (2012) compares music literacy to language literacy: the ability to think, listen, speak, read, and write language with comprehension.

² Lieven Strobbe and Hans van Regenmortel discuss this thoroughly in their recent book *Klanksporen – Breinvriendelijk musiceren* (2010).

³ Trial and error learning is not very effective because the brain registers mistakes as well as something ‘learned’, including the negative feelings of failing. The teacher should always choose exercises that are well prepared, and that he or she is sure about that the student will be able to execute with confidence. (see also Strobbe and van Regenmortel (2010) and Kodály (1972): 333 Reading Exercises).

That many students (whom we can also almost call professional musicians) find solfège and ear training difficult has in my view not so much to do with their competence or talent, but mainly with the properties of staff notation itself and the way it is learned. Teachers need to understand what they are asking from their students, and what is learned when they work with staff notation. This is especially important when they teach young children. But also when these lessons take place late in the career of highly trained musicians, teachers need to be aware of the pitfalls of reading and understanding staff notation in relation to the development of aural skills.

In this article I will discuss different approaches to reading and writing pitch in music notation in relation to musical imagery (aural understanding). I will not focus on rhythm and meter, although this is as interesting as pitch and of course cannot be disconnected in complete musical understanding. More than pitch, rhythm and meter can *only* be understood aurally, and there are already methods that connect aural understanding to reading rhythm notation in a convincing way⁴.

Absolute and relative systems in pitch notation

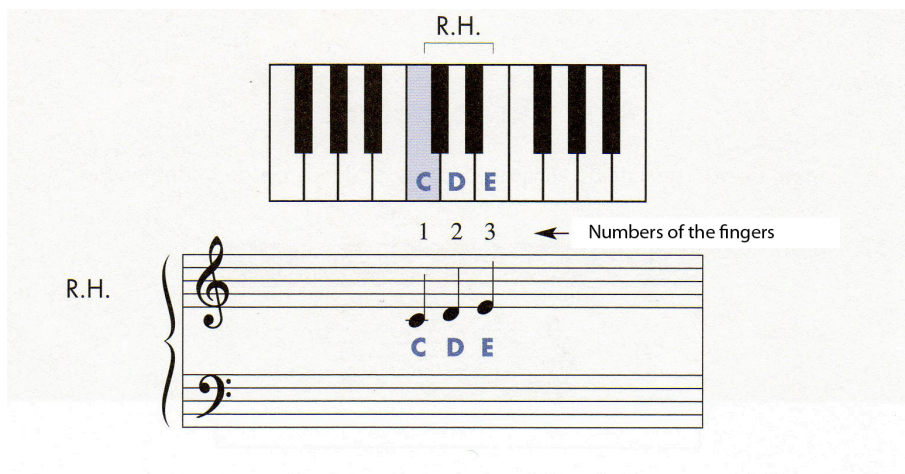
There are two approaches of understanding pitch notation that differ fundamentally. The absolute and the relative systems are two ways of representing pitch with names or symbols that in my view do not address the same mental processes.

Pitch notation on the five-line staff is an **absolute system** when a *sign* (position of a note on the staff in combination with a clef and possibly a key signature) has a one-to-one connection to a *name* of a note and a *fingering or key on the musical instrument*. This works for all instruments. Pupils look at the sign, they learn that it is called 'c', and that there is a certain position on the instrument that will produce the sound 'c'. For keyboard and fret board instruments often a connection is made to numbers for getting the right fingers to press the keys: this functions as another visual clue that connects to the physical reaction and this can even interfere with the reading of notes in later stages of the learning process.

Example 1 shows the first page of a keyboard method. This could be the pupil's very first music lesson, in which music notation and learning to play the instrument are introduced at the same time, without any prior musical training. I will come to that later.

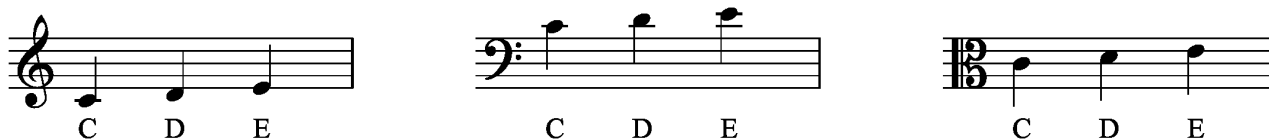
⁴ See for example Hoffman (2009) and Curwen (1892).

Example 1 – from: Keyboard World



The use of different clefs does not change this fingering-notation: it is the notation that looks different (other position of the note on the five lines), but the name of the note is still connected to a key or fingering on the instrument. The visual instruction gives the player certainty about the key that needs to be pressed on the instrument and the sound will follow. When staff notation is read in this way it is a kind of ‘instrument-independent’ form of tablature notation. Tablature notation mainly directs the connection between the eyes and the hands.

Example 2 – other clefs



For singers the *sign–name–fingering connection* does not exist, or at least should not exist. It can only be the musical ear that hears the music in advance that can steer the sound production of the vocal chords. For singers to ‘pitch’ notes on their vocal chords, as if they are trying to find keys on an instrument, is usually not advised by singing pedagogues, because it can hinder legato singing and relies more on physical control (muscles) than on musical imagery.

Players of transposing instruments also read notation as an indication how notes have to be played on the instrument. The pitch notation is in this case still connected to the name of the note and the fingering on the instrument, but not ‘absolute’ concerning to sounding pitch.

Example 3 – transposing instrument



played on a B \flat clarinet
sounds as:



If an instrumental player is asked to play a piece of music transposed by himself from a written score, major problems can occur because of the strongly learned connection between the visual sign and the fingering of these notes on the instrument. This difficult task can be practised by learning to read the notation differently: for example to think in another clef or to mentally / visually re-position the placement of the notes on the staff (read all the notes a line higher or lower). In this way the connection between the name of the note and the fingering on the instrument can be retained, but the direct sign–fingering relation is disturbed. In fact, the notation is read transposed and so the exercise becomes a reading exercise. Sometimes students even read one clef as a transposition of another clef: for example they read the bass clef as a treble clef in which all the notes are written a line lower (have the name of the note on the higher line). This visual and cognitive approach takes a lot of time, many mistakes are made and thinking in sound is hardly involved, or just functions as negative sound-feedback when the wrong key is pressed.

Example 4 – rethinking notation to transpose



is read or thought as follows in an assignment to play in another key:



or:



Absolute pitch notation systems, using note names like a-b-c-d-e-f-g or do-re-mi-fa-sol-la-si exist only in notation for people not having perfect pitch. When students, who have learned music notation with absolute note names listen to music without a score, they will apply the absolute system in a relative way. They will aurally analyse music that is played in a major key (for example E-flat major – they are not told however that it is in the E-flat major key) by using the note names of the c-major scale: c-d-e-f-g-a-b-c or do-re-mi-fa-sol-la-si-do. This happens because in the

beginning of their music reading training process mostly (or even only) these notes were used, connected to singing, notation or playing an instrument.

Example 5 – aural analysis of a melody, without instruction about the key



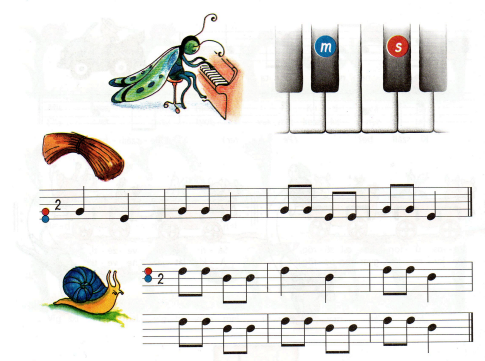
will be aurally perceived as:



For ‘absolute-raised’ musicians it is very confusing to name a note that is read on a certain position on the staff differently, unless they think in another clef. A ‘do’ on the staff can never be called ‘re’, just as what looks like a ‘c’ can not be ‘d’. That explains probably the endless exercises, called ‘solfeccio parlato’, where notes are said by their names in a notated rhythm and in increasing tempo, in different clefs. These exercises are performed in countries using the fixed-do system. But as explained above, this has nothing to do with sound imagination or developing inner hearing: it is a visual exercise to be able to retain the one-to-one connection of the name of a note to a fingering on an instrument in all forms of staff notation.

In a **relative pitch notation** system the names of the notes are connected to the sound of the relations between the notes, and are not connected to a fingering or key on an instrument. The same *sound-name* can be placed in different positions on the staff.

Example 6 – Csizergö 1: Hungarian music method for children: so and mi on the staff



And the same visual sign (position on the staff) can get a different name, depending on the meaning of the sound (the sound relations) in the context of the music.

Example 7 – relative note names in different contexts



When pitch notation on the staff is read relatively and is understood in the musical context⁵, a connection will be made to the ear. Or better, it is (or should be) the other way around: the musical ear will understand the context and thus tells the brain how to write and read the notation. A condition for learning music notation in this way is that before notation is introduced, the musical context is learned by ear. This is an aural process that develops through listening⁶ and music making. This may take a few years and from there step by step the musical elements can be made conscious and pitches can be ordered and named⁷, so that music notation becomes the visual image of what is already heard and can be played or sung.

In countries where they understand the importance of music education that starts early in the life of children (before the age of 6), these first stages of music education are indeed completely aural, without using instruments and music notation. Songs and games are repeated many times, and in most Western cultures the aural contexts of the major and minor or pentatonic scales are trained aurally for a long time in the beginning of the learning process through music itself. In these early years of musical development, they may already start using visual signs for tones (hand signs or other body movements). If note names are sung, they usually are not related to absolute pitches (the teacher will not always sing on the pitches of the C major scale when the song is in a major mode), so these early stages of aural learning are ‘relative’.

But as soon as notation is introduced, usually when children start playing an instrument or have to take a preparatory course to be allowed to choose an instrument, we can see the big difference between an absolute or relative system of reading pitch in staff notation. In an absolute system (fixed-do or a-b-c) the note names that were sung relatively in a musical context, and had a sound–name connection, are now fixed to certain positions on the staff. As long as the music is written in C-major or A-minor, (do-major or la-minor) there will be no conflict for the ear to understand these

⁵ This does not need to be a tonal context. Modal, pentatonic, octatonic and free-tonal music also depend on relations between tones, which can be associated with relative sound names.

⁶ Strobbe and Van Regenmortel (2010) argue that all humans develop the musical skills of the listener, necessary for understanding music through acculturation.

⁷ Gordon (2012) describes this process in the following terms: the verbal association level should be preceded by the aural /oral level of learning content and context in music.

visual signs. But in any other notated key the aural sound–name connection can no longer be retained and is overruled by the visual sign–name connection. Children will learn that the notes in the major scale starting on position ‘re’ on the paper, have to be sung as ‘re-mi-fa-sol-la-si-do-re’ and that these names sound the same as ‘do-re-mi-fa-sol-la-si-do’. The names of the notes do not mean anything anymore; they are just a new text to a memorized melody. The system where the sharps and flats are included in the absolute note names (re-mi-fa sostenido or d-e-fis) is maybe slightly less inadequate. But still every key has to be learned anew with its own note names, which have different meanings in the different keys, and theoretical explanation is needed to sing a ‘new scale’ that sounds exactly like a scale that exists already in the ears⁸.

In his introduction for *Let us sing correctly* Zoltán Kodály refers to the practice of learning fixed-do in one key and by scales as ‘the C-major-scale-method as the enemy of correct singing’. He mentions that aural understanding cannot be achieved by singing up and down the scale. The sound relations between all the notes of the key or mode have to be memorized separately and an interval is not made up of (missing) steps of the scale. Secondly, by ‘correct singing’ he meant singing in tune (not in equal temperament). Kodály does not comment on this here any further, but many years earlier John Curwen did⁹: ‘fixed’ do-re (or c-d) in C-major (big major second) should not sound the same as fixed do-re (c-d) in the context of F-major or A-minor, where it is a small major second¹⁰. Singing on absolute names, learned in the context of the C-major scale, can cause problems in singing on these same names in different keys. Music theory teachers may argue that musical students will automatically adjust to these delicate tuning issues, but I do not agree. In listening to students singing solfège in fixed do I have noticed that unstable intonation can cause students to lose the tonal context altogether. I suspect that traces of the early imprinting of the sound–name connection in the do-major scale plays a role in this, but that has to be researched further. It is a pity that all the good work that may have been done in the early years when music was learned aurally, is not translated to reading staff notation in a useful way. Connecting the aurally learned relative sound names to not corresponding visually learned absolute note names is a fundamental mistake. It creates a conflict between ear and eye and prevents aural understanding of pitch notation.

⁸ Gordon (2012) uses the terms ‘keyality’ and ‘tonality’ to explain that aural understanding of tonality should be related to the relative note names at the verbal association level. Tonality can include the major, minor, modal and other scales. Keyality just means the transposition of those scales. Fixed systems emphasize keyality and require theoretical understanding and notation as prerequisites, instead of ‘audiation’.

⁹ Curwen (1879).

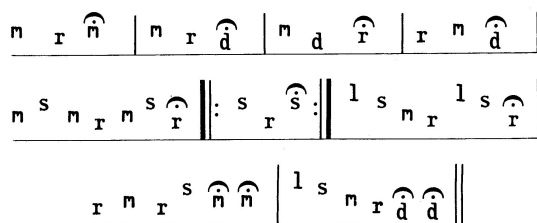
¹⁰ Kardos (2005) and Sapszon (2004) also take great care of pure intonation in their exercises for training choirs and address this issue.

In a relative system, which is also aurally trained in the pre-notation phase, the positions of notes on the staff (the visual signs) will be introduced as flexible or movable. In this case the eye will have to learn that ‘do’ can be anywhere on the staff, but once this is understood the ear can keep using the sound–name connections that were learned aurally in the musical context already. The meaning¹¹ of the notes in the scale, connected to their names is kept intact, and the sound–names become musical ‘tools of thought’¹². A clef, key signature or other theoretical explanations are not needed in the early stages of reading and writing, because the sound relations between notes are expressed by their relative names and these relations are at first only made visual by distances on the lines of the staff.

Some examples of relative systems for reading and writing pitch

To prepare reading staff notation¹³, other ‘in between stages’ of pitch notation have been developed. Here are some examples:

Example 8 – Relative pitch notation by vertically spaced solfa names (Vajda, 1974)



¹¹ The meaning of notes in a key or mode was expressed by Curwen (1872) in his description of the ‘mental effects’ of the (relative solfa) notes in different contexts: in a major or minor scale or in a ‘transition’ (change of key). Curwen connected sound, name, mental effect and visual manual signs in the early stages of music education.

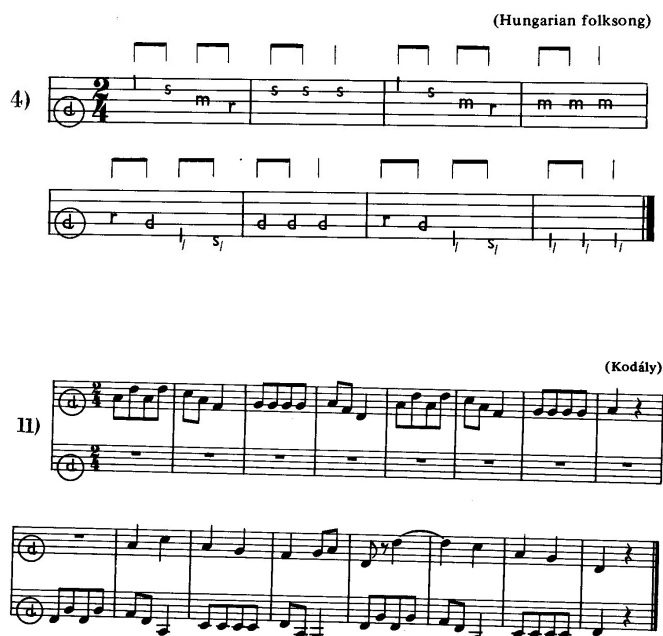
¹² Curwen (1875) quotes Isaac Taylor, saying “single words and certain constant conventional combinations of them are the tools of thought; without the aid of these its processes must stop short at a rudimental stage.”

¹³ Gordon (2012): the symbolic association level of learning includes the beginning of reading and writing. Vajda (1974), Strobbe and van Regenmortel (2010), and Mills and McPherson (2007) also describe an even earlier stage in the musical learning process where a child can show in his or her own notation how he or she understands the music, for example with pictures.

Example 9 – Stick notation with solfa names below rhythm notation (Tegzes, 1991)



Example 10 a and b – Staff notation with do-clef, solfa names and notes (Szönyi, 1974)



Most methods using a relative system in introducing staff notation work towards learning absolute note names (letter names A-B-C) as well. This step can be taken in different ways, using different forms of ‘proto-notation’¹⁴ or not (see also the examples above). Sometimes an instrument, for example a recorder or xylophone, is used. Clefs and key signatures can be introduced relatively late and sharps and flats are explained from the relative sound–name connection that exists in the ear. Students learn that a note has two names: a ‘calling name’ (absolute letter name) and a ‘singing name’ (relative solfa name)¹⁵. The new absolute name is always learned later than the relative name that the children already know in sound and relative notation¹⁶. This may seem complicated, but only the relative system with the sound–name connections provides a real aural understanding of

¹⁴ Karpinski (2006).

¹⁵ Van Blankenburg (1739), translated from Dutch: “sounds (as all things in the world) have to have two names, one for the thing itself, and another for their meaning, their order and relationships. Have there ever been names better than those Guido invented?”

¹⁶ Szönyi (1974): “In no way does relative solmisation preclude the use of absolute note names; on the contrary, it actually lays the foundations for this.” See also Glover (1835) and Curwen (1848, 1875).

the staff notation (including pure intonation), while the absolute sign–name connection may be needed for faster instrumental playing and score reading.

There have been educators who decided to dispose temporarily of the absolute staff notation system altogether and invented independent alternative ways of writing music. They did not only do so because reading music was considered ‘too difficult for amateurs’, but because they understood the problems of staff notation when it was read in the absolute way. It must be said that most of these teachers worked with singers and (school) children or had experienced trouble themselves in learning to read and write music notation. They were scorned many times by their colleagues, who taught music reading to professionals by the use of instruments and considered other ways of learning to read pitch notation as something necessary only for amateurs or less talented students¹⁷.

Jean-Jacques Rousseau, for example, invented a cipher system in the eighteenth century, where the tonic note in the major mode is called ‘1’ and the tonic note in the minor mode is ‘6’. But when the exercises notated in numbers are sung, the do-re-mi (solfa) names are used for singing. Resulting in the situation that the notes that are read by their absolute names on the staff are firstly analysed and re-notated with numbers (fa = 1, do = 5). And then the numbers are sung to relative solfa names: 1 = do and 5 = so. This system of translating fixed-do into relative solfa by using an ‘inter-stage’ of numbers was continued to be used in various modified ways in the nineteenth century by Galin, Paris and Chev  , and in the twentieth century by Justine Ward.

Example 11 – Upper line in cipher notation by Rousseau: ‘projet concernant de nouveaux signes pour la musique (1742), from Simpson (1976)



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¹⁷ F  tis warns in 1830 in his ‘La musique mise    la port  e de tout le monde’ against the ‘promise of certain charlatans’ using simplistic methods, meaning Rousseau’s cipher notation. In: Rainbow (1992).

In nineteenth century England Sarah Glover¹⁸ took relative solfa names and solfa notation (and not staff notation) as the starting point in the learning process. Children learned to sing by rote and by reading from the ‘Norwich solfa ladder’. John Curwen refined her ideas into the Tonic-Solfa system, using the same kind of chart for showing the positions of sounds in a tonal context on his ‘Modulator’ (see example 15). Like Rousseau, Glover and Curwen also developed another way of notating rhythm. Curwen’s Tonic-Solfa movement attracted many thousands of followers and complete scores and hymnbooks were printed in the Tonic-Solfa notation by the end of the 19th century.

Example 12 – four part tonic-solfa notation by Curwen, from Scottish Hymn Book

33 **GOD : HIS BEING, WORKS, AND WORD**
 SUSSEX. (87. 87.).
 Doh = G. *In moderate time.* Adapted from an English Traditional Melody.

$\left\{ \begin{array}{l} m : m \\ d : d \\ s : s \\ d : d \end{array} \right.$	$\left\{ \begin{array}{l} m : -.r \\ d : -.t_1 \\ s : -.s \\ d : -.s_1 \end{array} \right.$	$\left\{ \begin{array}{l} d : r : m : r \\ l_1 : s_1 \\ m : m \\ l_1 : l_1 \end{array} \right.$	$\left\{ \begin{array}{l} d : l_1 \\ l_1 : l_1 \\ m : d \\ l_1 : l_1 \end{array} \right.$	$\left\{ \begin{array}{l} f : f \\ l_1 : d \\ f : f \\ f_1 : l_1 \end{array} \right.$	$\left\{ \begin{array}{l} m : -.r \\ d : -.t_1 \\ s : -.s \\ d : -.s_1 \end{array} \right.$
$\left\{ \begin{array}{l} d : m \\ d : d \\ m : d \\ l_1 : m_1 \end{array} \right.$	$\left\{ \begin{array}{l} r : - \\ t_1 : - \\ r : - \\ s_1 : - \end{array} \right.$	$\left\{ \begin{array}{l} d : d \\ s_1 : s_1 \\ m : d \\ d_1 : m_1 \end{array} \right.$	$\left\{ \begin{array}{l} l_1 : s_1 \\ f_1 : m_1 : r_1 \\ d : t_1 \\ f_1 : s_1 \end{array} \right.$	$\left\{ \begin{array}{l} d : -.d \\ s_1 : -.l_1 \\ d : -.m \\ m_1 : -.l_1 \end{array} \right.$	$\left\{ \begin{array}{l} r : m : f \\ t_1 : d \\ s : l \\ s_1 : f_1 \end{array} \right.$
$\left\{ \begin{array}{l} s : -.s \\ d : -.s_1 \\ s : -.d \\ m_1 : -.m_1 \end{array} \right.$	$\left\{ \begin{array}{l} f : m : d \\ t_1 : d \\ f : s \\ r_1 : m_1 \end{array} \right.$	$\left\{ \begin{array}{l} r : r \\ d : t_1 \\ l : s : f \\ f_1 : s_1 \end{array} \right.$	$\left\{ \begin{array}{l} d : - \\ d : - \\ m : - \\ d_1 : - \end{array} \right.$	$\left\{ \begin{array}{l} d : d \\ l_1 : s_1 \\ f : m \\ f_1 : d_1 \end{array} \right.$	

A-men.

GOD is love : His mercy brightens
 All the path in which we rove ;
 Bliss He wakes, and woe He lightens :
 God is wisdom, God is love.

Back in history

Guido d’Arezzo was most probably the first to invent the notation of pitch on the staff, using fourlines with a clef and a coloured line for certain notes. The range of pitches used in the repertoire in Guido’s time was ordered already by note names in the gamma: g-a-b-flat/b-c-d-e-f-g spreading over almost three octaves. In the new staff notation the notes of the gamma each got their own place (on a line or in a space) and kept their gamma-names, indicated by the clef. B-flat and B-natural were not to appear directly (chromatically) after one another in a melody, so there needed to be just

¹⁸ Sarah Anna Glover (1835).

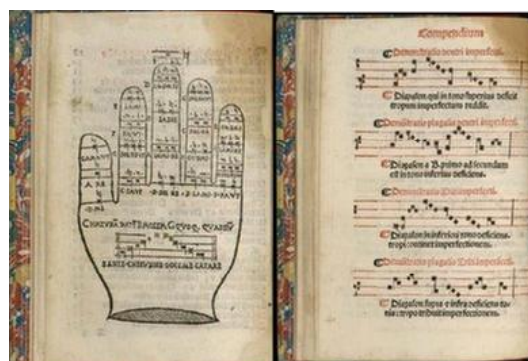
one space on the staff for both pitches. The sound of the notes of the gamma could be found by playing them one after another on the monochord: a resonance box with one string and a movable bridge to adjust the pitch of the note. The pitch notation on the staff gave adequate information where to place the bridge on the monochord, and the right sound was the result of this action.

Example 13: monochord and gamma (from: Grijp & Scheepers, 1990)

Example 14: staff notation and Guidonian hand



Abb. 10. Guido met monochord en bisschop Theobaldus. 12e eeuw.
Wenen, Österreichische Nationalbibliothek, hs. Cpv. 51, fol. 35v.



Guido taught a lot of the choristers that had to sing Gregorian chant in the mass. He knew that it was a time-consuming method to learn new melodies from notation by looking up all the notes on the monochord. Staff notation itself did not provide the singer with enough information about the distances of the notes, without using the monochord, if he did not know the melody already by ear. The other way, learning all the new melodies by rote, was equally time-consuming and proved not to be easy¹⁹. How could the new music notation on the staff be helpful in learning and singing unknown melodies in church?

With his second invention, the hexachord system, Guido introduced unambiguous names for relations between tones in an already existing absolute note name system (the gamma), where there is one variable note: the B-natural or the B-flat. Although it may not be too difficult to understand

¹⁹ Anna Reisenweaver (2012) paints a nice picture of this practice.

the relations between the notes of this eight-tone system aurally by their (absolute) names, it was noticed by Guido that the appearance of B or B-flat changed the place of the half step between notes of the gamma. This could cause misreadings and intonation problems for singers. The six note names ut-re-mi-fa-sol-la of the new hexachord system were always stable in their distances between the notes; there is just one place in the hexachord where there is a half step and that sound is always called mi-fa. Melodies however tended to expand the range of the six notes of one hexachord. In order to be able to sing and name all the eight notes of the gamma, the hexachord starting on C in the gamma (*hexachordum naturale* which connects to absolute e-f being mi-fa) needed to be transposed. It was moved to two other starting places in the gamma: to F and G, so that the notes A - B-flat could be understood as mi-fa (in the *molle* hexachord) and B-natural - C could be understood as mi-fa (in the *durum* hexachord) as well. The hexachord system covers and ‘reduces’ the gamma with its eight note names per octave and the variable B-flat or B to a movable figure of six *sound names* that gives aural certainty about the relations between the notes.

Singers needed to learn how to switch quickly between the three hexachord-positions when singing melodies and therefore they were trained to remember the absolute note names in combination with their possible relative solmisation names in the three hexachords. In fact they learned by heart what the possibilities were to mutate (in later times to modulate!) from one hexachord to another, being flexible all over the range of the absolute notes of the gamma. The famous Guidonian hand was used as a device to memorize all the names. In Guido’s time, and a long time after, the relative hexachord solmisation system and the absolute note names of the gamma were expressed in the ‘gamut’ (gamma-ut).

Example 15 Gamma and hexachord-solmisation (from: Rainbow, 2006)

ee	-----	la
dd	-----	la-----sol
cc	-----	sol-----fa
bb	-----	fa----- \sharp -----mi
aa	-----	la-----mi-----re
g	-----	sol-----re-----ut
f	-----	fa-----ut
e	-----	la-----mi
d	-----	la-----sol-----re
c	-----	sol-----fa-----ut
b	-----	fa----- \sharp -----mi
a	-----	la-----mi-----re
G	-----	sol-----re-----ut
F	-----	fa-----ut
E	-----	la-----mi
D	-----	sol-----re
C	-----	fa-----ut
B	-----	mi
A	-----	re
Γ	-----	ut

With Guido d'Arezzo the foundations for notating pitch were laid down in two fundamentally different but connected systems:

1. An absolute, visual and instrumental orientated system of the staff with clefs
2. A relative, aural and vocally orientated system of solmisation with hexachords

Both systems served different goals:

1. Being able to read and play: the *note names* being provided by the staff notation, leading to the placement of a note on an instrument
2. Being able to read and sing: developing aural imagery or inner hearing of the staff notation by using *sound names*.

A relative (movable) system of sound names that stood for stable sound relations between different notes was needed right at the beginning of the use of staff notation to be able to understand the absolute system of pitch notation aurally.

Modern times

A question that may arise: is a relative way of approaching pitch notation extremely awkward for instrumentalists, because there is no stable sign – name – fingering connection, and instead there is a context – sound – name connection? For singers though, the relative system seems to be the most, and maybe only helpful way to read pitch notation. But should instrumentalists then learn to read staff notation relatively? Indeed there are many more methods for singers that use the relative system of reading and writing music that reach a very high level²⁰ than there are for instrumentalists. There are however recent instrumental methods like 'The Singing Instrumentalist' books²¹ in which the early stages of reading and writing notation are approached by what is already understood relatively by the ears.

Aural skills in relation to the instrument may best be learned through the instrument, away from reading notation. Or when notation is involved it should be avoided to just train the sign (– name) – fingering connection, by instead practising all kinds of 'creative' forms of playing the music, like transposing by ear and improvising. This way children or students learn to understand their instrument aurally and develop aural skills through the instrument²². If reading notation is involved it should be understood relatively or at least the musical context should always be understood by

²⁰ Szönyi (1974-1979) and Hegyi (1974, 1979).

²¹ Da Capo (2005).

²² Strobbe and van Regenmortel (2010) and Ilomäki (2011).

ear. This is necessary because for all instruments where pitch can be influenced (intonation) the sign – name – fingering connection is insufficient for a musical realisation of pitch notation. Not eye and hand, but mainly ear and aural understanding should be the most important factors. And as we have seen the musical ear understands music relatively.

The music theory classroom


Strangely enough in solfège and ear-training classes sometimes relative (movable) systems are used in which concessions are made to the most important principle of the stable name–sound connection. Examples are ‘movable do with do-based minor’ (do-re-ma) and number systems where scales with different interval structures all start on number 1. Most of the time this is done because of a theoretical idea: a certain analytical concept is considered more important than a stable sound–name relation between tones. The concept ‘root’ gets the same name in different modes (the root is ‘1’ or ‘do’). All modes will have their own series of (altered) note-names or numbers based on a theoretical construction of a scale (for example the phrygian mode as a natural minor scale with ‘ra’ or $b2$, as if the Phrygian mode is an abnormal form of the (do-based) minor mode, which in itself is already a ‘deviation’ of the major scale)²³. The simple and stable aural connection of sound and name (start singing a scale on mi and discover the Phrygian mode) is made subordinate to theoretical knowledge and understanding of analytical concepts. In this way the sound–name connection cannot lead to understanding of a new concept of a mode, but the understanding of the concept must lead to the name and the sound²⁴. This subject is closely linked to intonation issues, which I will discuss later.

²³ Curwen’s chapter ‘True intonation versus temperament’ in *Musical Statics* (1874) shows that this was a lively discussion in the 19th century: “such a change in notation [do-based minor] would entirely spoil the association of syllable and interval which the pupils have so long been accustomed to.”

²⁴ This is not desirable in the musical learning process and not possible for young children. Choksy (1999) argues that ‘we can only teach skills, concepts cannot be taught, they have to be inferred. A concept is a major idea, understanding, or generalization that can be applied to many diverse situations.[...] Concepts cannot however be “taught”. Skills may be taught. We can teach students to sing, play, move, listen, and create. But we cannot teach students to “understand”. The teacher can only present carefully selected experiences through which the students may understand, that is, infer concepts about music. For the teacher to do this requires that he or she clearly knows what the fundamental musical concepts are. Only then can musical experiences be ordered sequentially so that students may be led to musical understanding.’

Example 16 – scales in relative solfa, fixed-do and do-based solfa

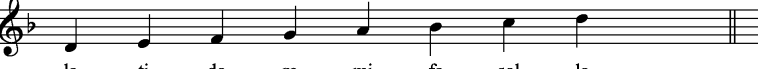
major



1. relative solfa
 2. fixed do
 3. relative, do-based


1.do	re	mi	fa	sol	la	ti	do
2.RE	MI	FA	SOL	LA	SI	DO	RE
3.do	re	mi	fa	sol	la	ti	do

minor



la	ti	do	re	mi	fa	sol	la
RE	MI	FA	SOL	LA	SI	DO	RE
do	re	ma	fa	sol	lo	ta	do

phrygian



mi	fa	sol	la	ti	do	re	mi
RE	MI	FA	SOL	LA	SI	DO	RE
do	ra	ma	fa	sol	lo	ta	do

It is a difficult situation that our students come to our music theory classes bringing all these different approaches, sometimes systematically trained and sometimes not. In a school usually teachers freely apply one approach or another, and authors of sight singing and aural skills manuals do often not make a clear decision about what system to use for their exercises²⁵. But it is very important for the teacher to know how the students understand pitch notation. And it is necessary that both teacher and student know that absolute and relative systems for understanding pitch notation do not serve the same purpose. They are *not* about the same thing²⁶. They trigger different mental processes, starting from the aural or the visual understanding. They cannot be used indifferently and have to be chosen according to the skill that needs to be developed.

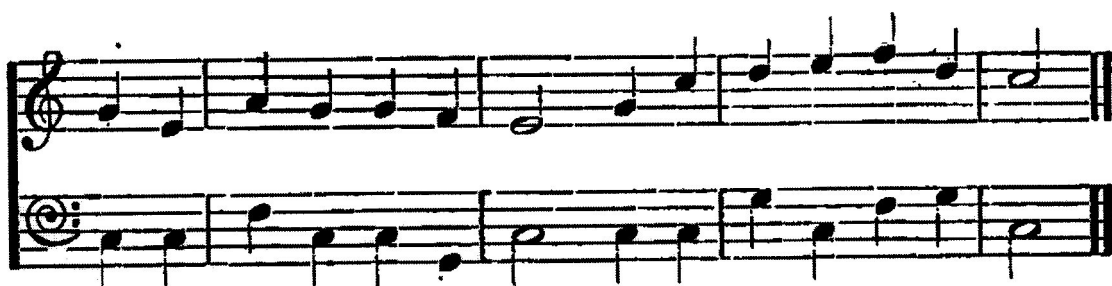
In sight singing the ear will have to direct the voice and no fingering or key action is involved. In dictation exercises the ear has to understand the meaning of the sounds, and the notational system should correspond as much as possible with the aural information. In both cases it is therefore necessary that pitch notation is understood relatively. As for transposition exercises: playing the music by aurally understanding the relations and meaning of the notes can be applied to another key, so that the ear directs the playing and the eyes do not have to read the notation as transposed. This can be illustrated by an easy exercise. Try to play the two examples from notation in different keys:

Example 17a and b: from Oakey Textbook of Harmony (1884) in staff notation and Curwen tonic-solfa notation

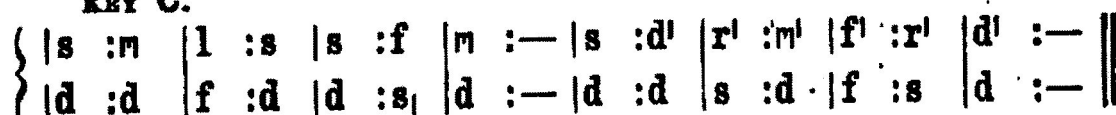
²⁵ See Marvin (2007).

²⁶ Elizabeth West Marvin (2007) mentions this shortly, saying that fixed-do and movable-do systems both teach valuable, but different, musical concepts.

7. Fill in the inner parts, using Dominant Seventh [7S] twice.



KEY C.



Sometimes it is tried in fixed-do countries to apply a relative system with other note names or numbers to the absolute do-re-mi names *after* fixed reading of pitch notation has been introduced. This is done to ‘fix’ the situation of having disposed of the sound–name relations in staff notation. In my opinion this will not work, because the sound–names that were learned aurally in the early years are now used for fixed pitches and instead new names will have to be relearned for this same sound–name connection.²⁷ It could be less confusing for children who did not learn the sound–name connection before learning to play an instrument reading from staff notation, and just learned the letter names (see example 1) without aural understanding, as is certainly too often the case in The Netherlands. They can learn to apply the relative solmisation syllables to the absolute letter names of the notes on the staff (at least the names are not the same) and on their instruments. And with some theoretical explanation this is not so difficult to achieve. But this is not enough: the relative system will have to be learned aurally first. Otherwise the direct aural sound–name relation (the name *is* the sound) is only replaced by an applied cognitive, or analytical way of thinking *about* the music.

²⁷ Throughout history there have been comments on using the do-re-mi names as fixed note names after the introduction of the seventh note name of the scale. For example Van Blankenburg (1739): ‘In France they have mistreated the new note *si*, because they have dismissed the letter names and have polluted the (relative) note names.’... ‘In Germany, on the contrary, they use only the letter names and ridicule the note names (solfa names), without knowing or recognizing their usefulness.’

Connecting aural understanding of content and context in music to verbal association and visual representation may be what solfège and ear training are all about. Even at college level the necessary steps have to be taken in the right order²⁸ if there have been misconceptions in the past.

There could be questions about the value of this discussion for musicians who have developed (or have retained) since early childhood some form of perfect pitch during their musical training. To be able to recognize, name or produce different pitches without the help of an instrument does not always mean that these sounds have musical meaning in the ears. This understanding of musical meaning for example becomes audible in intonation of chords or melodic intervals. Intonation is an important part of creating musical meaning. A relative system incorporates this musical meaning in the stable sound–names of the relations between notes. In an absolute system this connection is absent, because the same absolute note names will have different musical meaning all the time. And if intonation itself gives musical meaning and thus provides the ear with information for musical understanding there is a strong reason why not to use the piano (or any tempered instrument) in solfège lessons²⁹.

About intonation

Curwen based his work with the ‘Modulator’ on the relation between tonality, solfa names and intonation. He explains that in a transition (change of key³⁰) to the first sharp key (for example C-major to G-major or D-major to A-major) there will be a ‘brightening effect’ because of the new leading note *ti* and the higher intonation of the former *la*, which becomes *re* in the new key. A transition to the first flat key (C-major to F-major) will give a ‘sad effect’, because of the new fourth note *fa* and the lower intonation of the former *re*, which becomes *la* in the new key. Curwen also comments on the relative and parallel major and minor modes: “The major of the same tonic [for example A-major in relation to A-minor] is felt by the ear to be a key three removes off, and its tonic is really a komma different from the one from which we start. With a tempered instrument to guide, the transition is not difficult to sing, but without an instrument it is always felt to be awkward

²⁸ In my opinion this understanding of taking the steps in the right order is shown implicitly in the practical musical teaching sequences of good ‘Kodály-teachers’. Gordon (2012) describes the process explicitly in the levels and sublevels of his skill learning sequence.

²⁹ Kodály in *Let us Sing Correctly*: “The beginners first steps in the endless realm of notes should be supported not by any instrument of tempered tuning and dissimilar tone-colour, but by another voice.”

³⁰ Compare to Gordon: a change of keyality is a transposition of pitch, the mode stays the same. A change of mode (for example minor to major) is called a modulation by Curwen, and this can be compared to Gordon’s concept of a change of tonality.

and unnatural to the voice. The major of the same tonic is then, in practice, a key only distantly related to the minor, while the relative major (A-minor and C-major) is part of its own flesh and blood. The system of nomenclature should undoubtedly follow the stronger relationship.”

Example 18 Curwen’s Modulator as used in schools

Example 19 Curwen’s Modulator, showing just intonation in transition (from Musical Statics, 1874)

Example 18 is a chart titled "CURWEN'S MODULATOR" showing solfa names (DOH, TE, LAH, SOH, FAH, ME, RAY) and their corresponding fingerings (r, s, d, f, l, r, s, etc.) for various intervals. Example 19 is a page titled "THE SYSTEM OF KEYS AND JUST INTONATION" showing musical notation for various keys and intervals, with solfa names and fingerings indicated.

Curwen’s method for linking solfa names, musical function and intonation was recognized by Helmholtz, when he visited London in 1862 and heard the tonic solfa-ists sing by pure intonation. These are Helmholtz’s comments from the final paragraph of his book³¹:

“In London I had also an opportunity of comparing the intonation of this instrument [the Enharmonic Organ, constructed by General Thompson] with the natural intonation of singers who had learned to sing without any instrumental accompaniment at all, and are accustomed to follow their ear alone. This was the Society of Tonic Sol-faists [...] The Tonic Sol-faists represent the tones of the major scale by the syllables Do, Re, Mi, Fa, So, La, Ti, Do, where Do is always the tonic. Their vocal music is not written in ordinary musical notation, but is printed with common

³¹ Helmholtz (1885) pp. 422-428.

types [...] When the tonic is changed in modulations³², the notation is also changed. The new tonic is now called Do [...] This notation, therefore gives the very first place to representing the relation of every note to the tonic [...] Since the intervals of the natural major scale are transferred to each new tonic as it arises in the course of modulation, all keys are performed without tempering the intervals. [...] But the ordinary (staff) notation gives directly nothing but absolute pitch, and that too only for tempered intonation. [...] The Tonic Sol-faists, then, sing by natural, and not by tempered intervals. [...] After this experience I think that no doubt can remain, if ever any doubt existed, that the intervals which have been theoretically determined in the preceding pages, and there called natural, are really natural for uncorrupted ears; that moreover the deviations of tempered intonation are really perceptible and unpleasant to uncorrupted ears; and lastly that, notwithstanding the delicate distinctions in particular intervals, correct singing by natural intervals is much easier than singing in tempered intonation. [...] That the natural system can be carried out by singers, is proved by the English Tonic Sol-faists. [...]. I think that many of our best musical performances owe their beauty to an unconscious introduction of the natural system, and that we should oftener enjoy their charms if that system were taught pedagogically, and made the foundation of all instruction in music, in place of the tempered intonation which endeavours to prevent the human voice and bowed instruments from developing their full harmoniousness, for the sake of not interfering with the convenience of performers on the pianoforte and the organ.”

Conclusion

Many of Curwen's ideas have been adopted in the inspiring Kodály method of teaching music through singing. My opinion is that the essence of these approaches in the end lies not in the training of reading and writing music notation but in the development of the musical ear. But when we return to the key question of this article I have to state that in the development of the aural understanding of pitch notation it is insufficient to learn fixed (absolute) names for visual signs to realise the sound without the use of an instrument, because the musical meaning cannot be included in the names if the same names will have a different meaning in another musical (aural) context. Relative note names that are based on the relations of sounds in a musical context provide a connection between sound and name: the name *is* the sound. Relations between notes are expressed by their names and are understood by their musical meaning. Relative note names are therefore a necessary pedagogical and didactical tool to learn to understand pitch in staff notation aurally.

³² ‘transitions’ according to Curwen.

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