

# Written vs. Sounding Pitch

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## **Abstract**

It is generally believed that converting written pitch to sounding pitch in conventional Western music notation is simply a matter of transposition and always straightforward. In fact, there are many situations in which converting written pitch to sounding with confidence is difficult, and some in which it is virtually impossible. I discuss a number of cases, with an eye towards both providing a practical guide for musicians and for raising awareness of the complexity of conventional notation, which is more often underestimated than not. The situations fall into three general categories: instrument-specific and related to clef; instrument-specific but regardless of clef; and more general. In most of the common situations, only the octave is ambiguous, a relatively minor problem, but many situations can involve other intervals. Many of the most problematic cases involve obsolete conventions, but they cannot yet be forgotten; editions from the 19<sup>th</sup> century will be with us for some time to come.

## **Introduction**

It is generally believed that converting written pitch to sounding pitch in conventional Western music notation is always straightforward, if not trivial. This is not true. In fact, in some instances it is impossible to convert written pitch to sounding pitch with confidence, even for an expert. There are many reasons for this, and the body of this article enumerates those I am aware of; it is likely there are others.

It is also generally considered that the difference between written and sounding pitch is simply a matter of transposition; indeed, Rastall<sup>1</sup> discusses a number of the problem cases under the heading “Conventions of Transposition”. This is fine if (as several of the cases described here suggest) transposition is defined so broadly that it can vary from note to note, even within a chord, and so broadly that it can involve any interval up to two octaves, if not more. However, the term is often taken in the same narrow sense as the word *transposing* in “transposing instruments”, i.e., changing pitch by a fixed interval that cannot be an octave or multiple of an octave.<sup>2</sup>

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<sup>1</sup>Richard Rastall, *The Notation of Western Music* (New York: St. Martin’s Press), 226–230.

<sup>2</sup>Denis Arnold, ed., *The New Oxford Companion to Music* (Oxford: Oxford University Press, 1983), article “Transposing Instruments”, II, 1838. Also see discussion in Byrd, Donald, & Isaacson, Eric (2003). A Music Representation Requirement Specification for Academia. *Computer Music Journal* 27, no. 4, 43-57; revised version available at <http://www.informatics.indiana.edu/donbyrd/Papers/MusicRepReqForAcad1-09.doc> .

The term “conventional Western music notation” (henceforth, “CWMN”) has been used in a variety of ways. I use it here in the sense of Byrd<sup>3</sup>: any arrangement of the symbols in general use by composers in the European art music tradition from about 1700 to 1935, used with the meanings that were standard: (1) if the notation was created between 1700 and 1935, at the time it was created; (2) if the notation was created before 1700, with the meanings of 1700; or (3) if the notation was created after 1935, with the meanings of 1935. Thus, such phenomena as the *musica ficta* of the Medieval and Renaissance are not considered here. Considering when the notation is from is relevant because of changes over time to such aspects as the rules for when accidentals carry. When they first came into use, accidentals applied only to immediate repetitions of the pitch in question (though they might affect following notes on other pitches, e.g., to avoid augmented intervals). The now-standard rules under which they apply for the remainder of the measure started coming into use about 1700, but they took the entire 18<sup>th</sup> century to become firmly established. For example, Fig. 1, based on Winternitz<sup>4</sup>, is from the notation in the manuscript of *The Epicure* by Henry Purcell (1659-1695). Rastall<sup>5</sup> discusses this music, pointing out that the asterisked note would be sung as a C-natural. If, however, it had appeared this way in an edition a century later, one would expect it to be a C-sharp. The note with the dagger is C-sharp according to either 17<sup>th</sup>-century or modern rules.

## Purpose and Scope

In my view, this article has two purposes, one very practical and one less so. The practical motivation is to provide a general guide for score readers, especially conductors, musicologists, music theorists, and music-informatics researchers. It might also be useful to composers, and to performers looking at music for other instruments. (Of course performers, at least those with classical-music training, are generally very familiar with peculiarities of notation for their own instruments.) Many of the most problematic situations involve obsolete conventions, but they cannot yet be forgotten; editions from the 19<sup>th</sup> century will be with us for some time to come.

I have been studying and writing about music notation for at least 25 years<sup>6</sup>, and I have discovered repeatedly that people of all backgrounds—from professional musicians to computer scientists interested in music—severely underestimate the complexity of CWMN; even those aspects that seem straightforward can be very subtle. To my knowledge, almost nothing has been published that emphasizes this fact<sup>7</sup>, and my second purpose is to demonstrate it for one important aspect of notation.

In a sense, both purposes can be summarized in a single statement: be careful in interpreting notated pitch; things are not always what they seem!

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<sup>3</sup> Donald Byrd, *Music Notation by Computer* (Ph.D. diss., Indiana University, 1984), 13.

<sup>4</sup> Emmanuel Winternitz, *Musical Autographs from Monteverdi to Hindemith*. 2 vols. (New York: Dover Publications, 1965), vol. 2, Plate 14.

<sup>5</sup> Rastall, *The Notation of Western Music*, 180.

<sup>6</sup> See for example Byrd, *Music Notation by Computer*; Byrd, Donald, & Isaacson, Eric (2003), A Music Representation Requirement Specification for Academia, *Computer Music Journal* 27, no. 4, pp. 43-57 (revised version available at <http://variations2.indiana.edu/pdf/MusicRepReqForAcadD5-09-05.pdf>).

<sup>7</sup> One paper that does emphasize it is Byrd, Donald (1994). Music-Notation Software and Intelligence. *Computer Music Journal* 18, no. 1, 17-20.

**Definite vs. “Semi-definite” Pitch.** This article focuses on music for definite-pitched instruments. Pitch notation for instruments with “semi-definite” pitch—mostly percussion instruments such as wood blocks and bongos—brings up different issues. This is especially true of notation of music intended for computer sound synthesis. For example, MIDI note numbers normally go up with the chromatic scale, but, for no obvious reason, the General MIDI percussion sounds sometimes assign higher pitches to lower numbers<sup>8</sup>. The result is that unsuspecting transcribers, whether human or computer, are likely to make an ascending series of sounds appear to be descending and vice-versa,

## ***When is Converting Pitch Difficult?***

Below is a list of cases where converting from written to sounding pitch is difficult. Note that the first eight items are specific to various instruments, while the others are more generic. Note also that most of these items affect only the octave, so errors are easily overlooked and, as a practical matter, not particularly serious, though octave errors can easily result in mistakes in identifying the outer voices. The exceptions are: timpani notation and accidental-carrying, which can produce semitone errors; natural harmonics notated at fingered pitch, which can produce errors of a few large intervals; baritone horn and euphonium clef dependencies, which can produce errors of a major ninth; and scordatura and C scores, which can lead to errors of almost any amount. Obviously these are quite serious, if not disastrous.

## **Instrument Specific and Related to Clef**

1. In older editions, **horn** parts in bass clef are almost always written an octave lower than their transposition would dictate. According to Read<sup>9</sup>, this was standard “up to the turn of the [20th] century, at least”. Good examples of the confusion possible are hard to come by mostly because it is not often clear to a non-horn player whether the old bass clef notation is in use. But, for example, horn solos in Beethoven’s *Fidelio Overture* (Eulenberg ed.; Fig. 2), and in Strauss’s *Till Eulenspiegel* (Boosey & Hawkes, Eulenberg, Kalmus eds.), include clef changes embedded in arpeggios that make it obvious that written “tenths” or “elevenths” are actually thirds or fourths. The *New Grove* article “Transposing instruments”<sup>10</sup> comments: “An instruction is often printed to indicate the reformed bass-clef notation; otherwise it has to be discovered by context.” Compare this situation to the one involving crooks described below (under item 9), which is obviously related. Stone<sup>11</sup> recommends indicating which notation is in use by putting a number below or above the bass clef to indicate the actual transposition; this may be a good idea, but it does not seem likely that many editions that use the old notation will be reprinted with modified clefs. NB: according to the article “Transposing instruments” in Arnold (1983), this usage of bass clef in old editions applies also to **basset horn** and occasionally **trumpet**.

2. The *New Grove* article “Bass clarinet”<sup>12</sup> describes “several current conventions regarding notation for the **bass clarinet**.” In the French system, the part is written entirely in treble clef,

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<sup>8</sup> MIDI Manufacturers Association, *General MIDI 2 Specification v 1.1* (2003).

<sup>9</sup> Gardner Read, *Music Notation*, 2nd ed. (Boston: Crescendo, 1969), 356.

<sup>10</sup> Anthony C. Baines/Janet K. Page, “Transposing instruments”, in *The New Grove Dictionary of Music and Musicians*, 2nd ed. (London: Macmillan, 2001), vol 25, 700.

<sup>11</sup> Stone, *Music Notation in the Twentieth Century*, 57.

<sup>12</sup> Nicholas Shackleton, “Bass clarinet”, in *New Grove Dictionary*, vol. 2, 863.

sounding (for the B-flat instrument, the only one really used anymore) a ninth lower than written. The German system uses both treble and bass clefs, sounding a second lower than written. There is also a hybrid system. *New Grove* comments: “In the treble clef [the German system] runs counter to the player’s instincts; in an attempt to avoid confusion, some composers change to a ninth transposition when using the treble clef.” This may reduce confusion among players, but it almost certainly *increases* confusion among those trying to read the score. There is rarely if ever an explicit indication of which system is in use. For example, the bass clarinets in the original version of Stravinsky’s *Le Sacre du Printemps* (Boosey & Hawkes ed.) are written in both treble and bass clef, so the notation might be either in the German or the hybrid system. The score contains no explicit indication, and nothing like a scale or arpeggio with a clef change in the middle ever appears to settle the question, but the range of the treble-clef notes and passages like the end of the “Ritual of the Ancients” (“Action Rituelle des Ancêtres”) suggest the hybrid system.

3. In older editions, **cello** parts in treble clef are sometimes written an octave higher than sounding pitch. See, for example, Dvořák’s *Carnaval Overture* (Simrock and Artia eds.), mm. 80ff (Fig. 3). (Simrock’s cello part is identical; I have not seen Artia’s, if indeed they publish performance materials.) Note that the violas and celli are playing in unison at the start of the excerpt. Then, at the beginning of m. 83, the violas jump up a fifth, while—thanks to the clef change—the celli appear to go up a 12<sup>th</sup>, putting them in an extreme register for orchestral celli, as well as an octave *above* the violas! This notational anomaly appears to be very common in editions from certain publishers—particularly Simrock—of music by Dvořák, and may also be found in Schumann, Brahms, etc. As far as I know, there is never an explicit indication of when the convention applies, and considerable confusion exists about it; an orchestration textbook<sup>13</sup>, a music dictionary<sup>14</sup>, and two cellists I consulted all gave different rules. It may appear more often in the actual cello parts than the score; editions that use it may tend to use only treble and bass clefs, skipping tenor. Presumably the point is to simplify the notation by reducing clef changes, but still avoid excessive ledger lines. However, none of this is certain. A similar phenomenon seems to occur in **double-bass** parts, particularly Ricordi editions (Hunter Capoccioni, personal communication, June 2007).

4. In band music, according to the *New Grove* article “Transposing instruments”<sup>15</sup>, “The **B-flat baritone [horn] and euphonium**, when written in treble clef, sound a major ninth lower, but in the bass clef there is no transposition.” Thus, in the former notation, they are written as B-flat instruments, but in the later case as C instruments.

5. **Tenor voice** always sounds an octave lower when written in treble clef but at sounding pitch in treble-tenor clef. This is a relatively minor problem because, to my knowledge, it is purely a matter of editorial style, and the clef never changes within a piece.

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<sup>13</sup> Walter Piston, *Orchestration* (New York: W. W. Norton, 1955), 84.

<sup>14</sup> Denis Arnold, ed., *The New Oxford Companion to Music* (Oxford: Oxford University Press, 1983), article “cello”, I, 330.

<sup>15</sup> “Transposing instruments”, in *New Grove Dictionary*, vol. 25, 700.

## Instrument Specific and Unrelated to Clef

6. In older editions of music written through the early Romantic period, **timpani** parts are sometimes written at other than concert pitch; in such cases, the sounding pitch may or may not be given explicitly. This phenomenon occurs in two distinct forms. (a) Key signatures and/or accidentals omitted. For example, Beethoven's Symphony no. 3, I, III, and IV, are largely in E-flat major, but the timpani part has no key signatures or accidentals (e.g., Eulenberg ed.), so B-flats and E-flats appear as B's and E's. Similar things appear in Beethoven's Symphony no. 4 (Eulenberg), Mendelssohn's *Hebrides Overture* (Philharmonia), Weber's *Euryanthe Overture* (Boosey & Hawkes), etc. But in most cases I have seen, the notes used in a given movement are listed at the beginning of the movement (e.g., "Timpani in B and F#"), so the sounding pitch is given that way. Note also that if the timpani notes are, say, B-flat and F, as in Beethoven's Symphony no. 4, I, omitting accidentals effectively transposes B's by a semitone but leaves F's unchanged, something that does not fit the conventional definition of a transposition (Fig. 4). (b) The tonic and dominant are written as C and G, respectively, regardless of the actual pitches; no other notes appear. This is equivalent to conventional transposing-instrument notation with the transposition expressed in a peculiar way. For example, the Bach-Gesellschaft edition of the *B-minor Mass* has movements in D major in which the timpani notes—obviously intended to sound as D and A—are written as C and G. The staff is labeled simply "Timpani", with no indication of the transposition and, of course, no key signature. (In fact, the Gesellschaft editions seem to write timpani this way consistently.)

7. In **organ** music, registration ("stops") can produce transposition down by one or two octaves and up by as much as three octaves; it can also produce doubling at any one or more of those levels, and it can be changed at any time. The notation is often explicit, but often not. "16 ft." clearly means sounding one octave down, and "4 ft." one octave up; "with 4 ft." probably means doubling one octave up. But many scores—including most of J. S. Bach's—say nothing about registration. This ordinarily means, for pedals, 8 ft. and 16 ft. (sounding as written, but doubled down an octave), and for manuals, 8 ft. (sounding as written). However, for manuals, the fact that no stop is indicated does not necessarily imply 8 ft.: the organist may occasionally play at 4 ft. or 16 ft. pitch, due to the character of the music or limitations of the stops available on a given instrument. Also, some scores that describe the registration do so in ambiguous terms. For example, Verdi's *Otello* begins with an extraordinary, low-pitched chromatic tone cluster in the organ that continues for hundreds of measures. A change of register by an octave would make a substantial difference in the sound; but the first page of the score, in the Ricordi edition (Fig. 5), says only "L'Organo sulla scena mettera il registro dei Contrabassi e Timpani, e coi Pedali suonera contemporaneamente."<sup>16</sup> Does that mean it sounds as written, an octave lower, or what? I'm fairly confident that the answer is an octave lower, but only after five years of intermittent research.<sup>17</sup> (Note that mutation and mixture stops could produce transposition by other intervals,

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<sup>16</sup> Literally, "The on-stage organ will set up the stops for the Double Bass and Timpani, and will play them simultaneously on the pedals." Verdi's *Disposizione Scenica* for the opera has a comment that is much longer but no less ambiguous.

<sup>17</sup> I'd discussed the issue with organists and an experienced opera conductor, and at considerable length with a Verdi scholar, among others; no one was certain. I finally asked an organ builder, who told me (Tom Wood, personal communication, January 2009) that some opera houses of the time would have had devices for use in storm scenes that played the bottom three or four notes of the organ with a 16-ft. stop, i.e., an octave lower; this description agrees perfectly with the *Disposizione Scenica*.

e.g., a 12th, but they are conventionally used only to affect timbre; if they were used for transposition, it would certainly need to be notated explicitly.) Similar considerations apply to the **harpsichord**, though, to my knowledge, harpsichord registration allows only one octave of transposition up or (less often) down, and even that is used much less than on the organ.

8. In music for brass instruments, primarily **trumpets and horns**, ambiguity as to the octave occurs in parts written for use with crooks to put the instrument into the desired key. The *New Grove* article “Transposing instruments” comments that “[t]he most familiar case is that of horn parts from the Classical period marked simply ‘in B-flat’, because this can be understood either as ‘Bb alto’ (sounding a major 2<sup>nd</sup> lower) or ‘Bb basso’ (sounding a major 9<sup>th</sup> lower)... The correct solution must be found by inspecting the tessitura of the parts...or the score as a whole; even so the correct alternative cannot always be decided with certainty.”<sup>18</sup> Myron Bloom, former principal horn of the Cleveland Orchestra, comments that this problem is especially common in Haydn symphonies (personal communication, January 2009).

9. In some music of the late Baroque when **violins** play the bass line (in the so-called “bassetto” style), they may be written in bass clef, sounding an octave or two higher than written. Rastall<sup>19</sup>, associates this feature with Hasse, but it also occurs many times in the music of Vivaldi (David Lasocki, personal communication, October 2007).

## Non-Instrument Specific

10. **Scordatura** for string instruments is probably the most complex situation of all. It usually—though not always—effectively involves different transpositions mixed within a single part, and sometimes even within a single chord. It was “first introduced early in the 16<sup>th</sup> century and enjoyed a particular vogue between 1600 and 1750”<sup>20</sup>. The simpler form involves tuning all strings higher or lower than normal by the same amount. For example, the solo viola part of Mozart’s *Sinfonia Concertante*, K. 364, is marked “accordata un mezzo tono piu alto”, i.e., tune all the strings a half-step higher than normal, so the instrument, written in D major, sounds in E-flat. In the other and far more complex form, the modified tuning is not the same on all strings; in that case, determining sounding pitch requires the “accord” (tuning to be used) plus knowledge of the instrument’s normal tuning, and an ordinary key signature is likely to be misleading. The best-known example is perhaps the Prelude to Bach’s *Cello Suite no. 5* in C minor (Fig. 6). The first three notes in m. 2 are written as B-flat, B-flat, A-flat; all would be played on the cello’s top string, which is tuned down a whole step, so one would expect them to sound a whole step lower. Indeed, the first two should sound as A-flats—but the third note sounds as G-natural, not G-flat. The reason is that the top string is written in D minor, not C minor, so it needs a key signature of one flat, not three! (The following information is largely from the *New Grove* article “Scordatura”<sup>21</sup>.) Other well-known examples of this type of scordatura include Saint-Saens’ *Danse Macabre* and Mahler’s *Fourth Symphony* (solo violin); the slow movement of the Schumann *Piano Quartet*, Op. 47 (cello); and parts of the last movement of Bartók’s *Contrasts* (violin). Scordatura is common in 17th-century violin music, especially that of Heinrich Biber. In fact, Biber went so far in at least one case as to reverse the order of two strings, asking for the A string to be tuned to

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<sup>18</sup> “Transposing instruments”, in *New Grove Dictionary*, vol. 25, 699.

<sup>19</sup> Rastall, *The Notation of Western Music*, 226.

<sup>20</sup> David D. Boyden/Robin Stowell, “Scordatura”, in *New Grove Dictionary*, vol. 22, 890.

<sup>21</sup> *Ibid.*, 890-894.

a lower pitch than the D string! Scordatura is very widely used in lute music and in early guitar music. It is also found in traditional fiddle music such as that of Scotland and the southern Appalachians. (Even knowing the accord and normal tuning would not suffice to determine a note's sounding pitch if it is unclear what string it should be played on, but ambiguities of this kind seem to be very rare.)

11. A great many recent orchestral works are written with “**C scores**”. This usually means that everything is at concert pitch except for octave-transposing instruments such as piccolo (up) and contrabass (down), although a few scores (e.g., the Berg Violin Concerto, Boosey & Hawkes ed.) have even piccolo, contrabass, etc., written in the sounding octave. Many C scores indicate that all instruments are written at concert pitch, but many do not.

12. The **rules for when accidentals carry** can be ambiguous. As we have pointed out, when they first came into use, accidentals applied only to immediate repetitions of the pitch in question; the rules that are now standard took the entire 18<sup>th</sup> century to become firmly established. Arguably, even the standard rules are ambiguous in the presence of multiple voices, clef changes, and octave changes. For example, see Fig. 7, from Ravel's *Gaspard de la Nuit*. This is one of at least five places in the Durand edition of this work where—in a passage extending over several octaves—an octave sign covers part of a measure, resulting in a note in one octave with an accidental being followed by a note in the same staff position without an accidental but in a different octave. (In every case, it looks as if the accidental is intended to apply to the later note.) In addition, many 20th-century scores contain a statement to the effect that accidentals apply only to the notes they precede—but what about immediate repetitions? Others say that accidentals apply only to the note and immediate repetitions—but what counts as an “immediate repetition”, e.g., what about other voices on the same staff? In the Schoenberg *Variations for Orchestra*, not only are immediately repeated pitches not given accidentals, but also notes within short repeated motives.

13. There are instances, specified by such devices as clefs above or below the staff or ties across clef changes, of **simultaneous notes in two clefs on one staff**. It is usually obvious which clef applies to which notes, but not always. I know of at least eight examples of this phenomenon in works, mostly for piano, of Brahms, Debussy (Fig. 8; also cf. Byrd<sup>22</sup>), Poulenc, Puccini, Rachmaninoff, and Ravel. Read<sup>23</sup> comments that this device is sometimes used in late Romantic horn parts, which makes sense; but none of the examples I have seen are in horn parts, so there are almost certainly many more.

14. **Harmonics** introduce a couple of problems. For natural harmonics, some composers write the fingered note (with a diamond-shaped head) rather than the sounding note (with a small circle above or below); if the note can be played on more than one string, it may be difficult to figure out which is intended, and therefore what the sounding pitch is. I have seen this notation most often in Ravel: for example, in *L'Heure Espagnole* (Fig. 9), and numerous places in the solo violin part of *Tzigane* (Durand ed.). Alan Belkin comments (personal communication, September 2007) that “Ravel uses this method so that he can easily see where shifts of position are required, and usually this provides the key to the solution: the choice will be the note involving the least

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<sup>22</sup> Byrd, *Music Notation by Computer*, Figs. 62 and 63.

<sup>23</sup> Read, *Music Notation*, 355.

shifting.” Also, Stone<sup>24</sup> says: “Double-bass harmonics are occasionally notated at sounding pitch, in G-clef”. Both cases are relatively rare.

15. The vertical scope of **octave signs** is not always clear. A little-known fact is that when there are two voices on a staff that is affected by an octave sign, the sign may apply to only one voice. A clear-cut example is Debussy’s *Les Collines d’Anacapri* (Figure 10; also cf. Byrd<sup>25</sup>), where only the upstemmed voice is an octave higher. On the other hand, it is also possible for an octave sign to apply to both staves, a notation that appears several times in *Scarbo* in Ravel’s *Gaspard de la Nuit* (Durand ed.). However, both cases are quite rare, and even when they occur, their scope is sometimes obvious; so this phenomenon is not of much practical importance.

16. **Staves in scores are not always labeled clearly** as to what instruments are to play them. For example, some of the scores of Beethoven piano concerti (at a minimum, all movements of no. 2 and the outer movements of no. 3) in the Breitkopf & Härtel complete edition identify the bottom staff as “Bassi”. Ordinarily, that means double basses (sounding an octave lower than written), but here it means both celli and double basses (sounding as written, doubled an octave lower). Again, this is a rare phenomenon and of little practical importance.

## Conclusions

A reader of an earlier version of this article commented:

Most of the figures are taken from older performing editions. I would like to see how these cases are handled in more recent scholarly editions. Did the editors of those editions discuss the problem? Did they make the right decision?

...I would like to see some investigation into how these situations are performed. Do performances vary in how they interpret the notational ambiguities? Is there consensus among performers regarding how a passage should be performed? Is that consensus right or wrong? I’m also curious about whether the composer is okay with the ambiguity in some of these cases. Maybe the composer doesn’t always have in mind a specific sounding octave?

These are all interesting questions, but they would take considerable effort to answer; in any case, they are beyond the scope of this article, which attempts simply to offer general warnings.

The difficult cases this article has enumerated are summarized in the table below. Can anything be concluded from the list other than that CWMN, as actually used, is riddled with ambiguities and inconsistencies? Yes. I discussed the implications for music-notation software of features like these in a paper some years ago<sup>26</sup>. But it has become clear to me that—behind the myriad rules of CWMN that appear in Read, Stone, and every other book of the subject—lie at least two “metarules”, related to principles of composer-to-performer communication, that are rarely, if ever, mentioned.

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<sup>24</sup> Stone, *Music Notation in the Twentieth Century*, 312.

<sup>25</sup> Byrd, *Music Notation by Computer*, Fig. 64.

<sup>26</sup> Donald Byrd, “Music-Notation Software and Intelligence”, *Computer Music Journal* 18, no. 1 (1994): 18.



- *Avoid clutter*, or, to adapt Strunk & White’s succinct recommendation for writing prose<sup>27</sup>, *omit needless symbols*; and
- *use as little space as possible without causing ambiguity*.

Many of the items in my list have the effect of eliminating ledger lines; that both removes needless symbols and saves space. In addition, item 6 eliminates key signatures; item 12 saves space. Not surprisingly, these two metarules affect other aspects of CWMN, for example, on a page of continuous triplets, suppressing the little “3”s after the first few. But the metarules actually have significant implications for all forms of music notation, not just CWMN. They will be the subject of a later article of mine.

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## **Table of Situations Discussed**

<i>Instrument(s) &amp; situation</i>	<i>Figure</i>	<i>Pitch confusion</i>
<b>Related to Clef</b>		
1. Horn; also basset horn, trumpet?	2	may sound an octave higher than expected
2. Bass clarinet		may sound an octave lower than expected (e.g., either a 2nd or a 9th below written)
3. Cello parts	3	may sound an octave lower than written
4. B-flat baritone [horn] and euphonium		may sound a major 9th lower or as written
5. Tenor voice		May sound an octave lower than written
<b>Unrelated to Clef</b>		
6. Timpani	4	(a) a semitone; (b) any interval up to ca. a tritone
7. Organ (harpsichord is similar but simpler)	5	may transpose down by 1 or 2 octaves, or up by as much as 3; can also produce doubling at any one or more of those, and can change at any time
8. Horn, trumpet		ambiguity of an octave
9. Violin		may sound 1 or 2 octaves higher than written
10. String instruments: scordatura	6	any interval

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<sup>27</sup> William Strunk Jr. & E. B. White, *The Elements of Style*, 4<sup>th</sup> ed. (New York: Longman, 2000), 23.

11. Recent orchestral works with "C scores"		various, depending on instrument
12. Note without accidentals when "same" note occurs close before with accidental	1, 7	may sound 1 or 2 semitones higher or lower than expected
13. Simultaneous notes in two clefs on one staff	8	may sound far higher or lower than expected
14. String harmonics	9	various large intervals
15. Octave signs	10	May sound 1 or 2 octaves higher or lower
16. In orch. score, staves with ambiguous instrument label		ambiguity of an octave

## Figures



Fig. 1. Purcell: *The Epicure* (based on the manuscript)

A page of a musical score for Beethoven's *Fidelio Overture*, Op. 72b, measures 47-60. The score includes staves for Cor. (E), Vl., Vc. e B., Cl., and Cor. (E). The top system shows the first three staves with dynamics like *cresc.*, *p dolce*, and *pizz.*. The bottom system shows the Clarinet and second Cor. (E) staves with dynamics like *dolce* and *p*. Measure numbers 47, 50, and 60 are indicated. The score is in a key with two sharps and a common time signature.

Fig. 2. Beethoven: *Fidelio Overture*, Op. 72b, mm. 47–60 (Eulenberg ed.)

This musical score shows the string section of Dvořák's Carnival Overture, measures 80 through 84. The score is written for five staves: Violin I, Violin II, Viola, Violoncello, and Double Bass. The key signature is one sharp (F#), and the time signature is 2/4. The music features a rhythmic pattern of eighth and sixteenth notes. Dynamics include *f* (forte), *cresc.* (crescendo), and *ff* (fortissimo). There are also markings for *allegro* and *rit.* (ritardando).

Fig. 3. Dvořák: *Carnaval Overture*, mm. 80 ff., strings (Simrock ed.)

This musical score shows the brass and woodwind sections of Beethoven's Symphony no. 4, Op. 60, I, measures 51 through 54. The score is written for seven staves: Cor (B), Tr. (B), Timp., VI. (Violin I and II), Vla. (Viola), and Vc. Cb. (Violoncello and Double Bass). The key signature is two flats (Bb), and the time signature is 3/4. The music features a rhythmic pattern of eighth and sixteenth notes. Dynamics include *ff* (fortissimo) and *ff sempre* (fortissimo sempre). There are also markings for *rit.* (ritardando) and *tr.* (trill).

Fig. 4. Beethoven: *Symphony no. 4, Op. 60, I*, mm. 51–54 (Eulenberg ed.)

**Allegro agitato. (♩ = 76.)**

Flauti I. II.  
Ottavino  
e Flauto III.  
Oboi.  
Clarini in Do.  
Fagotti I. II.  
III. IV.  
Corni in Fa.  
in Do.  
Cornette in Do.  
Trombe in Do.  
Tromboni I. II. III.  
Trombonebasso.  
Timpani.  
G. Cassa e Piatti.  
Tam-tam.  
Altra G. Cassa.  
Lampi e Fulmini.  
Tuono e Organo.

*Piatti squillanti suonati con due bacchette da timpani.*  
*L'Organo sulla scena metterà il registro dei Contrabassi e Timpani, e coi Pedali suonerà contemporaneamente.*  
*Sino alla lettera T*

Fig. 5. Verdi: Otello, Act I, Scene 1, opening (Ricordi ed.)

Disordant. Accord:

Prélude.

Fig. 6. Bach: Cello Suite no. 5, BWV 1011, I, accord & mm. 1-9 (Bach-Gesellschaft ed.)



Fig. 7. Ravel: *Gaspard de la Nuit, Scarbo*, mm. 90-94 (Durand ed.)

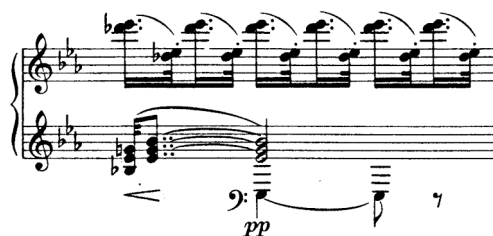


Fig. 8. Debussy: *La Danse de Puck*, m. 34 (Dover/Sorokin ed.)

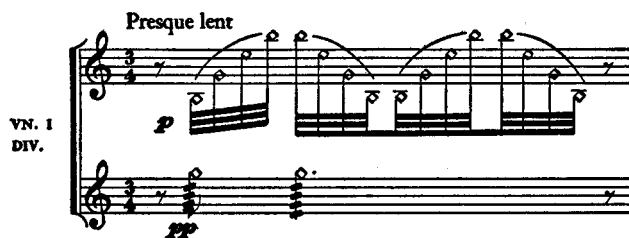


Fig. 9. Ravel: *L'Heure Espagnole*, p. 121 (Durand ed.; reprinted in Piston)



Fig. 10. Debussy: *Les Collines d'Anacapri*, final measures (Durand ed.)