

## Pitch shift problems (2)

*(Math (violin), List (violin), Perf (viola), and Comp (cello), have attended the performance of Schütz's St. Matthew Passion by Perf's choir. They evaluate the way in which Perf solved the pitch shift problems in the choir part of 'Die Kriegsknechte'.)*

MATH. I am very happy with your solution of the problem we dealt with in our first discussion of pitch shift problems. I noticed that everything turned out all right in the fifth bar of 'Gegrüßet'. The A major chord was in the right pitch, and the choir did not go flat any more, just as I had hoped.

The image shows a musical score for the phrase "der Ju-den Kö - nig!". It consists of four staves, each with a different clef and a key signature of one flat (B-flat). The first staff is in treble clef, the second in treble clef, the third in treble clef, and the fourth in bass clef. The lyrics are written below each staff. The first staff has a 7-measure rest followed by a quarter note G4, a quarter note A4, a quarter note B4, a quarter note C5, and a quarter note D5. The second staff has a quarter note G4, a quarter note A4, a quarter note B4, a quarter note C5, and a quarter note D5. The third staff has a 7-measure rest followed by a quarter note G4, a quarter note A4, a quarter note B4, a quarter note C5, and a quarter note D5. The fourth staff has a 7-measure rest followed by a quarter note G3, a quarter note A3, a quarter note B3, a quarter note C4, and a quarter note D4.

PERF. Thank you so much, Math. And what was your opinion, List? You have the best ears of all of us!

LIST. I noticed a somewhat strange transition, but it passed so swiftly, that I did not understand what happened. Yet the continuation was indeed perfect. Nevertheless I would like to see and hear a more transparent example, and preferably a piece that we can perform ourselves.

COMP. I know an extraordinary second movement of a concerto for four violins by Telemann. I can play the fourth violin part when you give me a violin, Math. Perf can deal with the third violin part on the viola, I trust.

MATH. No problem (*takes his spare violin and bow, and hands it over to Comp. In the meantime, Perf has downloaded the parts of the piece together with the score from the Internet*).

PERF. Look:

**Adagio**

1

MATH. That's amazing, it starts with four dissonant chords!

PERF. Let us first tune our instruments in pure fifths, and play open strings as much as possible! (*So they do. Afterwards the discussion continues.*)

LIST. I have a problem with the intonation of the third consonant chord, and I have my doubts about the chords at the end.

MATH. The best thing to do seems to analyze the piece bar by bar, so let us number the bars (*he turns his words into deeds*):

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<sup>1</sup> Source: IMSLP (Telemann)

1 **Adagio** 2 3 4 5 6 7

8 9 10 11 12 13

COMP. Do you use your diagrams again, Math?

MATH. Sure. And as I said, bar by bar. I will take account of the ligatures by linking the diagrams. Consider bar 1 and bar 2:

1 2

		fis	
g	d		a
		dis	c
e	b		a
g			

PERF. Why do you take a minor third above the  $a^1$  for the  $c^2$ , instead of a fourth above the  $g^1$ ?

MATH. I regard the chord  $d^1 fis^1 a^1 c^2$  as a transient chord. There is no question of a cadence towards the end of a section. This holds also for the sequel, with the chord  $dis^1 fis^1 a^1 b^1$ . Therefore the  $a^1$  of the open A-string is not the characteristic dissonant of a major dominant chord.

LIST. Is that the reason why it sounds so indeterminate?

COMP. Or modern, as I would say.

PERF. Indeed I do not see the E minor chord as the end of a section. On the other hand, the alto part seems to come to a temporary rest in bar 3. Is that right, Math?

MATH. It is true that the chords of the second part of bar 2 and the two chords of bar 3 are just those of a cadence in B minor:

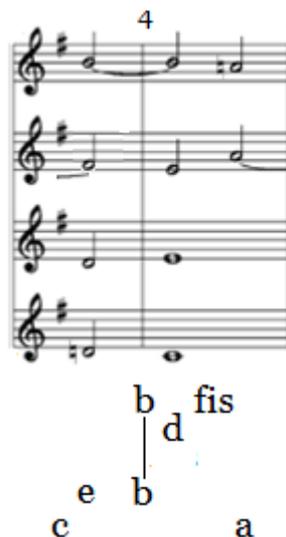
The image shows a musical score for a cadence in B minor. It consists of four staves. The first staff has a triplet of notes: G4, A4, and B4. The second staff has a whole note G3. The third staff has a whole note B3. The fourth staff has a whole note D4. Below the staves is a chord diagram for a B minor triad: a vertical line with 'e' at the top, 'g' in the middle, and 'e' at the bottom. To the right of this line are the notes 'b', 'd', 'fis', and 'cis'.

PERF. This means that the  $e^1$  in the chord  $cis^1 e^1 fis^1 ais^1$  is the characteristic dissonant of the dominant of B minor.

MATH. Correct! This time no transient chord.

LIST. Completely different from the next bar. The  $a^1$ 's, played with the open string, prevented that the chord  $c^1 e^1 a^1$  was the first inversion of a perfect A minor chord. Your analysis must explain it, Math.

MATH. It does indeed, List.



The  $a^1$  is a so-called sixte ajoutée. You know that this chord can be used in a cadence, leading to a D major chord with a dominant function in G major, or even G minor.

PERF. But a D major chord does not follow. You are right that the  $a^1$  of the A string is too high for an A minor chord. But we can get the first inversion of an A minor chord when the  $a^1$  is played a comma lower on the D-string.

COMP. Before we accept this, we have to make clear what is the case: either the  $a^1$  is an anticipation of a D major chord, or the first inversion of an A minor chord means the end of a section.

LIST. I do not perceive it as an end, but Perf already remarked that your D major chord is also absent. Nevertheless a  $d^2$  follows in the next bar, and this tone must form a perfect octave with the  $d^1$  in the second part of the bar.

MATH. This has consequences for the analysis of bar 5:

5

e

c a

g d a

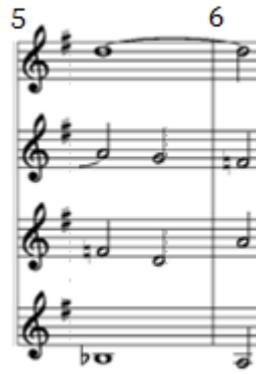
b<sup>b</sup> f

COMP. What is the use of the first chord of bar 5? And how do you describe it, Math, as a B flat? major chord with added upper major third, or as a D minor chord with under major third?

MATH. Telemann takes care that the first chord is dissonant, so it consists of four different tones. Given the *b flat* of the Bass, and the *a<sup>1</sup>* of the Alto, only d's and f's are available for the Soprano and the Tenor. In fact, the only possibility is the one chosen, the *d<sup>2</sup>* of the Soprano, and the *f<sup>1</sup>* of the Tenor. It follows that the chord can be described as a B flat major chord with added upper major third.

COMP. A peculiar way of preparing the first inversion of the G minor chord. But still no rest!

MATH. On the contrary, we approach a cadence in D minor, and it seems that the *sixte ajoutée* of the sixth chord in bar 4 finally got its way!



g d a  
 bes | f  
 |  
 d a  
 f

However ...



COMP. Extraordinary! Instead of finishing the cadence in G minor, Telemann goes to B minor! Is that possible without a comma shift?

MATH. Let us see:



$$\begin{array}{cccc}
 & & \text{ais} & \\
 \text{e} & \text{b} & \text{fis} & \text{cis} \\
 & & \text{d} & \text{a} & \text{e} \\
 & & \text{f} & & 
 \end{array}$$

The questionable chord is  $\text{ais } e^1 \text{fis}^1 \text{cis}^2$ , because the  $e^1$  can be interpreted as a characteristic dissonant of a chord with a distinct dominant function, or as part of a transient chord. In the former case the  $e^1$  is a fifth below the  $b^1$ , in the latter case, the  $e^1$  is a perfect major sixth below the  $\text{cis}^2$ .

COMP. Maybe you already made your choice, Math, but would it not be better to consider more than two bars, and see if the following bars do lead to a full close?

MATH. Right! And then we find that the B minor chord in bar 7 is followed by a complete cadence, leading to a G major chord in bar 9:

$$\begin{array}{cc}
 \text{b} & \text{fis} \\
 | & \\
 \text{d} & \\
 | & \\
 \text{e} & \text{b} & \text{fis} \\
 \text{c} & \text{g} & \text{d} & \text{a}
 \end{array}$$

PERF. This time there is no doubt about the pitch of the  $e^1$  in bar 8. Nevertheless I'm still waiting for a solution for the  $e^1$  in bar 6.

MATH. I perceive the second chord of bar 6 as the beginning of a real modulation, not as a provisional deviation. Therefore I reject the interpretation as a transient chord. The dominant function of the chord requires a characteristic dissonant  $e^1$ , only the following uninverted B minor chord is postponed by the suspension.

COMP. The same holds for the G major chord of bar 9. It is not the end of the piece, but we come close by. Can't we take the last four bars together?

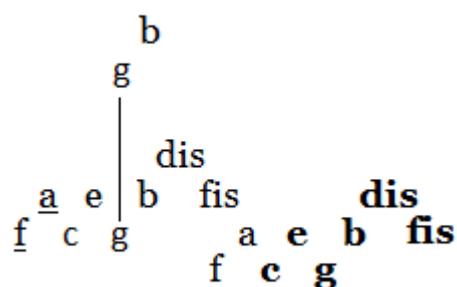
MATH. Quite right, because they form one complex cadence in E minor.

LIST. Or rather, one complicated cadence, because I experienced intonation problems due to the use of the open strings. Your analysis must explain it, Math!

MATH. Let me see:



Before I go from chord to chord, I will give a diagram with the tones that may be considered:



PERF. Terrible! Is it that bad?

LIST. I told you already that I had difficulties with our playing of the last bars.

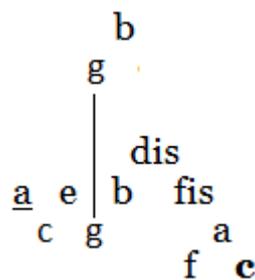
COMP. I wonder whether Telemann was aware of such problems.

MATH. It is obvious that the  $g$  and the  $e^2$ , played with the open string, together with a  $b^1$ , do not form the first inversion of a perfect E minor chord. They form at most an incomplete G major chord with *sixte ajoutée*, but this cannot be intended



g d a e

In order to get an E minor chord, the  $e^2$  must be played on the A string, a comma lower than the open E string. This excludes at least five tones of the diagram:



But that's not all. Look at the score:



It is obvious that the four last bars contain a modulation from G major to E minor. However, the open A string of the Alto in bar 10 is only consonant with the a of G major:

e b fis  
c g d a

This means that the chord  $a f^{\flat} a^{\flat} c^2$  in bar 10 must be placed at the right side of this diagram:

10

b  
g a  
f c

The image shows a musical score for bar 10 in G major. The staff contains a chord with notes b, g, a, f, and c. The notes are arranged in a way that suggests a specific voicing or fingering. The notes are: b (B-flat), g (G), a (A), f (F), and c (C).

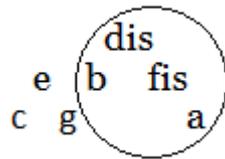
COMP. It looks like some kind of Neapolitan sixth chord, I think, but it is far away from the subdominant of E minor.

PERF. And the  $a$  at the beginning of bar 11 is still not the a of this subdominant.

11

The image shows a musical score for bar 11 in G major. The staff contains a chord with notes a, g, a, f, and c. The notes are arranged in a way that suggests a specific voicing or fingering. The notes are: a (A), g (G), a (A), f (F), and c (C).

MATH. This implies that the chord  $a\ dis^1\ fis^1\ b^1$  has the form of a transient chord:



LIST. Then the listener still does not feel that the piece will end in E minor.

COMP. It must be decided in what follows.

MATH. It does so indeed:

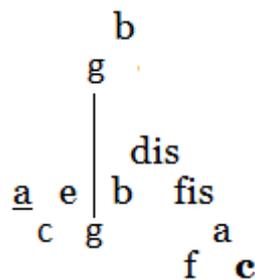
$$\begin{matrix} & & \text{dis} & & \\ \underline{a} & e & \text{b} & \text{fis} & \\ c & g & & & \end{matrix}$$

A subdominant chord with characteristic dissonant  $fis^1$ . Notice that the open A string is not used in this cadence.

COMP. Can you indicate which tones are actually used after the G major chord?



MATH. We had it already:



*(After Math's analysis they play the Adagio again, this time without the use of the open E string.)*

LIST. It remains an enigmatic piece!

PERF. And difficult to intonate! Of course it is possible to tune the E string a comma lower, but I am curious to see, or better, to hear what happens when the G string will be tuned a comma higher.

MATH. This is no solution, because the higher  $g$  cannot be combined with the  $d^{\flat}$ , played with the empty D string, even when they are part of a chord with a suspension in the Soprano part. This would occur in bar 9:



PERF. I see, and therefore I propose to do the experiment with the lower E string! (*So they do, and they decide to tape the performance after several trials. Unfortunately, the outcome is not yet available.*)