CORRESPONDENCE

LETTER TO THE EDITOR

In the interest of scientific inquiry (and editorial discretion) I would like to challenge some of the conclusions made by Gregor Widholm in his article on the Vienna horn in the previous issue of this *Journal*. His summary on p. 177 makes several unsubstantiated claims, which I will attempt to outline below, referring to his numbering.

1. I agree with the statement about the Vienna horn's distinctive dynamic spectrum, but not the subsequent two sentences. The player is in a position to affect the tone color on any horn, no more so on a Vienna horn. When an instrument has a greater variety of tube lengths, there are more options of tone color. Clearly on a triple horn there are many more tube lengths available to the player than on a Vienna horn. The variety of differences available on a Vienna horn are more at one end of the spectrum than on the triple horn, but that doesn't mean that "the player has at her/his disposal a greater palette of possible tone colors" (This is actually shown by the graphics!)

4. The valves on a Vienna horn are in fact farther away from the bell of the instrument than on any double or triple horn. Therefore, when comparing like with like—i.e., the standard F horn length—the three main valves are farther from the mouthpiece on a double or triple horn than on a Vienna horn. In that case, according to the argument provided, the valve slurs on the F horn should be even smoother on the double or triple horn than on the Vienna horn. This is not the case. In addition, to further challenge the statement about the positioning of the valves affecting legato playing, there are numerous examples of Vienna horns made by Dehmal (et al.) where the valves are in the standard Viennese location but are of the rotary type. These horns do not have an identical legato to the Viennese valve. I know because I have played them both and I can hear the difference!

5. The range of musical articulation is not greater on a Vienna horn. I agree that it can be very beautiful but my argument is similar to that in point 1. The articulation will be affected by the mouthpiece, the player and the horn, but its range of possibilities is increased by the range of tube lengths. The fact that many players of the triple horn choose not to use the full variety available to them does not mean that this potential variety does not exist. Equally there are many exponents of the Vienna horn who choose not to use the full variety of articulations available to them.

In the article, the example of an octave slur from the Strauss Horn Concerto No.1 is given (p. 173). I understand that a distinction is being made between a slur without a valve change (on a Vienna horn) and a slur with a valve change (on a double horn), but why was there not an example of a valveless slur on the double horn, in order to compare like with like? In any case, the graphics are interesting, but I feel that overall the article attempts to prove the point that we all know: the Vienna horn is a marvelous instrument with excellent musical possibilities. Its player is more limited by the

reduced range of fingerings available than on a double or triple horn, but that limitation paradoxically often gives more character to the music because the player is less able to choose safe options of tube lengths. For me the conclusions drawn from the research are not entirely backed up by the science.
Best regards,

Andrew Clark

Response from Gregor Widholm

I am pleased to see that my article has been read and discussed not only by musicologists but also by horn players. My thanks to the author for the clear structure of his letter—I enjoy answering his skeptical annotations and will try to prove the facts which, from his point of view, appear as "unsubstantiated claims."

1. I agree that "The player is in a position to affect the tone color on any horn," but "when an instrument has a greater variety of tube lengths, there are more options of tone color" is true only from the statistical point of view; in the case of playing the horn it is simply a fallacy. In my Figure 12 you can see that the range of sound colors on the F-alto side, depending on the played dynamic, is a part of and included in the range of the B♭ side. And this range again is a part of the F side. If you want to have the full range of sound colors available you would have to use the F side only. Additionally, Figure 12 shows that although with the same tube length the Vienna horn has a significantly larger range of sound colors compared to the F side of the triple horn. The reason is the smaller bore (10.8 mm) compared to the instruments used worldwide, which increases the friction loss. The consequences for the player and the sound color are explained on p. 176.

4. It is a misunderstanding if one believes that the distance of the valve section from the bell or the mouthpiece decides if slurs are smooth or not! It is only the fact that if the valve section for the starting note of a slur is randomly positioned at a node (smooth) or antinode (clear, abrupt) of the standing wave for this note—regardless if it is a rotary or piston valve. This result of my research has been proved and accepted in the international music acoustics community for many years.

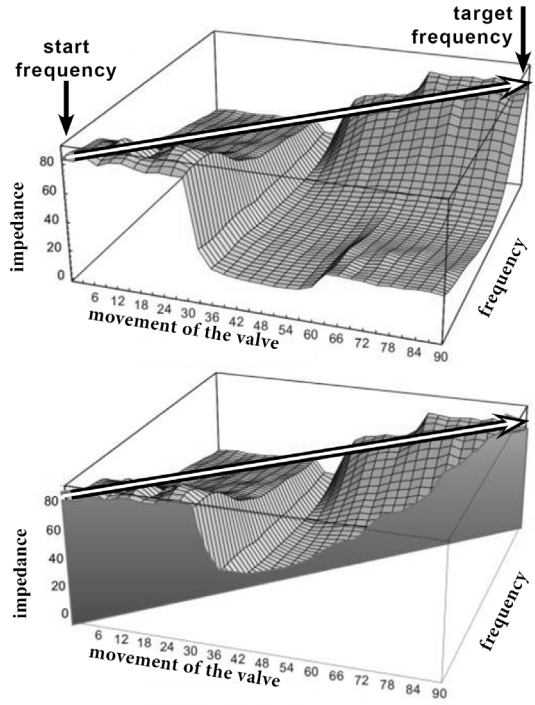
Concerning the Dehmal Vienna horns with rotary valves: "These horns do not have an identical legato to the Viennese valve. I know because I have played them both and I can hear the difference!" I also played such a horn for several years—and I have had the opposite experience. The reason this type of horn was so successfully used in Vienna up to the '60s of the last century was the fact that the rotary valves acted just like the Viennese valves. Sorry, I do not want to doubt Mr. Clark's sensation—but he is simply wrong. Numerous measurements made also by other groups and sound examples prove my results. Have a look at the following URL where you can find more information and see how a valve acts at different positions. http://iwk.mdw.ac.at/HBS/

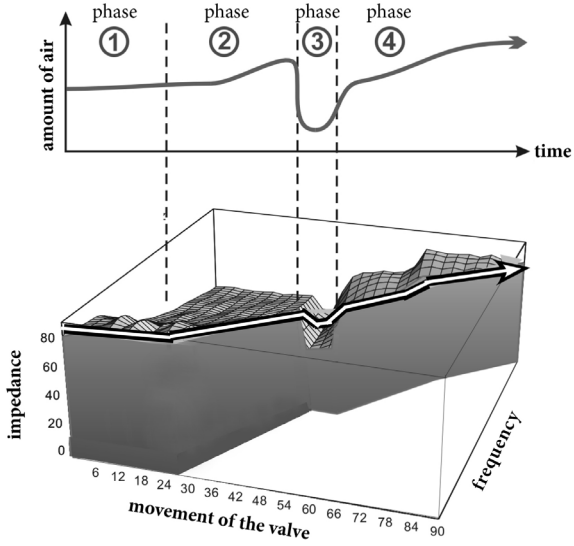
5. This is a repetition of point 1, but I agree with Mr. Clark's third sentence. Concerning the octave slur in the Strauss Horn Concerto No.1: I chose this example because it shows the difference very clearly and can be understood also by people who do not play a horn. Now I admit it was a failure, because every horn player knows that in this case nearly all will use the advantage of the thumb valve (but not Barry Tuckwell in his recording with the LSO! Sound example 31).

Mr. Clark may have overlooked my Figure 11, which shows the slur *b* ♭^{1}–*e* ♭^{2}, which is comparable because both use the valves. All the slurs mentioned in the article (sound examples 14–30), and many more, can be heard here: http://iwk.mdw.ac.at/HBS/

To avoid any misunderstanding, I finally want to state that the Vienna horn does not support a smooth tone transition for all slurs! It does so for only for about 70% of the possible slurs. For double horns the percentage is between 30% and 45% and depends on the use of the thumb valve (this is only my estimation and not scientifically proved).

Perhaps Mr. Clark knows how to outwit the horn and produce a smooth slur, even though it is not supported by the instrument. This technique is consistently (but mostly unconsciously) used by Vienna horn players (sound examples 16, 25, 26, 29). Listen to sound example 31, where Barry Tuckwell applies this technique. The illustrations that follow show what happens:





The first diagram shows the situation for the lips during a semitone slur, with no support for a smooth transition (compare Figure 10 of my article). The diagram below shows the changing impedance values during the slur (front left: starting point; rear right: target frequency). Pressing the key and simultaneously changing the tension of the lips uniformly, it is clear that the low impedance values in the middle of the slur cause a breakdown of the standing wave and produces the characteristic short noise band. The last figure shows the strategy of the player to get a smooth transition and mask the acoustics of the instrument.

Phase 1: no change of the lip tension and breath support during the valve action.
Phase 2: only a slight change of the lip tension but a massive increase in breath support (=crescendo) at the end of the phase.
Phase 3: dramatically reduced/stopped breath support and simultaneously a quick and massive change of the lip tension toward the target frequency.
Phase 4: increased air support toward the normal amount and a slight change of the lip tension toward the target frequency.

I hope I could clear up some misunderstandings and complete my article. And thanks to the author of the letter for his willingness to share his doubts and thoughts about this matter with the readers.

Gregor Widholm