The Pros and Cons of choosing Vienna horn in a Symphony Orchestra

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[Austris Apenis (1523633Z)]

[KM] ArtEZ University of the Arts

Supervisor: [Marjolijn van Roon]

Preface

There is a tendency in the horn sections in symphony orchestras now-a-days that the new auditionees are allowed to play on instruments only from certain manufacturers. There are not so many of them that are accepted among professional horn players and the difference in sound is not very large.

A particular example are the orchestras in Vienna, especially Vienna Philharmonics and Vienna State Opera. Following a long tradition the horn sections play only Vienna horn. The sound and build of these instruments is very different than that of the modern horns. My research is, what are the pros and cons of choosing Vienna horn in a symphony orchestra? And what kind of benefit would it bring to the symphony orchestra if the horn sections play Vienna horn?

In this research I have interviewed horn players and horn manufacturers from Austria, Germany and Great Britain and come to some stunning conclusions and revelations about the connection between the build of the horn and the technique to play it, the past experimentations of bettering Vienna horn designs and the growing popularity of the Vienna horn around the world.

I thank all the horn players and manufacturers, Wolfgang Vladar, Dave Claessen, Engelbert Schmid, Andreas Jungwirth, Tim Barrett, Rob van de Laar, Stefan Blonk and Rene Pagen, who supported my research and were very enthusiastic in answering my questions and providing me with essential information about Vienna horn, its history, construction, playing technique and the differences between Vienna, modern double and natural horns!

Abstract

This research is about finding out what are the pros and cons of choosing Vienna horn to play in a symphony orchestra.

There is a tendency that many horn players in symphony orchestras prefer that the newcomers, students and young professionals, play a specific horn model or a model from a specific manufacturer. This is almost like a tradition in some countries. For example, in Germany players prefer Alexander horns. The manufacturing of these instruments is of a very high standard and each of them have its own pros and cons but the difference in sound is not that big as compared to natural or Vienna horn.

I have been amazed by the sound of the Vienna horn for a lot of years. So I chose this horn design to be the subject of my research. To prove what differences there are between this design and others and why it is like that.

My research is almost entirely qualitative with some quantitative elements. I have used data gathered from online sources and libraries to find out more about the history and construction of the Vienna horn, modern double and natural horns. In paper form there is not much material to be found about Vienna horn or it is not available on online search engines which proves and further motivates me to research this subject. I have also interviewed horn players and manufacturers in Germany and Austria via email and live interview. They provided me with key insight of how is it to play Vienna horn and build them.

The results have shown me that the difference between Vienna horn and modern double horn designs is immense. The Vienna horn in many ways is a lot closer to the natural horn, the father of the valve horns. The construction is very similar because Vienna horn is based on an early valve horn design and has not changed much since then, contrary to the double horn. The sound of the Vienna horn blends much better with the string and woodwind sections because it is not necessary to play it with a lot of volume of sound to reach the brassy overtones and Vienna horn also blends better within its section, provided that all horn players use Vienna horn.

The most surprising revelation for me was that the Viennese horn players do not adapt to this horn design. It is the other way around. The instrument suits their traditional way of playing, the concept of the sound and technique. I have found out that it is vastly different than how players imagine the double horns should be played. For example, if a Viennese horn player would play a

double horn it still would sound more like a Vienna horn. If a double horn player would play Vienna horn it would sound more like a double horn.

Summarizing, the main difference in sound between Vienna horn and double horns is in the power of the mind and imagination. Which further translates into playing technique and thus a proper design of the instrument to suit this imagination of sound.

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1. Introduction

The Vienna horn is a different horn design that is based on a 19th century valve horn design. Vienna kept this long lasting tradition to play this specific horn design but in the rest of Europe valve horns of the 19th century slowly developed in what we now know as the modern double horn, which is mostly used by horn players. Because of the Viennese tradition the Vienna horn has stayed close to its first designs and therefore also close to the natural horn.

I have been amazed for a long time by the sound of the Vienna horn when listening to music performed by the Vienna Philharmonics and Vienna horns. It was a mystery to me why the instrument had this kind of sound. In my research I have interviewed several horn players and horn manufacturers in Germany, Austria and Great Britain. Some of them mostly play Vienna horn, some modern double and triple horns and some combine both. I also used the thesis of Thomas Jöbstl about the history and the technical aspects of the Vienna horn. As well as online sources, websites of horn players and manufacturers and online libraries.

The goal of my research is to weigh the pros and cons of choosing Vienna horn in a symphony orchestra instead of the double and triple horn brands. How this will change the sound of the orchestra and the horn section and how appealing would this difference be to the public, conductors and the musicians themselves.

The main question of the research is:

What are the pros and cons of choosing Vienna horn in a Symphony Orchestra?

The sub-questions are as follows:

- What is the difference in construction and capabilities between Vienna and double horns and the consequences concerning the sound of the instrument?
- How is the playing technique related to these aspects of construction and the sound possibilities?
- What are the main differences in construction between Vienna and double horns?

- What is the situation in Symphony Orchestras now-a-days in regard to the choice of the instrument?
- Who are the main Vienna horn manufacturers of today and the past and what are the differences in their model designs?
- Which are the opinions of the manufacturers and players concerning this matter?

Terminology:

Natural horn – one of the first concert instrument designs that was used in the symphony orchestra in the 18th century. This horn had no valves and was made of one long piece of tubing wrapped in a circle.

Natural horn crook – a piece of additional, curved tubing placed between the mouthpiece and the tubing of the instrument. It can be switched to change the pitch of the instrument

Double horn – a modern concert instrument design that incorporates two horns in one. There are two sets of tubing and crooks, one in F and another in Bb pitch. Some of the tubing is the same for both horns. This is the most commonly used horn design of today.

Vienna horn – a concert instrument design from the 19th century with three piston valves.

Single and double valve horn crook – a piece of tubing connected to the valve block that lengthens or shortens the horn changing the pitch of the instrument. These crooks can be taken out but each one is specially designed for a specific valve and cannot be interchanged

Pitch – determines from which note the natural harmonic series begins. Natural horns were pitched in Bb basso, C basso, D, Es, E, F, G, A

Natural harmonic series – sequence of notes that can be played openly on a horn without changing the length of the tubing. The notes are changed by the player by increasing or decreasing the speed of the air. The frequency (Hz) of each succeeding note is twice as high as the previous. In the low range the notes are placed far apart but in the high range very close to one another.

Mouthpiece terminology:

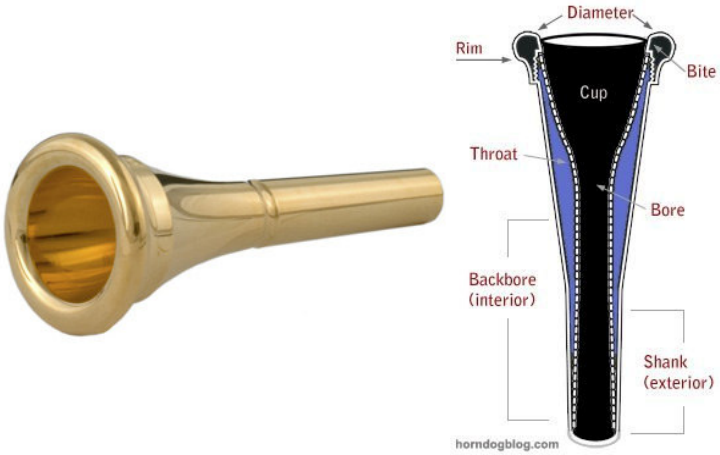
Cup shape – determines how the air is channeled from the lips of the player in the bore of the mouthpiece. V shape is channeled directly, S and U shape has distortions.

Cup depth – determines the quantity of the air that the cup can contain making the sound thinner with a shallow cup or richer with a deeper cup. Usually is balanced with the bore diameter.

Cup width – usually changed to suit the lip and jaw shape and size of the player

Bore diameter – determines the resistance of the airstream. Narrower bores focus the airstream more making it easier to play in the high register and wider ones let more air quantity through making it easier to play in the lower register

Backbore diameter – the end of the mouthpiece. It is adjusted to fit in the tubing of the instrument



2. Research methods

2.1. Introduction

This research is mainly qualitative but there are some quantitative elements to support the argument. The reason is that a large part of the research was in the form of interviews to collect subjective opinions and observations from professional horn players and horn manufacturers. To substantiate the cause of these observations quantitative research was used. The comparison of construction specifications between natural, modern double and Vienna horns.

The first step is collecting enough data to have an overview of the subject and to determine the pros and cons that are common when playing Vienna horn, t.i. sound quality, flexibility, attack, playing technique. This is only possible by interviewing horn players who mostly or occasionally play Vienna horn and preferably also modern double horns. This is qualitative research on which it is possible to make theories based on coinciding data.

Quantitative research is based on specifications and construction data found on internet or provided by the horn manufactures. By analysing these data with an already statistically sound theory it is possible to prove the reason why Vienna horn has its unique qualities and why it differs from other horn designs.

A lot of data was collected from the internet. As mentioned before there is not much material to be found in paper about this subject. At least not in this area. There is substantial amount of data available on the internet, horn manufacturers' and horn players' websites and online

databases, for example, horn manufacturer Alexander Mainz, Engelbert Schmid, horn player Ricardo Matosinhos and Oxford music online database.

The interviews with horn players Wolfgang Vladar, Dave Claessen and manufacturers Andreas Jungwirth and Engelbert Schmid provided me with subjective opinions about playing and making Vienna horn and experience in the field. What are the practical characteristics of the Vienna horn compared to other designs, its advantages and disadvantages, how the playing technique is related to the construction and sound and the collaboration between horn players and horn manufacturers.

These units of analysis have been chosen for this research and will be discussed in great detail in the following chapter:

- **Construction**
  - Body
  - Mouthpiece
  - Valves
- **Technical capabilities and playing technique**
  - Sound
  - Technical capabilities
  - Playing technique
- **Situation in Symphony Orchestra horn sections**

Each of these units and subunits represent a crucial aspect of the research to better understand
the relation between the construction of the instrument, its playing technique, subsequently the capabilities of the instrument and the current situation in Symphony Orchestras around the world.

2.2 Sample

The conclusions of this research concern all horn players around the world as well as other orchestra musicians and conductors. It will open up new possibilities of choice when choosing an instrument for a horn section to play regularly or just for specific programs. Also ensembles may benefit from choosing Vienna horn because of its specific color and sound which blends very well with other classical instruments, especially string and woodwind sections. Conductors may prefer the color of the Vienna horn and also its capability to produce a rich sound full with overtones and better project without playing extremely loudly.

2.3 Research tools

The collection of information took a lot of time. The first step was to find out what information could be found on the internet. Most of my materials were collected this way because books and other printed materials were either not possible to find or get in libraries in The Netherlands. Also because of my lack of knowledge of German and Austrian I could not search or read in those languages. All the material that was gathered is in English. ArtEZ ELO provided me with very useful online libraries. I managed to get information about the history of the double, natural and Vienna horn from there. Also information about the construction and the piston valves that are used in Vienna horns. Wikipedia had a lot of information but I chose not to use it because of its unreliability. Also I managed to find a thesis about The Vienna horn by Thomas Jöbstl, the principal hornist of the Vienna Philharmonics. There were several websites of horn manufacturers that had useful data, for example, Alexander Mainz and Engelbert Schmid. Both of these manufacturers have double and Vienna horn models. The website of Ricardo Matosinhos had a comparison chart of mouthpieces from numerous manufacturers to compare how Vienna horn mouthpieces differ from others.

I used several keywords, for example, horn history, Vienna horn history, brass instrument valves, Vienna horn manufacturers, horn mouthpieces.

The other part of the data was gathered through interviews. Many horn players and horn manufacturers were willing to help me by providing information about the construction, playing technique, capabilities of the Vienna horn and the comparison to that of the double horns. They

also provided information about the situation in Symphony orchestras in Germany, Austria, The Netherlands and Great Britain about the tendencies for the choice of the manufacturer and the traditional style of playing them.

Measurement instruments are interview questions because interviews are the most efficient and the fastest to collect subjective opinions of horn manufacturers and players. Questionnaires were not used because the horn players and manufacturers were located in different countries and the questions had to be adapted for almost each person. Also different questions were sent to horn manufacturers than horn players because they work in different fields, t.i., musicians and engineers. Horn manufacturers were able to provide me more with constructional data and horn players of the capabilities of the horns, playing technique and the situation in symphony orchestras. One of the interviews was done live. It was with Wolfgang Vladar, a member of the Vienna Philharmonics, in Vienna. The rest were conducted through email.

2.4 Data analysis

The information from each website on the internet was copied in a separate MS word document or downloaded directly. Because of the large amount of data only a selection of the information was copied on the computer, information related to this research.

The interview questions and answers done by email were directly copied to a MS word document without any changes. The live interview was recorded on a mobile device and later transcribed in text. Some alterations in grammar were made.

Program called Atlas.ti was used to code all of the data. All the documents were uploaded on it, coded in sections mentioned in paragraph 2.1. and exported for further analysis. Afterwards each unit was analyzed separately and put in paragraph 3.

3. Results

3.1.History of Vienna horn

The Vienna horn is an early 19th century valve horn design based on an orchestral natural horn from the 18th century. The Vienna horn is a single horn in F or B which were widely popular in the 19th century.

Before the invention of valves in the early 19th century horn players used natural horns. These were made of one cylindrical and conical tubing wrapped around itself in a hoop with a bell. The capabilities of this horn were limited. One could only play the notes that were on the natural harmonic series. In the low register the gap between the notes was big, but in the high register the notes were very close together so many notes in the low register were impossible to play. However in the high register the notes were close together, so it was possible to play a melody. That is why classical era composers wrote in the semi high and high register of the horn.

This horn design also has interchangeable crooks between the mouthpiece and the beginning of the tubing. By switching one part of the instrument one could change the pitch of the instrument. There were crooks in F, A, G, D, C basso, Bb basso, Eb. The longest being Bb basso and the shortest A.

In the middle of the 18th century a horn player A.J. Hampel was the first to use in practice a new technique of playing natural horn. With the help of the hand he could raise a note by a semitone or lower it by a semitone or a tone. This opened up a lot more possibilities for the horn players of the day. Now it was possible to play a chromatic scale on a natural horn, though some notes would sound muffled and not so beautiful. In time the horn players perfected the stopping technique so much that a listener could barely notice the stopped notes.

In the early 19th century the rotary and piston valves were invented. It allowed to shorten or lengthen the tubing of the horn by pressing a key. Almost all notes were possible to play on the harmonic series and the natural horn hand technique was no longer necessary. Manufacturers chose to base their newly developed valve horns on a natural horn in F since this length of tubing was a good compromise between the beauty and richness of the sound and technical security.

The Vienna horn developed with piston valves which were patented by Josef Kail and Joseph Riedl in 1823. Till now-a-days the body of the Vienna horn has stayed close to the natural

horn while the double horn is a much later concept. That accounts for the very different sound between modern double horns who are made with larger tubing and Vienna horns.

Double horn

Vienna horn

3.2 Manufacturers

Tobias Uhlmann and Sons

Tobias Uhlmann was a widely known instrument maker in Vienna in the 19th century with his two sons Leopold and Jacob. He opened an instrument workshop in 1833. They were very popular at that time. Their instruments were used in theaters in Vienna, they supplied the Austrian army with instruments and even exported them abroad. They built the Double pump valve system which is also used in the Vienna horns today. He also attempted to build a double Vienna horn with rotary valves. Tobias Uhlmann is unarguably considered as the father of the Vienna horn.

Yamaha Japan

They experimented and developed their Vienna horn design in the 1980s. Horn players from Austria consulted with them and tested the instruments in the Muziekverein concert hall. Now-a-days the Vienna horn model is being built by Robert Fröschl in Vienna but some parts are sent from Japan. He produces 6 – 10 instruments per year. Yamaha Vienna horn is one of the most popular and mostly purchased model now-a-days.

Andreas Jungwirth

Andreas Jungwirth began his business in 1997. He took an instrument of Anton Dehmals Nachfolger as a template. Wolfgang Tomboeck junior helped to test and better his design and Junwirth horns are now also one of the most popular designs used among professionals.

Engelbert Schmid

Engelbert Schmid is a known horn manufacturer in Mindelzell, Germany. He has also developed a Vienna horn design. He is experimenting with reducing the weight of the Double Piston Valves to improve its reaction speed and allow the musicians to play faster and more virtuosic with ease.

3.3. Construction

3.3.1 The body of the instrument

The body of the instrument about which I am going to talk in this chapter, consists of the tubing and the crooks which are vastly different for Vienna and double horns.

Stated by the *Oxford music online library* and the thesis of *Thomas Jöbstl,* the biggest difference is that the Vienna horn is a single horn and a double horn, hence its name, combines two horns in one. Most of the Vienna horns are pitched in F and double horns are pitched in Bb and F. The pitch is determined by the length of the tubing. For F horn it is approximately 3.7m and for the Bb horn approximately 2.7m. Double horns combine two separate tubing and crook systems between which it is possible to switch by pressing a valve. Natural horns used another kind of crooks than valve horns that were placed between the mouthpiece and the horn that lengthened the main tubing and consequently changed the pitch. After the valves were patented in 1814 by Heinrich Stölzel the need for use of so many crooks disappeared because it was possible to change the pitch by pressing a valve and not only relying on the natural harmonic series. Eventually only the F and Bb horns remained.

In the 19th century horn players only used single horns. The F horn had a full and dark tone and was the best option to use for the two major horn playing techniques of that time, one used the valves to play all the chromatic notes open and the other still practiced the use of the hand technique, changing only the pitch of the horn by pushing a valve and relying on only the harmonic series. The Bb pitch proved to be a lot more useful when playing in the upper range. The tubing of the Bb horn is a lot shorter than of the F horn. This reduces the air resistance and makes it easier to play, also intonation and precision are improved. The disadvantage is that the sound is thinner than and not as rich as the F horn because it lacks the overtones of the F horn. Summarizing the Bb horn is a safer option mostly used in symphony orchestras today by compromising on the sound quality and richness of the overtones.

The double horn, hence its name, is a model which incorporates both F and Bb horns in one. It has two sets of tubing which can be switched in between by an extra valve. The double horn does not use the historical natural horn crooks between the mouthpiece and the first section of the tubing. It has two layers of crooks for each of the three valves for pitch change. The upper layer is for the F horn and the lower one for the Bb horn. Horn players of today mostly use the Bb horn but also sometimes some notes on F horn for better intonation. The advantage of the double horn is that for one note there are many more valve combinations to choose from. Some are more stable some are less stable depending on the valve combination. But the F horn on the double horn is a lot more unstable than of the Vienna horn so the players would never choose to use it in a concert.

The reason for this is simple: difference in the diameter of the tubing. This also greatly influences the sound quality, projection and how the horn blends with other instrument sections.

	1st section of tubing	2nd section
Double horn	7.5-8mm	11.5-13mm
Vienna horn	7-9mm	10.7-11mm

Because the second section of the tubing is smaller on the Vienna horn the projection is greatly improved and the brassy overtones are reached with a lot less volume of sound than on the double horn. Of course this is also influenced by the alloy of the metal used but this subject requires more research and is not discussed in this paper.

The end of the tubing is called a bell. The bell of the Vienna horn is also a lot smaller than of the double horn. This, according to my idea, also changes the projection but it was not confirmed by the horn players and manufacturers that were interviewed. The projection is also influenced by the hand position which is a lot different on Vienna horn than on double horn. This was confirmed by Stefan Blonk but the Viennese horn players did not comment. I was able to ascertain this by watching recordings of Vienna horn ensembles playing live.

3.3.2 Valves

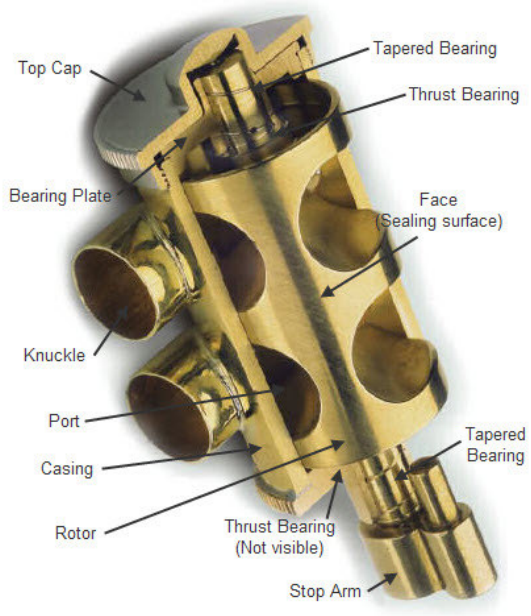
Stated in the *Oxford music online library* and the thesis of *Thomas Jöbstl,* the valves were patented in 1814 by Heinrich Stölzel. This was one of the biggest technological advancements for brass instruments in general. It allowed for more technical freedom, all notes now were playable open and a lot quicker than before. This truly made the horn a solo instrument. There were two valve designs – piston and rotary valves.

The construction of the Vienna horn valves are completely different than the ones on double horns. Double horns exploit the rotary valves. These make use of a rotating cylinder with holes in it, to direct the air stream into additional tubing. If the valve is pressed, the air is redirected and the overall tube length increased or decreased depending on the valve combination. Pros of the rotary valve are that one valve can be used for both F and Bb horn since the holes in the cylinder can be stacked on several levels. That is why there are two levels of crooks on the double horn valve block. For the Bb horn and the F horn the crook length is different. This is one of the main reasons why double horns are possible to build. This is not the case with Vienna horns. The rotary valve is fast and the mechanism that attaches it to the keys is short, making the response time quick. The cons are that there is a minimal disruption of the air stream for about 20-30ms. That has an effect on the legato properties. The delay is small, barely hearable.

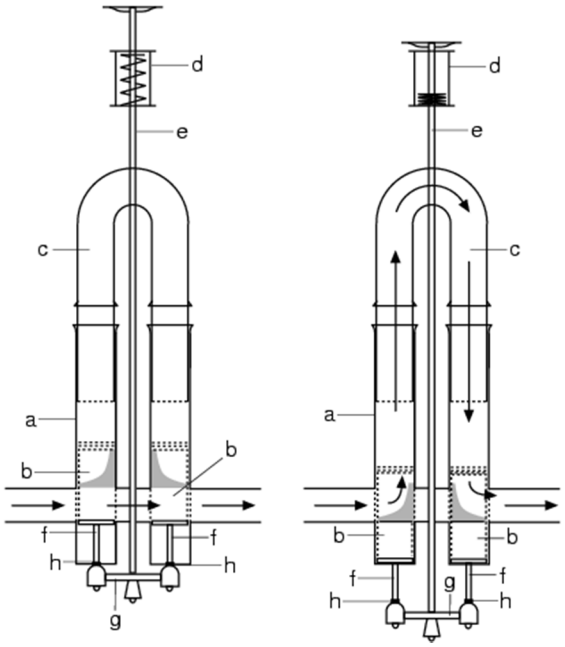
The Vienna horn uses the double piston valves. It is made of two pistons connected to the crook. When the leaver is pressed the piston opens a path for the airstream into the crook. The pros are that the valve works more quickly than the rotary one and there is no interruption in the airstream. That makes the legatos a lot smoother. But the connection between the key and the valve is long and heavy therefore the response time of the valve after pressing a key is slower than on the double horn and it is harder to play very fast passages. This problem is being solved by

Engelbert Schmid as he states himself in an interview. For some time there was also a problem that the horns tended to move when the piston was being pressed. That problem has been solved by horn manufacturers.

Another difference is the placement of the valve block within the body. The thesis of *Thomas Jöbstl* states that experiments have shown the placement of the valve block greatly influences the legato properties. For Vienna horn it is placed much further down the tubing than on the double horn. This is what mainly contributes to the smooth legatos.



Rotary valve



Double piston valve

3.3.3. Mouthpiece

The mouthpiece market is quite different than the one for instruments and they are not much related. Mouthpiece makers use vastly different alloys what influences the sound and also they have their own technical peculiarities. There are many aspects to look at when choosing a mouthpiece that suits you. One is the shape of your mouth, jaw and teeth and the other is what do you want the mouthpiece for. For example, you can chose a mouthpiece were the legato or staccato properties are better, the sound is more round or direct, cloudy or clear. One must know his or her own weak and strong points and choose a mouthpiece that balances them out. The same can be

said about the instrument. One would not choose a mouthpiece with a lot of resistance if the horn also has a lot of resistance, what is in the case of Vienna horn.

The constructional elements of the mouthpiece are:

- Shape and with of the rim
- Diameter, depth and shape of the cup
- Diameter of the bore
- Diameter of the backbore

In more detail see chapter 1, terminology.

A player should be very careful when switching to a mouthpiece with a different *shape and width of the rim* and the *diameter of the cup*. One must adapt their facial muscles to these changes and that takes time. However it is possible to switch to a mouthpiece where the other elements are different. In fact most professional horn players do this. If there is, for example, a Mozart or Haydn symphony in a concert programm and a descant horn (High horn with much shorter tubing than Bb horn, used for extreme high range) is needed, the player will choose a mouthpiece with a shallower *cup* and a narrower *bore*. Or if there are very low passages in a piece, the player will choose a mouthpiece with a deep cup and a wider bore.

According to the data gathered from the internet there are special mouthpieces designed for Vienna horn by Joseph Klier and WHF. The main difference is that *the cup is V shaped rather than S or U*. This allows for a more direct and intense airstream into the bore with far less distortions. Having such a mouthpiece when playing Vienna horn is a lot better because the resistance of the Vienna horn is bigger due to the longer tubing. Also the *backbore* is bigger than for other mouthpieces because the diameter of the first section of tubing on Vienna horns is slightly bigger than on double horns and the mouthpiece simply put would not fit in the instrument. Other aspects such as *cup diameter, cup depth and bore* vary the same as for any other mouthpiece design so the player can choose which model suits him or her more. Summarizing, the Vienna horn mouthpieces are slightly adapted to the characteristics of the Vienna horn with a wider bore and a V shaped cup but not much more is different. Still there are mouthpieces, which have, for example, a shallow cup and a narrow bore, will work on double horns but will be very uncomfortable to

play on Vienna horns. Wolfgang Vladar stated that there must be a good balance between the depth of the cup, diameter of the cup and the diameter of the bore but the main difference is that the Vienna horn mouthpieces have less resistance because the horn has more.

3.4. Technical capabilities and playing technique

3.4.1. Sound

There several factors influencing the sound of the Vienna horn:

The musicians.

Stated by Wolfgang Vladar, the most influential aspect of the sound of the Vienna horn is the way Viennese players have been raised. Their parents were horn players, musicians or music enthusiasts and they raised their children with the Austrian understanding of a beautiful sound. The playing technique, the attack, beginning and ending of the notes, phrasing is a result of that knowledge. It is a tradition that has been passed from generation to generation by learning subconsciously. Wolfgang Vladar said to me in the interview that his family were big classical music enthusiasts. They listened to a lot of recordings by Vienna Philharmonics and The State Opera at home and went to a lot of concerts performed by those orchestras. This taught him the aesthetics of sound.

The environment where the musician grows up is a big factor as well as **the personality** of the player. These often go hand in hand. I talked about this with Wolfgang Vladar after the interview. For example, the members of the Austrian, German, French or English horn schools speak different languages. Since the tongue is a vital part in the playing technique of the horn, the language has some influence on the attack of the note. Also the use of the throat is different in each language and that influences the sound itself. From my experience horn players from France have a slightly different sound in a sense that they use more natural vibrato then for example horn players in Germany. Music is an expression quite alike speech since using both one wants to tell something to the listener.

3.4.2. Technical capabilities

From the thesis of *Thomas Jöbstl*, Oxford music online and my own experience I gathered that the main technical difference is that the Vienna horn is an F horn with significantly longer tubing than that of the Bb horn, which is mostly used on the double horns. The F horn is approximately 370 cm and the Bb horn is approximately 270 cm long. The longer tubing makes it harder to play in the upper range and in general because greater intensity of the airstream is required to overcome the friction between the airstream and the pipe and make it resonate. Therefor greater endurance is required to play Vienna horn. The benefits are that the sound spectrum of the F horn is much richer with overtones than the Bb horn and that makes the sound richer and more interesting for the listener. It also allows to play quieter with ease.

Another difference is in the diameter of the pipes and the bell. On the Vienna horn it is smaller than on the double horn, for exact measures see paragraph 3.2.1, and this is the reason why Vienna horns can project so well. There is another peculiarity, the size of the bell, which has an effect on the playing technique. Since the bell on the Vienna horn is small some horn players have had difficulty of playing it with the same hand position as they do the double horn. The sound then is muffled and the intonation poor. The Viennese horn players take the hand more out.

These properties are responsible for the sound of the Vienna horn and its unique way of blending within the symphony orchestra because the brassy overtones are reached without much volume of sound and it is not needed to play loud to project well.

According to Oxford music online and the thesis by Thomas Jöbstl the double piston valves also make a lot of difference in the sound, the legato properties and the slurs. This is a completely different system than the rotary valves which are used on double horns. The double piston valves switch the air stream faster. But the reason that the slurs are smoother and it is easier to phrase is the placement of the valve block. For Vienna horn it is much further down in the tubing than on the double horns. The thesis of *Thomas Jöbstl* suggests that this accounts more for the known smooth legatos and slurs of the Vienna horn than the piston valves themselves. A downside of the double piston valve is that the connection between the piston itself and the leavers is much longer than on the rotary valve. It responds a bit slower, is lazier and heavier, making it more difficult to play very fast and virtuosic but horn makers are in the process of fixing this problem.

Safety and accuracy has been a long lasting debate of the usefulness of the Vienna horn. Stated by the thesis of *Thomas Jöbstl* it is harder to play the Vienna horn accurately in the high range because it is an F horn. The notes on the harmonic series in the upper range are a lot closer together than on the Bb horn. That requires more skill and precision from the player. But it is possible to improve that with finding a more suitable crook. The crook between the mouthpiece and the 1st section of tubing is the length of 1/3 of the entire horn and can greatly influence the sound, intonation and attack.

There is repertoire that is not suited for Vienna horn. Stated by Wolfgang Vladar it would not be advised to play baroque music or, for example, Haydn and Mozart symphonies on the Vienna horn because the horn has not been designed for that and would sound too heavy. This is a big disadvantage of the instrument but also a lot depends on the skill of the player.

3.4.3 Playing technique

As mentioned before the Vienna horn is an F horn and in its design is very close to the natural horn. That means that the playing technique also must be similar to the natural horn. Players should be aware that the Vienna horn tolerates less being played with a tense body, especially the neck and the throat, than the double horn. This will result in more cracks, distortions of the sound and the instability of the airstream, according to Dave Claessen.

Horn schools that are good for learning natural horn are also the most suitable for learning the correct fundamentals on Vienna horn, for example, the Schantl School. This and similar methods in combination with aesthetically beautiful imagination of the sound is the basis of playing Vienna horn.

Many horn players find it difficult to switch between the double and the Vienna horn. The opposite way there are less problems. Sometimes it can even take a week to adjust to the Vienna horn, stated by Dave Claessen. Though Tim Barrett of the Scottish Vienna horns believes that the switch is easier with time provided that the player practices more on Vienna horn.

3.5 Situation in Symphony Orchestra horn sections

There is a discussion in some symphony orchestras about Vienna horn as a potential replacement for double horns. The Vienna horn is more popular than I expected and the popularity is growing.

Stated by Engelbert Schmid, Dave Cleassen and Wolfgang Vladar in Germany it is required for a horn player to have an Alexander horn because that is the German tradition and the sound and technical capabilities of the Alexander horn suite their way of playing. From my own experience in the Netherlands the situation is not exactly like in Germany but similar. Players are recommended to have an Alexander horn but also sometimes other manufacturers' models are accepted. Stated by Tim Barrett in Great Britain there is a complete mix of horn models being used and it is a matter of taste.

What the data from the interviews with Wolfgang Vladar, Dave Claessen and Tim Barrett shows is, that the popularity of the Vienna horn is slowly growing. It is already used for some programs in the San Francisco Symphony, Finnish Radio Orchestra and the NDR Symphony Orchestra in Hamburg. The more experienced players from Vienna, for example, Wolfgang Vladar, is coaching professionals in the playing technique of this horn design. In general the Vienna horn is accepted but there are disputes between the string and wind sections about the intonation and volume of the newcomer. Wolfgang Vladar stated that the NDR Orchestra in Hamburg and their conductor liked the Vienna horn but Dave Claessen, horn player from the same orchestra, said that the woodwind section was not happy with the intonation of the Vienna horn and the brass section did not like the sound at all and the lower volume the Vienna horn can achieve. However the string section was very satisfied.

According to Engelbert Schmid and Dave Claessen the Vienna horn is also popular among amateurs and horn enthusiasts, however there is doubt, especially in Germany, that Vienna horn is a serious contender to double horns in replacing them in a symphony orchestra or that could take some time, more than in other countries.

4. Conclusion

I have been amazed for some time by the relaxed and beautiful sound of the Vienna horn. I have seen concerts live and on the internet and listened to many recordings by the Vienna horns. That is the reason why I chose this to be the subject of my research. I interviewed many well-known horn players and horn manufacturers about the construction of the Vienna horn, the playing technique and how is it to combine it with other horn designs. Also about the situation and traditions in the horn sections of the symphony orchestras in Austria, Germany, the Netherlands, Belgium and Great Britain. At the end it is a lot clearer to me why the sound of the Vienna horn is the way it is, what benefits and disadvantages it has as part of a symphony orchestra and what I could expect the Vienna horn will contribute to the horn society in the future.

There is a unique connection between the Austrian way of understanding the sound and the construction and capabilities of the Vienna horn itself. As I mentioned before, the basis of producing this kind of sound is in the power of the mind, the way the Viennese horn players were raised. They grew up in this environment where Vienna horn and not the double horn was the main instrument in the symphony orchestra. They grew up listening to the great Vienna horn players before them and subconsciously learned how it should sound. Also the Vienna horn itself supports this way of playing but also influences it.

There are several reasons why the Vienna horn is not often chosen to be played in a symphony orchestra. It is an F single horn and by nature more unstable and uneasy in the high range. A lot more care must be taken to produce a stable air column otherwise you risk cracking notes and making the sound unstable. This also forces the musician to always play with correct breathing because the horn does not ‘forgive’ slacking in this regard. Since the airstream is the basis of playing any wind instrument, practicing daily on a Vienna horn will help better the technique and the sound itself. If a musician has played on a double horn or a Bb horn most of his life, of course when you first try the Vienna horn it will feel difficult and uncomfortable. Once you have mastered it, switching back to the double horn is easy. The Viennese horn players have played Vienna horn all their lives and have adapted to the capabilities of the Vienna horn for a much longer time than most others. It could be compared to learning a language. You will always be more skilled and secure in your mother tongue. For most of the horn players the mother tongue is the double horn and the Bb horn.

The Vienna horn has smaller diameter pipes and bell. This accounts for the better projection. In a symphony orchestra Vienna horn projects very well without playing with a large volume of sound, also the brassy overtones are reached much earlier. That gives an impression that the Vienna horn is being played loudly but the actual dynamics are a lot less than that of the double horn. That is why the horn section using Vienna horn cannot 'overblow' the orchestra when the orchestra is playing very loudly. However it is perfectly hearable and clear when the orchestra is playing in a lower dynamic. This is often much appreciated by the string section.

The double piston valves makes a lot of difference in the legato properties of the Vienna horn and in the smoothness of the slurs. The mechanism in the pistons themselves disrupt the airstream a lot less than the rotary valves and that makes a difference. But the biggest difference in the legato and the slurs are because of the placement of the valve block within the length of the tubing. It is a lot further from the mouthpiece in the Vienna horn and that is why the legatos are smoother.

Because of the smaller bell the hand must be placed differently than when playing a double horn. It must be more out of the bell. Otherwise the intonation is bad and the sound quality drops drastically. This is another aspect to which players must get used when learning the basics of playing the Vienna horn.

The Vienna horn has its drawbacks but I believe that it is very healthy for the musician to play this horn design and I find the sound of the Vienna horn much more rich and beautiful. It is of-course harder to master than the double horn and it does not provide the player with such security and stability, but that also greatly depends on the skill of the player which can be perfected over time. Also the Vienna horn designs are becoming better and better. Nowadays Vienna horn is becoming more popular also among the professional players. It is on average used in a few programs per year, but it is possible that in the future more and more horn players will risk spending their time and energy in mastering this horn design because at the end it might be worth considering whether it is so wise that obsession with perfection of technique often comes before the quality of sound.

Now in the 21st Century, the age of the internet, a lot of live concerts and videos are available online and it is possible to hear prominent orchestras from other countries and continents without leaving your living room. This gives a unique opportunity for the youth and young professionals to find their own taste in horn sound and the aesthetics of music. The power of the

mind is a huge factor in playing an instrument and this is what many overlook while trying to solve problems.

5. Discussion

My research will show the current popularity of the Vienna horn and will clarify for the horn players, other musicians and conductors if it is worth changing to the Vienna horn in their orchestras and ensembles. This research has not only clearly gathered and structured the pros and cons of choosing Vienna horn in a symphony orchestra but also how it is to play Vienna horn and the reasons from a technical point of view why it is like that.

5.1 Reflection

In the process of writing this research I have learned many new things about the construction of the Vienna horn but most importantly about the Viennese traditional understanding of sound which is the basis of the sound of the Vienna horn. The horn supports this way of playing. My previous belief was opposite, that the Vienna horn is the reason why Viennese horn players play the way they do. Also I did not know what consequences the constructional peculiarities have for the playing technique, for example, that the placement of the valve block makes the legatos and slurs smoother on the Vienna horn and that the smaller diameter of the tubing and the smaller bell are responsible for the better projection.

The gathering of the data took though a long time, because sometimes the response was late or did not come at all. I wished I had more time to interview more horn manufacturers and horn players from many more countries and also different continents. I would also have liked to test and compare the sound spectrum of the Vienna horn and double horn models in a recording studio and do a live test in a symphony orchestra.

5.2 Recommendations

In connection with what I just mentioned, it might be worthwhile to research in greater detail the sound spectrum of Vienna horn, especially the Bb Vienna horn models, and double horns and compare them. That might give definitive proof which sound is richer with overtones and projects better. Also I was very intrigued by the hand position Viennese horns players use which is a lot different than other horn players and how that influences the sound.

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Appendix I. Original and achieved timetable

Original timetable		**Achieved timetable**	
Date	**Activity**	**Date**	**Activity**
July 2016	Contact Wolfgang Vladar and gather data about the subject	**November 2016**	Interview via email with horn manufacturer Andreas Jungwirth
	Contact Ab Koster about the situation in Symphony orchestras in Germany		Analyze data

	Contact Rob van de Laar and gather data	**December 2016**	Live interview with Wolfgang Vladar in Vienna
August 2016	Analyze gathered data from horn players		Analyze data
	Contact the horn manufacturers	**January 2017**	Interview with horn player Dave Claessen
September 2016	Analyze data		Analyze data
October 2016	(Optional) Visit horn manufacturers in Vienna	**February 2017**	Writing the report
November 2016	Analyze data	**March 2017**	Interview via email with horn manufacturer Engelbert Schmid
December 2016	Analyze data		Interview via email with horn player Dave Claessen
January 2017	Writing the report		Interview via email with horn player Tim Barrett
February 2017	Writing the report		Writing the report
March 2017	Writing the report	**April 2017**	Writing the report
April 2017	Writing the report	**May 2017**	Writing the report

Appendix II. Research tools

Interview questions

Interview with Andreas Jungwirth

1. What in your opinion are the main technical differences in build that makes the difference in sound and capabilities between Vienna and double horns?

The Vienna horn body is based on a late romantic Natural horn. That is the reason why there is still a crook instead of a fixed leadpipe. The main difference is the smaller cylindrical bore, the smaller bell diameter and the pitch in F, and the double piston valves.

2. In which keys are Vienna horns made?

F only. The use of higher crooks (A crook, Bb shank) is gone.

3. I met Wolfgang Vladar in Amsterdam and he showed me that players put in small tubes inside the crooks and that improves the attack and stability of the sound? From an engineering perspective why do you think that is?

Yes, that trick is helpful. Do not ask me why, but it works.

4. Have there been any attempts to make a double Vienna horn?

The makers Robert Engel and Hermann Ganter made this horn, with a Viennese body and bore and rotary valves.

5. Why are special Vienna horn mouthpieces necessary? How does it connect with the design of Vienna horn?

The traditional Vienna horn mouthpiece had a larger shank, larger backbore and a funnel shaped cup.

Interview with Engelbert Schmid

1. In what way your Vienna horn design differs from other Vienna horn manufacturers and how does that influence the sound and technical capabilities?
   Please see the website: http://engelbert-schmid-horns.com/index.php/en/french-horns/vienna-horn
2. What do you think of the current situation in symphony orchestra horn sections in Germany and the surrounding countries concerning the choice of the horn manufacturer?

   Germany: We are having a "National103erism". At the moment there is a lot of pressure to play on a 103 of Alexander, and they justify this by the sound. I´ll change this, but it will take a lot of effort. Others and we did sound contests behind the screen, my doubles and other horn models against the 103, - the result is 20:0 to my favor. Most test players were 103-players and the voting audience also in majority 103-players. Step by step these results are making the round.

3. In your experience how popular is the Vienna horn compared to double or triple horns?

   The Vienna horn is the horn of the Vienna orchestras. A few German orchestras are now buying a set for certain pieces. There are many fans of the Vienna Horn, amateurs and professionals, who just for fun have one.

4. Do you think Vienna horn has potential of replacing or partly replacing double horns in symphony orchestras?

   There seems to come a wave to have a set of Vienna Horns owned by the Orchestra. But I don´t think it will become a kind of competition to the rotary doubles and triples.

Interview with Dave Claessen

1. How long do you play Vienna horn?

   I play the Vienna Horn since 2013.

2. Do you also play on another horn than Vienna horn in your professional practise? If yes, than is it easy to combine and what are the main differences in your opinion?

   At work I play on an Alexander 103. For me, combining the two horns is not without complications. I observe, that when I start playing the Vienna Horn after a longer break, I need about a week of intensive practice, especially working on the sound and come into a more relax way of giving breath support. Also the mouthpiece is a different one from the mouthpiece I use on the double horn, so there are some changes in the whole system of playing. When I then change to the Alexander 103 again, it feels as if my embouchure, as if the whole playing-organism has been on a holiday! Playing the Vienna Horn is very good for your playing on the double horn. In the opposite way, it doesn't work so well. If I pick up the Vienna Horn after a very difficult program playing on the double horn, in the beginning I don't sound so well on the Vienna Horn.

3. Do you consult with the manufacturers and help them to improve the design? If yes, then maybe you have some examples.

   No, I have never been asked for feedback or support by manufacturers. I think, the players of the Vienna Orchestras should do this job. They have far more experience.

4. Which learning methods would you recommend for me if I wanted to learn Vienna horn?

First of all, find a Vienna Horn mouthpiece on which you feel well. In the very beginning, I recommend to just sit down, calm down, get the breathing deep down and get a relaxed feeling in your chest, on your breast-bone. And then: hold long notes! First c1, g1, g: Stay with the natural tones in the beginning, not going further apart as an octave. Discover the resistance of the instrument, lean against it much more than „blowing" through the horn. Professor Roland Berger called it: „Eine Fensterscheibe anhauchen". Then, slowly and all the time playing long notes, enlarge the register up to g2 and down to C. Listen to the great players from the Wiener Philharmoniker, Wiener Symphoniker, Volksoper Wien, Tonkünstler Orchester. Not only the recent recordings, but also the older ones. Listen, watch them, try to feel into it. The literature I play is not much different from what I practice on my Alexander 103: Josef Schantl, Grosse theoretisch-praktische Hornschule, Band I und II. Bernhard E. Mueller, 34 Studies (I like No.4 & 7 & 8 & 11 & 15). Verne Reynolds 48 Etudes, Strauss 1 and 2.

5. Why do you think Vienna horn is not as popular in symphony orchestras as modern double horns?

For the very simple reason, that there happen more „cracks" than on the double horn. Mostly the string players love the Vienna Horn, because it is a little less voluminous than the double horn. Woodwind players often complain because of the slightly different intonation. Trombonists and Trumpet players often don't like the sound at all. You could ignore all these complaints, but that is not comfortable and sometimes leads to disagreement within a wind section of an orchestra. That is the moment, when the Vienna Horn disappears back into its case and stays there for the rest of his life… or the horn group stands together strong and goes through this hard time and have such a lot of fun afterwards!

6. What specific challenges are with playing Vienna horn in a symphony orchestra?

The risk is of course a lot higher, because of the higher rate of cracks. But 4 Vienna Horns blend much easier than 4 double horns. The sound is more capable of melting together.

Playing soft is easier, that is an experience we have certainly made in the 5 projects we have played on Vienna Horns until now.

7. Do you think that Vienna horn will become more popular in German orchestras?

I think, other countries in the world will be quicker than Germany. As far as I know, the Finnish Radio Orchestra has Vienna Horns, as well as San Francisco Symphony. I don't know, if they use them a lot though. I hope, more and more orchestras will discover the beautiful possibilities the use of the Vienna Horn has!

Interview with Tim Barrett

1. How long do you play Vienna horn?
   Since 1985, so more than 30 years!
2. Do you also play on another horn than Vienna horn in your professional practise? If yes, than is it easy to combine?
   Yes, I play various other single, double and triple horns. Changing horns I find no problem but only because most practice I do on Vienna horn.
3. Do you consult with the manufacturers and help them to improve the design? If yes, then maybe you have some examples.
   I helped Alois Mayer (Haagston) in his early years making Vienna Horns.
4. Which learning methods would you recommend for me if I wanted to learn Vienna horn?
   All the usual basic methods concentrating on use of air, good production, different use of hand position. I studied in Vienna and would recommend study with a Viennese trained teacher.
5. Why do you think Vienna horn is not as popular in symphony orchestras as modern double horns?
   Several reasons! Sadly for many years Vienna horns were difficult to buy outside Vienna. As a result, players had little experience with them. Without regular use and experience

they are harder to play than modern horns. Also it is better if a complete horn section use them, rather than mixing double and V. Horns.

6. Do you play Vienna horn also in symphony orchestras? If yes then what specific challenges are there?
   Yes. I am lucky that members of Scottish Vienna Horns are also the horn section of several orchestras I play in, both symphony and chamber orchestras.
   Challenges are: accuracy, balance and intonation – all made easier by having all section of Vienna horns and regular use.
7. Which horn manufacturer instruments are mostly used in symphony orchestras in Great Britain? Why? Is there a tradition or tendency or is it just a matter of taste?
   A complete mixture! Double horns used are by Alexander, Paxman, Hoyer, Schmidt as well as smaller makers. Traditions are different. The traditional English style and an imported more American sound. All a matter of taste.
8. What in your opinion are the main technical differences in construction and playinf technique that makes the difference in sound and capabilities between Vienna and double horns?
   A lot of info on SVH web page, but main differences are on V. Horn, smaller bore, F Crook so long tapered section before valves, Vienna Valves nearer bell than on a double hom. More resistance, so air support important.
9. How are the Vienna horn mouthpieces different than others?
   Deeper funnel shaped cup, more cylindrical back bore, traditionally a narrower rim with sharper inner edge and larger shank for some crooks. They play with less resistance than modern mouthpieces.

Interview with Wolfgang Vladar

Me: How long do you play the Vienna horn?

Wolfgang: I started when I was 13. For 40 years now. I played violin before.

Me: Have you played a double horn before?

Wolfgang: No, I started with a Viennese horn.

Me: Is there a special school for Vienna horn?

Wolfgang: If we talk about how it sounds then Viennese school is a small part of that because it matters how you were raised with the imagination of the sound. I grew up with the orchestra here. My father went to all of the concerts. He had all the recordings. We were listening to this since I was small. All my teachers were from this orchestra and they taught me how it should sound, how the notes should start and end and that the goal is the beauty of the sound. And how we want it to sound the Viennese horn helps to support this. If I play on a double horn it will still sound like a Viennese horn. The Vienna horn forces you to play different than on a double horn because of the smaller tubing. It needs more air. Also usually they have more resistance than the Viennese horn.

Me: I have a mouthpiece that is shallow and the bore is quite small. I had a feeling that I can't get enough air through.

Wolfgang: I think it is not the question about the mouthpiece but the intensity. The mouthpiece shape is a little different. They are usually V shaped. That makes the sound more intense. It's not as easy to play exactly. But how we want to play we take more care than about the perfect accuracy. Because you can still get very good accuracy with that.

Me: And the bore on Viennese mouthpieces are different?

Wolfgang: Every player has a different bore. The width of the bore doesn't have anything to do with sound. It's just the relation to the bore and the shape is responsible for the intonation. The relation between the shape and depth of the cup and bore must be in balance.

Me: Do you agree with the obligation to play Vienna horn in Vienna Philharmonics?

Wolfgang: Absolutely. First of all the Viennese horn is something that is special for this orchestra and it helps the way we want to play and we want to sound. When I started we could not get an instrument with every note on it. At least you had one really bad note. But now-a-days the instruments are so perfect. And I think we don't make more mistakes than other orchestras. With the valves you can play technically everything that is needed in the orchestra.

Me: Do you use the models with piston or rotary valves?

Wolfgang: There are no Viennese horns with rotary valves. They tried it in the 50s but it didn't make sense.

Me: Do you think that there are some cases in which you can't play some pieces on Vienna horn?

Wolfgang: Usually you can play everything on a Viennese horn but it doesn't make sense to do it. For Haydn symphonies or higher Mozart symphonies because then it's harder to get this lightness and easy playing. Wouldn't make sense. But still our imagination of how it should sound is the same so it would also sound the same. The violins are also the same but the sound produced is different.

Me: Compared of the horn players of Germany what would be the main differences in playing?

Wolfgang: They are great horn players but they don't do it beautifully in my opinion. They like it that way but it is just a different school.

Me: Maybe Alexander horns suit their playing more?

Wolfgang: Perfectly!

Wolfgang: It was interesting because I was in the NDR Orchestra in Hamburg. There is one Dutch horn player, Dave Claessen. He's there for 20 years and he's a big fan of Viennese horn and he wanted his orchestra to play once on Viennese horns and so I coached them a little bit and they played Brahms Requiem and the orchestra really liked it. And the chief conductor also. So the orchestra bought 4 Viennese horns. Yamaha Viennese horns. They are still playing some stuff not everything but the easier stuff.

Me: There is precedent that people choose Vienna horns?

Wolfgang: Because the biggest difference between modern double horn and Viennese horn is that the Viennese horn blends much better with the rest of the orchestra. That's not our school, that is the instrument. Because it has a smaller diameter closer to the natural horn. It's between 10.8 and 11mm and the modern double horns are 12.4mm or something. Like on the natural horns this brassy fortissimo sound is reached much earlier. It is not as loud as a double horn but it sounds loud. We can't cover the woodwinds and the orchestra even if we try our best. But the Berlin group [horn section] can cover the whole orchestra. I think that's the biggest difference.

Me: Do you also work with the horn manufacturers to help them better their designs?

Wolfgang: Not really. We have one colleague. He did the most work. He was developing the Jungwirth horns to that level that they are now but I sometimes when I'm there I tell what's not so good and we try something but not as he did. Because he was there for 8 hours a day playing, playing and his embouchure is so perfect he even after 6 hours he knows that it's the fault of the horn and not the embouchure. After 2 hours I have no idea if it's my fault because I'm down.

Me: From the technical capabilities what do you think could be the cons of choosing Vienna horn in a symphony orchestra? Maybe contemporary music?

Wolfgang: For sure because we also use different horns. If there is something like a high D or E, some crazy stuff then we use something else but still with our sound.

Me: What kind of repertoire is the most difficult to play on Vienna horn?

Wolfgang: Usually we play 90% of the repertoire.

Me: I'll rephrase. Which repertoire is not?

Wolfgang: Contemporary music and there are some times when my colleagues used high F horn for one phrase in a Mahler symphony. But the generation before, as they had different conductors, they were more afraid than we are, so we usually play everything [on Vienna horns].