

FURTHER QUESTIONS CONCERNING THE VIOLIN

These are further questions that a more mature student might ask as he will be able to detach himself from his more pressing concerns of technique and think more about the quality of the sound coming from the violin and the characteristics of the instrument.

What is carrying power?

Carrying power is that property of a violin which allows the sound to be heard at the furthest seat in a large concert hall. It is difficult to assess in a hall because they are built with reflecting surfaces to equalise the reception of sound at all positions.

Ideally carrying power should be assessed in an open field where there are no reflections. A grassy surface would be a good absorber. In such a field the sound intensity of a pure tone falls off inversely as the square of the distance from the source, so that loudness at the source is of fundamental importance to good carrying power. Clearly the sound from a loud violin will carry further than that from one with a small sound output. The sound output is proportional to the active area and amplitude of vibration of the top and back of the violin.

What is "Timbre"?

Timbre refers to the number and strength of the harmonics or overtones present in the sound produced by a violin when a note is played. It is a qualitative term. A violin has an oboe-like timbre or a clarinet-like timbre or a nasal quality, etc. The string vibration theoretically has all the harmonics present. For a perfect string mounted on a monochord the strengths of the harmonics decrease as the reciprocal of the harmonic number. A very flexible string produces more harmonics than a stiff string. The resonances in the body of the instrument strengthen the harmonics present in a note, that coincide with the resonances. The more resonances possessed by the violin the better is the quality of the sound produced. Jascha Heifetz Guarneri del Gesu violin contains 53 resonances.

How does vibrato work?

There are in theory two kinds of vibrato, amplitude and frequency vibrato. Frequency vibrato is the form concentrated on by students when they roll their fingertip up and down the string while bowing a note. As the frequency of the fundamental varies up and down so do the frequencies of all the overtones. In doing so they interact with resonances causing the strengths to vary giving a pleasing effect to the sound. The usual speed of vibrato is about seven per second.

Amplitude vibrato could be generated by variation in finger important enough to consider and is possibly too hard to

do. Another form of amplitude vibrato can be performed on an open string by using the vibrato action on an adjacent string, either the same note on the lower string or the octave on the upper string, or further at the subharmonic (e.g. A3 on the G string while playing the open A string). It would seem these movements induce a similar reaction in the bow, and it may well be that true frequency vibrato cannot be produced without some amplitude vibrato being present.

What is a "Wolf" note?

When a note being played on a string lies close to an unusually strong resonance there is an uncontrollable transfer of energy back and forth between the string and the resonance with a consequent unsteady sound.

To prevent the "Wolf", one can either avoid playing the note at that position or reduce the energy input from the string. This can be done by fitting a lighter string. Alternatively, as is often done on the 'cello where this phenomenon seems to occur more frequently, one can install a suppressor to absorb some of the energy at the resonance.

What makes for ease of playing?

This can be divided into three aspects of importance to the player. The first is the weight of the instrument. A low weight instrument is of obvious advantage in reducing the fatigue of the player. A good violin weighs in the vicinity of 400 grams fitted up but without chinrest.

The second aspect is the physical feel of the violin and its comfort in handling. The neck should not feel bulky, the strings should be spaced above the fingerboard so that they are easy to depress yet have space to vibrate. These and other features are part of the fitting up process when commissioning a violin. Other considerations include the spacing of the strings at the nut and the bridge for ease of stopping, the curvature of the top of the bridge to allow unhindered bowing of each string. Properly fitting pegs also play a part in ease of handling a violin.

Finally there are two subjective evaluations of a violin that are more imaginary than real. In this context, ease of playing refers to the amount of effort a player has to expend to elicit a sound from the instrument. The minimum bow force needed to produce a clear note bowing 4 cm from the bridge, is about 12 grams and does not vary much between violins. This is much less than the weight of the bow which lies between 55 and 65 grams. Playing forte is achieved by an increase in bow velocity, with an instinctive increase in bow force. Playing near the bridge does require a higher bow force.

Quickness of response refers to the time for the partials in the sound to be excited to produce the recognisable note. This is the starting transient and has been found to be so short that a

player would be unaware of it. On the other hand, a played note should have a ringing quality which indicates that damping in the instrument is low, a desirable characteristic. It is not clear what low damping means. Good instruments have Q values between 20 and 50.

Does a violin have to be played in?

The short answer is no, but this needs to be qualified. We have to exclude mass produced violins and consider only handcrafted, carefully set up instruments for which the soundpost has been adjusted to give an even loudness on all four strings, the varnish has come to near equilibrium and the instrument has adjusted to the tension of the four strings.

For its purpose, the violin is a very strong structure well able to support the forces on it if the plates are sufficiently thick. Playing only adds very small variations to these forces so that the materials remain within their elastic range. This means that the instrument comes back, after playing, to the same state it had before.

In my opinion the "playing in" is really the adjustment of the player to the instrument. Every violin (and bow) is unique in its physical dimensions and the position and strength of its resonances. The differences between instruments is usually very subtle. The player has to adjust to the characteristics of each instrument. An experienced player may make all violins sound similar which would display the qualities of the player rather than the violin. This is reflected in the student remark that his teacher makes the student's violin sound like his i.e. the teacher's, while he, the student, makes the teacher's violin sound like his i.e. the student's. The acoustics of the room i.e. its reflectivity, reverberation time, the presence of standing waves, etc. are also very important.

All of this makes the assessment of violins a very subjective business. A maker who plays the violin has a distinct advantage when influencing a prospective buyer to purchase his instrument. Objective methods alone offer a means of assessment that can be used at successive times but those available do not seem to have the desired sensitivity.

Do steel cored strings have a higher tension than gut and nylon (Perlon) cored strings?

Generally no; today all strings have similar levels of tension that increase slightly in going from G to E. This gives acoustic balance between the tonal sound output on both wound and unwound gut strings. There is less difference in string weight with reduced tone quality difference. The bass strings are lighter and therefore respond more quickly. Changing strings during playing does not involve an adjustment in technique on the part of the player when at maximum loudness.

Steel cored strings because they have higher elasticity, about ten times that of gut, cannot be easily tuned with the pegs and need to have adjusters on the tailpiece which also reduces the risk of breakage through over tensioning. Gut and nylon cores because of their lower elasticity i.e. they stretch more readily, can easily be tuned with the pegs.

The alternative string tension recommended by Leopold Mozart in 1756 and used up to the 20th century when strings were gut with a wound, was equal tension on all strings. This gave the same "feel" to each string i.e. the bow force required to deflect the strings by the same amount was uniform. Also the acoustic output increased on the lower strings which compensated for the deficiency in the fundamental.

What is the "Diapason" on the violin?

The "Diapason" or "Stop" on the violin is the distance from the upper edge of the top plate at the shoulder of the neck to the bridge line which is the line joining the two inner notches on the soundholes. The back surface of the bridge which is vertical to the plane of the joint between the top and the sides, lies along this line. The Diapason is 195 mm on full size modern hand made instruments. The distance from the bridge line to the string nut is $\frac{5}{3}$ of the Diapason. The string is about 3 mm longer than this.

The Diapason originally referred to the most important fundamental stops on the organ. On a string instrument it must have related the body length to that of the string but the evidence is not clear on this. The length of the form on which the body is built is $\frac{18}{17}$ of the string length.

What is "son file'" (literally "sound thread") bowing?

A natural approach to bowing which uses a relaxed state in the muscles and position of the right arm and hand with no preconceived notions about the precise position of the bow on the string or the motion of the bow across the strings. It also involves no deliberately applied bow force by the fingers or arm. On the contrary, it only employs the weight of the bow.

The hand position on the bow may be loosely called the "Russian" hold as first introduced by Wieniawski at the St Petersburg Conservatory in 1862, as distinct from the "Franco-Belgian" hold. Many modern virtuoso violinists employ this hold including the late Jascha Heifetz, Itzhak Perlman, etc. See STRAD, March 1991 for details.

What is "Scordatura"?

In short, mistuning one or more of the strings of the violin to other than G D A E. This was done by early virtuosi to allow an easier fingering or to achieve special effects. Franz von Biber b.1644 made extensive use of this device. It required a complete

knowledge and command of the fingerboard. He made great use of all the violinistic devices including high positions, double stops, bariolage and staccato. Scordatura was also used to raise the brilliance of the string instrument so that it would stand out against the orchestral accompaniment. Mozart wrote the viola part in his Sinfonia Concertante in E flat K364 in the key of D and the instrument was tuned up a semitone for performance. This was done to make it more brilliant and more resonant and in turn a more equal partner to the violin. Another recent example is the recording of Franz von Biber's Mystery Sonatas for Baroque violin which use extensive scordatura.