

### **Pitch relativity in the Renaissance and the sizes of fiddles and viols**

Some early writers such as Praetorius (1619) tried to be scrupulous about the absolute tuning pitches of the instruments discussed. Musicians were practical about their tuning pitches, making different assumptions about them for different purposes. Mid-16<sup>th</sup> century sets of viol players often read from readily-available vocal repertoire, and Hans Gerle (1546) wrote that if the music was so high that it would have required playing past the frets, one should make it playable by assuming that the strings of all their viols were tuned a fourth higher when reading it. Avoiding excessively high pitches was also why, according to Ganassi (1542,3), Gombert suggested that it is better to pitch a choir a tone too low for the basses, with their lowest notes just being audible, than a semitone too high, which would strain the trebles.

Another reason for assuming different tuning pitches for their strings was to change key, either to simplify fingering by maximal use of the open strings, or to transpose to play at different pitches. An example of the first of these is the instruction of Ganassi to assume string tunings on all viol sizes a tone lower than usual when the music has two flats in its signature, thus transposing the music a tone higher. An example of the other practice is the tables given by Virgiliano for assumed viol string tunings to transpose up a tone for a set of low clefs and for a set of high clefs, down a tone, a minor third, a fourth, a fifth, a major sixth and a minor seventh.

Nathaniel Tomkins (1668), when writing about how the music of his father (Thomas) was performed, indicated that on the organ of that time (10 ft), the lowest note was a C according to the keys and FF according to the choir. The organists learned to assume both pitch levels for their keyboards. Rousseau (1687) wrote that the English reduced the sizes of their viols before the French did. This could well have happened around 1560 when viol playing was popularised by public performances by viol-playing choirboys. The pitch level that the new sizes played at (called 'Consort Pitch' by Mace) was a fourth below the level they sang at with the organ, an easy transposition.

The obvious reason why open strings are given pitch names is that they tell you where to put your fingers when pitches are indicated in the music you read. When Lanfranco (1533) described the tunings of the *lyra (da braccio)* and the *violette da arco* (fiddles) by indicating intervals between strings with no indication of note names, he most probably implied that players of these instruments did not read from music.

For most of the 16<sup>th</sup> century, when music was usually performed either solo or with sets of instruments that had previously been tuned to one-another, the pitch level was quite arbitrary. The important thing was a correspondence between the notes in the music and the fingerings on the instrument. Late in the century, ensembles of different types of instrument became fashionable and pitch standards became important. Yet when Monteverdi in *Orfeo* (1607) wrote music to be played on tiny *violini piccolo alla Francese*, it was written in a standard vocal clef but sounding an octave higher. So when pitch standards applied, it was not unusual to write it in the wrong octave for practical reasons. So when Bach wrote bass instrumental parts for his cantatas, he often wrote them in treble clef, probably for a violinist to play on a small bass violin tuned an octave lower than the violin. Kircher (1650) depicted large bowed instruments giving string tunings in vocal clefs an octave higher than other sources indicate they should be.

Though original instrument size is usually irrelevant for early music since instruments are usually scaled to play at modern pitch standards, it is important for music historians because size strongly affects the quality of the sounds produced, and it helps to identify surviving ones. Before the 20<sup>th</sup> century, almost all stringed instruments used gut strings. We can make a good estimate of the pitch

limits of gut-strung instruments from my analysis of the information on the instruments that push the limits in Praetorius's book if we know their pitch level and their vibrating string lengths from written or pictorial sources. If we represent the pitch frequency in Hz by  $f$  and the string length in metres by  $L$ , then the highest frequency is  $f_{\max} = 210 \cdot L^{-1}$  for a low-twist gut string, and the lowest frequency by  $f_{\min} = A \cdot L^{-1.25}$ , where  $A = 36$  for a roped gut string, 31 for an octave pair including a roped gut string and 48 for a high-twist gut string. Knowing the ranges lets us estimate either the size, tuning or pitch level when we can estimate the other two.

Zacconi (1592) was the earliest writer to give tunings for Italian fiddles. By then pitch standards were important. The tunings he gave were  $BB^b F c g$  for the *basso*,  $(F) c g d'$  (the  $F$  was usual by then) for the *tenore* and *contralto* and  $(c) g d' a'$  (the  $c$  was unusual) for the *soprano*. These tunings imply very large instruments (the *basso* string length would have been over 96 cm at the Italian *corista* standard). Such large fiddles do not appear in any of the Italian pictures from the 16<sup>th</sup> century. The fiddles illustrated in the famous Ferrari fresco (1535-6) have string lengths of about 62, 42 and 27-9 cm. These fit neatly within the limits at the *corista* standard (about  $a' = 385$  Hz) if the actual string tunings were an octave higher than Zacconi indicated, i.e.  $B^b f c' g'$ ,  $(f) c' g' d''$  and  $(c') g' d'' a''$ . Just after the turn of the century, when the violin joined the fiddle band, the original soprano was abandoned, the *tenore* and *contralto* dropped a fourth in pitch to  $c g d' a'$  and the *basso* dropped a minor third to  $G d a e'$ . Amateurs then were switching from viols to fiddles, and missing a large bass, had basses made an octave below the usual ones, usually with an added  $b$  first string.

French fiddles in the 16<sup>th</sup> century started out with about the same sizes as the Italian ones, as evidenced by the Paris woodcut (1516) of four philosopher fiddlers. But by 1556, Jambe de Fer wrote that the fiddle tunings were for the *basse*  $BB^b F c g$ , for the *taille* and *hautcontre*  $c g d' a'$  and for the *dessus*  $g d' a' e''$ . The fiddles appear to have increased in size, and indeed their name for fiddle then was '*violon*' with an 'on' ending that in French as well as Italian implies 'large'. Pictures such as the two showing a couple dancing the Volta (c. 1580) show such sizes at the *ton de chapelle* standard (similar to Italian *corista* and English consort pitch).

Italian viols derived from the late 15<sup>th</sup> century Spanish bowed *vihuela* with a string length of about half a metre. In 1493, there was a report of a pair of Spaniards from Rome playing *vihuelas* almost as large as people (about twice the original size). By about a decade later, *vihuelas* had become viols, with higher moveable bridges (having curved tops), single courses and intermediate sizes beside the original and double ones. With these sizes, the tunings  $GG C F A d g$  for the *basso*,  $D G c e a d'$  for the *tenore* and *contralto* and  $G c f a d' g'$  for the *soprano*, as reported by Zacconi (1592), Banchieri (1609) and Cerone (1613), are appropriate at the *corista* standard. These reports are late, when pitch standards mattered. Tuning reports from earlier in the 16<sup>th</sup> century were a fifth higher, presumably to read the vocal repertoire.

When the French followed the English in reducing the sizes of their viols, the original sizes were probably similar to the Italian ones, with string lengths of about a metre, half that, and two intermediate sizes. Before the 17<sup>th</sup> century, each French viol had 5 strings tuned in fourths throughout. The tunings reported by Jambe de Fer (1556) were for the *bas*  $E A d g c'$ , for the *taille* and *hautcontre*  $B e a d' g'$ , and for the *dessus*  $e a d' g' c''$ . Mareschall (1589) reported the same tunings except that the *dessus* was a tone higher. The size reductions appear to coincide with the addition of a 6<sup>th</sup> string, but there was no pressure to follow a pitch standard (as there was in Italy at the time) because viols rarely mixed with other instruments. There are indications in Mersenne (1635) that a semitone below *ton de chapelle* was a common pitch level. The tunings then were  $D G c e a d'$  for the *bas*,  $G c f a d' g'$  for the *taille*,  $c f b^b d' g' c''$  for the *hautcontre* and  $d g c' e' a' d''$  for the *dessus*. The string lengths were probably about 0.8, 0.6, 0.45 and 0.4 metres respectively. English viols of sets had essentially the same sizes (except for omitting the 0.45 metre *hautcontre*). Viols for vocal accompaniment or other soloistic purposes, though called 'basses', were between bass and tenor sizes.