What factors should be considered when choosing a stringing for historical French viols for repertoire circa 1670 – 1740? How does this shape our performance and execution of this music today?

Extract of a Bachelor Thesis done by Luke Challinor at the Royal College of Music. Experimentally proved during the Violanet Programme at the Mozarteum University

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What factors should be considered when choosing a stringing for historical French viols for repertoire circa 1670 – 1740? How does this shape our performance and execution of this music today? *By Luke Challinor*

The factors to be considered in preparing and performing any music derive from various areas of contribution: the instruments made by the luthier and string-maker or other types of instrument maker, the raw materials available to them, the purpose or genre of the music to be performed, the location of performance, the creative input of the composer and the performers and the relationship between the performer and the audience and their enjoyment of it. These elements are all integral but also interdependent, for example a dialogue may unfold between performer and composer when one or other wishes to achieve a new effect, style or sound and this may, in turn, set a trend that may initiate a change that a luthier would decide to make in designing the shape or size of an instrument. In the case of the viol, this could therefore, necessitate a change in bridge design and stringing and experiments in changing stringing. Bridge style and bridge and sound post position, could continue over a period of time, initiated by the player, in consultation with the luthier. The design of how the viol was constructed did not actually change much in the 17th century with the advent of wound strings; the biggest change was that small instruments could be used at low pitches. The setting and size of the performance space and the audience could also require a greater volume of sound and scale of accompaniment, which would require string instruments to have higher tension strings for a broader range of sound.[1] This is also true for the viol. If we are to create the music of a composer like Marin Marais (1656-1728) and have the full range of expression he indicates in his scores, then the starting point should be the strings because originally the instruments were designed around the strings that were available, but the player can have a certain amount of choice over the strings he puts on the instrument as there is room within the physical working parameters of a string tuned to a given pitch.

As a viol player, string-maker and student of historical performance I aim to explore factors around stringing, and highlight any facts that can assist performers playing French repertoire for Viols written circa 1670-

[1] Boyden, David D., Peter Walls, Peter Holman, Karel Moens, Robin Stowell, Anthony Barnett, Matt Glaser, Alyn Shipton, Peter Cooke, Alastair Dick, and Chris Goertzen. "Violin." *Grove Music Online.* 20 Jan. 2001; Accessed 10 Jun. 2020. https://www.oxfordmusiconline.com/grovemusic/view/10.1093/gmo/9781561592630.001.0001/omo-9781561592630-e-0000041161. David D. Boyden, *New Grove article on the violin.* (ii) Sound Production and Acoustics David D. Boyden revised by Peter Walls Published January 20th 2001. This is explained in David Boyden's article on the violin in New Grove when he writes 'any violin has a certain potential of volume, whose realisation depends partly on 'accessories' – the type of strings and their tension, the type of bridge, the quality of the bow - and partly on the skill of the player.

1740, firstly by exploring the cultural context and meaning of the repertoire and where it would have been performed, then discussing the historical sources and iconography in order to form an idea of what would be historically accurate for a performance and therefore string choice. Following on from this, I will look at what strings are available today and how they compare to what we know about historical strings; I will introduce my own research in string-making and finally, discuss how these different elements come together in a modern viol players choice of stringing to creating their own artistic interpretation of it for their audience.

Chapter 1 Cultural context, repertoire, performance spaces and meaning.

In the 17th to early 18th century in France, the viol was very much an aristocratic instrument. Players were found amongst the aristocracy and the upper middle classes, and there were not many professional viol players, Marin Marais and Antoine Forqueray among the exceptions. The vast majority of the repertoire was intended to be played by skilled amateurs in private houses (their own and others) where polite society would enjoy sharing music and poetry, as evidenced by Marais comments in the prefaces of his Livres de Pieces de Viole, the 2nd of which is dedicated to the public. The genre of solo viol music called the 'pieces' and is a highly rhetorical form of music, almost akin to musical poetry. Good examples of composers of this music are Marais, his students Charles Dolle and Caix D'Hervelois as well as Antoine Forqueray.

According to Dr Eph Segerman in his *'The Development of Western* European *Stringed Instruments',* there is a record of a viol player in France in the first decade of the 16th century, but for decades after then, evidence of viol activity is lacking" [2]. Two 16th century sources are well-known and generally consulted. The first is *'Epitome Musical des tons, sons et accordz, es voix humaines, fleustes d'alleman, fleustes a neuf trous, violes, et violons'*, by Philibert Jambe de Fer which is a musicology and methods book[3]. The second is 'Porta Musices' by Samuel Mareschall[4]. Both describe tunings all in fourths, and instruments with five strings. Marin Mersenne's work 'Harmonie Universelle' is another well-known source of information about French Music in the 17th Century, musical theory and technical theories[5]. He was a priest, philosopher and mathematician and is often referred to as the 'father' of acoustics because of his theories or 'laws' which describe the harmonics of a vibrating string. In his *'Premier Preface Generale au Lecteur Book VII prop.xxi'* he credited Jacques Maduit (1557-1627) with the addition of a 6th string to French viols." [6] These viols mentioned by Jambe de Fer, Mareschall and Mersenne would have been played in consort and would have been quite large because the available all gut stringing would have

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[2] Dr Eph Segerman, *The Development of Western European Stringed Instruments* (Manchester, Published by Lulu.com 2006), Page 86.

[3] Philibert Jambe de Fer, *Epitome - Musical des tons, sons et accordz, es voix humaines, fleustes d'alleman, fleustes a neuf trous, violes, et violons* (Lyon,France: 1556)

[4] Samuel Mareschall *Porta Musices'* (Basel 1589)

[5] Marin Mersenne *Harmonie Universelle* (Paris 1636)

[6] Marin Mersenne *Harminie Universelle*, "*Premier Preface Generale au Lecteur".* Book VII prop.xxi

required a long string length so as not to be unmanageably thick on the bottom string.

Among the earliest viol music published in France were consort pieces by Nicolas Métru (c. 1610-1668) the *'Duets for Two Viols'* (printed in Paris in 1642). He was a French organist, viol player and composer. He was a music master for the Jesuits and he taught Francois Couperin and Jean-Baptiste Lully. He also wrote Fantasias for viols based on 'Airs de Cour' and 'the Danse', writing upper parts to suit the smaller viols that appeared around that time. However, from around 1670 onwards, the fashion changed and the old polyphonic consort style was replaced by Suites for instrument and continuo, as well as Sonatas with continuo; the use of continuo being the most significant change. There is a well-respected vocal treatise by Bertrand de Bacilly entitled *'Remarques curieuses sur l'art de bien chantre'* (1688) in which he says that the viol is preferable to the harpsichord and the theorbo is preferable to the viol for accompanying the 'Airs de Cour'. [7]

This implies that the viol was commonly use for the 'Airs de Cour'. Most of the 'Airs de Cour' up until around 1660 are written with lute tablature as the accompaniment. However, Michel Lambert, in his 'Airs de Cours' of 1669, utilizes figured bass continuous the accompaniment which shows part of the general move away from written out polyphony to improvised accompaniment upon a bass line in a genre that we know the viol was used in.[8] The speed of bass lines increased but a solid bass sound was required; because the speed increased, it makes sense to have a small nimble instrument, however, the amplitude would be much less in all gut strings, and the response slower on the shorter string length therefore wound strings might have seemed preferable and this factor remains for the modern viol player's choice of strings.

The first book of solostic viol music that was published in France was by Le Sieur De Machy (fl1655-1700), entitled *'Pieces de Violle en Musique et en Tablature'* published in 1685.[9] He said that the 7th string of the bass viol, said to have been added by Saint Colombe, was a fad that would pass. Nevertheless, he uses it frequently in the compositions in that publication. He provides us with some cultural context for the viol saying that the three common uses for the viol are providing an accompaniment whilst you sing,

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[7] Bertrand de Bacilly, *Remarques curieuses sur l'art de bien chanter* (Paris 1688)

[8] Michel Lambert *Airs de Cours'*(Paris 1669)

[9] Le Sieur De Machy *Pieces de Violle en Musique et en Tablature* (Paris 1685)

playing in consort and thirdly playing solo.[10] De Machy also believed that the viol was a chordal instrument and that playing only a melody line on it is like someone who plays a keyboard instrument very well but only with one hand. De Machy's pieces comprise danse movements and unmeasured preludes in the style 'brisé' which was popular in French lute and harpsichord music at the time. It means 'the broken style' and it's a general term for irregular arpeggiated texture in instrumental music of the Baroque period. The original French term is 'style luthé'.[11] This is in stark contrast to earlier consort music where each instrument has a single line. In order to play De Machy's pieces you need an equal response from the whole range of the instrument. Each string has to have an equal acoustic output and must feel similar under the bow and would be a factor to be addressed when choosing strings. The topic of 'equal tension' is a technical factor that we will return to later.

The earliest virtuoso viol players in France described by Mersenne (Harmony Universelle) as being 'the most excellent French Viola da Gamba virtuousi and improvisers of diminutions' were Nicolas Hottman (c1610-1663), teacher of DeMachy and Saint Colombe, and Andre Maugars (c1580-c1645). Ian Spink's article *'The Musicians of Queen Henriette Maria – Some notes and references in the English State papers'* refers to some documents that show Maugars having travelled to England along with the Queen and that he stayed there for two years.[12] Maugars was a musician to Charles I wife, and when they married, he came to England but returned to France, so there was possibly some transfer of musical influence. The playing of divisions was popular in England at that time. Simpson's *'The Division Viol or The Art of playing above a Ground'* was published in1659.[13] He described it as a manual instructing 'learners' how to improvise above a ground. The skill of the solo player improvising technically complex divisions over the ground must, therefore have been viewed as a desirable skill and perhaps

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[10] Le Sieur De Machy *Pieces de Violle en Musique et en Tablature* Preface (Paris 1685)

[11] David Ledbetter *Grove Music Online, style brisé,* The contemporary French term is 'luthé', used by François Couperin (see, for example, *Les charmes* from his ninth *ordre*) and others. This term refers to the transference of idiomatic lute figurations to the harpsichord. This is a marked feature of French music of the mid-17th century, being found, for example, in the harpsichord music of Louis Couperin and J.H. D'Anglebert. The unmeasured preludes of French harpsichordists of this period provide examples of the wholesale adaptation of such lute techniques to the keyboard.

[12] Ian Spink *"The Musicians of Queen Henriette Maria – Some Notes and References in the English State Papers" Acta Musicologica Volume 36* (April- Sept 1964) 177-178

[13] Christopher Simpson, *The Division Viol or The Art of Playing above a Ground'* (London 1665)

further led the way to the viol being seen as a solo instrument and requiring an adjustment to the stringing.

During Le Grand Siècle, in France there were a number a number of highly virtuosic players at court and King Louis XIV himself played the viol and it was a favourite instrument of both him and his brother Phillipe, so it was often played at court; utilised for solo music, chamber music and occasionally in the Petit Coeur of the opera band. His 'Ordinaire de la Chambre du Roy pour la Viole', Marin Marais, was the most prolific composer for viol. There can be no doubt that the opulence and grandeur of Versailles influenced the music. Hubert Le Blanc said Marais was the one who "founded and firmly established the empire of The Viol". He kept this title until 1725, when he retired and his son, Roland Marais replaced him.

Although there were notable composers writing diminution treatises in Italy, for example Ricardo Rognoni and Girolamo Dalla Casa, I haven't found evidence that they had an impact on French viol playing. Maugars, who could be considered as a seminal figure of viol playing in France, wrote a letter from Rome in 1639 saying "The viol is still recommended among them (the Italians); but I have not heard of any that should be compared to Ferrabosco of England."[14] Despite his Italian-sounding surname, Ferrabosco was born and lived in England and didn't have contact with his Italian father. Maugars goes on to say that although Ferrabosco's father had introduced the (lyra/division) viol to England from Italy, the "English viol-playing surpassed all nations".

Louis XIV was known to have a very ritualistic routine and would have music for various occasions at Versailles ranging from getting dressed in the morning, religious services, public ceremonies and entertaining himself and his courtiers[15]. There were three different sections of music at Versailles: The Chambre, The Chapelle, the Ecurie (a wind band for hunting) and the viol would have been utilised in the former.[16] There would have been various

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[14] Andre Maugars, "*Response faite a un curieux sur le sentiment de la musique de Italy, escrit a Rome" 1st October, 1639 Andre Maugars Celebre Jouer de Viole* Printed in Ernest Thoinan (Paris, 1865),p.32-34.

[15] Louis de Rouvroy, Duke de Saint Simon, *The Memoirs of Louis XIV., His Court and The Regency, The Project Gutenberg EBook of The Memoirs of Louis XIV., His Court and The Regency* Release Date: September 29, 2006 [EBook #3875] Last Updated: August 23, 2016.

[16] Pierre Robert was made '*compositeur de la musique de la chapelle et de la chambre du roi* ' after Gobert's death in 1672. He composed *Des Profundis Clamavi* ,Motets pour la Chapelle du Roi published by Christophe Ballard (1684). The 5 part instrumental writing of the music composed for the chapel is the same as that composed by Lully for his large scale works at the court and for the opera and there is a bass part so, although conjecture, it is possible that viols were used in music played in the chapel. Following the use of the violin the Petit Choeur of the opera, the viol may have had a similar role in the chapel accompanying smaller combinations of instruments and singers.James R. Anthony Grove Online, Pierre Robert.

different sizes of room and acoustic environment to work in, the King's chamber, Hall of Mirrors or an outside space where a ballet may have been performed. Gut strings were extraordinarily expensive, so it is likely that the musicians used a stringing that would work in both the smallest of the King's chambers and large spaces such as the Hall of Mirrors. There is no evidence that musicians had different types of instruments for different kind of spaces but neither is there evidence to the contrary except that in his letters to the Prince of Prussia, Forqueray mentions that his father had two instruments one for solo and one for continuo.[17] Although conjecture, it is likely that the majority of musicians would have one or maybe two different instruments at the most because the expense would preclude them having more.

Marais published five books of *'Livres' of Pieces de Viole'* and a couple of other books: Book I 20th August 1686 and the continuo published 1st March 1689, Pieces en Trio a separate book published in 20th December 1692, Book 2 of Pieces de Viole was published in 1701, Book 3 1711, Book 4 1717 and *'La Gamme et autres morceaux de symphonie'* in 1723 which comprised trios in an Italian influenced style, Book 5 in 1725. It can be assumed that expressions and rhetorical devices employed in the solo viol music were borrowed from the tradition of singing the 'Airs de Cour' since Mersenne wrote about how the viol should imitate the voice and the Air de Cour was the vocal music sung at the time.[18]

In the preface to the continuo of his first book, Marais says that he had intended to add the continuo parts, which were 'essential' but he remarks that "since engraving is a very lengthy undertaking", he had to delay the publication of the continuo. However, the Pieces are in the chordal style, similar to de Machy and are fully musically intelligible without the continuo part. A year before the continuo was published, Rousseau said 'Those pieces of Monsieur Marais, everyone is playing them."[19] It is possible that Marais originally did intend them to be solo pieces, hence the chordal texture but changed his practise in response to the popularity of the pieces

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[17] Forqueray's letters to the Prince of Prussia between 1767 and 1769, preserved amongst the papers of Prince Friedrich Wilhelm of Prussia; Geheimes Staatsarchiv Preussischer Kulturbesitz, Berlin, BPH Rep. 48 J Nr. 327.

[18] Mersenne wrote "If instruments are judged according to their ability to imitate the human voice, and if naturalness in art is esteemed the highest accomplishment, then the prize must surely go to the viol, which imitates the human voice in all its modulations, even in its most moving nuances of sadness and joy." translated from 'Harmonie Universelle' by Jaqueline Minette 1998 from the liner notes of Les Voix Humanes CD by Jordi Savall 1998.

[19] Jean Rousseau *Traite de la Viole* (1687) Quoted through *"The Sieur de Machy and the French Solo Viol tradition"* by Shaun Ng unpublished, 2008 p.46

and saw a further opportunity to make money from the publication. He could have just seen it as an opportunity to provide the players with an improved version since he did add some new pieces into the volume and having a continuo would allow players to play with their friends and fellow musicians which would enhance the pleasure. The pitch compass of the continuo, with the lowest note being a low AA, the lowest string on the 7 string viol, would suggest that he envisaged a bass viol playing that part although the frontispiece for Livre III has an illustration of a theorbo and a bass viol so both those instruments may have been possible as continuo instruments. In my opinion, the publication of the continuo book is the turning point of when the soloistic viol music went from being self-accompanied in the style luthé, to being more melodic but with integral continuo part.

Antoine Forqueray was a slightly younger contemporary of Marais and Hubert LeBlanc wrote in his *'Defense de la Basse de Viole'* that Marais played like an angel and Forqueray played like the devil.[20] Forqueray also played at Versailles; his unique and extraordinary technical skills on viol culminated in him playing before Louis XIV at the young age of 10. The king was so impressed that he thereafter paid for Forqueray's lessons and seven years later, appointed him a 'musicien ordinaire de la chamber du roy', a position that he held until the end of his life. He taught members of the royal family and aristocracy to bolster his income. There are no known publications that he made of his compositions but his son published a set of pieces claimed to be by Antoine in the preface but stylistically, they are much more modern and according to Dr. Lucy Robinson, it is likely that Jean Baptiste wrote the pieces himself since he was also a virtuoso who perhaps exceeded his father in technical ability.[21]

Many of the compositions of Marais and Forqueray are 'character' pieces portraying a mood of an individual or group, for example 'La Reveuse' (the dreamer), or 'Le Badinage' (the banter) and Forqueray named some pieces after other composers, for example 'La Rameau' and 'Le Couperin'. Unusually for the music of this period, the composers of viol music are very specific about markings in the music; there are many ornaments, bowings,

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[20] Hubert Le Blanc *Defense de la Basse de Viole* Amsterdam 1740 Quoted through "*A Viola da gamba Miscellanea: Articles from and inspired by Viol Symposiums*" by Christophe Coin edited by Susan Orlando The University Press of Limoges (2004) p.80

[21] Lucy Robinson, "*Forqueray Pieces de Violle Paris 1747: An Enigma of Authorship between Father and Son." Early Music* Vol.XXXiV, no.2 (2006). p. 259-276.

dynamics, articulation markings and expressions to help the player convey the rhetorical gestures within the piece.

This copperplate engraving of an Allemande from Livre III by Marin Marais (fig 1)is a good example of the frequent and various detailed instructions or embellishments, the French term for these is ‘agreements’.

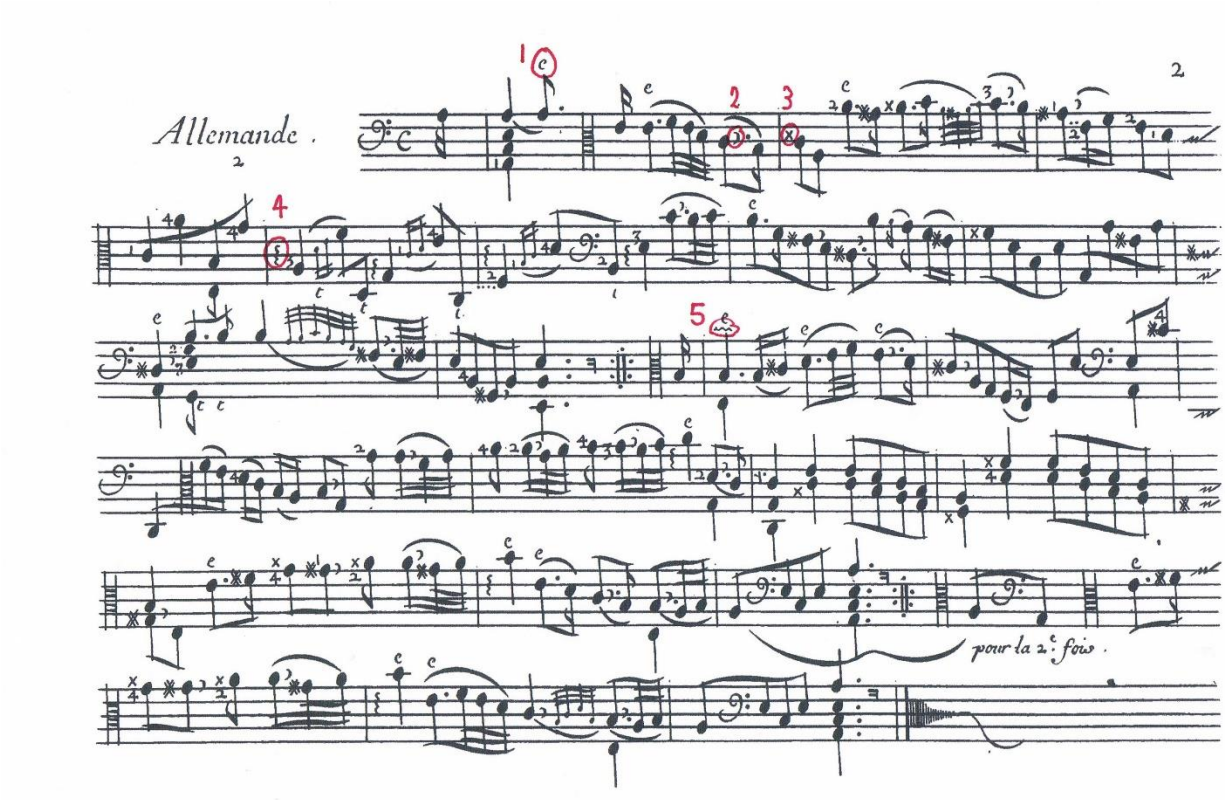


Figure 1: Engraving of ‘Allemande’ from ‘Pieces de Viole Livre III’ by Marin Marais

Figure Key to the ornaments
These are Marais’ own instructions as given in the prefaces. All of these exceot for the enflee are from the Preface to Livre I. The enflée instruction is from the Preface to Livre III.
1 enflee/expression – signifies that it is necessary to express, or swell the bowstrike, by pressing more or less upon the string according as the piece demands it, and this sometimes at the start of the beat or on the value of the dot, just as the mark indicates it. In this manner ones gives soul to the pieces, which, without this, would be too monotonous or uniform.
2 Tremblement – A trill or inverted mordant
3 Batement – A mordant
4 Plainte – The plainte is usually made with the little finger by rocking the hand.
5 flatement/pince – a two fingered vibrato

My aim as a player and performer of the French repertoire by Marais, and Forqueray and others is to interpret their music with a great range of emotion and subtlety to move the audience and convey the beauty and

depth of feeling of the music to give it the 'soul' that Marais suggests in the footnote about the enflee. A stringing is needed that provides the entire palette of sound required and this is something that I am looking to find for my instrument and what prompted me to become a string maker.

Le Blanc mentions that Marais played with his bow most of the time in the air and his left hand shifted around a lot - in contrast, the style of both Antoine and Jean Baptiste Forqueray employed 'imperceptible joins between bow strokes and favoured going across over the strings in the left hand rather than shifting around. Evidence for this is also provided in Jean Baptiste Forqueray's letters instructing the Prince of Prussia in how to play the viol.[22]

The different methods of expression employed by Marais Antoine and Jean-Baptiste Forqueray to perform their music had implications for their choice of stringing and it remains a factor for performers today, the evidence for which I will explore further in the next chapter.

It is evident that during the period between the mid-17th century and the first half of the 18th century in France, the viol was coming to the fore as a solo instrument alongside its role as a continuo instrument. There were a number of virtuosic viol players and composers in France whose music became popular and fashionable and enjoyed the patronage of Louis XIV who played the viol himself and included it prominently in the music performed at Versailles. The subtlety of the music written for viol during this period required responsive strings and with the introduction of wound strings the choices of stringing were widened.

[22] Forqueray's letters to the Prince of Prussia between 1767 and 1769, preserved amongst the papers of Prince Friedrich Wilhelm of Prussia; Geheimes Staatsarchiv Preussischer Kulturbesitz, Berlin, BPH Rep. 48 J Nr. 327.

Chapter 2 Technical plus aesthetic evidence contemporaneous sources on instrument making and on string making with attention paid to bridge design.

Throughout history, developments in string technology have had two main effects on instruments. First, the pitch ranges of various instruments are increased and the second being that the sizes of instruments get smaller for a given tuning or pitch. Simpson described the division viol as being smaller than the consort bass, and Rousseau's treatise suggests that there was a general trend in England to reduce the size of the viol.[23]

In this section I will refer to a variety of sources: primary, secondary as well as some paintings and illustrations which raise some interesting questions relating to strings. Some of these sources relate information about a various strung instruments and others are more specific to the viol.

I will begin by introducing a "Timeline of String Developments" (Figure 1) drawn up by George Stoppani and Oliver Webber of 'Real Guts', a collaboration which began in the 1980s in Manchester, working towards reproducing high twist gut strings based on primary sources. This is a general string technology timeline of strings for all instruments.

On the timeline in 1500, figure 2, there is evidence such as the lute gaining a 6th course points towards an advance in the construction of highly twisted bass strings yielding a lower elastic modulus as well as lute tablature appearing which is written on six staves, one representing each string. Two examples are Francesco Spinnacino's *'Intabolatura de Lauto'* published by Ottaviano Petrucci in 1507 and Giovanni Maria Alemanni's *'Intabolatura de Lauto III'* also published by Petrucci, in 1508.

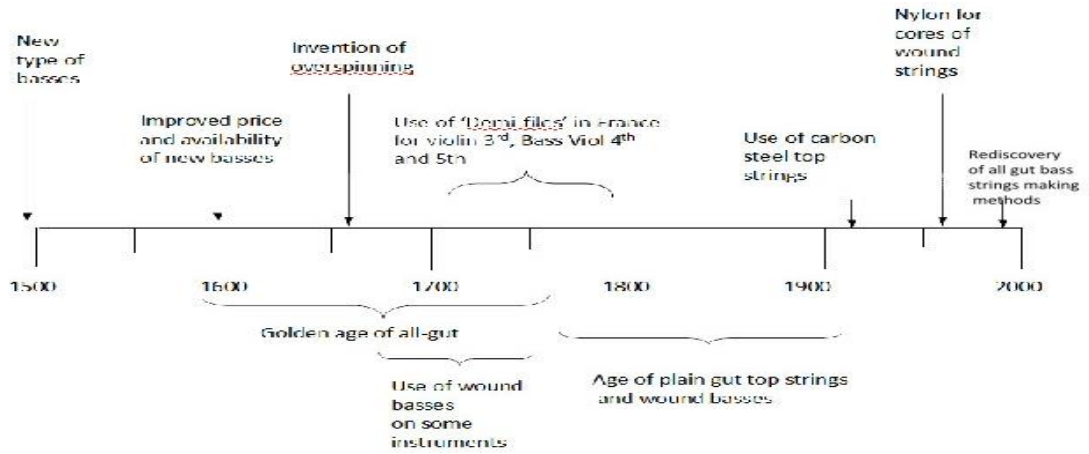
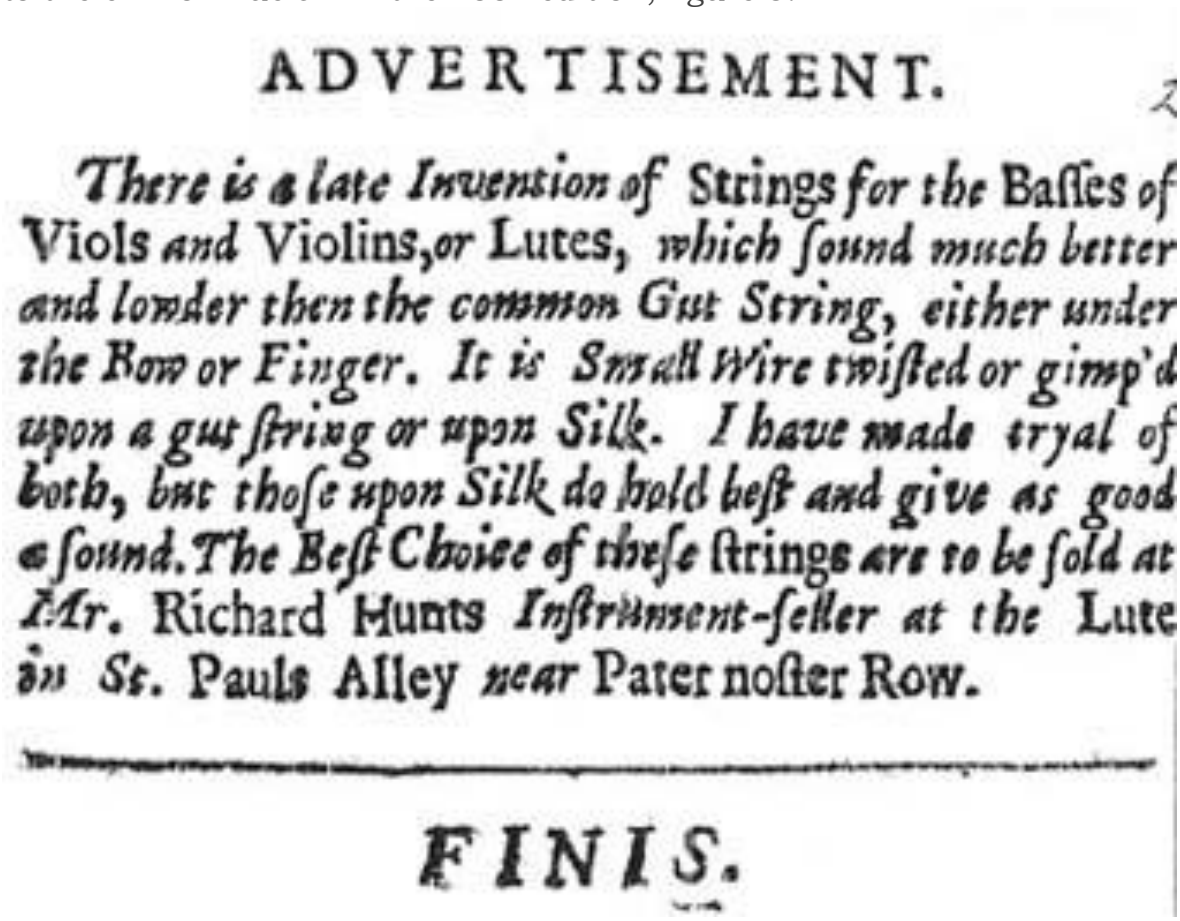


Figure 2: Timeline of String Developments for various instruments

[23] Christopher Simpson, *The Division Viol* (London 1665), Jean Rousseau *'Traite de la Viole* (Paris 1687)

The first mention of overspun or wound strings is from '*Ephemerides'*, a set of note books with new scientific discoveries assembled by Samuel Hartlib in 1659.[24] He was a great 17th century man of science and set out to record all human knowledge to make it available to all levels in society for the purposes of education. He mentions '*Goretsky hath an Invention of Lute strings covered with Sylver wyer or strings which make a most admirable musick. Mr [Robert] Boyle.'* A few days later he mentions *'String of Guts done about with Silver-wyer makes a very sweet musick being of Goretsky's invention.* It is closely followed by an advert in John Playford's 'Introduction to the skill of musick' in the 1664 edition, figure 3.[25]



ADVERTISEMENT.

There is a late Invention of Strings *for the* Baſſes *of* Viols *and* Violins, *or* Lutes, *which ſound much better and lowder then the common Gut String, either under the Bow or Finger. It is Small Wire twiſted or gimp'd upon a gut ſtring or upon Silk. I have made tryal of both, but thoſe upon Silk do hold beſt and give as good a ſound. The Beſt Choice of theſe ſtrings are to be ſold at Mr.* Richard Hunts *Inſtrument-ſeller at the* Lute *in St.* Pauls Alley *near* Pater noſter Row.

FINIS.

Figure 3: Advertisement from John Playford's publication' Introduction to the skill of musick. 1664 edition.

[24] Samuel Hartlib *Ephemerides (*University of Sheffield, 1659)

[25] John Playford *Introduction to the skill of Musick* Playford was a music publisher based in London,1664.

With the first mentions of wound strings being in England, it is surprising to find that they don't seem to have caught on very quickly there. James Talbot, an English writer on Music and Regius Professor of Hebrew at Cambridge wrote a manuscript circa 1690, (Christchurch Library Music Manuscript 1187), latterly known as '*The Talbot Manuscript'*, which lists the measurements of various instruments as well as other miscellaneous information and he makes very scant mention of wound strings, only as an alternative to all gut.[26]

There is evidence of the use of wound strings in France by 1687. According to Jean Rousseau, a French viol player, pupil of Sainte Colombe, composer, music theorist and author (1644-1699) in his *'Traite de la Viole* '(1687), Sainte Colombe is generally credited with introducing wound strings to France as well as for the addition of the 7th string to the bass viol.[27] He wrote "It is also to Monsieur de Sainte Colombe that we are obliged to for the addition of the 7th string which he added to the viol and of which he has thereby increased the range of by a fourth. It is he who has put the silver spun strings into use in France, and who is continually striving to find all that is capable of adding greater perfection to this instrument, if it is possible."

The invention of the Basse de viole of 7 strings was entirely dependent on the invention of metal wound strings a few years prior. This is one of the few instances of wound strings being used to increase the range of an instrument, the other being the viola d'amore 7th string most likely added in Austria. The earliest surviving unaltered instruments are from Austria, specifically the Salzburg region and can be seen in the Salzburg Museum.

The earliest surviving 7 string bass viol is by Michel Colichon, 1683. It is worth noting that Rousseau lodged at Colichon's workshop and Sainte Colombe and De Machy were also frequent visitors there, although they had different opinions in relation to the viol. In the preface of De Machy's book, he is critical of Sainte Colombe's innovations in left hand technique.[28]

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26 James Talbot, an English writer on Music and Regius Professor of Hebrew at Cambridge wrote a manuscript circa 1690, (Christchurch Library Music Manuscript 1187), latterly known as '*The Talbot Manuscript'*

[27] Jean Rousseau *Traite de la Viole* (Paris 1687)

[28] Le Sieur De Machy *Pieces de Violle en Musique et en Tablature* (Paris 1685).

It is likely that the French were also the first to use more than one wound string on any instrument, improving the timbre of already existing strings, and the first to use open-wound strings; the first mention of demi-filés is by Sebastian de Brossard in 1708 in fragments of an unpublished violin treatise kept at the Bibliotheque Nationale de France, Musique (F-Pn):RES VM8C-1.[29] I haven't found any mention of demi-filés in any country outside of France in relation to bowed instruments. Brossard wrote "…it (the D string relative to A string) must be at least double the size of the second if it is purely of gut, but if it is half wound with silver, as is nearly always done at present, it is no bigger than the second. Finally, the string next to the 3rd…I call the 4th, or more commonly the Bourdon because it makes the lowest or biggest sound. If it is purely of gut it must be at least twice as big as the 3rd, but if it is completely wound with silver it is only a very little thicker than the 3rd."

Another source is Titon du Tillet, (1677-1762) who is best known for his biographical chronicle *'Le Parnasse Francois'*.[30] He was based in Paris and was a secretary of the King and General Manager of the Armouries under Louis XiV. He mentions that 'Marais was the first to imagine adding brass windings to the three bass strings to make the viol more sonorous', However, his use of the work 'imagine' does not make it clear whether such strings were actually made or speculated about.

There are also French paintings of the period showing multiple wound strings. These paintings that could give some indication of the stringing used at the time. The earliest painting showing what seem to be wound strings is a painting by Domenico Gabbiani c. 1685 entitled *'Musicians at the Court of Crown Prince Ferdinando di Medici'* now at The Museo di Strumenti Musicale(Figure 4).[31] The painting depicts a group of musicians positioned around a harpsichord, one to the left is playing a bass violin and there are three other smaller bowed instruments. The lowest string of the Bass Violin appears to be wound. Only one of the other instruments fully and that appears to be all gut.

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[29] Sebastian de Brossard *Unpublished violin treatise* kept at the Bibliotheque Nationale de France, Musique (F-Pn):RES VM8C-1. (1708)

[30] Evrard Titon du Tillet *'Le Parnasse Francois' A biographical chronicle, (*Paris.1732)

[31] Domenico Gabbiani painting entitled *'Musicians at the Court of Crown Prince Ferdinando di Medici'* now at The Museo di Strumenti Musicale. (c.1685)

Figure 4: Domenico Gabbiani painting entitled *'Musicians at the Court of Crown Prince Ferdinando di Medici'* now at The Museo di Strumenti Musicale c. 1685

There is an engraving by Nicholas Bonnart, a French, Paris-based printmaker entitled *'Recueil des modes de la cour de France. Habit de Ville, Gentleman of Quality playing the bass viol'*(fig 5*)* currently in Los Angeles County Museum of Art. Google Arts and Culture date it circa 1664-1675. He made engravings of many people from the court including the King as well as musicians. These engravings are detailed but stylised illustrations rather than portraits that achieve a near photographic likeness. This is possibly the earliest iconographical source depicting such an instrument. It is interesting to note that the four bowline knots on the upper strings seen in this engraving imply that there were already three wound strings, even in such early days of the technology.

Source gallica.bnf.fr / Bibliothèque nationale de France

Figure 5: Nicholas Bonnart *'Recueil des modes de la cour de France. Habit de Ville, Gentleman of Quality playing the bass viol'* an engraving, currently in Los Angeles County Museum of Art. 1675

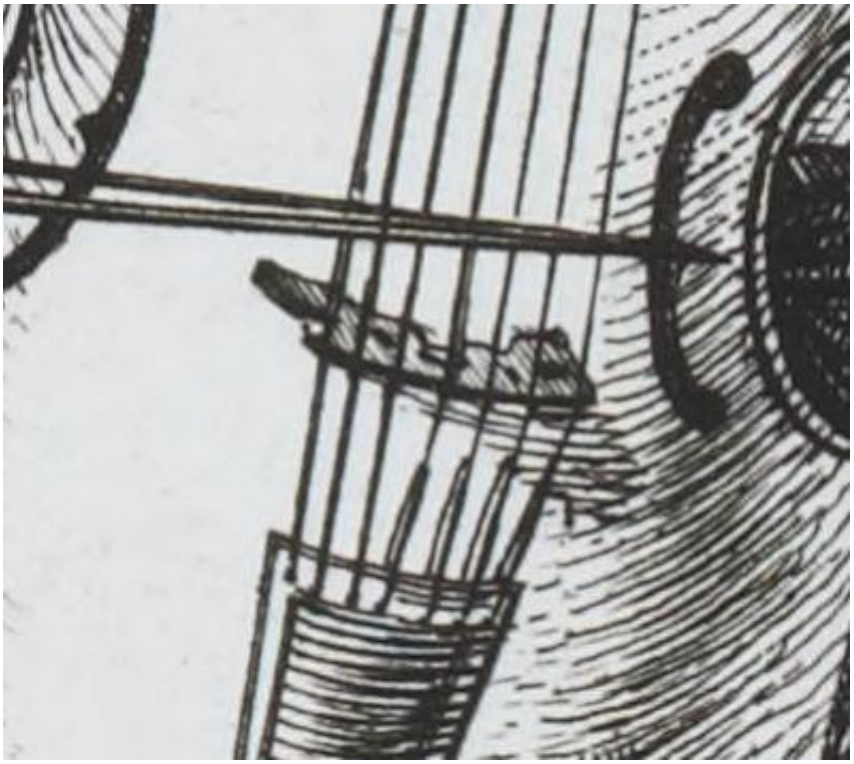


Figure 6 Nicholas Bonnart Detail from *'Recueil des modes de la cour de France. Habit de Ville, Gentleman of Quality playing the bass viol' an engraving* currently in Los Angeles County Museum of Art. 1675.

It is likely that the illustration does show the three lowest strings to be wound while showing the upper four knotted because an all gut string at that low pitch and string length would be so thick that it would produce little to no sound, and would dampen the sound of the other strings.

There are two paintings by different artists that suggest the same stringing choice for the bass viol by each player. The first is a portrait of Jean Baptiste Forqueray by Jean Martial Fredou (1737)(fig 7) owned by the Forqueray family and a painting entitled 'La Barre and other musicians' by Andre Bouys c. 1710 in the National Gallery, London. Both portraits are realistic representations and attention is paid to the details of the instruments. The viewer would expect to see accuracy in the accuracy paid to details by the artist and over time we would hope to learn about the practices of stringing and instrument makers as well as the players.

Figure 7: Jean Martial Fredou, painting *Portrait of Jean Baptiste Forqueray*. In the collection of the Forqueray family (1737).

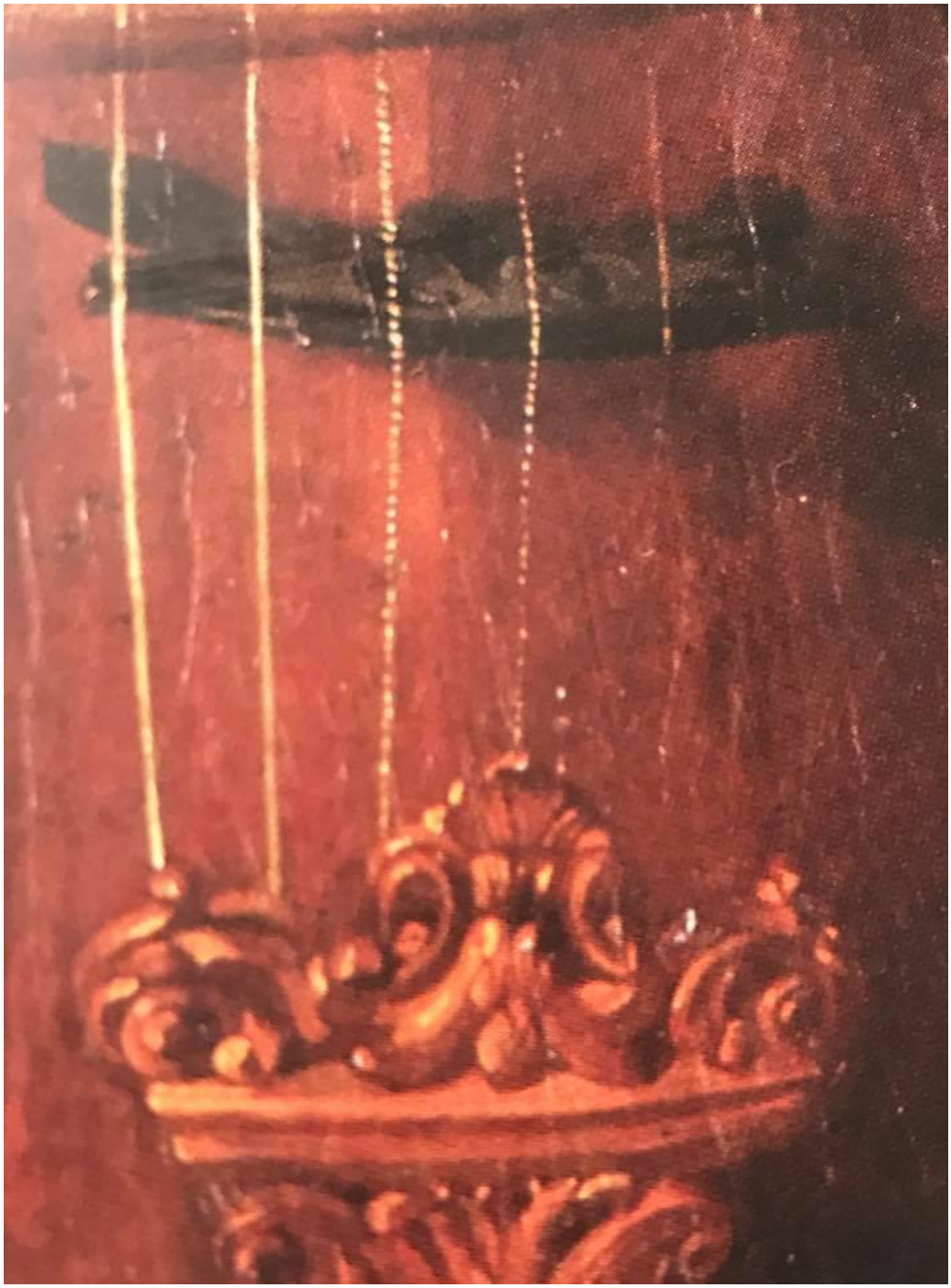


Figure 8: Jean Martial Fredou painting, Detail from portrait of Jean Baptiste Forqueray. In the collection of the Forqueray family, 1737.

In the painting of Forqueray by Fredou, (fig.7) it looks like there are four wound strings; a close wound 6th, 7th and half wound 4th and 5th. Wound strings are necessary for the long slurred runs on the low strings utilised by these composers, as all gut strings require a sharper attack to set in motion and this remains an important factor for the modern player's choice of stringing today.

Interestingly, in Jean-Baptiste Forqueray's letters to the prince of Prussia from a few years later, he mentions that only the 4th string should be demi-filé, and the 5th, 6th, and 7th should be fully wound.[32]

Figure 9: Painting entitled *'La Barre and other musicians'* by Andre Bouys c. 1710 in the National Gallery, London.

[32] Forqueray's letters to the Prince of Prussia between 1767 and 1769, preserved amongst the papers of Prince Friedrich Wilhelm of Prussia; Geheimes Staatsarchiv Preussischer Kulturbesitz, Berlin, BPH Rep. 48 J Nr. 327.

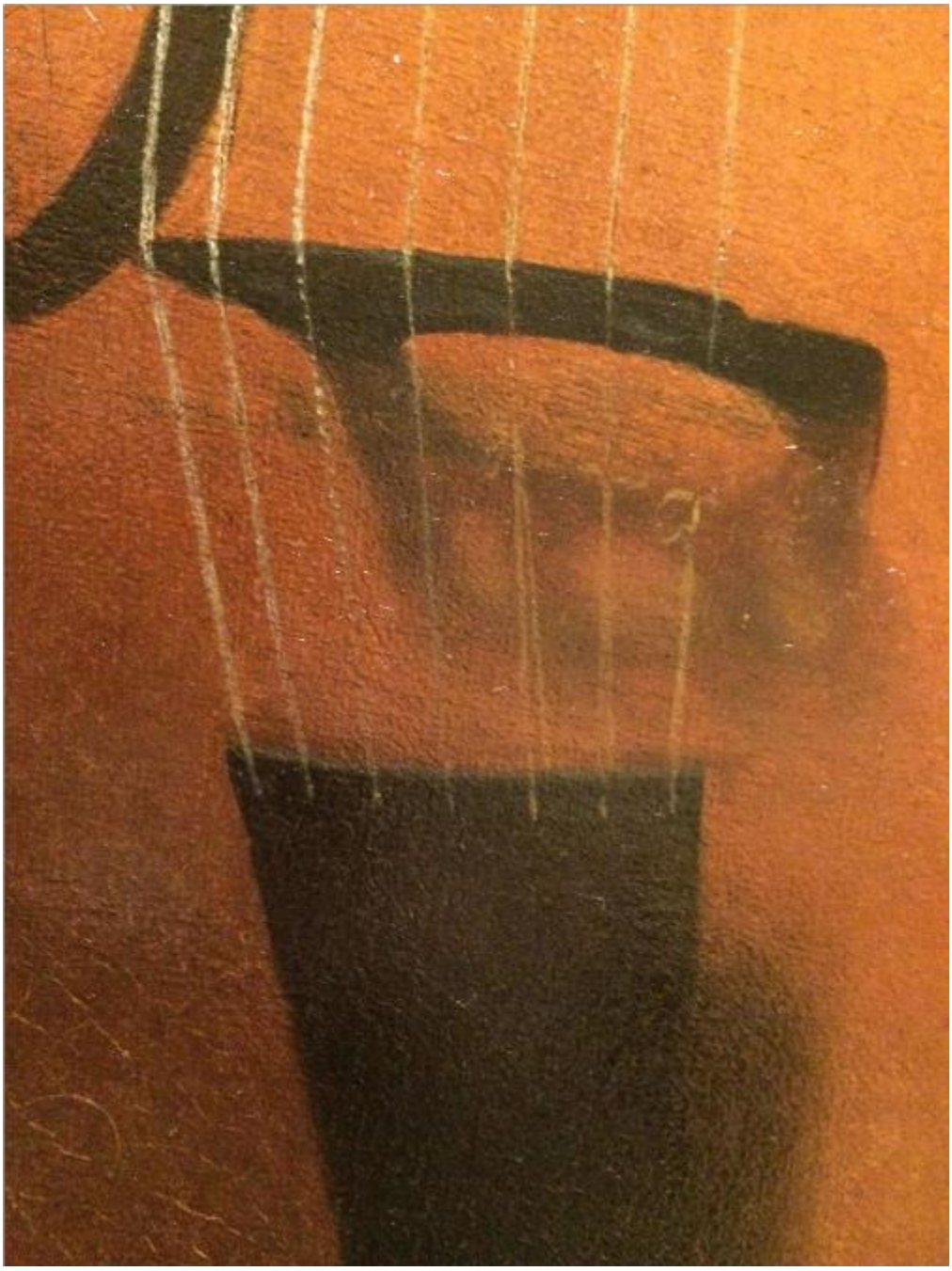


Figure 10: Photograph of detail from painting entitled 'La Barre and other musicians' by Andre Bouys c. 1710 in the National Gallery, London. A recent photograph taken by me.

Figure11: Jean Dieu de Saint-Jean *'Portrait of the young Marais'* Chateau de Blois c.1685

In the portrait of the young Marais by Saint Jean (fig. 11), he appears to employ two close wound strings at the bottom and all gut 4th (the 5th string is unclear). This is backed up by Titon du Tillet's statement. The portrait of Jean Baptiste Forqueray by Fredou, shows two close wound strings at the bottom and two demi files on the 4th and 5th, and this stringing also appears in a painting reputedly depicting Antoine Forqueray by André Bouys. Marais may have found the smooth surface of the close wound bass strings and the all gut 4th preferable because he was shifting around so much in his technique whereas Antoine and Jean-Baptiste Forqueray wouldn't have had

a problem with shifting because their technique didn't often employ it on those strings, and the faster response of the demi filés would have aided the imperceptible bow changes. Due to the left hand technique employed Antoine and Jean-Baptiste Forqueray, high positions on low strings particularly the 4th and 5th are very common, so the wound 4th sounds much clearer than the thick all gut equivalent being stopped so short.

There is a limit to how much once can be sure of regarding the depictions of the strings in these images because they are representations rather than photographs there could be some artistic licence or inaccuracy by the artist but they do provide some indication of trends in stringing choice. Nevertheless, it appears that wound strings were utilised by Marais and Forqueray, both close wound and demi file. They were the leading pedagogues of their generation and so it is likely that they had influence on the string choices of other players.

The detail gleaned from these primary textual sources and visual sources does highlight that string choice was a very important factor for viol player of the French repertoire to consider for the 7 string bass viol and there was evidently more than one historically viable choice of string type for the 4th and 5th string on the viol. Another factor, however, is which diameter or tension of string to choose, which brings us on to the question of 'Equal Tension'.

Until at least the mid18th century, various sources mention 'Equal tension' as the mode of stringing. These include the following:

Author	Title	Date	Country
Robert Dowland, (son of John Dowland)	*'A Variety of Lute Lessons'*	1610	England
Marin Mersenne	*'Harmonie Universelle'*	1636	French
Thomas Mace	*'Musick's Monument'*	1676	England
Serafino di Colco	*'Equal Tension Diagram'* fig. 12	1690	Italy
Johann Philipp Eisel, a lawyer, cellist, composer	*'Musicus Autodidactus'* about the construction of instruments & playing of music during the first half of the 18th century.	1738	Germany
Leopold Mozart	*'Versuch eine Gründlichen Violinschule'*	1756	Austria/Germany

Serafino di Colco wrote in 'Lettera prima' "The strings are adjuste to the violin as seen in the illustration (fig. 12) A.B.C.D.are stretched and pulled by equal weights, E.F.G.H. If upon touching them or playing them with the bow, they form a perfectly tuned violin, they are perfectly proportioned, otherwise, one must change them many times, until the tuning remains in 5th, two by two, which is exactly the tuning of the violin."[33] This is illustration in the illustration below (fig. 12).

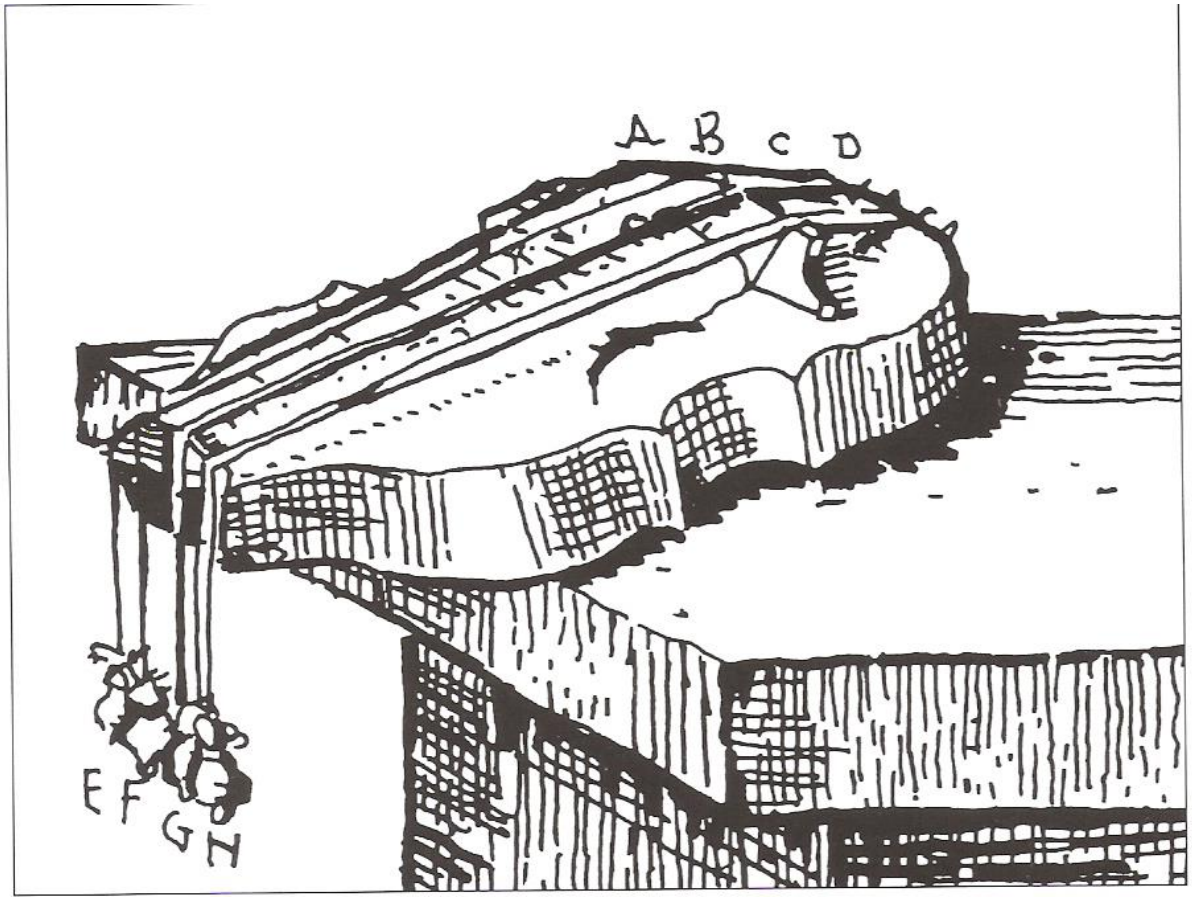
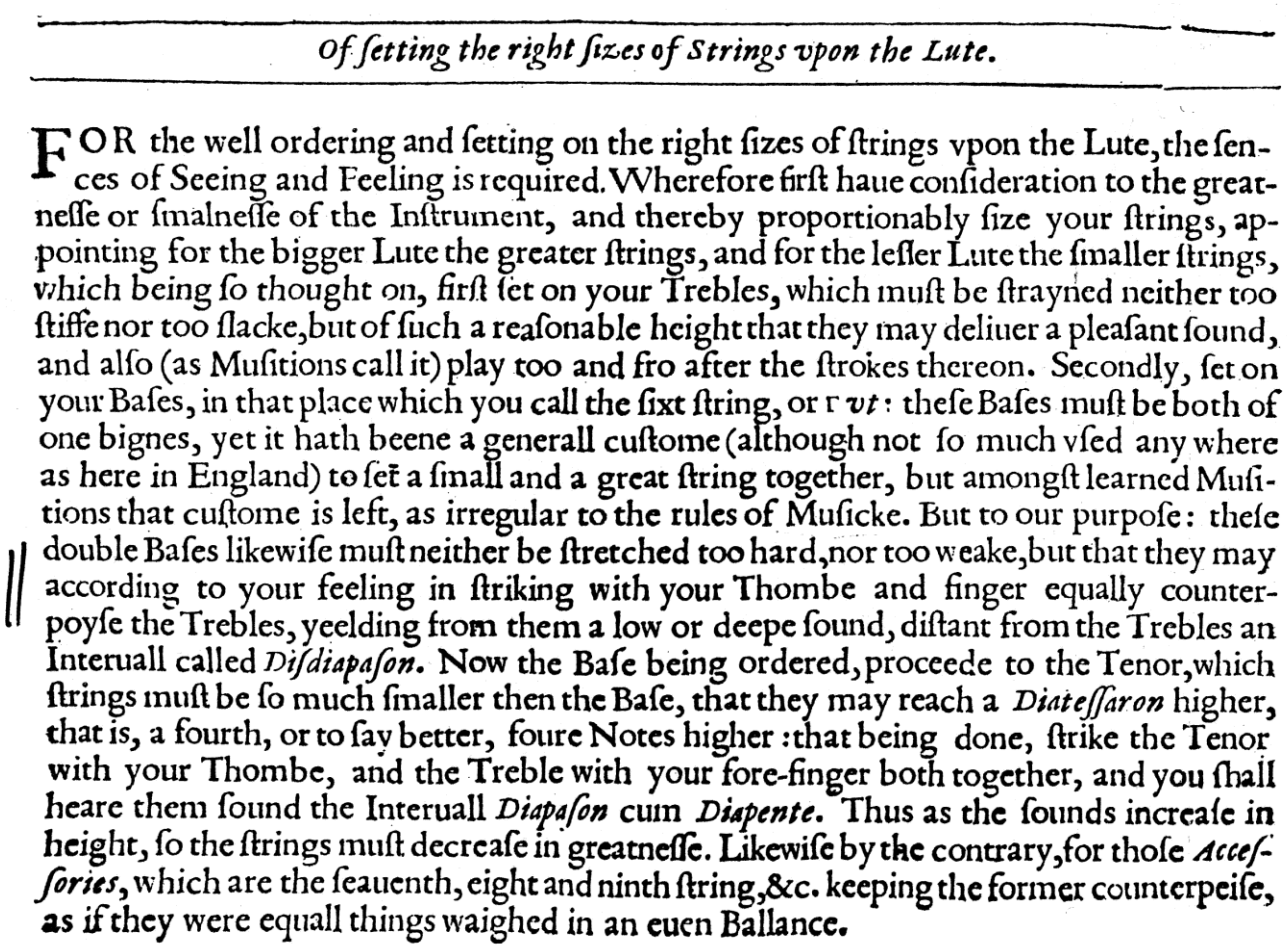


Figure 12. Serafino di Colco, Diagram to illustrate 'Equal Tension' from *Lettera prima'*(Venice, 7th January 1690), in le Vegghie di Minerva nella Accademia de Filaretti (Venice 1690), page 32-33. Courtesy of Mimmo Peruffo

[33] Serafino di Colco '*Lettera prima'* (Venice, 7th January 1690), in le Vegghie di Minerva nella Accademia de Filaretti (Venice 1690), page 32-33.

Figure 13: John Dowland, *A Variety of Lute Lessons*, 1610



Of ſetting the right ſizes of Strings vpon the Lute.

FOR the well ordering and ſetting on the right ſizes of ſtrings vpon the Lute, the ſences of Seeing and Feeling is required. Wherefore firſt haue conſideration to the greatneſſe or ſmalneſſe of the Inſtrument, and thereby proportionably ſize your ſtrings, appointing for the bigger Lute the greater ſtrings, and for the leſſer Lute the ſmaller ſtrings, which being ſo thought on, firſt ſet on your Trebles, which muſt be ſtrayned neither too ſtiffe nor too ſlacke, but of ſuch a reaſonable height that they may deliuer a pleaſant ſound, and alſo (as Muſitions call it) play too and fro after the ſtrokes thereon. Secondly, ſet on your Baſes, in that place which you call the ſixt ſtring, or *vt*: theſe Baſes muſt be both of one bignes, yet it hath beene a generall cuſtome (although not ſo much vſed any where as here in England) to ſet a ſmall and a great ſtring together, but amongſt learned Muſitions that cuſtome is left, as irregular to the rules of Muſicke. But to our purpoſe: theſe double Baſes likewiſe muſt neither be ſtretched too hard, nor too weake, but that they may according to your feeling in ſtriking with your Thombe and finger equally counterpoyſe the Trebles, yeelding from them a low or deepe ſound, diſtant from the Trebles an Interuall called *Diſdiapaſon*. Now the Baſe being ordered, proceede to the Tenor, which ſtrings muſt be ſo much ſmaller then the Baſe, that they may reach a *Diateſſaron* higher, that is, a fourth, or to ſay better, foure Notes higher: that being done, ſtrike the Tenor with your Thombe, and the Treble with your fore-finger both together, and you ſhall heare them ſound the Interuall *Diapaſon* cum *Diapente*. Thus as the ſounds increaſe in height, ſo the ſtrings muſt decreaſe in greatneſſe. Likewiſe by the contrary, for thoſe *Acceſſories*, which are the ſeauenth, eight and ninth ſtring, &c. keeping the former counterpeiſe, as if they were equall things waighed in an euen Ballance.

A calculated 'Scaled' tension (where each string progressively decreases in tension towards the bottom of the instrument) is not mentioned until Count Giordano Riccatti does so in 1767. There is however some confusion at this current time regarding the matter of Equal tension, and a false dichotomy has formed between this and the so called 'equal feel' that is mentioned in some treatises such as Dowland and Mace; with well-made strings, these are one and the same thing. Confusion is caused because the art of making suitably flexible bass strings has only relatively recently been rediscovered .To achieve True equal tension, the top string must be very slightly higher in tension than the rest of the strings; this is because a thin string near its breaking point will reduce in diameter slightly after it has been taken up to pitch. The effect is much less prominent on thicker strings,

and therefore the result is that all strings will end up with the same amount of tension.

Some of the only known surviving gut bass strings that have been reliably dated to the 18th century are on a bass by Zancker, circa 1700 shown in the illustration below; a close up of the Zancker strings, figure 14. The diameters of the two strings that have been dated to the mid-18th century are 4.5mm and 7mm, which would result in either equal tension, or in fact slightly higher tension on the bottom string, depending on the tuning.

Figure 14: Strings on18th Century bass by Zancker circa 1700 – Photo courtesy of Oliver Webber, at the Berlin Musik Instrument Museum 2006.

The only gauge information for viols we have is for the first string of the Pardessus. Fouchetti (1770) says that the first string of the Pardesssus is the same as the first of the Mandolin, and Angelucci tells us around 1760 that the 1st string of the mandolin should consist of two strands of gut, which in practice results in strings in a range of diameters between 0.52-0.54mm. We must bear in mind that this stringing is probably intended for the low French pitch of a=392. If we scale this up to a bass viol, then the theoretical diameter of the top string would be around 0.82-0.85mm. This would appear to agree with Talbot's equivalents, If we bear in mind Raguenet's statements about French violin strings being thinner than that of the Italians, whose top strings were between 0.71- 0.74 according to several different sources, including Riccatti (1767).

Another point to bear in mind is that strings were not sold by diameter in the past as they are now, but by the number of gut strands in a string. This is because there was no method of controlling the diameter via polishing as there is today, and therefore the diameter is variable. This may be what Rousseau means by using strings 'as thin as possible' – He may have meant for example a violin A of 5 strands, but as thin as possible, which would result in a top string around 0.80mm-0.82mm at the thinnest, which although probably wouldn't have actually been used by violinists at the time, being thin by their standards, would have made a perfect bass viol

top string. An interesting parallel to this situation is Paganini, who when asking a friend in Naples to collect some violin strings for him said the following in a letter written 31st July 1829;

"I need a favour to be done with care and solicitude. I am without chantarelles. Even if they are very thin, they must be made of four strands to endure. Make sure the string is smooth, even and well-stretched. I beg you to keep an eye on the makers and to do this soon and well".[34]

Surviving 'e' strings owned by Paganini and kept in the museum in Genoa, measure around 0.70mm-0.72mm, incredibly high tension by today's standards and higher than those used by similar sized viols in the 17th century, as they were made possible by the use of wound strings, and later, demi-filés. The gauges of the Paganini Strings were 0.7mm for the 'e', 0.88mm for the 'a' 1.16mm for the 'd' and there was no 'g' string, as that would have been wound.

This historical evidence is an important factor to be considered as it suggests that the modern player should try using thicker strings than have been commonly used in recent decades. It is difficult to say what implications this would have for bridge design since Master luthier and viol expert Shem Mackey[35] told me recently that, there are very few surviving bridges from that period and iconography from that time is often not clear enough for the modern luthier to copy. There are a few 18th century French Bridges from viols with joined up sides and this does seem to work well in combination with wound strings as it provides a lot of high harmonics to the sound but it cannot be said for sure what stringing was used on those bridges.

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[34] Edward Neill: *Niccolo Pagannini; Registro di Lette*re, 1829, Graphos, Genova 1991, page 80.

[35] Shem Mackey is Musical Instruments Master Tutor at West Dean College He is an honorary life member of the BVMA. He is a QEST scholar and a Churchill fellow. In 2016 he was recipient of the Fattorini award for excellence in British craftsmanship.

Chapter 3 Techniques in string manufacture today, including my own experience of re-creating the strings and ideas of how strings influence performance decisions today, including experimentation and research

Since the commencement of my study in viola da gamba at the Mozarteum, I have had the opportunity to build upon my earlier research into string-making and stringing choices for the instrument. Other members of the faculty have been keen to take part in experiments using different string types, diameters and tensions in order to explore the benefits and disadvantages of the choices and how this can be best applied to their performances in different ensembles, playing different styles of the repertoire in both solo and group performances.

In the modern revival of music for viola da gamba and other historical bowed instruments such a viola d'amore, baryton, and violin family instruments, we have the physical evidence of the instruments but the properties of the strings we have are very different from those that were available historically as the tradition of making strings was broken in the twentieth century due to the First World War, when craftsmen were required to focus all their energies into providing surgical sutures, if they weren't required to fight. These require vastly different physical properties to musical strings. Tensile strength and completely sterile material was required, whereas instruments had been designed to use strings of a lower elastic modulus in the past.

When the early music revival started, in the early Twentieth Century, the only gut that was available was either surgical gut or badminton racket gut. Due to its stiffness, only thin diameters could be used as otherwise the string would be inharmonic and would not sound. Thin gut strings were commonly used for the upper strings at this time and these were made of split beef or split sheep gut.

I became involved in string-making at the age of sixteen, having visited Northern Renaissance Instruments (NRI) in Manchester to purchase a bespoke all gut 4th string for my bass viol. The company was founded in the 1970's by Dr. Eph Segerman and Djilda Segerman (née Abbott), two scientists who had a passion for early music and wrote carried academic research into instrument set-up and historical performance practice using a scientific method. NRI became a world-leader in the field.

When I began working there, instrument and varnish making was no longer undertaken but string-making continued for a range of early instruments. When NRI started it wasn't possible for them to source raw gut for string-making. String made from beef serosa was therefore utilised and

for thick strings these were hydrated and twisted together like a rope to form a 'catline'. This was the first modern attempt at re-constructing thick all gut bass strings for instrument such as viols, lutes and violins. Using the rope construction, of twisting the strands together under tension on a hook, using a hand drill, and then leaving them to dry under tension using springs on a metal frame rack, a low elastic modulus was achieved without using metal wire and this was an important step which other attempts were built upon. The problem with these strings is they were ridged, like a rope and so uncomfortable to play on and this did not match up with historical descriptions of strings such as those by Dowland and Mace where the qualities of good gut strings for musical use are described as being smooth, well-twisted and translucent. These catlines could only be made smooth by a modern polishing process which also weakened them and caused them to go hairy after a short time.[36]

Further advancements in the Manchester vicinity were made by the luthier George Stoppani and the professional baroque violinist Oliver Webber and in Italy by Mimmo Peruffo, founder of Aquila Pure Corda. They were the first to study historical descriptions of the string-making process from sources including Philip Skippon 'An account of a journey made thro' part of the low countries, Germany, Italy, and France', Diderot's 'Encyclopedia', the Bachmann Encyclopedia and secondary sources Patrizio Barbieri's 'Roman and Neopolitan gut strings 1550 to 1950', and tried to replicate it based on the available information, from wet gut.[37] A rope construction was still utilised but the use of various chemical baths and the availability of fresh raw gut from a supplier of sausage casings allowed strings to be made smooth but flexible for use on the aforementioned instruments.

[36] These comments about problems with modern catlines is not from a written source, it is verbal advice from Dr. Eph Segerman which formed part of my practical training as a string maker at Northern Renaissance Instruments, which began in 2013.

[37] Philip Skippon *An account of a journey made thro' part of the low countries, Germany, Italy, and France, (*London 1732)

Diderots 'D'alembert *Encyclopedia articles on "Boyaudier"* (Paris 1752) *and "Lutherie"* (Paris 1765)

Alberto Bachmann *An Encyclopeadia of the Violin* (New York 1925)

Patrizio Barbieri *Roman and Neopolitan gut strings 1550 to 1950* (JStor 2006)

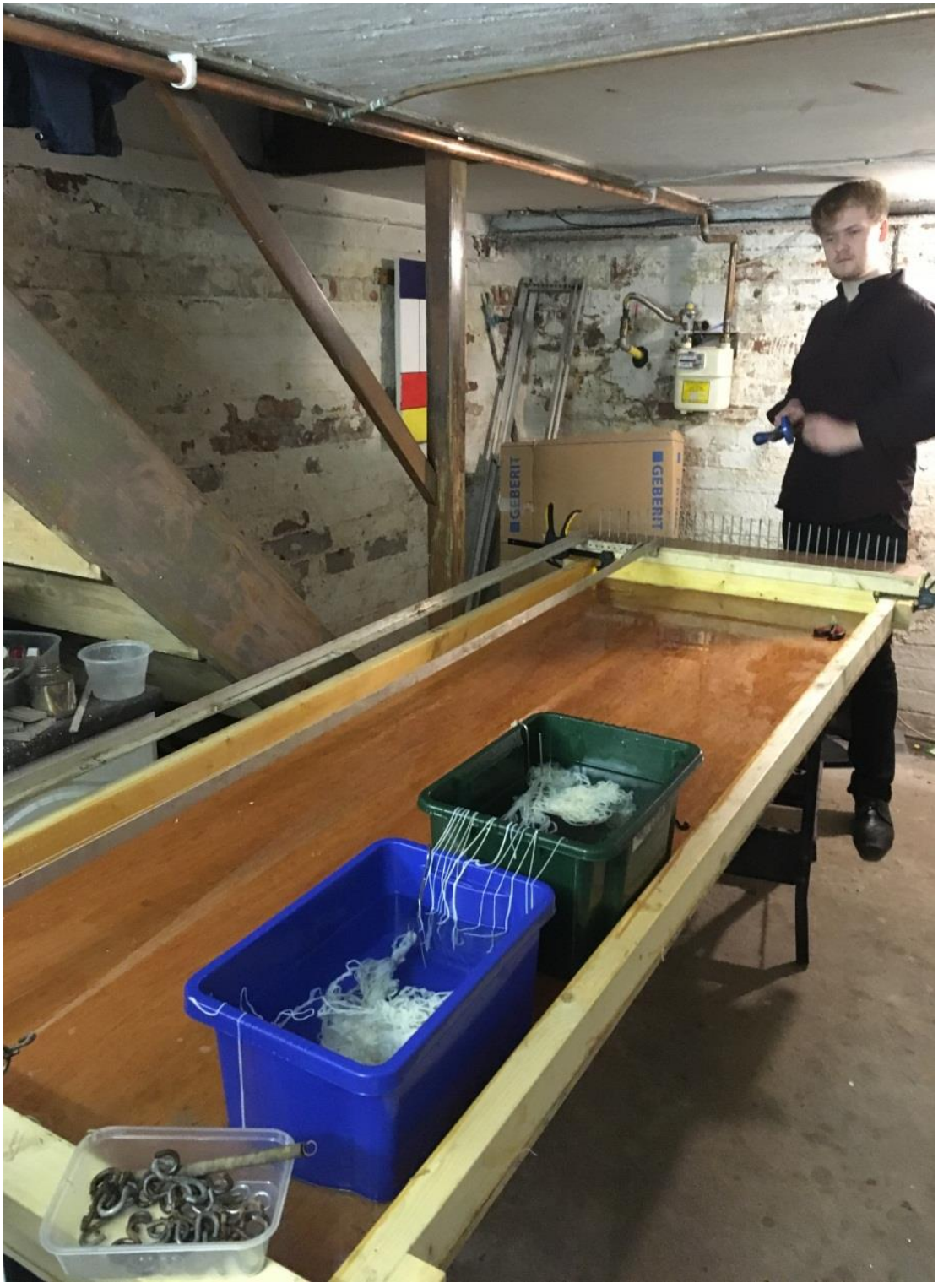

Figure 15: My making session January 2020, showing the twisting of the wet gut strands in a rope construction to be placed on a metal rack under tension to dry. Once dry they are polished by hand.

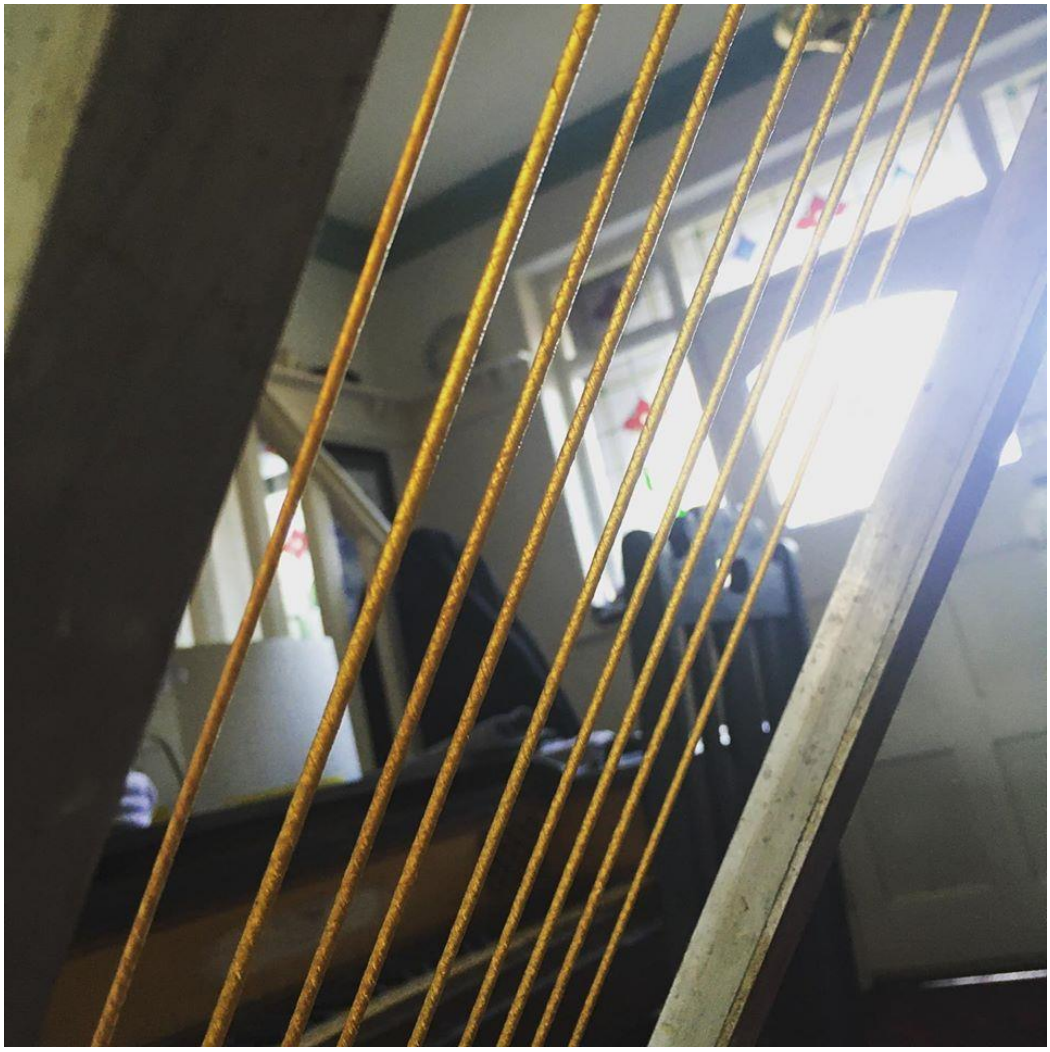

Figure 16: Strings from the January 2020 making session drying under tension on a rack before polishing.

I began researching independently while working for NRI to try and improve the quality of the raw gut strings to make a more historically informed product. I read many sources including those mentioned above, and when George Stoppani noticed that I had been employing a sulphur dioxide treatment to my own strings, he invited me to work alongside him. The sulphur is mentioned in Skippon and Diderot and until my in depth experiments, had not been used commercially by other string-makers, possibly due to the health and safety issues for the maker from the acidic fumes created during the process. The results I have observed from the sulphur treatment is increased tensile strength, due to the creation of sulphide cross-links between the collagen fibres of the gut and also gives them the translucency described in the historical sources. The increased tensile strength also allows the thinner top strings to be very highly twisted without the risk of immediate breakage. Having medium to high twist top

strings was essential to avoid strings being false i.e. uneven distribution of mass or uneven stiffness would stop the string vibrating properly and sounding musically. In modern string-making a low twist string made of beef serosa is highly polished to remove any bumps from the surface but this was not possible historically where only a very light polishing was employed. There is no evidence of the use of beef serosa until the twentieth century and the historical sources are almost unanimous in mentioning sheep or lamb gut.

Today it is very hard to source very thin lamb gut because lambs are bred for meat and not slaughtered at a young age as larger lambs are more profitable and the only string company currently producing un-split lamb gut top-strings in large quantities is Mimmo Peruffo's company, Aquila Corde Armoniche, in Italy. These have only become available, for sale within the past year but the thin strands are not from Italy; they are sourced from the Middle East, where lambs are slaughtered at a younger age. The other European Stringmakers I know (these include the late Nicholas Baldock, NRI, George Stoppani and Oliver Webber at 'Real Guts'), all buy their gut from the same supplier in Blackburn who also supplies them for sausage casings. He supplies the gut 'salted down' so that it is very dehydrated and can be stored for a long time or sent out in the post to the string makers. Luckily all of the gauges for bass viol and violin do not require such thin materials and so an authentic all gut set of strings is available to the modern player. For the French repertoire for viol 1670-1740 wound strings are essential; as I explained in chapter one, the lowest string of a 7 string bass viol would be unmanageably thick if it was all gut and on a smaller size bass at that pitch all gut strings are not sufficiently responsive.

According to Segerman, wound strings are what allowed the viol to become a continuo instrument by virtue of the increased volume, more nimble feel under the bow and the increased range of the instrument and as I have previously mentioned, there is a good amount of historical information about the stringing different wound stringing used by Marais and Forqueray and why that would aid viol players to perform the solo music and continuo parts today. Wound strings made the historical way have a thick gut core and a thin wire, whereas modern ones are mostly metallic, with a thin core of gut. Demi-files were the historical solution for making a wound string at a diameter where the thinnest available wire in the 17th and 18th century would be too thick, resulting in a string that was

too heavy, or too metallic in its ratio of metal to gut.[38]Historical stringing is equal tension as opposed to modern scaled tension.

Segerman and Peruffo have had a profound influence on my aims and methods of trying to re-create strings because they have approached the same tasks before me in a scientific way due to their backgrounds in science and both based their viewpoints on a mixture of historical evidence and physics. At times this has challenged the received knowledge prevalent among musicians regarding stringing. This is evident in Peruffo's comment made in an interview with Esther Visser.

Extract from an interview by Esther Visser with Mimmo Peruffo in 2005.

"Since I began my work as a scholar, I discovered a lot of things. I started to study the modern [Baroque] instrument problems. I discovered very important documents in Venice, in Florence, in Padua, in Naples, in Rome. A lot of things were never seen before. So I understood one thing: • First: Modern gut strings are wrong • Second: Modern baroque gauges are wrong • Third: The modern set-up is not historical. My conclusion: as consequence, all Baroque performances are a farce, it was not at all like that in the past. This was very critical for me. It is all a farce…maybe not the performance, not the study of practises how to play, but the set-up, the string, the gauges…everything was wrong. So, that nasal and weak sound that they have is not historical! This conclusion was very hard.

So, Segerman, before me, put also very important matter of historical stringing and started to say these things: The gauges in the past were thicker, etc."[39]

I have made flexible gut strings which are long-lasting, used thicker gauges on my viol as suggested by Segerman and Peruffo and the sound quality is not 'weak' or 'nasal' but warm and clear. A comparison of the photograph of the surviving strings on the Zancker Violone, dated circa 1700 (Figure 17) and the strings I have made for my large consort bass viol are very similar in appearance and show a similar angle of twist.

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[38] Mimmo Peruffo *"from what we know about the metallurgic technology of the time it seems that it was not possible, at least in the common practice, to produce wires thinner than about .12 mm (see for example James Grassineau " Musical Dictionary" London, 1740 under the world 'wires'; see also the Cryselius's wire gauges and the 18 th Nuremberg's wire gauge tables). The Lute in its Historical Reality* . This is research paper published by Mimmo Peruffo on his website https://aquilacorde.com/en/Page 85

[39] Ester Visser *The strings of Paganini – essay on the use of gut strings in the early Romantic Era – an interview with Mimmo Peruffo"*2005-2007 Formation Superieure Abbaye Aux Dams

Figure 17: Some surviving 18th century strings on a Zancker Violone c.1700 – photo taken by Ben Hebbert in the Berlin Musik Instrument Museum 2006.

Figure 18: Strings made in recent weeks by me using 'historical' methods with similar angle of twist. Photograph taken by me.

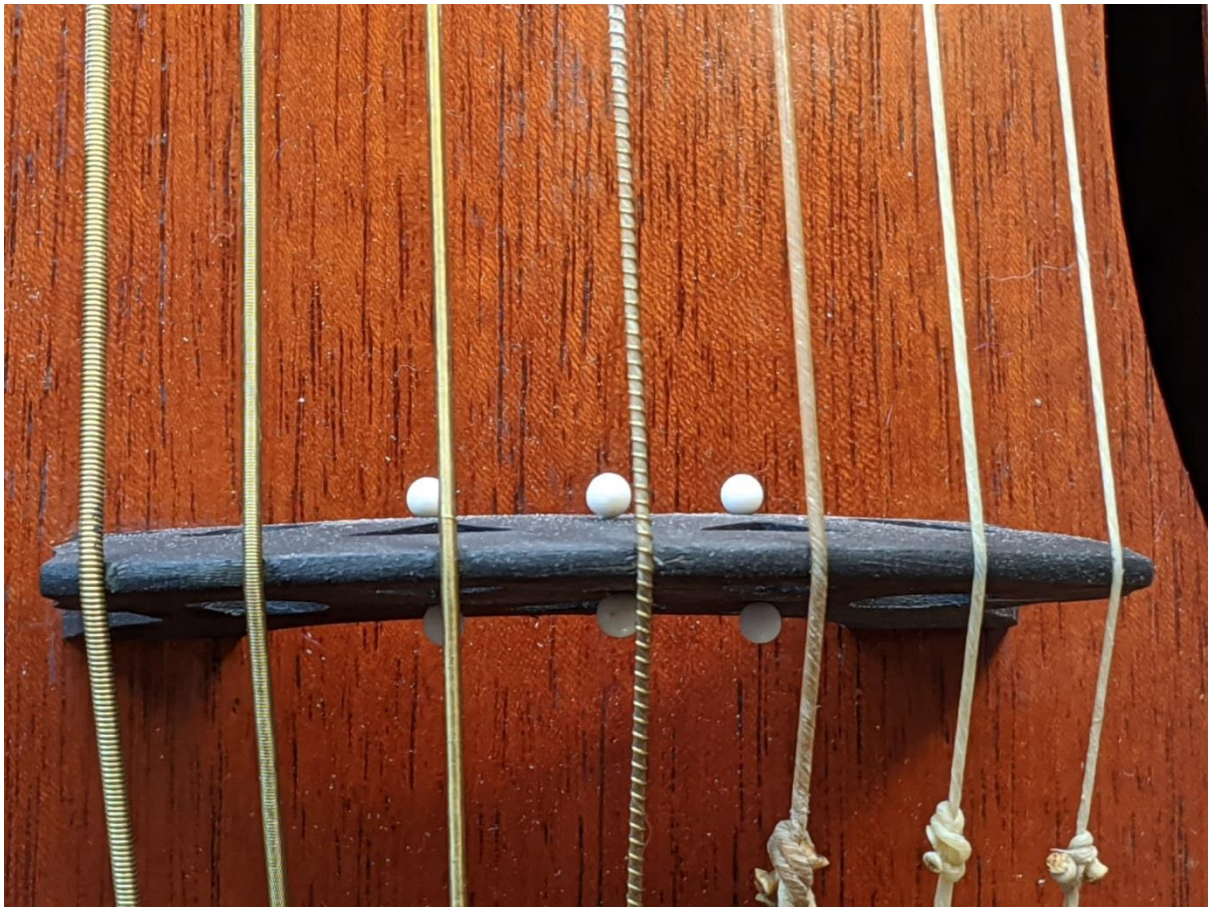

Figure 19: A set of strings I made wound in brass for my 7 string bass viol using my own high twist lamb gut cores. Phot taken by me, February 2020.

Figure 19 shows strings I made using my own gut cores and wound in brass. I made these in response to Titon du Tillet's mention of Marais being the first to 'imagine' strings wound in brass. Although it is not clear whether strings were actually wound in brass at that point in time, there are surviving strings for cellos, violins and pianos from later on.

This set of strings are for a bass viol that I recently commissioned by Shem Mackey which is at the point of completion but not yet played by me.

I am at the point where I am making strings that have no compromises in terms of historical evidence and also seem to work better than others available commercially but am open to further experimentation in the light of new sources that may be discovered.

My methods begins by washing the tubes of salted lambgut in water and a gentle soaping agent as mentioned in Skippon. The strength of the solution increases over several days of washing, and slightly different strengths are used for different types of strings. I then tie a number of strands onto a hook fixed at one end of a long table (see figure1 above.) and tie them onto a spring which I then twist on a hand drill while wet. I then

place these on a rack under tension and dry them out. I keep adding extra twist as they become slack as they dry out and it is important to keep them tense so as to dry them out to be straight, and evenly twisted. These strings dry over the course of a few days, depending on the thickness. I place them in a box and light sulphur to burn and smoke them which increases the internal bonding between the fibres of the string (it creates sulphide cross links between the collagen fibres). Once they are dry, I polish them with wet and dry paper whilst they are turning on a drill. Finally, I oil them. These are the bare bones of the process and great care and a certain amount of instinct must be used at each stage, which comes with experience. String makers do have trade secrets, just like luthiers, but all the important information is there for all to see in the historical sources I have included.

As a viol player and student of historical performance, I feel fortunate to have had the opportunity to draw on the wealth of historical evidence and expertise of the string-makers, and musicologists who have helped me in my training as a maker of historical strings. My quest to learn all I could about string-making was born out of my desire to have access to the strings that would enable me to best perform the music I love on my viol, with the full palette of sound that Marais and Forqueray would have had and giving room for my own expression. The contextual and stylistic study I presented in chapter 1 has increased my understanding of the intricacies of the different styles, for example the ornamentation is as much about colour as about physical movement or articulation or shape. I didn't find that the standardized modern string set up provided this.

I was inspired by Mimmo Peruffo's quote from an interview by Esther Visser (1) to explore what I could achieve with thicker diameters and types of close wound and demi filé strings I could make today, based on his analysis of what a good string is and the range of sound palette that could be obtained:

"A string is very good, when we have these properties:
• They last long
• They are very stable to humidity change
• It is possible to obtain a true pianissimo, true fortissimo and every kind of taste in colour with them, to follow the human voice
For example, imagine a person who works in the theatre. His face is able to produce every kind of emotion. This is the better string. Vice versa if you don't work in the theatre, you are not able to do. This is the bad string. Or, if you are a painter, if you are Caravaggio, imagine you have a palette… a bad string has only four colours. A very good string has a lot of different colours. If you are Caravaggio, you are able to use a lot of colours to produce your work, but if you are Caravaggio and you have

only four colours, it's nothing. So, if you are Paganini, but if the strings are very bad in quality: No pianissimo, no fortissimo, no expression…the string does not last long and is not stable under humidity change." [40]

Figure 20: My new 7 string bass viol by Shem Mackey after Colichon with a set of brass string made by me.

[40] Ester Visser-*"The strings of Paganini – essay on the use of gut strings in the early Romantic Era – an interview with Mimmo Peruffo'* 2005-2007 Formation Superieure Abbaye Aux Dams

I realize that I have personal preferences regarding sound and that some of these are innate and come from the way my brain is wired up, for example, despite growing up as a modern cellist at a leading music school, I disliked what I felt was excessive use of vibrato by modern cellists and other musicians because I felt that it lacked variety and subtlety and didn't seem to have any reasoning behind its use other than that it was accepted common practice and it was expected of me. I was trusting my ears, and always questioning why and how we did things, but this was controversial in playing the modern cello repertoire. Even though I much preferred the viol, there were still some things that I questioned regarding the set up, and it is always a danger to assume that we know already everything about how the music was played and how the instruments worked – every idea should always be questioned, no matter how accepted it has become, or how many professionals see it as a fact.

For this reason, I recently initiated two discussions on facebook with various eminent professional viol players, luthiers, string-makers and musicologists on the what the origins of the modern Baroque string gauges were and secondly on the interpretation of Danoville's comment about stringing viols with "de cordes deliées" in his publication "L'art de toucher le dessus et le basse de violle" (1687).

The danger of historical performance now being institutionalised, means that quite often, people now simply do as they are taught, and do not seek out or read the original materials as much, or question where the current opinions have come from. This issue is brought up in the facebook discussion by Dr Vittorio Ghielmi, of the Mozarteum University, who says "finally things are starting to move". By this Dr. Ghielmi is suggesting that opinions are shifting and the 'accepted' string set-up has begun to be questioned by some players. He makes the point that "With modern low tensions you cannot develop the full range of high harmonics (this is physics, not taste) and this would pose a doctrinal problem for the ancient reflection on music". This expresses my own feeling of constraint in sound using low tension strings. He adds "I am "awaiting no verdict, I trust my ears and my fingers". Professor Liam Byrne, of the Guildhall School of Music echoes this when he says he has "been using a top string of 0.88mm for the past five years or so, on a seven string of 71cm string length, switching back and forth between 392 and 415, and it is absolutely delicious and oh so stable and I change my top string now, maybe three times a year, not even out of necessity, usually just on the occasion of really important concerts, when I want to sound extra fly." "Since making this switch, the lute like aspect of the viol sound has really come to the fore and it's so much less work!"

It is clear that although the string choice of these two performers satisfies their senses, it is not based on personal taste; there are practical advantages that are undeniably true; durability and stability of the string, better range of sound palette enabling expression of the music which is based on years of research of texts, music and also collaboration with master luthiers. It is interesting to note that despite these two masters both advocating high tension strings, their playing is extraordinarily different; it enables them to create the sound that they choose, to give their individual artistic performance of the music.

There are undoubtedly many factors for the contemporary viol player to consider when choosing strings for the French repertoire of this period. The repertoire is so rich and varied and the sources that I have referred to have highlighted that there is not just one string choice that will work. Over recent decades modern string makers and luthiers have made progress in building responsive instruments and stringing them with historically accurate types of strings and this has enabled the modern player to explore what is possible in terms of sound and expression on their instrument.

Starting in 2021, a number of my fellow students at the Mozarteum began using strings of my manufacture and of various historical diameters that I deduced from my research of the historical documents. This has for the first time given us the opportunity to test various configurations of ensemble with this type of stringing. A few important observations have been made by us:

On a very practical note, the first thing we have noticed is that the rehearsal time taken up by tuning is vastly reduced. Every time we have played, we have tuned once at the beginning of the rehearsal, and have not needed to retune at all for the rest of it! The idea that gut strings are more affected by changes in humidity and temperature than modern steel or synthetic strings seems to be an urban legend, and there are no attestations in the historical documents that this was a problem for the ancients regarding the Viol. In fact these gut strings seem to require even less tuning than their counterparts on modern instruments! This is particularly evident when playing in a consort of 4 or more parts, as with so many instruments to tune, rehearsals have been extremely disrupted by the need to constantly retune. Another practical aspect is that the strings seem to last longer. In the Viol consort we have also noticed that the viols now seem to amplify and complement each other's sound, and the texture is incredibly sweet and rich. Each instrument's line can be heard clearly in its role in the texture, but the overall sonority still has much depth.

Musically we have all found that the Viols blend better with other instruments such as Harpsichords and Violins, and each different instrument can be heard clearly in the ensemble mix. This makes playing with such instrument much easier, as one does not need to fight to be heard, and this in turn opens up a wider variety of musical options to the performer. With the bow it is much easier to articulate, and pieces of music that seemed difficult before seem to work very naturally and intuitively now. When recently playing some Sainte Colombe duos with a friend, we noticed how 'Bell like' the sound was, a quality that is frequently commented on in the historical documents and which we had found to be lacking before.

A potential problem would arise if a player using these diameters when to play with an ensemble of viol players who were using lighter tension stringing because they may stand out as playing louder and may not find it easy to blend in when trying to play quieter. Even if they are not playing louder, their instrument is more stable and acoustically more efficient which would give the impression that they were playing louder. I think it is important to encourage others to try the historical diameters to explore the benefits that they could gain.

As a string maker, I have had the luxury of opportunity to try a wide variety of strings on my instrument; some made by established string makers and other experimental types of string that I have wanted to try, for example the brass wound ones in figure 19, in order to test out Titon du Tillet's quote about the strings imagined by Marais. I have found that some work better for particular compositions or the acoustic in a performance space and that my personal preferences and physical response leads me in these instances but that having some scientific knowledge about string making provides awareness of string options that can be tried out to provide improvements. I have also recognized that my preference may change over time and that this is likely to be the case for other players as we grow as artists and performers and learn more about the music of the past.

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