

### The Bodleian baroque lute stringing chart: a stringmaker's view

The discovery of the Bodleian string schedule provides us with an insight into the world of a French lute player in the latter part of the 17th century. The key to understanding the significance of the string schedule is to see it in the context of 17th century commerce in strings, and to do that we need to have a better understanding of the stringmaker's art. About the latter there is very little understanding at present. I am still often asked if strings are made from cats and I suppose this will never change. So allow me to share with you my insight into the string schedule from the standpoint of a stringmaker and as well a lute player whose favorite repertoire is 17th century French lute music.

First, I would like to respond to Richard Corran's article. As Mr. Corran correctly observes, if the numbers correspond to the number of ribbons in a string, then this is 'a statement about area.' It is approximate to the cross-sectional area which is expressed in  $\text{mm}^2$ . But in the absence of a system of measurement, it remains simply a number corresponding to the number of ribbons in the 'build' of a string. It will not correspond to a Pythagorean ratio of pitches as would diameter, expressed in mm, or mass expressed in whatever measure of weight you adopt. We in fact use a spreadsheet which we created using an empirically derived constant of approximately  $.04\text{mm}^2$  as the value of a single right-side thread [derived from the 'right' side of the animal's gut—Ed.] to generate the desired 'build' of a string. With this tool we can easily find the theoretical number of ribbons needed to make a string of a given diameter. This is not to say that the values in our lute player's string schedule are directly translatable into modern results. We use centreless grinders to polish strings whereas in the distant past they were polished by hand. There is no codification for the placement of the blade in the process of splitting a casing into right and left ribbons and even a very slight adjustment of the position of the blade will result in a compounded change in the 'build' of a string. In addition the primary materials were likely different in important ways from those available to us in modern times. Although this system of numbering does appear to be widespread and long lived, there were surely vast differences between the products of different makers due to any number of factors. It was an approximate system, an aid to the lute player intent on organising his strings and nothing more.

After receiving the news of the discovery of the Bodleian string schedule I derived the output in diameter from the numbers in the string schedule using our spreadsheet. The numbers for courses 1-6 are remarkably consistent with those I have found ideal for my own lute (<http://www.dami-anstrings.com/lutelist.htm>). This makes perfect sense to me because I use right-side ribbons for courses 1-6 as these are thinner strings. For the diapasons 7-11 I have always used left-side ribbons still, however, using right-side ribbons for the octaves. So I had to make a series of basses using right-side ribbons to see what would come of it both in terms of the string schedule and of course, sound-wise. Not surprisingly the results for courses 1-6 were very much in line with the strings currently on my lute. But the greater the number of ribbons to make a string, the further from the expected result. It became clear to me that any number of variables; the difference in the age of the animal, the placement of the blade in the splitting of the casing, the cleaning process itself, could skew the results as the variance was compounded with the thicker strings. Interestingly, I did not find the sound quality of these basses more appealing than the strings I was making with left-side ribbons. In fact the strings made with the latter had a warmer and deeper sound, and I continue to play those on my lute.

A few observations about the string schedule. The numbers are really all over the place. For example for the 4th course we have 11,  $11\frac{1}{2}$  and 12; for the 5th course 15,  $15\frac{1}{2}$  and 16. For the 8th course, 38, 40, and to the left, '42 or 43.' How do we explain this variance? And how can this lute player

find these numbers at all reliable? I will try to explain. Any given production of strings of the same build and torsion will result in a normal distribution of diameters in the shape of a bell curve. For instance a small production of 20 right-side ribbons at a high-torsion might yield the following:

1.32mm (2)  
1.30mm (1)  
1.26mm (2)  
1.25mm (3)  
1.20mm (8)  
1.17mm (2)  
1.13mm (2)  
1.10mm (2)

So our 17th century lute player purchased a '#20' string which could be any one of those diameters, or several diameters within a 'knot' consisting of multiple strings. And assuming that the string was uniform from one end to the other (a thing by no means assured)<sup>1</sup> he would know that that particular string in his collection would work for a particular pitch on his lute. In other words, if he was organised, he could have a collection of strings that he could identify as having a definite pitch value. What I am suggesting is that this numbering system was not a measuring system in the way we use for example, the metric system. Our lute player could not shop at a market or a fair and purchase a #20 string with any degree of certainty that it would work as for example, a 6th course fundamental. It is about identifying a #20 string already in his possession with its proper musical value.

So how shall we regard the strings that are not whole numbers but that are expressed as fractions  $11 \frac{1}{2}$ ,  $12 \frac{1}{2}$ , and  $15 \frac{1}{2}$ ? Surely you can't have half of a ribbon, can you? Of course you can not. But remember, the owner of these particular strings has catalogued them and his ear is sensitive enough to be able to discriminate between a 15 and a  $15 \frac{1}{2}$ ; or between an  $11 \frac{1}{2}$  and a 12. The lute player's experience with the thinner fretted strings is more thorough simply because these are the strings that need changing more often. So he has a collection of #12 strings, some thinner, some slightly larger in diameter. In a 'normal distribution' of #12 you will have .62mm to .82mm in actual diameters with the greatest number at .72. In a 'knot' of #13 you would likely have a collection of strings with .77 as the mean number. So the variation from one number to another would be approximately .05mm in real terms. I am suggesting that our lute player, who after all is organised well enough to create a record of his favoured stringing, and who has a grasp of numbers, assigns fractional values to certain strings in his collection of twelves so he can distinguish between those and the slightly thicker strings in the bundle. I know that is perhaps too simple an explanation, but we have to visualise this from the vantage point of our lute player, who simply needs a way to sort out his collection of strings.

The question was asked: 'if strings were sold this way in the renaissance and baroque era, why does no one mention it?' A fair question, since the contemporary English writers Dowland and Mace make no mention of this system of numbering strings based on the 'build' of the string. Mersenne on the other hand was a scientist; his intention was to explain the laws of musical sound. And given the altogether unpredictable real values of this numbering system, it is unlikely that he considered these whole numbers to be of much value in his quest. And yet it is clear that in France, this numbering system *was* widely in use. In the article 'Des cordes à boyau' in Diderot's *Encyclopédie* it is written:

On dit qu'il ne se fabrique de bonnes cordes d'instrumens qu'en Italie, celles qui viennent de Rome passent pour les meilleures; on les tire par paquets assortis, composées en sept ou huit plis. On les distingue par numéro, & il y en a depuis le no. 1. jusqu'au no. 50.

(It is said that good instrument strings are made only in Italy, those that come from Rome pass for the best; one gets them in assorted packets, composed of seven or eight folds [hanks?]. One distinguishes them by number, and they go from no. 1 to no. 50.)

Of course this was written one hundred years after the lute player who wrote our chart lived and yet the same system seems to have been in place. And it has been noted that this system survives into the 19th century probably not to change until the metric system and accurate measuring tools come in to existence around the turn of the 20th century. So why don't our English writers refer to it in their commentaries?

I think part of the answer may be found in the different ways in which England and France conducted a commerce in music strings. Dowland prefaces his chapter 'For Changing of Lute-Strings' by informing the student that he will

leave and let passe over some things, as apparant of themselves, or easie to be discerned of every learner, by Nature, Sense, Reason, or common Experience . . .

Perhaps Dowland wanted to avoid getting bogged down in a numbering system which he knew from experience was of little practical use. Rather he concentrates on identifying ways in which the appearance of strings gives some evidence of their quality. Then he describes different sorts of strings according to their provenance; strings from Rome and other parts of Italy are bound up in a certain way; those from Germany are packed in boxes; strings from Livernia in Tuscany come rolled up in coils; those from Nuremburg and Strasbourg are bound up in knots; or from Bologna as double knots. These latter are sent to Venice 'from which place they are transported to the Martes . . .' He adds that the

best time for the Marchant is to provide his strings at Michaelmas, for then the string-makers bring their best strings which were made in Summer to Franckford, and Lypzig Martes. Contrarily at Easter they bring their Winter strings which are not so good.

The important thing to note here is that England relied on mercantile trade with string making centres in Germany and Italy by way of the twice yearly markets in Frankfurt and Leipzig. English merchants would purchase large quantities of strings and once back on English soil the strings would travel to markets and fairs held in every part of England. A merchant would likely be selling a wide variety of strings, much like those Dowland describes for the novice lute player. Those varied types of strings were the product of many different workshops and one can not really expect any standard to be observed in their primary materials or in their manner of working with those materials.

Let's revisit Diderot, and the article 'BOYAUDIER'—those who make strings using lamb gut:

Ces maîtres composent une des communautés des Art & Métiers de la ville & faubourgs de Paris: ils ne sont que huit maîtres en tout, qui travaillent dans le même endroit, & ont chacun leur atelier au faubourg S. Martin, auprès de l'endroit appellé Montfaucon.

(Those masters make up one of the communities of arts and crafts of the city and suburbs of Paris, there are no more than eight masters in all, who work in the same place, and have their workshop in the Fauboug St. Martin, near the place called Montfaucon).

So, eight string makers in the heart of Paris. Some, of course were involved with making tennis strings and strings for other non-musical purposes. But others surely were quite skilled and knowledgeable artisans and familiar with all the kinds of strings needed by Paris' constantly

evolving music scene. So it is reasonable to assume that a lutenist would be familiar with the best of them and through commerce with them directly or through merchants representing them, come to be able to rely on this inherently haphazard numbering system having a reasonable degree of consistency. But still it was a matter of having in hand a string that worked for a given pitch on a specific instrument.

Perhaps our lute player was unique in drawing this chart to help him make sense of the strings in his collection. The sophistication of this string chart indicates that he was an experienced player. Surely he had no need of the accompanying chart to remind himself of the placement of the notes on the fingerboard. Rather it is more likely that our lute player was also a teacher, who used this chart to familiarise his beginner students with tablature. Many of us started with something like that. The identity of this 17th century *luthiste* may forever remain mystery, but hopefully the theory I have offered makes his string chart less perplexing.

1. Editor's footnote: there is just one historical reference, in the Capirola lute book, to strings being fatter at and one end than the other, and the skilful lute player having regard to this when putting on strings; see Chris Coakley's work on this being a possible explanation for the angling of bridges such that the bass strings are shorter than the trebles, at <http://www.fomrhi.org/uploads/bulletins/Fomrhi-109.pdf> and his essay, following.





