



# FoMRHI Quarterly



BULLETIN 115

Christopher Goodwin 2

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The next issue, Quarterly 116, will appear in June 2010. Please send in Comms and announcements to the address below, to arrive by June 1<sup>st</sup>.

### Fellowship of Makers and Researchers of Historical Instruments

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This editorial takes the form of some important announcements – please read and inwardly digest!

### 1. A last 'free' Quarterly

This is the seventh and last *Quarterly* which will be sent free, gratis and for nothing, to those who were members when Fomrhi went into hibernation in 2002. If you've paid a subscription for this subscription period (*Qs* 113-116) then you can ignore this; if you *haven't* you will find a coloured subscription form herewith. We can now accept payment in a sufficient variety of ways that everybody should be able to pay who wishes to. If you choose not to renew this is the last *Q* you will receive.

### 2. New bank account

We have at last managed to set up an account with a high street bank which, relatively speaking at least, does not seem to be run by disobliging nincompoops and malfunctioning robots. You will find the account details on the coloured subscription form herewith, if you want to pay your subscription by bank transfer. If you want our bank details to make any other kind of payment, email or otherwise contact the Secretary.

### 3. Website

We now have a very nice, if still embryonic, website, kindly set up for us by Luke Emmet, who also redesigned the Lute Society website. The url is

**[www.fomrhi.org](http://www.fomrhi.org)**

Do pay it a visit, and direct any constructive criticisms to the Secretary. Luke has set it up in such a way that it is very easy to edit. The content will gradually increase. It may one day be possible to pay subscriptions or buy back issues directly at the website, but for the moment you can pay online anyway, by sending a Paypal payment to the Secretary; please email to ask how. I understand you don't need a Paypal account to pay by Paypal; a credit card will do.

The first priority is to list on the website all the Comms since the inception of Fomrhi, so that the world in general can see what a wealth of material Fomrhi-ites have contributed over the years, and ask for copies of Comms or whole *Qs*. More recent Comms can in many cases already be sent out as email attachments, in Word or PDF format, or just as photocopies (or original copies where we have them) in the post.

### 4. Towards an electronic Fomrhi

For the moment we remain committed to a printed paper format . . . but . . . I was on the train the other day and couldn't help noticing the man next to me with one of those new-fangled electronic books (retailed under the name 'Kindl'). It was a slim oblong tablet, in a nice leather carrying case, with a screen a little smaller than A4. The display has a 'real' rather than 'virtual' appearance (like a liquid crystal rather than cathode ray display, but much nicer) and so does not tire the eyes any more than paper. The thought that at the press of a button, and at a tiny outlay compared to buying and storing bulky books, one could have a large proportion of all

the world's literature at ones disposal, whether one is on the beach or on the bus, via a single book-like object, does appeal to the minimalist, puritan, and thrift in one. And for the purposes of Fomrhi-ites, one could prop one's electronic book up on a workshop bench and follow instructions, plans, and so forth very easily. Reports of the demise of printed media, like those of the death of Mark Twain, have been somewhat exaggerated, for some years, but perhaps ten or twenty years from now it may be as rare not to have an electronic book as it once was not to have a television, telephone, or mobile phone.

How does this affect Fomrhi? Most of the Comms received since August 2008 are now on the Secretary's computer in Word or PDF format. Jeremy Burbidge of Jacks, Pipes and Hammers has very kindly offer to scan and digitise all the old Qs, though this will take some time. Would anyone else care to volunteer to help with this work?

Once the list of old Comms is complete on the website, the public will be able at least to request back issue material by email; and gradually we will go over to responding to these requests by return of email attachment rather than paper in the post.

It occurs to me that since people will gradually go over to searching for material they are interested in via computer keyword searches, it would be a very good idea if henceforth contributors were to include likely search terms in the titles of their Comms. So if you are discussing, say, a Ruckers harpsichord in Paris, call it 'Observations on a Ruckers harpsichord in Paris', rather than 'Observations on a curious old instrument.'

Many thanks, as always to contributors of the Comms herein; it only remains to remind you yet again that only **YOU** can make FoMRHI continue to prosper.

Members' announcements are always welcome – if using a computer, please send these as plain text emails, rather than attachments.

Keep those Comms coming!

**Email addresses, please!** If you haven't received any emails from us this year, that means we don't have your email address. It makes communication so much easier if we have it. We promise not to send out any spam, or pass it on to anyone else. Please send a brief message to [Lutesoc@aol.com](mailto:Lutesoc@aol.com), or [secretary@fomrhi.org](mailto:secretary@fomrhi.org) and we can add you to our list.

## STANDING CALL FOR PAPERS

The Fellowship of Makers and Researchers of Historical Instruments welcomes papers on all aspects of the history and making of historical musical instruments. Communications or 'Comms' as they are called, appeared unedited (please don't be libellous or insulting to other contributors!), so please send them EXACTLY as you wish them to appear – in 12 point type, on A4 paper with a 25mm or 1 inch border all round, or to put it another way, if you are using non-European paper sizes, then the text area must be 160 x 246 mm (or at least no wider or longer than this). Our printers usually make a reasonably good job of scanning photos.

In naming your Communication, remember that people will search for it online using keywords. So if you are discussing, say, a Ruckers harpsichord in Paris, call it 'Observations on a Ruckers harpsichord in Paris', rather than 'Observations on a curious old instrument.'

You can send contributions EITHER on paper, OR as a Word-compatible or PDF attachment. If you *really* do not have access to a word processor of any kind, we may be able to retype typed or handwritten submissions. The address to send them to is:

FoMRHI  
c/o Chris Goodwin  
Southside Cottage  
Brook Hill  
Albury  
Guildford GU5 9DJ  
United Kingdom

and the email address for Comms sent as attachments (and other email correspondence) is [Lutesoc@aol.com](mailto:Lutesoc@aol.com) or [secretary@fomrhi.org](mailto:secretary@fomrhi.org)

Non-members will be given a year's free subscription if they send in a Communication to the Quarterly.

If you ever sent in a paper (in the last 8 years) for the Quarterly, and it never appeared, please re-send it, to the new address.

There are plans to scan back issues of the Quarterly and make them downloadable from a website, to be set up; in the meantime you can obtain back issues for the princely sum of £4 per issue, including postage anywhere in the world; send a cheque payable to FoMRHI, at the above address, or write with your credit card details.

If your interests have changed, and you don't now want to be a member of FoMRHI, please let us know, to save postage costs.

## MEMBERS ANNOUNCEMENTS

### **Low density, eccentric, reversed tapered, gouged bassoon cane, from David Rachor**

In the next few weeks I will be offering Baroque bassoon cane with an eccentric historical gouge for sale. This low-density cane will have a reversed tapered gouge (what the French bassoonists call *contrepointe*), starting about 1.3 mm thick at the stock, 1.0mm at the first wire to about .6 mm at the tip. The cane will have been density tested.

I am of the opinion that reed makers in the eighteenth century used softer cane to make their reeds than the cane we use today. For this reason, the reed makers of the past developed the reversed tapered gouge (see my article titled "The Importance of Cane Selection in Historical Bassoon Reed-Making" in the *Galpin Journal*, LVII, May 2004, for more information).

For all of you period reeds makers who have tried using a reversed tapered gouge with little success, using this cane enables you to make historical reeds without taking the time to learn how to gouge by hand.

I personally have used this tapered gouge for Baroque bassoon and bass and tenor dulcian reeds. A reed made with low-density cane and a reversed tapered gouge has flexible playing characteristics; such a reed is most likely not like any other historical reed that you might have played in the past. The price of each gouged piece of cane will be 2.85 Euros. If interested please contact me via email: [djrachor@gmail.com](mailto:djrachor@gmail.com)

**English Guitars in the Danish Music Museum, Copenhagen  
Additions to Comm. 1876 and 1884**

Further to Jim Tyler's and Taro Takeuchi's lists of English guitars, here is the list of instruments in The Danish Music Museum, Copenhagen (Musikhistorisk Museum og Carl Claudius' Samling). All the listed instruments have watch-key tuners.

**Inv. No. C 4**

Inscription [tuning keys]:

PRESTON INVENTOR

Length: 680 mm

String length: 423 mm

Strings: 10 strings: 2 single courses, 4 double courses

Threaded holes in the sound board show that the instrument once had an external keyboard mechanism.

**Inv. No. C 86**

Inscription [stamped on sound board]:

PATENT INSTRUMENT CLAUS & CO INVENTOR LONDON

No. 7 GARRARD STREET

Length: 700 mm

String length: 433 mm

Strings: 12 strings: 2 single, 2 double and 2 triple courses

Keyboard: Internal hammer mechanism

**Inv. No. CL 148**

No inscription

Length: 720 mm

String length: 435 mm

Strings: 10 strings: 2 single courses, 4 double courses

**Inv. No. CL 149**

No inscription

Length: 720 mm

String length: 443 mm

Strings: 10 strings: 2 single courses, 4 double courses

Threaded holes in the sound board show that the instrument once had an external keyboard mechanism.

**Inv. No. CL 150**

Inscription [written label]:

Harley maker  
... Wych Street  
London 1805

Length:

740 mm

String length:

Not recorded

Strings:

10 strings: 2 single courses, 4 double courses

Keyboard:

External hammer mechanism, with monogram "KPM"

Belonged allegedly to the Danish princess Caroline (1793-1881)

**Inv. No. 1973-23**

Inscription [neck]: PRESTON MAKER LONDON

Inscription [tuning keys]:

PRESTON INVENTOR

Inscription [back]:

"LONGMAN ... (, CLEMENTI?) & CO., No. 26 CHEAPSIDE,  
LONDON"

Length:

675 mm

String length:

430 mm

Strings:

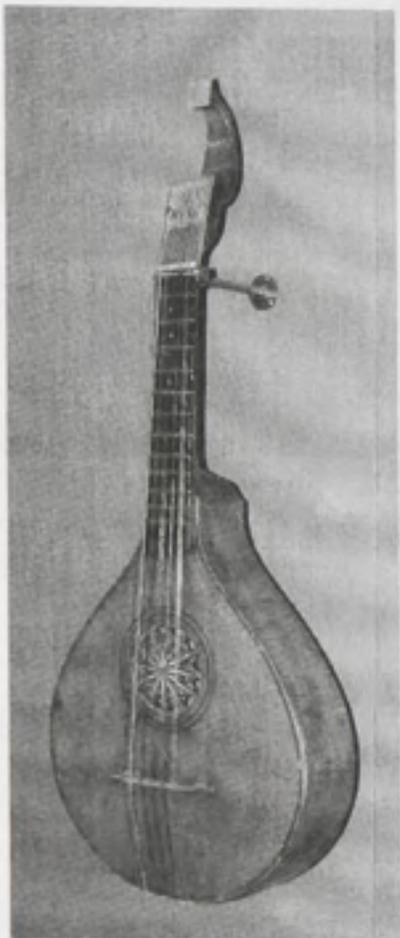
10 strings: 2 single courses, 4 double courses



C 4, Preston



C 86, Claus & Co.



CL 148



CL 149



CL 150, Harley



1973-23, Preston

### DESIGN AND CONSTRUCTION OF A 'MULTIPURPOSE' LUTE

If you have an 8 course renaissance lute and would like to play music requiring extra bass strings; various early baroque 'transition tunings'; later baroque D minor tuning; theorbos; archlutes etc, then I have devised a method. This may be particularly useful for someone with:

(i) a spare 8 course instrument or a plan for making a new one, (ii) smallish hands or limited stretch, (iii) a desire to avoid accumulating many large lutes, (iv) no need to match the pitch standard of other instruments, (v) some use for a small multiple purpose lute, such as practice away from home.

There are many obvious objections to this procedure, which I shall not attempt to refute, but just soften slightly. However, I hope not to lose any credibility resulting from a series of papers on fundamental scientific aspects of lutes in FoMRHI Comms 1808 to 1814 and 1832. Related matters will not be dwelt on here, but indicated by 'Refs'. After all, one can study large or esoteric systems without needing to own them, and then relax intelligently with a more modest piece of equipment. Papers were requested by the Secretary for FoMRHI and the Lute Society, but the principal subject may have little historical significance and is concerned mainly with making and adapting present day lutes.

The final scheme could be presented as a neat geometric point, but this would appear too abstract, so some practical background may be helpful. A while ago I had restrung an 8 course lute (No 1) with a fairly large body, wide neck and small rose to give a sort of D minor tuning with 2 single top courses, 4 double courses, and the 2 lowest courses as 4 different basses. Perhaps other enthusiasts have tried something similar. The sound was nice but the strings could not be spaced properly. I also had another 7 course renaissance lute.

Later, I started making a new 8 course lute (No 2), as a reaction to an exasperating DIY job. It then seemed that an improvement could be 2 properly spaced top strings and just 2 extra holes to give five basses spaced more evenly (ie 2x1, 4x2, 5x1, using all 15 pegs) while also retaining the standard 8 courses and the option of a single 9<sup>th</sup>. However, this had the disadvantage of a fixed single 2<sup>nd</sup> course, and lute No 1 might be made into a more suitable full-time 'D minor' instrument. Then I learned that there are larger lutes with a dual use as 10 course renaissance (and possibly transition) tuning, and 11 course baroque tuning. This has been provided by the restorers of the old Sixtus Rauwolf lute owned by Jakob Lindberg. The bass courses are fixed and extra holes drilled to allow respacing of the upper courses, effectively squeezing in an extra single 2<sup>nd</sup> course. This differed from my plan, but it suggested one might be more adventurous. A major consideration is how many holes about 1mm in diameter can be drilled without endangering the bridge. In my schemes, it therefore seemed better to use holes in common for the different stringings. This may not be possible in the 10/11 case where a gradual shift is needed. Next, I drew out further schemes with either single or double strings for 2<sup>nd</sup> courses and for the basses. It became clear that for graded changes of spacing between courses and for the width between two strings in a course, as on most normal lutes, then only about two systems may be possible, as for the 10/11 or 8/11 cases.

After further investigation a very promising solution was found to be a set of holes evenly spaced by about 4mm. This basic unit determines all the different dimensions. Firstly, it fixes the width of a double course; next it allows a general spacing between any courses of 8mm; and also a larger spacing of 12mm particularly for single strings. This permits many different sequences of single and double courses. At the same time it was seen that many types of lute could be imitated. My available width of bridge was 104mm, including an extra 4mm at each end beyond a normal setup. This allows 27 evenly spaced holes with the following schemes.

- 14 single courses for 'theorbo, tiorbino, chitarrone, archlute, liuto attiorbato'.  
13 equal spacings of 8mm = 104mm.
- 13 single courses for a 'later baroque lute'.  
2 upper spacings of 12mm and 10 equal spacings of 8mm = 104mm.
- 12 single courses for a 'French lute'.  
A similar choice of spacings. With only 15 pegs on an 8 course lute a few double courses are possible, but probably less useful than for the following schemes.
- 11 course 'baroque lute'.  
2 single upper courses with 12mm spacings, 4 double courses and 5 single basses with 8mm spacings = 104mm.
- 10 course 'renaissance lute or transition tunings'.  
One single top course with 12mm spacing, 4 double courses and 4 single basses with 8mm spacings = 96mm, and two spacings can be increased to 12mm.
- 9 course 'renaissance lute'.  
One single top course with 12mm spacing, 6 double courses and 2 single basses with 8mm spacings = 92mm, and three spacings can be increased to 12mm.
- 8 course renaissance lute.  
One single top course with 12mm spacing, 7 double courses with 8mm spacings = 88mm and four spacings can be increased to 12mm.

These schemes can be written as lists, with the 10 course case (1x1, 5x2, 4x1), for example, as (/\_12/4/8/4/8/4/8/4/12/\_/12/\_8/\_8/\_), using \_ to indicate the courses. Drawings are clearer. With fewer courses the spacings can be increased. This might be best for single strings near double courses, which also have an effective separation of 12mm between centres or edges. The 2<sup>nd</sup> to 3<sup>rd</sup> space can also be increased. These arrangements show clearly how room for extra courses has been gained by reducing a double course to a single string, and by a slight general shrinking of all the normal spacings to 4 and 8mm. One could go further and increase some or all the spacings for 7, 6 courses, and even 5 or 4, on the basic 8 course lute.

The same principles could also be applied to adapting larger lutes, but perhaps not if a good instrument thereby loses considerable value. For example, 10 or 11 courses could be increased to 12 or 13. Lutes with 15 courses may be scarce, but the 'angelique' with 16 or 17 single courses would need 9 normal courses. Lutes with 7 normal courses would be less useful.

In the area of larger renaissance lutes, usually for consorts, the present schemes are not relevant. The main purpose would be different pitch and tone rather than the number and arrangement of courses, and the only very rough solution would be changes in gauge and tension (see Refs).

The basic 4mm equal spacing of holes provides a unique and very fortunate solution. It is conceivable that no solution may have been possible if the lute had some other basic configuration. This can be seen as follows. Spaces of 3½ mm are too small, especially for bass courses; the spacing between courses would be lower at 7mm, but useful for some at 10½mm, and too high at 14mm. Larger spaces of 4½ and 9mm would be good for lower courses, but allow fewer extra courses, and 13½mm is also too large. By similar reasoning, a much smaller basic spacing of 3mm would not be useful, and 2mm would also weaken the bridge. There was little fear with 4mm spaces because, in terms of strength, a normal bridge is similar for each course and the extra holes roughly halve the spacing between courses. This simple procedure would not be useful for modifying a normal lute.

After thinking this over, I drilled 27 holes 1mm in diameter, before gluing the bridge. The holes needed to be very evenly spaced, but it was chance that my maximum width on the bridge was

104mm giving an exact 4mm spacing. For a width of say 109mm careful equal division would be needed, rather than trying to measure 4.19mm spaces. Also the bridge needed positioning so that the top treble string was about 3mm inside and parallel to the edge of the fingerboard. This placed the bass end closer to the body side, needing appropriate changes for the internal bars, and the bass strings were also made slightly longer (see Refs). The next important factor is the nut, and an individual one could be made for each stringing. It was sufficient to make a single nut of strong bone with 27 grooves evenly spaced by about  $2\frac{1}{2}$ mm, in scale with the bridge. The use of the grooves could exactly mirror the bridge scheme, but it is better to choose smaller spacings for the lowest unfretted basses, and larger spaces for the upper courses, similar to the grading on a normal lute. The nut overhung the bass side of the neck by 7mm, as in 10/11 course conversions. This carries two bass strings and increases the spacings. (It might be asked why a longer bridge was not made, then a new neck and pegbox, but this just leads to say an 11 course lute with a small body and the initial requirement for multiple schemes.)

Lute No 2 is now strung with 10 courses as listed above, in a transition tuning. It is seen that the four single basses are not spaced equally, and it is better at present to have the extra 12mm spacings continuing the effective spacing between the centres or edges of the double courses. This extra spacing could be removed or shifted. Equal spaces of 10mm would need just two extra holes, but any alteration for one stringing is best left until all the others have been tried. Similarly, the second hole at the treble end is not essential but could allow a more central positioning of any schemes with fewer than 9 courses.

Returning to lute No 1, I wanted to improve the 11 course option. It was useful to play lute No 2 for a while before deciding on a scheme and the delicate job of making new holes quite close to the original 15 holes in a bridge already glued on the belly. The aim was to make good use of existing holes but, even so, 8 new holes were needed for the stringing scheme listed above, including some grading of spacings as on a normal lute, and well-spaced basses. The smallest width of wood between holes was about  $1\frac{1}{2}$  mm in two necessary places. (Michael Lowe told me that on the Rauwolf lute two holes were so close that a slot was filed. I avoided this, but slight widening of holes might provide a fine adjustment of spacings.) It is remarkable that while 12 extra holes on a new design gave so many schemes, 8 holes were needed for one more scheme on an existing lute (plus 9 and 10 course versions with a single 2<sup>nd</sup> course).

Some practical details may be useful for anyone tempted down this path. Accurate positions are needed, and a good point to make an impression for a drill. I had heard that special bits and rigs were necessary for drilling a bridge fixed on a lute. However, I had previously enlarged holes on another lute to fit gut strings. A hole 1 inch deep was drilled down the axis of a 9 inch length of  $\frac{1}{4}$  inch dowel, and the shank glued in. A similar hand-held 'drill stick' proved accurate for making the extra holes, starting with the less critical ones. Position and alignment could be judged well and, with a sharp drill frequently cleared of waste at the tip, the job took a careful couple of hours. A new nut was made with 15 grooves, graded spacings and a 7mm overhang. This dual purpose lute No 1 is now strung for 11 course 'D minor' baroque use, so in this standard tuning the multipurpose lute No 2 might only be needed as a comparison. Both lutes presently have frets set for equal temperament, which may be appropriate for this later music.

The strings I have used are nylon, PVF and metal overwound types (see Refs on all the following matters). The obvious necessary compromises in pitch, tone quality, and single instead of double courses certainly mean that many expensive gut bass strings need not be a temptation. The thinner metal-wound basses are better with the smaller spacings, and as single courses they produce a good strong tone, whereas gentler gut would need brighter octave strings. Pyramids were used because I already had a collection, and the metal windings are durable for future changes of setup. Regarding pitch and string gauges, it is better to have a top string of about 0.45mm rather than try to lower pitch with thicker strings, which will sacrifice brightness and make all the lower strings feel too heavy. The tonal difference between, for

example, a normal baroque lute in F, or modern E, and a modified G lute need not be a great problem since the former can have fairly small bodies etc, and the latter can be relatively large and rich sounding. Some players may even descend to a modern d' on a top string of great length.

This criterion would give a 'D minor' tuning as: g', e', b, g, e, B; A, G, F<sup>#</sup>, E, D; and then transition tunings as: g' / f<sup>#</sup>; e<sup>b</sup>; c / b; a<sup>b</sup>; e<sup>b</sup>, B<sup>b</sup> and 4 basses to E<sup>b</sup>. Three main transition tunings can be obtained with changes of only a semitone in the 1<sup>st</sup> and 3<sup>rd</sup> courses and a semitone for most basses. 'Flat French' needs f<sup>#</sup> and b; 'Mesangeau' f<sup>#</sup> and c; and 'Gaultier' g' and c; but less common 'Sharp' tunings would need g<sup>#</sup>. However, it can be seen that to obtain a 10 course renaissance tuning from the transition scheme would require two large jumps to b<sup>b</sup> and f' for the 1<sup>st</sup> and 2<sup>nd</sup> courses. This is just about possible with a slightly smaller gauge and higher tension for a top string, and a new 2<sup>nd</sup> course. More conventionally, on account of the original fragile gut trebles, and because thicker strings or lower tensions are not acceptable on the upper courses, a change between renaissance and transition tuning requires restringing all the 9 lower courses, even on normal lutes. It can also be seen that transition tunings could be obtained from a 'D minor' tuning by sharpening the 3<sup>rd</sup> and 4<sup>th</sup> courses by a tone or less, and sometimes the 1<sup>st</sup> by a semitone. This would have a single 2<sup>nd</sup> course, but it involves far fewer string changes and could also be useful for normal lutes.

Historically, the original makers adapted the 10 course renaissance range of say g' to C by removing the lowest heavy strings, and redistributing the tuning to obtain their ideals in tone and resonance, while the lutenists invented a new and influential musical style. Courses 11, 12 and 13 later restored the heavy basses. Modern comparisons, involving as many as ten tunings, are often based on a 6<sup>th</sup> course renaissance G, or a baroque A lowered from B by a greater string length but with the G effectively moved down to the 8<sup>th</sup> course. This tends to disguise the history and practical concerns, and additional reference to a fixed top string is useful.

After modifying a lute, it is reasonable to look for an added convenience of less string changing and retuning. As shown above, there is some scope for using intermediate strings biased towards favourite tunings, but the full range between the two main tunings 'renaissance' and 'D minor' is too large to span properly. Ironically, with fine normal lutes full restringings may be considered more essential and so discourage exploration, but even here some strings might be reused on other courses. More could be said on these technical matters.

The remaining distinctly different tuning is for theorbos etc, and I may start in a few months with the top three courses at f', c', g', leading to a 14th course E<sup>b</sup>. It is worth noting that while a normal theorbo is a sixth lower in A, there were also higher instruments in D for solo music and even a tiorbino in A, a third higher than my scheme. The long bass strings did not need octaves, and on many modern instruments all the courses are single. Later instruments also had shorter basses as metal windings became available. These points may be some support for the single courses on many of the present schemes, and also indicate that there may not be a great problem or danger in becoming accustomed to single courses.

It is not suggested that one turns up with a multipurpose 'chitarrone' for a performance of Orfeo, but an 'innocent ear' or recording could be interesting with the 9 to 13 course schemes. The long history of lutes has produced so many different types that there are considerable problems in choosing what to play and own. Any thought of 'all purpose and good for nothing' need not be a deterrent since I have already had more use and satisfaction out of both modified lutes in a few months than any screwdriver set, etc. If anyone feels like modifying an existing lute for dual purpose, or adapting a design to build a multipurpose lute, then this plan would allow them to 'have a go' at many types of lute music. In woodworking a useful maxim is 'measure twice and cut once', which must be preceded here by thinking many times. However, a scheme could be altered or removed by carefully gluing strands of wood in the holes, which could even strengthen the bridge, or fitting a new one.

**How big is a lute? – the statistical evidence from hand sizes**

(The statistics for this article appeared originally in the *Lute News*, the Lute Society Newsletter no. 78)

**Introduction**

Since I first took up playing the lute in 1973 I have been concerned about problems with certain hand stretches given in many tablatures. My first two instruments had vibrating lengths of 60cm followed by another two at 55cm, all four with the upper course tuned to 'g' at A=440Hz pitch standard. One of the latter pair has but three supporting bars under the belly, strung in gut throughout, and gives a good rich resonant tone at this length.

Key to my enquiries was the observation that many of the pieces I had found difficult to play at 60cm because of awkward barrés became much easier at 55cm. Yet the observed wisdom amongst players, exemplified in Robert Lundgren's book on Historical Lute Construction, is that the preferred 'mean' lute should be longer than 60cm.

I wanted to know if there were anything exceptional about my hand size that discouraged me from playing larger instruments.

**Statistical evidence**

I'm lucky to be employed to teach students (chemistry) in an FE college in Bristol and even luckier in that they were keen to help me with assembling evidence. Needless to say they are non-lutenists though with a smattering of amateur guitar players amongst them.

I took my sister in law's unstrung guitar, stuck a centimetre scale to the fingerboard next to the treble edge, starting at the 'b' fret and took it into college.

I asked them to barré behind the 'b' fret and stretch out their little finger as far as it would reasonably go along the scale, then place the remaining fingers on the fingerboard and finally, to place the thumb behind the first or second finger – whichever was the more comfortable. I measured the length from 'b' fret to the tip of the little finger along the scale.

**Results**

| Stretch (mm) |
|--------------|--------------|--------------|--------------|--------------|
| 135          | 125          | 115          | 105          | 105          |
| 110          | 100          | 125          | 125          | 100          |
| 110          | 120          | 105          | 105          | 120          |
| 145          | 80           | 90           | 110          | 105          |
| 110          | 90           | 130          | 130          | 140          |
| 110          | 100          | 145          | 130          | 90           |
| 110          | 130          | 100          | 120          | 110          |
| 120          | 100          | 115          | 120          | 105          |
| 150          | 110          | 110          | 115          | 105          |
| 110          | 110          | 120          | 100          | 115          |

The distribution looks reasonably Gaussian so I calculated the mean value at 113.2mm and the standard deviation (n-1) as 14.7mm giving the corresponding range

of lute vibrating lengths as mean 58.1cm, plus one standard deviation 65.7cm, minus one standard deviation 50.6cm.

(Approximately 64% of hand sizes will lie within one standard deviation of the mean and 95% within two standard deviations).

### Discussion

*How reasonable is my criterion of barré stretch?*

I set this 'b' to 'f' fret barré as the biggest stretch I had ever had to use, but it occurs to me that not all tablatures need such stretches. To that end, I consulted a range of facsimiles to see how often it turns up.

Capirola lute book		5 fret stretch present
Casteliono lute book		5 fret stretch present
Attaignant	Tres Brève etc.	3 fret stretch present
Dowland	Lachrimae	5 fret stretch present
Molinaro	1 <sup>st</sup> book	5 fret stretch present
Robinson		5 fret stretch present
Euing		5 fret stretch present
Adrienssen	Pratum Musicum	5 fret stretch present
Rbt. Dowland	Varietie	5 fret stretch present
Board	Pre-baroque	5 fret stretch present
Denis Gautier	Pièces de Luth	4 fret stretch present
Mouton	Pièces de Luth	4 fret stretch present
Kellner		4 fret stretch present
Conradi		3 fret stretch present
Lauffensteiner		3 fret stretch present

My stretch at 11cm lies exactly on the mean of the statistics – it's always nice to know that you aren't deviant – and so I have to be prepared to use such stretches or modify the difficult chords in much of the earlier repertoire unless I wish to restrict severely my choice of music.

*The evidence of surviving lutes suggests that they should be bigger than 60cm.  
You b\*ggers must learn to stretch*

When I submitted these statistics to the Lute Society Newsletter I challenged teachers to provide some evidence for how much one might expect a stretch to grow with practice. None has been forthcoming; indeed, I have neither heard nor seen any discussion of the paper – perhaps the evidence was inconvenient and better ignored.

*I don't have difficulties with 60cm instruments or larger, why do you?*

Perhaps your hands are larger than mine. I wonder how the statistics of current players would look against the non-players in my first table? Is it possible that beginners give up because they can't manage the current size of instrument, let alone the larger ones proposed?

To set the record straight, I have built six course and eleven course instruments with vibrating lengths in the region of 67cm and I find them perfectly playable provided I don't try any pieces with heroic chords. Perhaps they had bigger hands back then?

*Why not modify that difficult chord?*

That would imply that the composer or printer didn't know what they were doing. If they could play it, so should I, though it might explain different manuscript versions in different keys to get round the problem.

*Your statistics imply shorter lutes than the historical evidence records.*

Surely – historical survival is often a chapter of lucky accidents – if an instrument looks good, freaky, or can be converted into something more useful like a baroque lute or a mandora it survives. Humdrum instruments get used, broken and forgotten when the fashion passes and this is likely to lead to skewed statistics when you try to research survivors. I'm sorry if this sounds dismissive of the research of lute historians but it has to be recognised as a constraint on the quality of any historical evidence.

*So do I follow the evidence from surviving instruments or build something that fits my hands?*

Thomas Mace is quite clear on this in chapter three of *Music's Monument*:  
'The first thing to be thought upon before you begin to learn must be to get a good lute and of a fit size for your hand..... for I have known some young persons so discouraged under the sense and inconvenience of a bad and ill contrived instrument that in short time they have grown out of love with their undertaking...'

*I don't feel comfortable playing a smaller instrument at the same pitch alongside longer instruments at the same pitch.*

If it's resonance that's troubling you, try reducing the number or strength of bars under the soundboard – it works a treat. If it's the apparent mismatch in length, back in historical times thicker strings give a lower pitch and were used to allow for this (Mace comments on this). Not everyone could afford the thinnest high quality guts, anyway.

Standardised lutes sizes and pitches are very much a product of modern social duet or consort playing. For a parallel, gatherings of Northumbrian Small Pipe players have similar problems. All the instruments are hand built to slightly different tunings and pitch standards and I have been taken to task for using a perfectly good chanter reed ostensibly because it was out of tune when it was merely working at a fractionally higher pitch. It's not a problem for solo pipes as they were intended to be used but a real problem when playing in groups.

### **Conclusion**

If it's frustrating playing an instrument that is too big for you, get something built that you can play, even if it's a bit shorter than the norm, and use slightly thicker strings if you want to play along with others – there's nothing unhistorical about this.

Eric Franklin, January 2010 (briefly revised).

**Five alto recorders by Bressan: windways and blocks**

In Comm. 1880 I have written in the conclusion some remarks about the necessity to obtain accurate measurements of windways (blocks, etc.) of historic recorders, this for coming closer to the 'soul' of these instruments. But it is today in many collections not allowed to remove the block, and that is essential to get an idea of the parts which are important for the voicing of the recorder. Most copy makers are restricted to use existing drawings with measurements, hoping that they are precise and also informative. And to get a good idea how a woodwind maker has worked in the past, it is good to compare as many data as possible from various instruments by that maker. I did this recently when I wanted to make a copy of an alto recorder by Peter Bressan, the famous woodwind maker who was born in 1663 as Pierre Jaillard in Bourg-en-Bresse (France) and who started to work in London in 1688. Phillip Young (1990 *Historical Woodwind Instruments*, London 1993) mentions 3 traversos and 51 recorders (of which 27 altos) with the Bressan stamp. Of these altos, I found only five with drawings, published somewhere or available from the collections or owners. There must be many more measurements, but it is difficult to obtain them. At last, I could use drawings and measurements of five different alto recorders by Bressan:

a- Oxford, Bate-Collection (ex-Hunt), Inv. No. 0112. Boxwood with ivory rings.

This is the famous recorder once in the possession of Edgar Hunt. Drawings with measurements by Fred Morgan and Friedrich von Huene. And I have additional information by Toon Moonen, the former founder of the Bouwerskontakt (Toon died in 2004). I found a drawing and some measurements of a Bressan alto, by Von Huene in the book *Musikinstrumentenbau* by Günter Dullat (published by Moeck Germany, as No. 4040 in the series of Moeck publications) and discovered that these data were from the ex-Hunt Bressan.

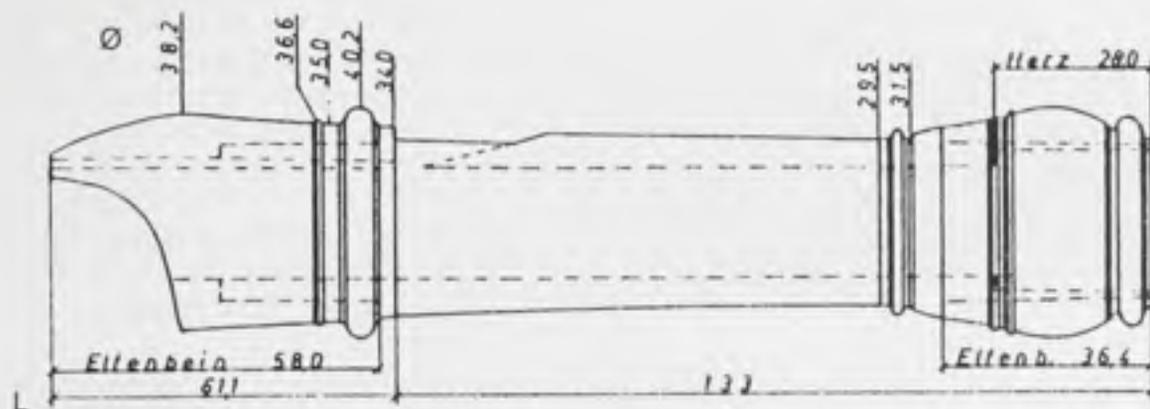
Frans Brügger played this recorder (Telemann Fantasien) for a gramophone record (Teldec SMA 25 073-T/1-3, with other recorder recordings by Brügger also sold by Teldec on a set of 12 compact discs, some years ago, but sold out).

b- Tokyo, Ueno Gakuen museum, Inv. No. ?. Alto recorder in fruit wood or boxwood, with ivory rings (not at the 'mouthpiece'). This instrument was in bad condition, with repairs at windway, block and labium. A copy of a drawing with measurements (made by S. Hirao) were given to me by the staff of the museum.

c- Frans Brügger Collection, No. XI in the set of drawings by Fred Morgan, published in 1981 by ZenOn (Tokyo). This recorder (boxwood with ivory rings) was once shortened. Hans Coolsma has restored the instrument and made also a new block.

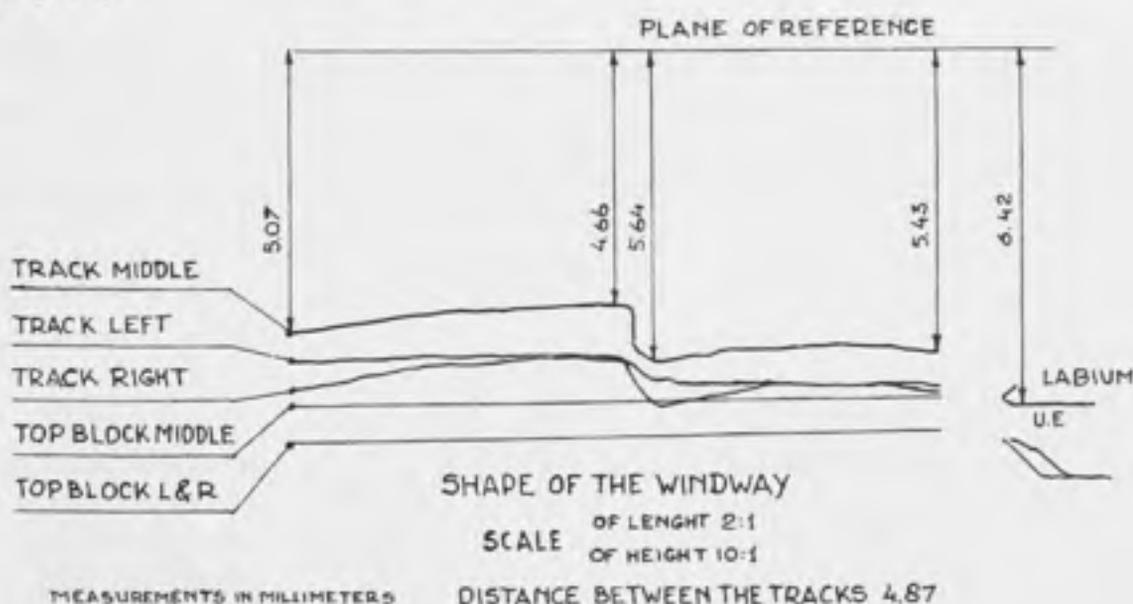
d Frans Brügger Collection, No. X in the same set of drawings. This recorder (also in boxwood with ivory rings) is in fine condition and was recently played by Heiko ter Schegget on a cd with Handel sonatas (MDG 905 1564-6).

e- Berlin, Germany, Staatliches Institut für Musikforschung (Museum of Musical Instruments), Inv. No. 2801. In boxwood with ivory rings. There is an old set of measurements, which are not so useful, and an newer drawing by Jean-François Beaudin (which some annotations in French), which can be bought from the museum.

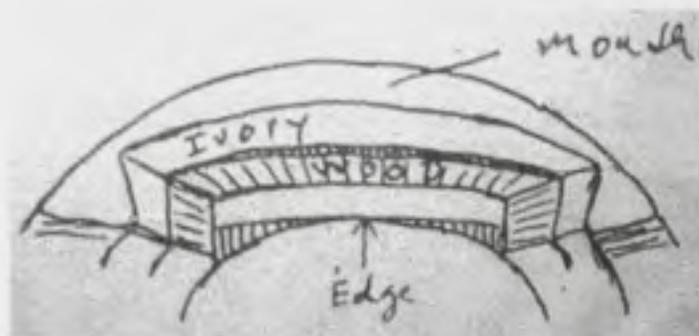


Cross section of the head of alto a- (Bate collection), after a drawing by Friedrich von Huene, published in the book 'Musikinstrumentenbau' by Günter Dullat. In this drawing you can see that the first section of the windway is cut in the ivory ring ('Elfenbein'), and in the second section in the wood.

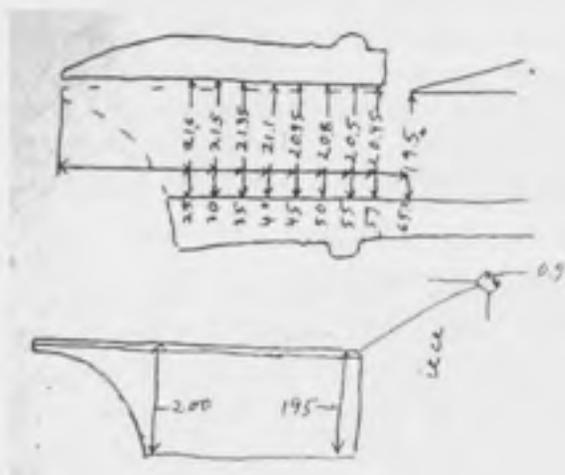
There is a problem with the windway in Bressan's alto a-: Toon Moonen saw and measured a big ridge or step (of about 1 millimeter, see graph below!) in the windway roof at the point where wood section begins. The only reason for that is that the box-wood has warped and shrunk considerably more than the ivory ring. But did this shrinking happen after the recorder was given to the museum, and was not be played regularly as it was by Edgar Hunt? Morgan and Von Huene did not mention such a big step.



Windway measurements by Toon Moonen of Bressan alto a- in Oxford. Moonen measured the distance from three parallel tracks at the windway roof to a plane of reference above the head joint. He did not explain in his drawing about the technics of of this measuring. An interesting detail: the edge of the labium is slightly undercut over a short length (U.E in the drawing). This has an effect on the step (the difference in height between windway roof and lower side of the labium edge). The surface of the block is straight (in length direction).

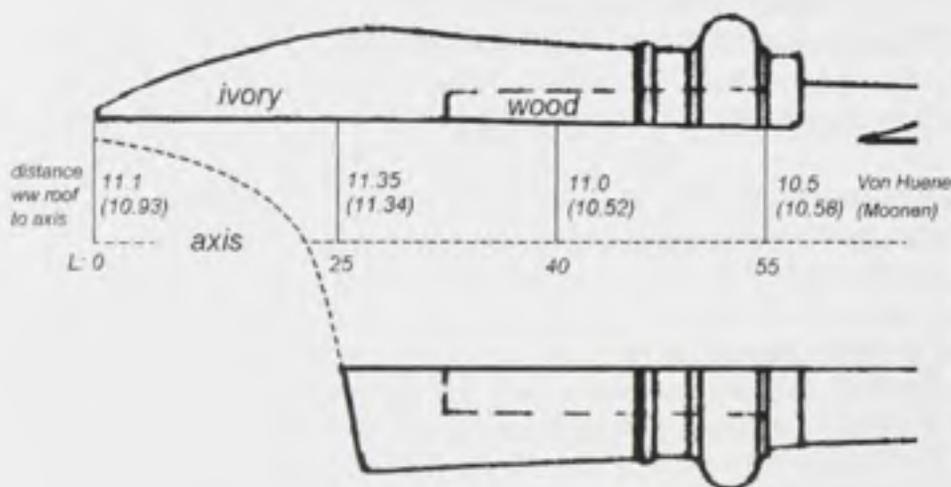


Left: sketch by Von Huene of the windway of alto a-; the ridge between ivory and wood is clearly visible, but is not so in the table with vertical measurements (left below). The other table gives a list of horizontal measurements; further: a drawing of the block and chamfers by Von Huene in the topsection of Bressan alto a- (from photos, taken from a screen of a microfiche reader).

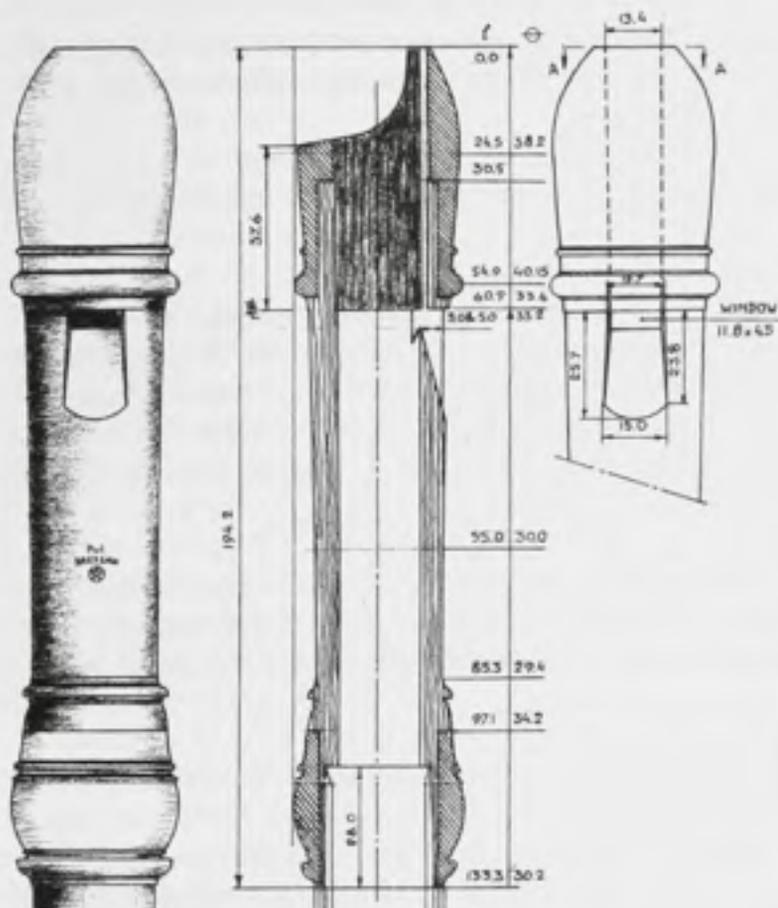


Bore of head piece		
dist.	φ	
40	202	max
55	200	"
60	199.5	"
65	198	
70	197	
80	195.5	
90	195	
100	195	
120	195	
164	194	

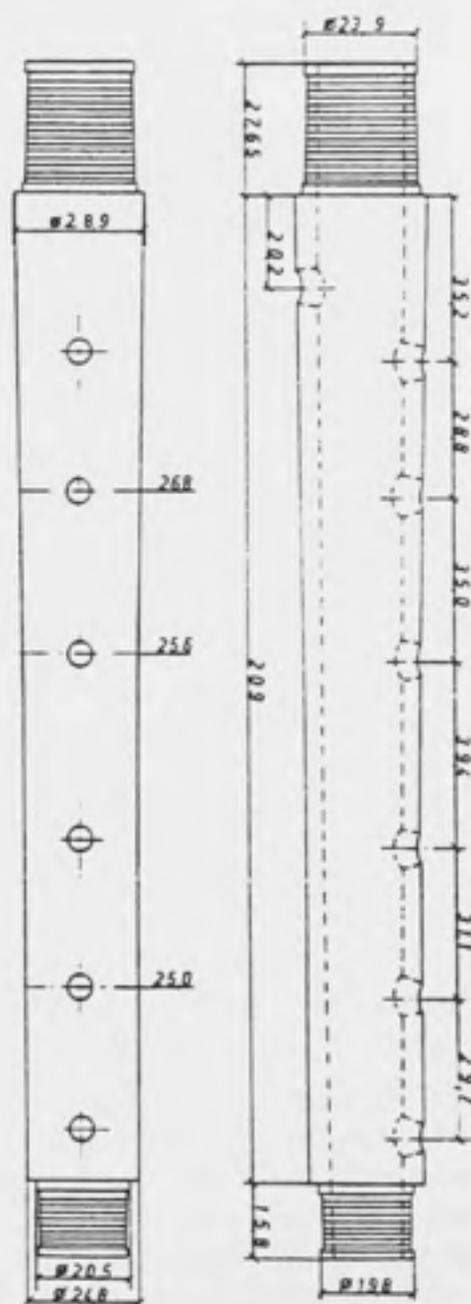
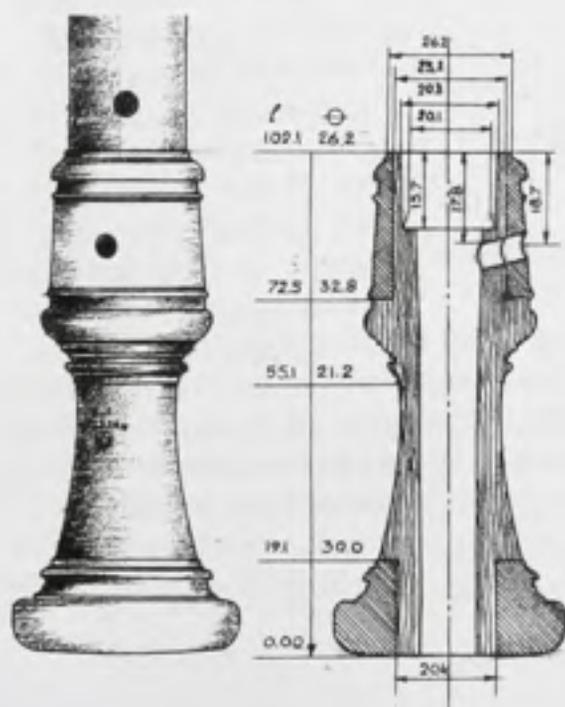
From these data by Von Huene it is possible to calculate the length profile of the windway roof of this recorder, just as I explained in Comm. 1880 (p. 31). In the next drawing I have compared the results of these calculations (upper row) with the measurements of Toon Moonen (lower row, all distances from windway roof to the axis of the head).



Only at L-40 is a greater difference between the two sets of measurements, and that is just in the wood section of the windway roof, where Moonen found (in 2002) much more warping than Von Huene about 30 years earlier.



Bressan alto recorder a- (Bate Collection);  
 drawings of head and foot by Toon Moonen,  
 middle joint by Von Huene (published in Dullat  
 Musikinstrumentenbau).



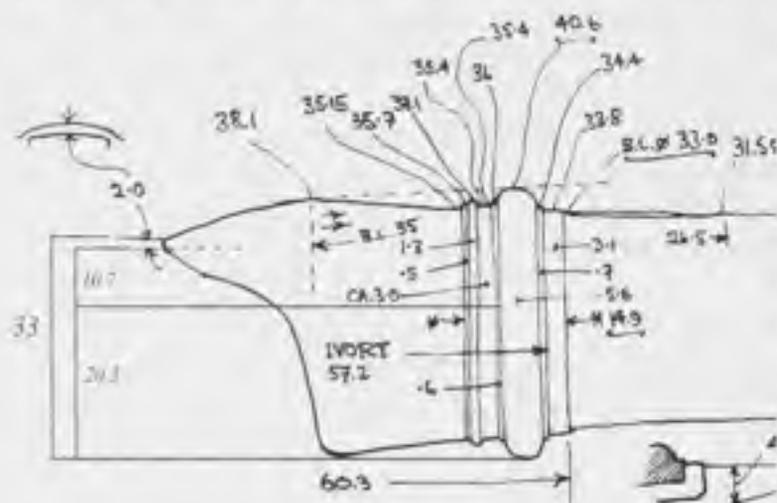
The general direction of the length profile of the windway roof of alto a- is slightly descending from North to South. However, the effect of irregular warping of the wood (resulting in ovally shaped cross sections) can be big. The problem here is that both Morgan and Von Huene give no, and Moonen only very little information about this warping. The only thing I could discover that near the window the vertical height of the bore is about 0.4 mm smaller than the horizontal width; this difference can also be seen at the exterior of the head at that place.

About the block of Bressan alto a-: the surface seems to be in length direction exactly flat, which is rather remarkable. On most baroque recorders the block surface has a slight concave profile.

The drawing of the alto recorder b- in Tokyo gives no information about the profiles of the roof and floor of the windway: Hirao gives the remark that the 'windway is very much scraped away, it makes the sound very noisy and resistance lower'. It seems that also some wood is scraped from the candle flame, that is the transition from the edge to the bore. The block of this recorder was revoiced in 1966 by Carl Dolmetsch. Hirao gives no further measurements or a description.

About the two Bressan recorders in the Brügger collection: Fred Morgan gives from alto c- two series of measurements: the width of the bore (B), and the height from the roof of the windway to the bottom of the bore (A, not measurable in the beak section, where there is no bottom).

Subtracting the half of the B-measurements from the A-line gives the distance from windway roof to the bore axis of the head joint. This graph is nearly horizontal, but how is the direction over the first 25 mm, in the beak section?



drawing the table distance, 33 mm from the table surface to the top of the ivory at the windway opening (see the drawing left). Bressan was so kind to turn the ivory rings at both ends of the head to the same diameter (40.6 mm), which made the calculations easy: we find a distance of 10.7 mm from the windway roof to the axis of the instrument. That means that over the first 25 mm the windway roof is (only) slightly rising.

table distance and measurements alto c- (drawing by Morgan, calculations added by Jan B.)

However: we must consider that these calculations are

not very accurate: there is not only the disturbing effect of the warping of the wood and ivory (Morgan didn't give any information about that), there is also the problem of augmentation of the rounding off faults during the calculations. As we are trying to or copy windways with an accuracy of 0.1 mm, these faults can have a disturbing effect on the results. The block of alto c- was made by Hans Coolsma; there are some measurements on the drawing.

About the other Bressan alto (d-) in the Brügger collection: it is so strange that Fred Morgan didn't give a full list of windway measurements, as this recorder is preserved much better than alto c-. We can only calculate the distance from the windway to the axis at the opening (again by calculating from the table distance) and at the south end. We see then that this windway is slightly rising (0.3 mm). The block of alto d- is likely original, and is in good condition with a slightly (maximum depth 0.2 to 0.3 mm) concave length profile.

The Bressan alto e- in Berlin was measured by Jean-François Beaudin. He gives in his drawing a table with measurements of the 'hauteur du couloir' (height of the windway), from L 23. In another table we find the bore measurements (only one series, with the widest of these measurements). By calculating the distances to the axis, just as we did with Bressan alto a-, we see that the windway of alto is slightly descending, from 10.5 mm at L 23 to 10.3 at L 30, and 10.2 mm at the south end. We must know that also on this recorder the first part of the windway goes through the ivory ring, and the second part through the wooden body of the instrument. Near the window there is some warping: the maximum diameter of the ring just above the window is 0.4 mm thicker (in horizontal direction) than the other measurement.

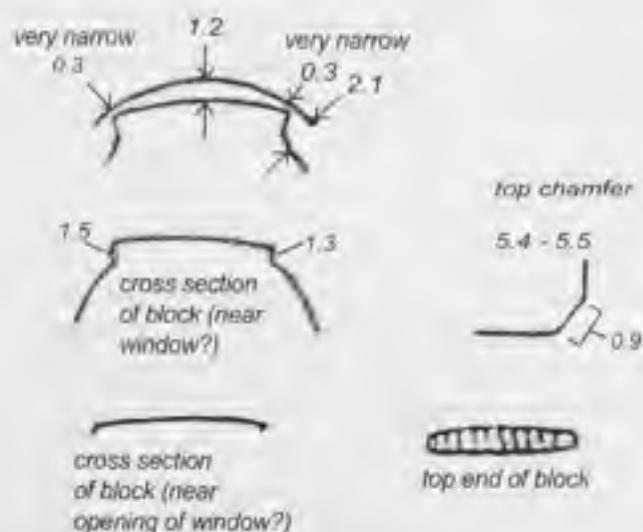
Beaudin gives surprisingly no information about the dimensions of the block.

Preliminary conclusion: it is difficult to tell how the windways were designed by Bressan: the directions of the windway roofs seem to be more or less parallel to the axis of the head joints, or only slightly rising or descending, and not very much curved.

The effect of irregular warping of wood (and or ivory) is rather big. About the blocks: we have more or less complete information about of only two of them (altos a- en d-).

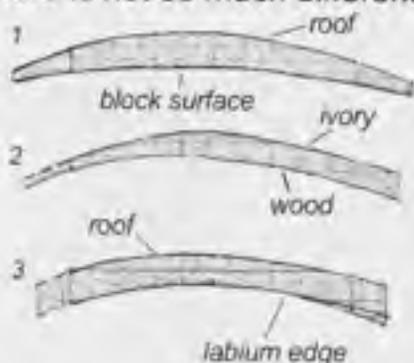
But there is some clearer information about the cross section of the windways. The sketch by Von Huene of alto a- seems to be fairly accurate (see illustrations at the top of the third page of this article), and shows that the curve of the labium edge is

flatter than the curve of the roof of the windway at the opening. That corresponds with the information in the sketches made by Morgan (and which are - together with the sketches and measurements by Friedrich von Huene - in the set of drawings of this instrument, which can be ordered from the Bate Collection in Oxford). The windway opening is crescent-shaped. Eric Halfpenny made a remark about this shape in an article in the Galpin Society Journal in 1956 ('The English baroque treble recorder'): *At the top the windway slit is crescent-shaped, i.e. set on a*



*very slight 'thumb-nail' curve, widest at the centre line and narrowing to the edges. The crescent section favours maximum air-pressure down the centre region of the windway, and in practice it has been observed that this 'feathers' unwanted moisture to the edges, where it drains away without trouble. These instruments are, in fact, notably free from 'clogging', the besetting evil of so many modern recorders.*

I myself don't know if Halpenny's use of the term 'air-pressure' is correct; I suppose that *air flow* is better. Besides that, I have seen many baroque recorders with parallel top and bottom curves, which also do not have clogging problems. And also on the modern copies, I have rarely seen crescent-shaped windway cross sections, and never so marked as on the Bressan alto in Oxford. At the lower end of its windway, there is not so much different in height between the centre and the edges. From



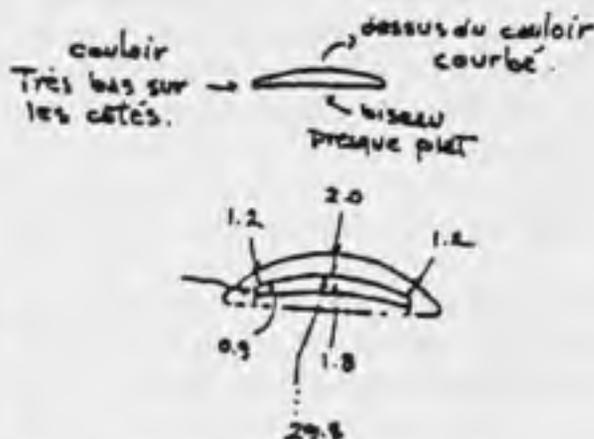
Toon Moonen's exact measurements of these heights, I have drawn the curves in a graph (see illustration left). 1- is the cross section at the windway opening; 2- shows the step in the windway roof at the transition from the ivory to the wood section; 3- gives the cross section at the lower end, with the labium edge. At this point the surfaces are more strongly curved than in the sketches by Morgan and Von Huene. It is a pity that Moonen - who produced an excellent technical drawing of the Bressan recorder -

did not make some sketches of these might have provided useful additional information.

In the windway of alto recorder e- in Berlin we see in cross section a different shape of the windway.

The opening is wider: 1.8 in the centre, 0.9 mm at the left side (see illustration right, from the drawing by Beaudin). But here is the labium edge ('biseau') much flatter, which makes the height of the windway ('couloir') very low at the sides.

There is always the question if there has been more of less severe warping of the wood. I do not know how this alto recorder sounds at the moment, or even if it is playable at all. Beaudin gives no information, he only makes the remark that the pitch of the recorder is a 410 Hz.



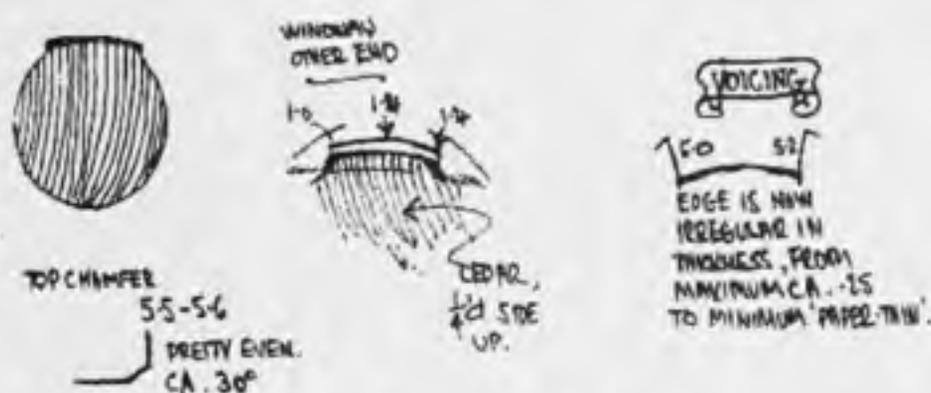
block  
(by Hans Coolsma)



Of alto c- in the Brügger collection gives Fred Morgan only a sketch of the opening (which is very worn). I assume that Hans Coolsma made the curve of the block parallel to the curve of the labium edge. The sketch by Morgan (left) of the lower end of the block gives also an indication of the curved shape of that labium edge.

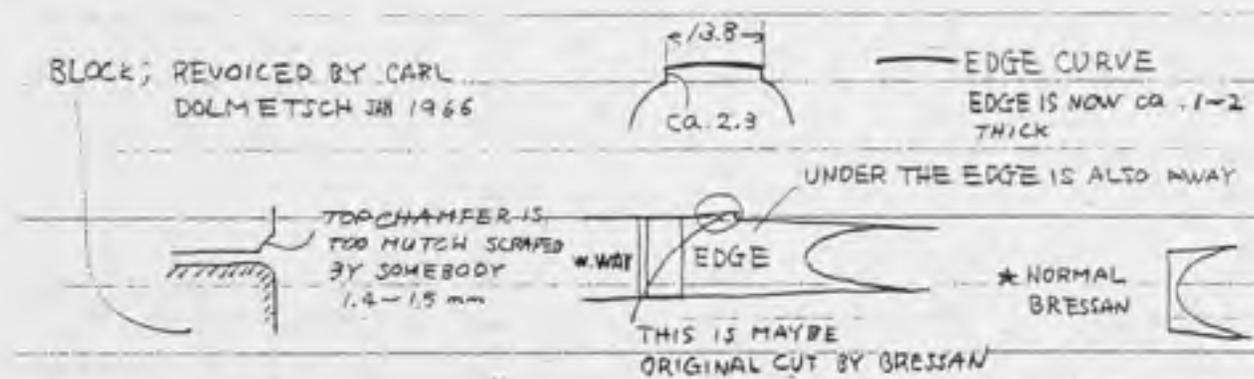
Morgan was more comprehensive with information about the cross sections of the other alto recorder (d-) by Bressan in the Brügger collection (see illustration next page), however not giving a sketch of the curve of the roof of the windway near the window. The drawings by Fred Morgan are often very detailed, but also rather complex, and never made in a 'technically correct'

way, without explanations. They are fully understandable only for people who have measured recorders themselves. I myself do not know exactly how Morgan measured the top chamfers. What exactly do the data 5.5 - 5.6 for the top chamfer of the alt recorder d- mean? I think now (but am not sure) that he measured the distance (height) from the top of the north face of the window to the top edge of the chamfer. Or is it the distance from the labium edge to the most far end of the chamfer, inside the roof? But how did he measure that?



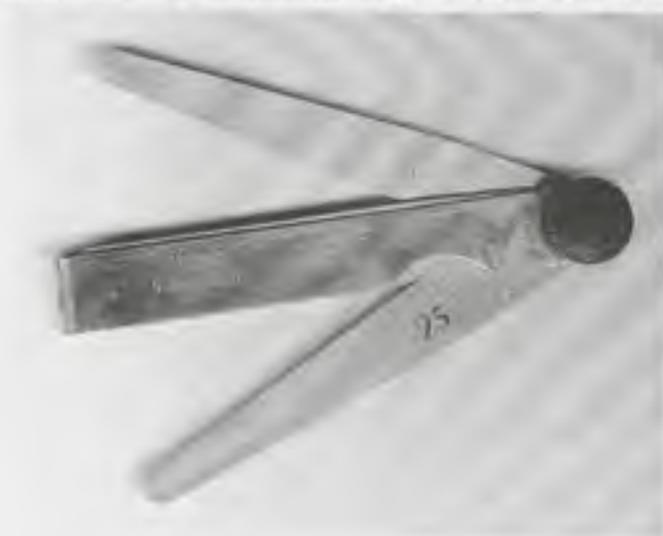
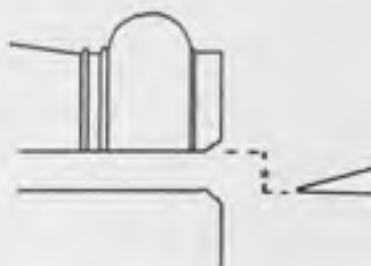
*Alto recorder d-. voicing details, from the drawing by Fred Morgan*

Finally, Hirao gives some detailed sketches of the curves of the windway roof (at the opening, where the width is 13.8 mm) and of the edge of Bressan's alto recorder b- (see illustration below).



My impression is that the windways and labium edges of the Bressan recorders are in average slightly more curved than I know of recorders by most of the Dutch makers (whose instruments I know best). It is perhaps also a proof of the craftsmanship of Peter Bressan: my own experience with making windways, combined with observations on historical instruments, is that windways become flatter when you are working sloppy. Of course, there were (and are) recorder makers who prefer windways and labium edges which are flat (in cross section, sometimes however at the same time sharply domed, such as we see on recorders by Willem Beukers). However, I do not know the effect to the sound and other playing characteristics of a windway which is - in cross section - flat, or more curved. The side walls of the labium at the point of the labium edge are slightly higher (of course also depending on the thickness of the wall), which has some influence on the sound (stability of some tones) and also the general pitch of the recorder.

The step is the effective difference in height between the windway roof (just before the window) and the lower side of the labium edge (south of the window), see \* in the drawing (right). The height of the block has no influence of the size of the step. As the general shape of the bore in this section of the head is most likely conical, we must measure (or better: calculate) these heights in relation to the axis of the head. The thickness of the labium edge is a difficult thing to how



Fred Morgan exactly and the others has done that. One possibility: comparing (by looking through the windway) the edge with pieces of metal with various thicknesses (see photo, left; there are more blades in this tool, of which I do not know the English name; visible are the blades with 0.25 and 0.30 mm).

The step heights:

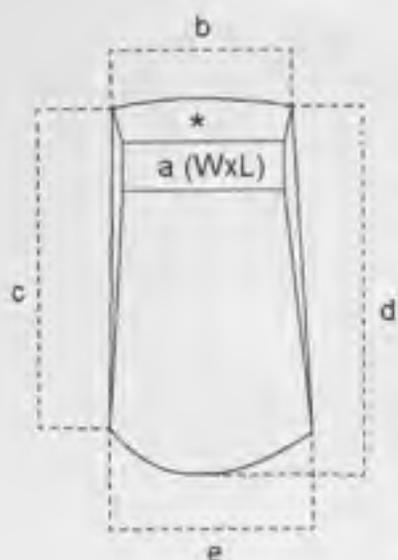
alto:	a-	b-	c-	d-	e-
step (height)	0.95	?	0.95	0.8	1.0
labium edge (thickness)	0.3/0.35	0.1/0.2#	0.25	0.25##	?

#: labium not in original condition

##: labium edge irregular, in some parts 'paper thin'

Conclusion: the steps of these Bressan alto recorders are not very low (which should be about 0.5 - 0.7 mm), but average (0.8 mm) to moderately wide (1.0 mm). I have not enough information about the thickness of the labium edges of other recorders, but from my own experiences I know that everything below 0.2 mm is very thin.

One of the outcomes of the measurements is that we can figure out the relation between the surface areas of the opening (north end) and exit (south end) of the window. The crescent shape of the opening of some of the altos is a complication in assessing the surface of the opening and for the other end, we must not measure the step, but the distance from roof of the windway to the surface of the block, just before the chamfers. It is easier measuring on the Bressan copy I have made, and there is a ratio of about 1.7 to 1 for opening and exit of the windows of that instrument, which gives for me a very good degree of breath resistance. I have measured similar relations on a Terton alto recorder, one of my favourite instruments.



It is now time to discuss some measurements of the windows and labiums of the Bressan altos.

In the illustration at the left I have indicated the most important of these measurements:

- a: window (width x length)
- b: upper or external width of the window at block line (\* is 'north face' of the window)
- c: length of side wall of labium (including window)
- d: total length of labium (including window)
- e: maximum width of labium
- f: (not on illustration); external  $\varnothing$  of the wood at window (close to the block line)

	a	b	c	d	e	f
Bressan a-	11.8 x 4.4/4.5	12.7	23.8	25.7	15.0	33.2
Bressan b-	11.7 x 4.7	13.1	21.6/21.8	26.2	15.5	32.9
Bressan c-	11.5 x 4.6 (4.3)#	13.3	19.9/20.6	26.5	15.3	33.0
Bressan d-	12.0 x 4.6 (4.2)#	12.4	22.6	26.5	14	?
Bressan e-	12.0 x 4.5	13.3	21.8	26.8	15.1	32.7

#: Morgan measured maximum windway lengths of 4.6 mm on the altos c- and d-, but at close to the side(s) shorter lengths of 4.3 and 4.2 mm.

Discussion: the windows of these Bressan altos are (in relation to the length and pitch of these instruments) rather narrow (alto b has a very narrow upper width) and also long: long in relation to their width, and long compared with the windows of many Dutch alto recorders. The external diameters at the windows vary only slightly, from 32.7 to 33.2 mm, and are quite average.

For myself I have made a scheme for window and labium dimensions of alto recorders in lower pitches (a 405 to 415 Hz). Some examples: a (width): narrow: 11.8 or less; average: 11.9-12.1; wide: 12.2 - 12.5; very wide 12.6 and more; a (length): very short: 4.0 or less; short: 4.1-4.2; average: 4.3-4.4; long: 4.5-4.7; very long: 4.8 and more; f thin: 32.5 and less; average: 32.5-33; rather thick: 33.5-34

About the chamfers. Measuring chamfers is not so easy, especially of the chamfers of the roof of the windway (by the way: I have seen some old recorders with chamfers at the windway opening, but didn't read about these on Bressan recorders).

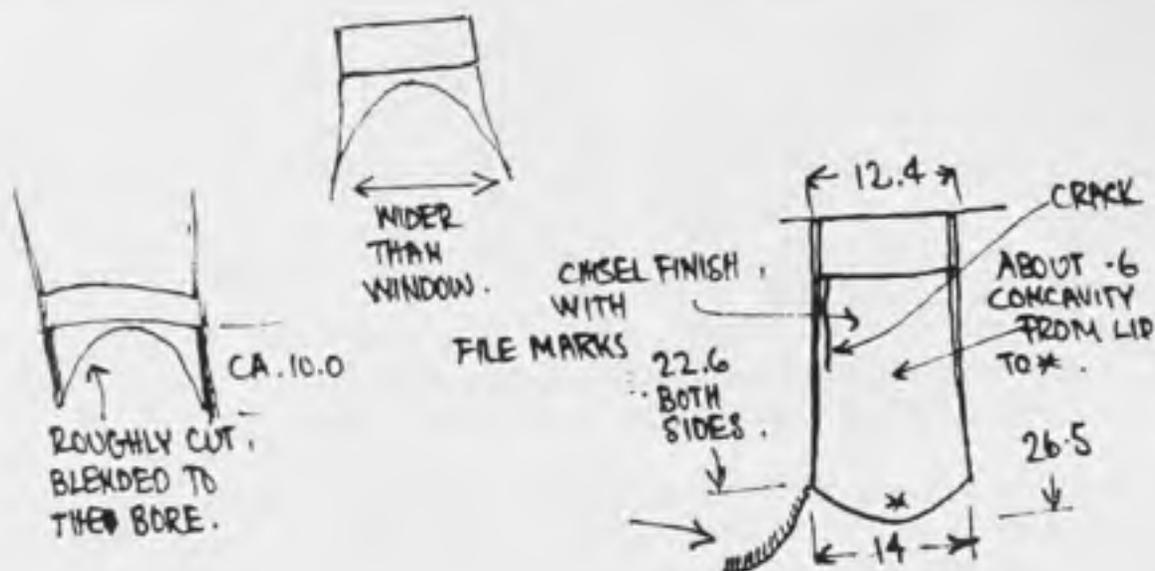
For Bressan alto a- gives Morgan 5.4/5.4 for the size of the topchamfer, but we do not know if that is very much or not. The block chamfer has a length for the hypotenuse of 0.9 mm (measured by Von Huene)

For alto b- we know that the topchamfer is (just as the block) not in original condition and now very large (1.4 - 1.5 mm over the hypotenuse).

Morgan says about alto c- that the topchamfer is flatter than usual (ca.  $30^{\circ}$ ); he gives as measurements '5.1 at sides', and '5.5 at centre'. The same flat angle is given for the topchamfer of alto d-; the block of this recorder has a chamfer with a length of 0.8 mm (hypotenuse).

Beaudin says that the topchamfer of alto e- is a bit damaged, and that the chamfer of the block is very small, likely not in original condition.

Finally some remarks about the candle flames. See the photo (right) for a candle flame of one of my own recorders (this instrument was not finished at that moment). The candle flame marks the transition of the curve of the labium edge to that of the bore of the head. Sometimes, the candle flame is rather roughly cut and shaped, as on the alto d-, and widening to the south. The top of the candle flame can just reach the labium edge - as on the photo -, or stops 1 or 2 mm before the edge (also in alto d-, see drawing below).



Toon Moonen was suggesting the same for alto a- in his drawing. That can be an indication that Bressan has cut some wood at that place, to raise the labium edge a little bit. That results in a slightly smaller step, what is always an important factor on recorders. Morgan & Von Huene didn't mention that for alto a-, and for the other instruments we have not enough information, or there has been some repair work.

So far this first article about my research into the drawings and measurements of some alto recorders by Peter Bressan. I do hope that it gives the reader some useful information about these instruments and how they were made. It is not only about measurements, I believe that in the first place the very high level of finishing makes these recorders so good. Maybe also the choice of the materials and the design of the bore profiles. About these profiles and other aspects, as tuning and pitch, I am going to write a second article. But I am very interested in observations by other researchers. So, if you have information for me about (other) Bressan recorders, please write or mail me: [mcjbouterse@hetnet.nl](mailto:mcjbouterse@hetnet.nl), or my address: M.C.J. Bouterse, Sandenburg 69, NL 2402 RJ Alphen a/d Rijn, Netherlands.

### A Renaissance Piano?

Inventions rarely happen completely out of the blue. Experiences usually help inspire the creative mind. So what might have lead towards Cristofori's invention of the piano? A few scanty references to Chekkers, Dolce-Melos and so on are tantalisingly thin on technical information and existing examples are almost non-existent. So I was intrigued by details given in Stewart Pollen's book *The Early Pianoforte* of a spinettino which had been converted to a tangent-striking action possibly in 1632. This tiny spinet, now in the Metropolitan Museum of Art in New York and inscribed Franciscus Bonafinis MDLXXV, is quite a conventional Italian instrument and certainly originally built with plucking jacks. (Jack rail supports are still in-situ). It is now to be found with two sets of wooden tangents in place of the harpsichord jacks. One full set seem to be the most recent and there are just a few surviving from an earlier set of slightly different design. (For a complete description it is well worth reading Pollen's chapter in the above mentioned book). Was this an instrument that could have had a musical life? Could it be called an early piano? A working reconstruction might provide some answers.

Although I did not inspect and measure the original instrument Pollen's book provides good photos and various measurements. There was enough information to work out the drawings needed to make a close reconstruction. In fact I aimed to make two versions using the different sets of tangents.

No alterations had been made to the original instrument to enable the tangents to run in the box register other than some realignment of the strings. There is no additional intermediate lever to accelerate the upward motion of the tangents so their travel is, therefore, the same as a jack. The tangents are a shaft of wood with an additional block on one side to strike the offset string. The complete set has no dampers and has very thin leather coverings on the striking surface. The few remaining from an older set have no coverings but there is a twist of brass wire that holds a leather damper. These will hang on the strings and thus arrest the drop of each tangent.

Having built two cases and keyboards I started to experiment with the tangents and it soon became apparent that the set with leather coverings and no dampers had certain practical problems. The lack of damper means that the foot of the tangent must sit on the key lever when it is at rest or else the striking extension will hit the soundboard as it drops. This would cause a tapping noise each time the key is released. As far as I could tell there was no evidence of cloth or leather to cushion this and so there could be no alternate way to set up the action. This might lead to two possible routes: does the tangent stay in contact with the string like a clavichord or should it be set so that the key-dip is limited to allow the tangent to fly freely to the string for the last millimetre or two? I discounted the first idea immediately as a non starter. The tangent would not form a fixed end to the string and enable it to vibrate – it's covered in leather for a start! It must be set up to stop a fraction short of the string. So the overall travel of the tangent can only be the height of the bridge less at least 5mm (say 3mm for the tangent block, 0.5mm clearance above the soundboard and 1.5mm clearance below the string). My experiments showed that the tiny amount of travel, and the fact that these tangents are covered, no worthwhile musical sound was produced at all! Even removing the leather covering barely made a difference.

Trying the other set of tangents that are equipped with dampers enables the keyboard and action to be set up quite differently. Here the tangents hang on the string and it is possible to leave as much of a gap as you like between the bottom of the tangent and the cloth of the key lever. Halting the key-dip accurately is still critical to achieve some free flight before the strike of the string but it is now possible to set the keyboard up with some initial lost motion before the lever starts to lift the tangent. Within some obvious limits the distal end of the lever will travel and accelerate a little before engaging and propelling the tangent upwards. Although the distance travelled by the tangent itself may be no greater than the set without dampers it is certainly possible to achieve more momentum to the strike this way. This coupled with the bare striking surface there is certainly just enough momentum to sound the string. It can produce a working instrument. This finished version has been successfully used by Philip Picket on a recording called *The Bones of All Men*. The sound is small, perhaps just a little more than a small clavichord, but bright – some may say tinny. (It is well amplified on the recording however!)

As this was really an experiment in practical archaeology I concluded that the present complete of tangents to be found on the original instrument would not really have produced a workable musical instrument at all but the earlier set are workable. But several questions arise. Were the newer tangents originally bare rather than leather covered? (That might have helped but would not have made much difference due to the limitations imposed by the lack of dampers on the keyboard set up). The earlier set would seem to be the more practical – so why were they abandoned for an inferior arrangement? Or is the assumption that the complete set of tangents is more recent incorrect? It would be more natural to progress from an idea that didn't really work to one that did. And wouldn't it have been easier to have applied leather coverings to these rather than make a new set and omit the dampers? I think it is more logical that the four remaining tangents are in fact newer than the complete set. If I'm right that the keyboard can be set up with a greater motion than the distance travelled by the tangents then the cloths must have been changed when the tangents were changed. Studying the keyboard's cloth might tell something more but probably not how the keyboard was set up when the earliest set of tangents were fitted.

I would suggest that the earlier incarnation worked probably enough to be a curiosity rather than a useful instrument. Why it was changed to something that was virtually useless is difficult to guess. Whichever of the two sets of tangents came first may be a question for debate but this little instrument does show that someone was thinking about a percussive keyboard instrument with a certain amount of determination in the decades before Cristofori.

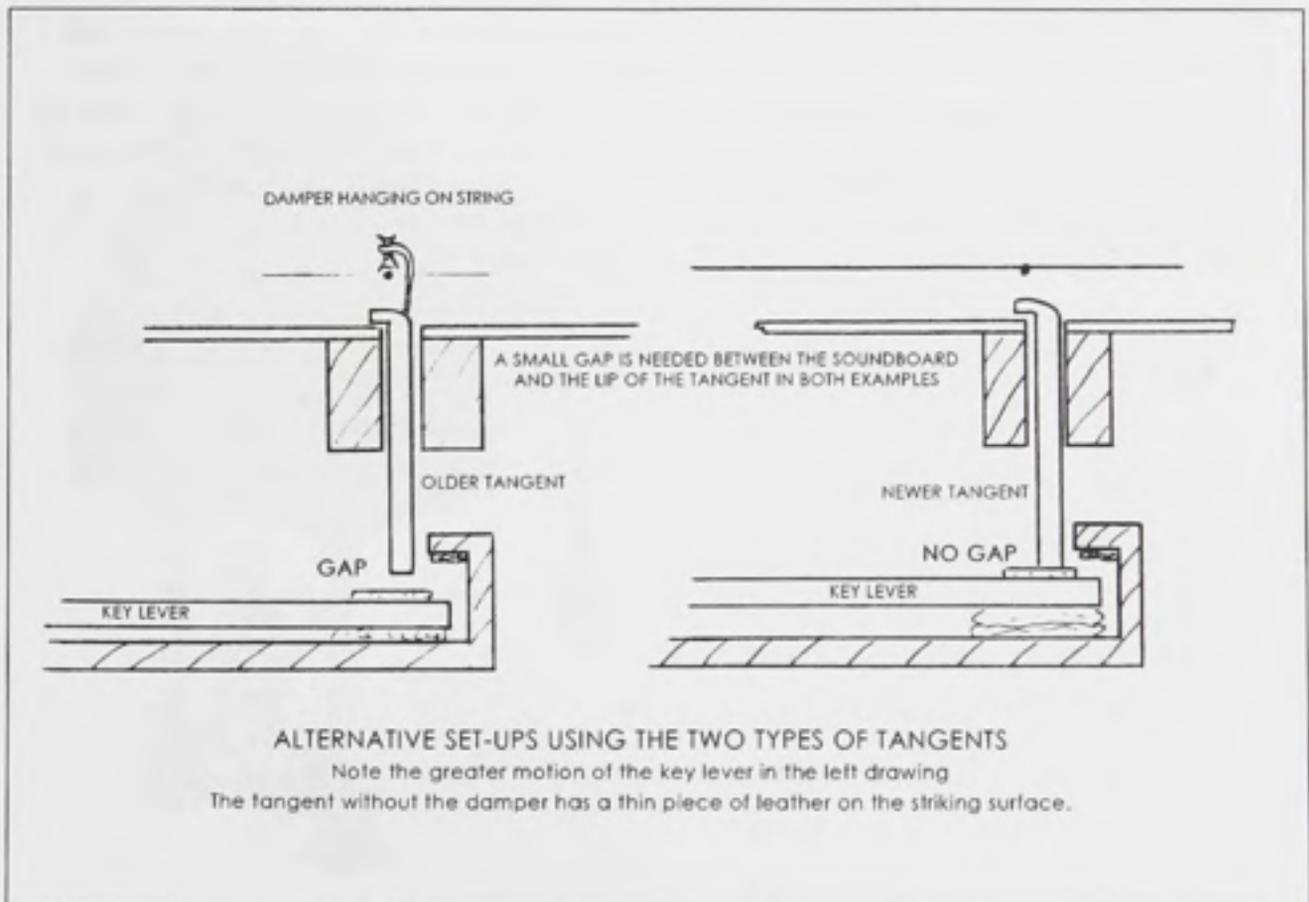
#### Postscript

I felt there was no point finishing the second instrument with tangents so it was finished as a very useful *musical octave spinet*!

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I would like to acknowledge the help and interest from Stewart Pollens, firstly via his book *The Early Pianoforte* published by Cambridge University Press ISBN 0-521-41729-5 and from a conversation with him at the Lausanne Rencontres Harmoniques Conference on Early Pianos in 2008.



Reconstruction of a spinnettino as rebuilt (in 1632?) with bare wooden tangents with dampers



**Reply to David Rachor's Comm. 1889 On adapting techniques to the material or not.**

David's article makes some interesting points about different approaches to making something and I would offer two examples where an older approach probably allows the material (or more particularly the properties of that material) to influence the techniques used in the construction of instruments or their components more than some more modern techniques.

My first example is a simple one. *Making a 'replica' of an original instrument.* Taking detailed measurement from one instrument to create another is a very different approach to the one the original builder would have used. It could be very easy to disregard the material in the quest for a precision replica. Dimensions themselves will not reflect the qualities of timbers selected. (or other materials).

My second example perhaps is more of a detailed example of the above. G F Sievers writing in the mid nineteenth century describes *Methods for Soundboard Tuning* in his book of the world of the pianoforte. (As seen in the English handbook version by Marco Tiella). He opens this chapter by saying that each maker has his own method for this, based on his experience. He then goes on to describe how the partly finished soundboard is cramped into the case for tuning. The position of all the A strings are marked and using a series of tuning forks and a tool that resembles a long thin drum stick with a padded end the resonance of each area of the board is assessed. If it is too high the ribs must be made thinner. If the vibrations are at a lower pitch it is better to substitute the ribs with stronger ones or add more ribs, we are told. He continues in describing the problems of tuning the bridges and also the allowances that must be made for the extra thickness the varnish will add when that is applied. In this case the soundboard should be left a tone lower for wide boards and a semitone flat for medium sized boards. This example of a technique that works with, and responds to, the materials being used could never be replicated or even guessed at by simply copying the dimension of an old board. And how many modern massed produced pianos are build like this?

**A KEYBOARD INSTRUMENT IN A MUSEUM.**

**A Rebuilt Italian Harpsichord at the Metropolitan Collection (NY):  
Restoring a Chain of Events**

*Have you ever come across a mystery that would excite you for years afterwards?  
And did you finally feel a need to puzzle it out?*

*This paper is about that...*

ATTENDING THE METROPOLITAN

In the late 1990s, I visited the Metropolitan Museum. My special interest was the collection of musical instruments. The National Collection contained thousands of musical instruments of different kinds and countries of origin, including about 50 keyboards. Among the latter were exemplars such as a harpsichord converted to a

fortepiano, the earliest of extant Cristofori fortepianos, and two harpsichords with three unison (8') string sets. One of them, Nr. 45.41 (Fig. 1), will be the subject of the following pages.



There has always existed the tendency to provide a harpsichord with additional equipment for enriching its sound with either over- or undertones or just for an option of another tone quality. Among the different rare features such as the 2' and 16' string sets, nasal (fagot) or leather (lute) registers, buff stops and even

*Fig. 1. Italian harpsichord at the Metropolitan, Catalogue Nr. 45.41*

a third keyboard, the third unison string set is probably one of the most exotic design solutions in harpsichord building of the 18th century.

As we will see later, this instrument has been rebuilt and there were many uncertainties about its initial disposition or possible further changes. Nowadays, we cannot imagine that somebody would change the compass of, say, a concert Steinway, but rebuilding keyboard instruments was typical in the 18th century. As a practicing restorer and rebuilders of early keyboards, with experience of changing string types and keyboard compasses, I would try to restore the chain of events that might have passed over that instrument. My starting point is to suppose the unusual human stories behind the unusual technical solutions. Another point is that we often follow paradigms for evaluations and opinions; sometimes, however, we have to change our mind to gain more truthful picture. I will build my essay by combining different perceptions of the subject (in addition to the first glance of a visitor): curator, conservator, restorer, writer and, finally, rebuilders.

I would like to acknowledge J. Kenneth (Ken) Moore, Associate Curator & Administrator in the Department of Musical Instruments at the Metropolitan Museum, and Susana Henriques Caldeira, conservator in the department, for their generous and substantial contribution to the work on this material.

#### CATALOGUE INFORMATION<sup>1</sup>

<i>Department:</i>	Musical Instruments
<i>Object Name:</i>	Harpsichord
<i>Classification:</i>	Chordophone-Zither-plucked-harpsichord
<i>Label Text:</i>	This harpsichord has three sets of unison strings, one of which is plucked at a point very closed to the nut so as to give a brighter timbre than the others. <sup>2</sup> The mermaid holding one of the supporting columns is a device of the Colonna family. The painting inside the lid shows a landscape with a duck hunter. The conventionalized foliage and the aerial perspective have the flavor of the work of Gaspard Dughet, brother-in-law of Nicolas Poussin, who painted chiefly in Rome.
<i>Date Label:</i>	Late 17th century
<i>Country of Origin:</i>	Italy, Southern, Europe
<i>Medium:</i>	Wood, various materials

<sup>1</sup> This material, compiled by L. Libin in 1985, has been kindly granted by Ken Moore.

<sup>2</sup> 10 years ago, this phrase put me into a "mystery of the third unison string set". I guessed that a timbre in that case might be rather nasal-like, and a short-scaled set might be supposedly strung in brass.

<i>Description:</i>	Inner-outer case, inner of cypress or cedar with spruce or fir soundboard, present compass AA-c <sup>m</sup> , 3x8', probably enlarged from C/E-c <sup>m</sup> 2x8'; pin-block, nuts and registers possibly not original; interior much altered; in painted outer case on 3 columnar legs, front 2 supporting crowned mermaid, <i>signia</i> of the Colonna family.
<i>Dimensions:</i>	Inner case: L. w/o moldings 227.8 cm (89-11/16 in.), L. w/moldings 231.2 cm (91-7/16 in.); W. w/o moldings 79.7 cm (31.3/8 in.), W. w/moldings: 81.5 cm (32-1/16 in.); D. 24.8 cm (9-3/4 in.); Octave span: c-b2 cm 49.9 cm (19-11/16 in.)
<i>Mark(s):</i>	Marked (on interior): Restored to playing condition for Miss S. D. Bliss in August & September Nineteen Forty, By Ernst Schlesinger & Fred J. Markert New York City N. Y.
<i>Notes:</i>	Pinblock and nuts not original, compass perhaps changed (John van der Meer, October 1976). Dating changed from XVII century to XVIII century; Rome added; paintings attributed to Gaspard Dughet, probably. The crowned mermaid and column supports indicate that the harpsichord was made for the Colonna family.

#### A RANGE OF OPINIONS<sup>3</sup>

This harpsichord is of the traditional Italian inner-outer type. Through study of the moldings, Denzil Wraight attributes it to Orazio Albana, whose known work is dated between 1628 and 1645.<sup>4</sup> The instrument has undergone some alterations, and the original disposition is uncertain. The keyboard, now with compass AA to c<sup>m</sup>, has also been altered. Wraight concluded, on the evidence of an addition to the bass of the keyframe, that the original compass was GG/BB to c<sup>m</sup>.<sup>5</sup> The bottom seven key levers (AA to E-flat) are made of a different wood from the rest, which (excepting keys 46 and 52) are made of beech. This suggests the possibility that the original compass began on E (C/E) and extended to f<sup>m</sup>.<sup>6</sup> There are two nuts and one bridge. The nut closer to the player is at a higher level and carries two sets of strings. The strings of the lower nut, closer to the wrest plank, pass through slots in the higher nut. The three jackslides are marked P, S, and T (Primo, Secondo, Terzo) from front to back.

<sup>3</sup> This review has been carried out by Susana Henriques Caldeira as a part of her MA thesis '*An Italian Harpsichord Built About 1700: History, Design, and Conservation*', Department of Music in the Graduate School, The University of South Dakota, Vermillion, May 2004, pp. 93-96.

Footnotes 4-9 below are a part of that paper - A.R.

<sup>4</sup> Denzil Wraight, *The Stringing of Italian Keyboard Instruments c. 1500 - c. 1650*, Ph.D. dissertation, Queen's University of Belfast, 1997, part 2, 19.

<sup>5</sup> *Ibid.*

<sup>6</sup> Grant O'Brien, in his notes in the Metropolitan Museum files, suggests that the original compass was C/E to c<sup>m</sup>.

The present arrangement of the jacks is:

T: < 8' lower level

S: < 8' upper level

P: 8' > upper level

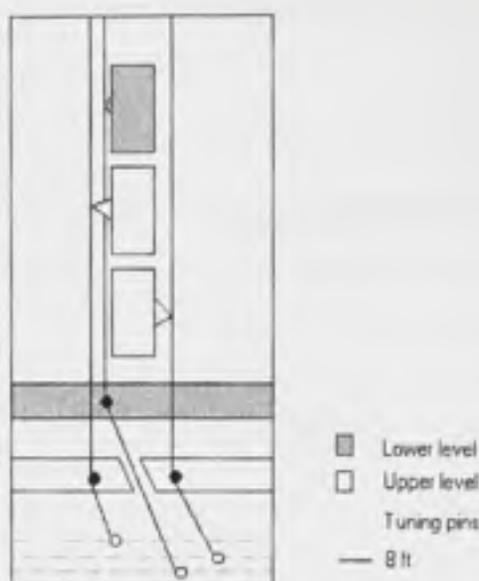


Fig. 2. String and jack arrangement of the Albana harpsichord.

Whether this arrangement is original, from a later rebuild, or from a twentieth-century restoration is uncertain. The present string lengths and plucking points are:

Table 1. String measurements, plucking points, and percentages of plucked string of the Albana harpsichord.<sup>7</sup>

	< 8' upper level			8' > upper level			< 8' lower level		
	String length	plucking point (estimated)	% plucking point	String length	plucking point	% plucking point	String length	plucking point	% plucking point
c <sup>m</sup>	143	62	43.3	133	44	33	119	45	37.8
c <sup>n</sup>	280	77	27.5	267	59	22	230	45	19.5
c <sup>r</sup>	559	102	18.2	530	84	15.8	485	47	9.7
c	1125	121	10.7	1069	103	9.6	1042	61	5.8
C	1833	139	7.5	1818	121	6.6	1767	89	5

Grant O'Brien has suggested that the lower level of strings, which in the treble are shorter than the longer upper-level set by a ratio of about 5:6, was intended for brass strings, while the upper-level strings would have been strung in iron.<sup>8</sup> With the present keyboard compass, the upper-level string lengths (for example, c<sup>n</sup> of the <8' is 280 mm long) are what one would expect for a brass-strung instrument at normal 8' pitch. Strung in iron, the pitch would be about a third higher, but if the keyboard originally ended on f<sup>m</sup>, with that key playing the strings now played by the c<sup>m</sup> key of the present altered keyboard, the original pitch might have been close to the normal 8' level. The situation is

<sup>7</sup> Measurements from the file of the instrument at The Metropolitan Museum of Art. Some have been converted from measurements in inches. The upper-level <8' plucking points are estimated from measurements of the 8' > plucking points.

<sup>8</sup> O'Brien's conclusions are reported by Wraight, 'The Stringing of Italian Keyboard Instruments', part 2, 19.

more complicated, however, since marks on the wrest plank show that the two nuts were formerly closely spaced. [...] Wraight also notes that the moldings of the present nuts do not match the bridge, so they might have been replaced as well as moved. Even the soundboard might have been replaced, since other Albana instruments have cypress soundboards and this one is of spruce or fir, with the grain somewhat unusually placed at an angle with the spine rather than parallel to it.

The most that can be said is that the present disposition, compass, and scaling may stem from an eighteenth-century rebuilding. While it might have been strung with a mixture of brass and iron, as O'Brien suggests, another possibility is that it was intended to be strung entirely in brass. The upper-level strings could then be tuned to normal 8' pitch, while the lower-level strings would have been tuned to a somewhat higher pitch. Thus, accompaniments could be transposed for different singers or instruments. One should note that the plucking points of lower-level strings, even when acted upon by the back set of jacks, are significantly closer than the plucking points of the upper-level strings. Thus, this register must have had a much more nasal tone quality in comparison with the others.

#### TECHNICAL INTERMEZZO

Well, opinions of experienced experts have diverged in almost all questions of principle concerning the harpsichord with a mermaid statue. Those and some additional aspects can be divided into four groups according to the chronological order of possible events:

- 1) Original disposition:
  - compass of keyboard;
  - material of strings; and
  - pitch;
- 2) Reasons for rebuilding;
- 3) Initial plan of rebuilding:
  - compass of keyboard;
  - material of strings;
  - pitch;
  - destination of the third unison string set;
  - design of the new wrest plank (position of the additional nut); and
  - order and plucking direction of the new jack sets;
- 4) Later changes (leading to the present disposition).

In our attempt to restore the possible chain of events, we will take into account the following points of attitude:

- 1) Compass, string material and pitch of Italian harpsichords in the 17th and 18th centuries;
- 2) Lengths of the longest and shortest c" (of the discussed instrument);
- 3) Initial position of low nut in the wrest plank.
- 4) The circumstances that might accompany the performing of rebuilding works; and
- 5) External factors such as the weather or quality of the string wire.

The information below was helpful to our search.

#### *String material*

Presently, most Italian harpsichords are disposed with two 8' choirs, and strung with brass, which was the norm in the late 17th and 18th centuries. Before about 1630, however, the most frequent disposition featured one 8' and one 4', and some instruments were designed with iron wire.<sup>9</sup> It is possible that what we have come to appreciate as the 'traditional' Italian harpsichord with a short, brass-wire scale is in fact merely the restringing of a 16th-century, iron-wire scaled design.<sup>10</sup>

#### *Pitch*

Until recent times, there has been no common standard for pitches. Different pitches were circulating at different periods in different countries (Table 2).

*Table 2. Selected pitches from the table by A.J.Ellis<sup>11</sup>*

<i>Pitch</i>	<i>Place</i>	<i>Year</i>	<i>Source</i>
395.8	Versailles, France	1789	Organ of the palace chapel
409.0	Paris, France	1783	Tuning fork of Pascal Taskin, court tuner
441.0	Rome, Italy	1725	Pitch calculated from a flute made by Biglioni, Rome
422.5	London, England	1751	Handel's tuning fork
451.7	Milan, Italy	1867	<i>La Scala Opera</i>
454.08	London, England	1874	Old philharmonic pitch, instigated by Sir Charles Hall

<sup>9</sup> Douglas Maple (<http://www.mapleharpsichords.com>).

<sup>10</sup> Denzil Wraight (<http://denzilwraight.com>).

<sup>11</sup> Alexander J. Ellis. "On the History of Musical Pitch," *Journal of the Society of Arts*, (March 5, 1880). Reprinted in *Studies in the History of Music Pitch*, Amsterdam: Frits Knuf, 1968.

Seventeenth century Italy had probably the widest range of pitches (in different cities), although there were, nevertheless, certain names for certain pitches:

*tuono corista* = 408–409 Hz

*tutto punto* = 440–443 Hz

*mezzo punto* = 460–470 Hz<sup>12</sup>

#### *Keyboard compass*

The accepted compass standards of early Italian harpsichords were either C/E-c<sup>m</sup> or C/E-f<sup>m</sup><sup>13</sup>.

#### *String length*

The main range for Italian 8' instruments was between about 255 mm and 360 mm measured at c<sup>n</sup><sup>14</sup>. C/E-c<sup>m</sup> compasses usually had short scales (averaging 266 mm), while C/E-f<sup>m</sup> compasses were associated with long scales (averaging 327 mm). In our case, the lengths of the longest and shortest a' were, correspondingly, 28 and 23 cm. As a reminder, the optimal length (at a pitch of a'=440) for the soft Baroque iron is 36 cm, and 26 cm for the yellow brass wire<sup>15</sup>.

#### *Quality of string wire*

My experience has shown that brass string wires of a similar size produced by different manufacturers might have different breaking points (of more than half a tone).

#### *Concepts to be and not to be concerned*

The technical evidence of the seven keys (in the bass) made of different wood as against the marks of changing the key frame complicates the clarification of possible events. Of course, the seven keys could have been replaced for a simple reason. For instance, a scion of the Colonna family suddenly puts his arm on the waist of servant-maid, and she drops wet linen (or a saucepan) on the keyboard. As a result, several keys are totally damaged. Such versions, however, will not be regarded here. Now, I suppose that no 18th century builder would engage with an additional (unison) string

<sup>12</sup> Bruce Haynes, *Pitch Standards in the Baroque and Classical Periods*, Ph.D. thesis, University of Montréal, 1995; Folkers & Powell, *Makers of Historical Flutes* (<http://www.baroqueflute.com>).

<sup>13</sup> John Shortridge, 'Harpsichord-Building in the 16th and 17th Centuries', *United States National Museum Bulletin* 225 paper 15 (1960, 2/1970).

<sup>14</sup> Denzil Wraight (<http://denzilwraight.com>).

<sup>15</sup> This follows Gerrit Klop's table of harpsichord string lengths, which I copied to my notebook in the early 1990s.

set without the essential action of reducing the general tension. Therefore, the idea of the original AA/B-c" compass with brass stringing will also receive little consideration. The marks of another initial placement of the second nut on the wrest plank allude to a story with pitches during the performing of the planned work on the instrument. Those are preliminary layouts to which both our 'writer' and 'rebuilder' will follow in their investigations into the possible chain of events.

#### BELLEZZA ROSSA

*Buzz... Buzz... Buzz...* What a horrible sound! Alessandro Marella had a sorrowful glance at the last string to be replaced and slowly pressed the key: *Denn... Denn... Denn...* The sound of a carefree childhood. The difference was so perceptible that tears filled the maker's eyes.

A young brother of Giovanni Marella, an Italian composer favored by the French court, Alessandro was a cheerful guy who knew how to live within the moment and sought not to enter history. The brothers were distant relatives of Felice Colonna, a descendant from a powerful noble family in Medieval and Renaissance Rome. Alessandro was infatuated with Natalina, Felice's young daughter, and the pretty red-haired girl, *bellezza rossa*, was also well disposed to him.

A while before, Colonna had acquired an old harpsichord. The instrument was in playable condition, but it lacked several low keys and thus did not truly suit contemporary music. Felice wanted to rebuild the harpsichord and entrusted the task to Alessandro who, however, had to first undertake professional studies with one of the specialists in the field. Colonna's friend Gaspard Dughet, a French painter who chiefly worked in Rome and was the brother-in-law of the renowned artist Nicolas Poussin, recommended Pascal Taskin, a tuner of the French court, who was already well known for his work on Ruckers' harpsichords. Giovanni talked to Taskin about his brother, and *le maître* approved of Alessandro's arrival with an Italian *clavicembalo* to be rebuilt to the *gravicembalo* quality level. Thus, Alessandro traveled to Paris, and on the day before his departure, Natalina promised to marry him upon his return.

At the beginning, Taskin confided the three principles of rebuilding to his pupil. "Everything you do must make sense. Be precise but know when to stop. Be original but don't break existing rules." The harpsichord had to be rebuilt, restrung and tuned at

a lower tone. For Marella, the new strings made of brass were a hidden sign of his love for *bellezza rossa*. Taskin permitted him to design an additional string set to also be strung in brass. This register might give the instrument a new-fashioned nasal timbre. For Alessandro, dreams of Natalina, who often became sick during the winter, were a part of this concept.

When the instrument was almost ready, something unexpected happened. Colonna sent them a flute by Biglioni with a short directive that the harpsichord must be tuned at that tone. The flute's pitch was substantially higher than Taskin's fork. "*Pourquoi?*" Taskin was truly puzzled; he knew that the low tone, *tuono corista*, was still commonly used in Rome. "Your outstanding design will be lost!" Marella, however, quickly caught the true meaning of this gesture; *Ferro Felice*, who was rather displeased with his daughter's choice, was attempting to delay his return. Alessandro wrote to Natalina, telling her that there was nothing more important in his life than their love and asking her to wait for him. Week after week went by but no answer arrived.

The harpsichord was restrung again in iron. The "*Bellezza rossa*" register, though still in brass, lost its nasal timbre. It was now only the register that offered a bright, clear sound; the others became dark and dull. Taskin was no longer interested in that business.

After three months Marella finished his work and came back with the rebuilt instrument. The next day he learned that Natalina had gone to a monastery: she had received none of his letters and was full of despair. Alessandro would never know whose fault it was – the postman's or her father's.

Shortly thereafter, the instrument was painted by Gaspard Dughet, and a crown mermaid, a *signia* of the Colonna family, found its place near the front leg. It was already winter, and the weather was unusually cold that year. The brass strings raised their tone and commenced to break, one by one. "Do something!" commanded Colonna. A dream was broken. There was no more sense in maintaining the "*Bellezza rossa*" in brass.

*Buzz... Buzz... Buzz...* The last string was replaced. Marella took a brief breath: a love was buried, but a mystery was born, a mystery of the third register, which was neither nasal nor bright. Just a senseless accessory...

*Knock-knock-knock.* Alessandro looked at the door and answered listlessly, "Sì." Suddenly, his face has brightened into the happiest smile: Natalina entered the room.

#### POST SCRIPTUM

Italian harpsichord. Supposedly built by Orazio Albana, Rome, in the mid-17th century with a compass of C/E-f<sup>m</sup> and two sets of iron strings at a pitch of around a<sup>'</sup>=460 (so-called *mezzo punto*). Planned to be rebuilt in the early 18th century with a new compass of



Fig. 3. Italian harpsichord at the Metropolitan, Catalogue Nr. 45.41. A view from the front.

A-c<sup>m</sup> and brass stringing at a pitch around a<sup>'</sup>=408 (*tuono corista*). The lower tension of the new strings lent itself to putting an additional set of slightly shorter unison strings to be plucked by an additional row of jacks close to the nut, so as to give a fashioned then nasal register. A new wrest plank with two nuts was also designed.

The circumstances have probably changed. A customer might give a rebuilder, as a sample of a wanted pitch, a wind instrument (or a fork) tuned at around 440 (*tutto punto*). One of nuts then must be moved to shorten the lengths of the third 8' to keep at least one string set at a clear brass sound. The rest were restrung in iron.

As a later step, some of the brass strings might not last the winter when the instrument raised its tone (because of the insufficient quality of the wire) and therefore the third 8' was restrung in iron. Since then, the instrument became just a 'transposing continuo keyboard' for different vocal and instrumental pitch solutions. Each one of its string sets might be tuned to a different pitch (up to a fifth higher than a<sup>'</sup>=440).

**A clarinet from before clarinets were invented?**

An angel from the Plasy organ (Abraham Starck, 1688, West Bohemia) seems to be playing a clarinet, at a time, as far as I know, when they had not been invented. Any comments anyone?



## On the gittern's body change around 1500

As shown conclusively by Wright in 1977, the medieval gittern was a miniature lute with a round back and no waist. We also know that the 16<sup>th</sup> century gittern was a miniature Renaissance vihuela with a flat or somewhat domed back and a waist. A possible way this change could have happened is suggested here.

Late in the 15th century, Tinctoris<sup>1</sup> wrote that the medieval gittern was used rarely 'because of the thinness of its sound', and when he heard it in Catalonia, it was played more by women to accompany love songs than by men. By then, use of the original vihuela as a dual-purpose instrument faded. Those who bowed vihuelas modified or replaced them so as to have somewhat higher moveable bridges. Those who plucked vihuelas replaced them (starting in Valencia) with often larger 10-fret versions of the Italian violas (without sharp corners in the waist) to fill the ecological niches of the lute. It is likely that some of the original vihuelas that had become redundant got into the hands of gittern players, who just took off a course (two strings) and played them as gitterns. It was the right size (with a string length of about a half metre) and was probably more resonant than the old gittern. It would have been appropriate then for any instrument that gittern-players played in their traditional ways, to have been called a gittern (*guitarra* in Spanish), regardless of its shape. With the new design of gittern, gittern-playing began to prosper again in Spain. Within a few decades, gitterns copied the body design (without the sharp corners on the waist) and the peg plate (for holding the tuning pegs) of the current vihuela, and then looked like a miniature version of it.



An early 16th century illustration of the original vihuela possibly used as a gittern is given as Fig. 21 in I. Woodfield, *The Early History of the Viol* (Cambridge, 1984), p. 44. It is shown on the left. Notice that it is played with a quill.

By the middle of the 16th century, such gitterns had spread to the rest of Europe and the overseas colonies of European countries, as the vihuelas played then didn't. Gitterns were played (at least in Spain and Italy) through the 17th and 18th centuries. We now call this instrument the 'Renaissance guitar'.

The adjective 'Renaissance' is modern and the noun 'guitar' is 17th century English. In the 16th century the instrument was called 'gittern' in England, *guitarra* in Spain, *guiterne* in France, *chitarra* in Italy and *quinterne* in Germany. Some baroque names for it were 'Italian guitar' and *chitarrino*. In most countries other than Spain, the relative neck length was reduced to limit the number of frets tied on it to only eight, like on the lute, and the peg plate often reverted to a curved pegbox.

<sup>1</sup> J. Tinctoris, *De Inventione et Usu Musicae* (c. 1487), trans. A. Baines, 'Fifteenth-century Instruments in Tinctoris's *De Inventione et Usu Musicae*', *Galpin Soc. J.* III (1950), pp. 19-26.

### The step between the top of the sides and the top of the neck

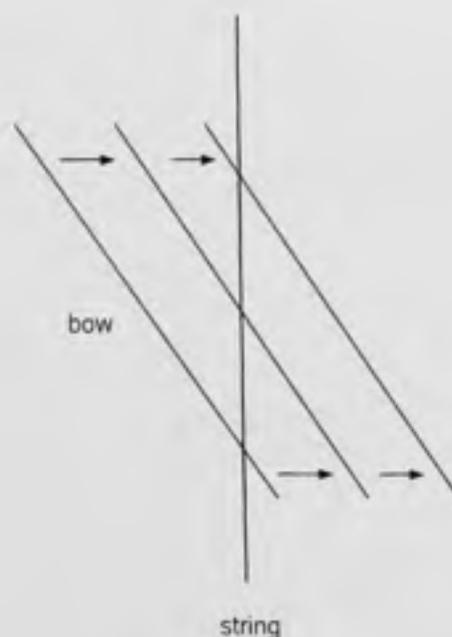
On medieval (and many later) necked stringed instruments, there has been a step between the tops of the sides and the top of the neck. On such medieval instruments (except for the lute), the sides, back and neck were usually carved out of the same piece of wood. A common result of the step was that the top of the soundboard was flush with the top of the neck. When there was no additional fingerboard, this allowed fingering in higher positions than otherwise. But when the strings or a tailpiece were fixed to the body at the tail, the step was essential for the stability of the soundboard. The strings at the tail (or the tailpiece attachment to the body) pressed the soundboard against the body and also pushed the soundboard towards the neck. The small angle made by the strings over the bridge made the bridge press the soundboard against the body, and with the soundboard clamped between the tail and the step, the soundboard was fixed in place. It is possible that it was sometimes not even glued.

FoMRHI Comm. 1925

Ephraim Segerman

### Angled bowing

In the surviving medieval and Renaissance pictures, the bow can occasionally be held at a considerable angle to the strings. In normal bowing, the bow is moved in the direction of the stick. If this is done when it is at such an angle, the string does not respond with a musical note. Consequently, most observers have considered that the picture could not represent proper bowing. This is not necessarily true. If the bow is moved in such a way that that the hair moves in a direction perpendicular to the string, as shown in the diagram below, the string will sound. The most obvious purpose for bowing in this way would be to start the stroke with the string sounding in its characteristic sound for bowing in that position (such as close to the bridge), and then progressing to the different sound of bowing in a different position (such as at the middle of the string). I suspect that this type of bowing was usually used when multiple strings were being sounded.



Why it was the vihuela and not the lute in 16<sup>th</sup> century Spain

I agree with Arroitauregi in Comm. 1857 that the lute was respected in 16<sup>th</sup> century Spain and not discriminated against as a Moorish instrument. There was no problem of lute unavailability since the training of a professional stringed instrument maker (violero) then was to be able to make a lute as well as the claviorgan, harpsichord, clavichord, viol (vihuela de arco), harp, large vihuela with inlaid pieces and lesser vihuelas. So why?

Late 15<sup>th</sup> and early 16<sup>th</sup> century paintings reproduced in Woodfield's *The Early History of the Viol* mainly show angels bowing or plucking vihuelas, with a few plucking lutes. They were painted for the Spanish nobility, and the instruments were the ones played in their environment, either by themselves, their servants or professionals hired for occasions. It appears that the lute was mainly played by professionals, and these would mostly have been Moors and Jews. The families of the Jewish musicians working in the court of Henry VIII came from Venice after fleeing Spain. So, though the inquisition did not discriminate against the lute as an instrument, it seems that by driving out the more mobile Moors and Jews, it killed lute playing and teaching in the country. Musicians have always been more mobile than most others.

Around 1487 probably in Naples, Tinctoris wrote 'While some play every sort of composition most delightfully on the lute, in Italy and Spain the viola without a bow is more often used'. The discussion above is about the 'viola without a bow' in Spain, and Tinctoris adds Italy. This implies that there was an interruption in the late 15<sup>th</sup> century of the upward trajectory of the lute's popularity in Italy as well as in Spain. There was a surge of fashion then for the vihuela/viola in both countries, from which the lute recovered in Italy after 1500. This didn't happen in Spain, presumably because the lute players were not there any more.