



FoMREI was founded at the instigation of Ephraim Segerman and Djilda Abbott during the 1975 Early Music Fair in London. Its aim is to promote authenticity in early instrument making, repair and restoration and to pool information and the results of research.

The basic idea behind FoMREI is the exchange of information: tell your colleagues anything that you find out and, if you're lucky, they'll fill the gaps in your own knowledge; if not, you will at least have helped someone else and you will have increased the standards of authenticity. If you can recommend tools, techniques or sources of supply, or if you find things wrong with tools, techniques or sources of supply or any other matters, pass word on in the Bulletin. If you have collected data on instruments, either write a Communication, like those enclosed, or at least let your colleagues know through the Bulletin that you've got it and will make copies available. There's no point in each of us measuring the same instruments or examining the same manuscripts; it wastes time and effort and harms the instruments and manuscripts. If you're willing to help others in this way but don't want the trouble of duplicating the material and of keeping stocks available, consider the NRI Design Service, whose notice is also enclosed with this Bulletin. We're not asking you to divulge your own designs (that's up to you), but to make available to others the basic research material on which your, and everyone else's, design material is based, either on whatever basis you prefer yourself, or on a royalty basis through NRI.

BULLETINS: Future Bulletins will be sent only to members, but this one is going to many people whom we think may be interested; we have economised to the extent of not sending it to many known readers of and advertisers in Early Music because they are being kind enough to give us publicity in the next issue. If you know of people who have not received this Bulletin and who would be interested, please photo-copy and pass it on, with a copy of the Membership Form, or else send me their names and addresses (but the sore that people can help themselves and ourselves, the lower we can keep the subscription). Enclosed with this Bulletin are the first FoMREI Communications which, if you the members send us the material, will be a regular feature. Another regular feature, starting with Bulletin no.2, will be a List of Members, since one of our prime aims is to help people contact others in the field.

Any members' queries or information will be welcomed for the Bulletin. Offers of material available at cost of duplication and postage will also be welcomed (the first few are listed below); advertisements of material for sale will be inserted at the discretion of the Secretary (this mainly because we don't want to offend our contemporaries who have to charge for advertisements by undercutting them in giving too much free advertising; we might hesitate to advertise finished instruments or kits but would welcome advertisements for instrument-makers' materials or source materials). We will usually be happy to circulate your leaflets with our Bulletins, advertising publications and so on, but we reserve the right to make a charge if the added weight bumps up the postage. We will always be happy to send a list of our members to your publishers or other firms who have anything to offer us that might help us. Notes and news of relevant activities of members will always be welcomed for the Bulletin. If you're travelling and would be willing to check an instrument for a colleague, please let me know (see a request of my own below).

RULES: Enclosed to members only is a copy of the draft Rules of FoMREI. This will be sent to all who join, with their receipt, and comments are urgently solicited. Your comments, which must be received by 31st December, will be circulated with the next Bulletin for voting. Briefly, for the information of those who are not yet members, FoMREI is designed as a two-tier organisation. Anybody is welcome to join and become a Member and receive material such as the Bulletin and the enclosed Communications, but we reckon that the organisation should be run by those who contribute, those who are willing to make the results of their research available to others. These are the Fellows and it is they who have the voting power. I would emphasise that any Member can become a Fellow by publishing his research to a standard of authenticity that satisfies the majority of the existing Fellows, and there are, of course, a fair number of people who, if they join FoMREI as a result of receiving this Bulletin, will automatically become Fellows on the strength of past publications. Another important aspect of the Rules is that all voting will be postal: this is time-consuming but it is unlikely that a Fellowship of this sort will be confronted with sudden crises requiring urgent decisions and it seemed more important to avoid the situation where a local clique, or those with the time to attend meetings, could dominate the Fellowship. All Fellows will have an equal say.

COMMUNICATIONS: As I've said above, we hope to send out Communications with each bulletin. These will remain available until their authors wish to withdraw them and a list will be published in the Bulletin once a year or so. Their circulation to FoMRHI members will not constitute formal publication and the authors are welcome to publish them properly elsewhere in due course; FoMRHI will hold no copyright in them (any author who is worried about this is advised to add his own copyright declaration). The idea behind FoMRHI Communications is a) to fly 'kites' so that authors may receive comments from other members on their ideas (eg the Communication herewith on Late Larring and Bridging); b) to pass information to other members; c) to make information known quickly and informally in advance of proper publication.

Communications should be typed on single-sided A4 paper (210 x 297 mm; 8 $\frac{1}{4}$ x 11 $\frac{1}{4}$ inches) and will be xeroxed (and reduced like this bulletin) from your typing, so it's up to you to see that it is correct. This method has the advantage of saving time and money and also that you can include marginal or textual sketches and figures; I'm afraid that we can't afford to cope with photographs. We shall keep the original so that further copies can be made as back-numbers until the author tells us that he wishes to withdraw it, either because he is now dissatisfied with it or because a later version has been formally published elsewhere, after which no further copies will be issued. We would prefer Communications to be in English at this stage; if we build up a sufficient foreign membership, we will welcome volunteers willing to translate from and into other languages.

QUERY: In GSJ XXI (we assume that all members of FoMRHI are acquainted with the standard periodicals in our field, such as the Galpin Society Journal, the Late Society Journal, Early Music, etc; we aim to supplement the work of these Societies and not be any sort of cheap substitute) I gave measurements of the Prague rauschpfeife or wind-cap shawms (p.17, Table 8). I pointed out that these differed quite distinctly from those given by Alexandr Buchner in Zaniklé Dřevěné Dechové Nástroje 16. Století (eg I have a length of 75 cm for a tenor and he has 85.8 cm). If anyone has been to Prague or is going there, can they provide me with measurements so that I know which of us was right? The discrepancy has been worrying me ever since I wrote the article.

OFFER OF MATERIAL: I have been going through some mediaeval illuminated manuscripts in the British Museum (sorry, British Library Reference Division nowadays). I have lists of all the instruments that I've seen and could make those available for the cost of duplicating and postage if anyone needs them and if I can find the time to type out my illegible pencil notes; initially I can offer for 30p a list of the Mss. concerned, with a brief note of whether they include useful, not much, or middling amounts of material.

I can offer also similar lists of carvings etc in some churches and for some of these I have photos available (Adderbury, Oxon; Leachamp Chapel, Warwick).

I also have lists, some more detailed than others, of instruments in museums. Who will volunteer to build up a master file to include not only mine but those of us all (for few of us are without such lists) so that anyone who is planning a trip can find out what's worth seeing in the places he's going to? Preferably someone with the time and the energy to make a duplicate file so that he can also say where to go to see any particular type and date of instrument.

ADVERTISEMENT: Early in the new year OUP are publishing two books on early percussion: one by James Blades and myself on the history and the use, the other by myself on their construction. These supersede my articles in GSJ and EM on construction and, I hope, will help others to make better instruments than I've made.

FINALLY: There is too much by and about Jeremy Montagu in this Bulletin. The remedy is in your hands. Send me similar or better information and queries about your work for the next Bulletin. Publication will be roughly quarterly but if I get enough material to send out more frequent Bulletins, I'll do so unless and until we run out of money to pay for postage and xeroxing; in addition, any member who thinks it worth while can pay for a special mailing for anything really urgent (circulation costs will be listed in the next Bulletin) - FoMRHI is here to help you if it can.

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FoMRHI COMMUNICATION No. 1.

ON EARLY 16TH CENTURY LUTE BARRING AND BRIDGE PLACEMENT

Ephraim Segerman and Djilda Abbott

In 1949 Michael Prynne (G.S.J. II, 47) surmised that an earlier, probably original barring of the Halfpenny Frei lute now at Warwick Museum had "five fairly evenly spaced bars between neck and bridge". We would like to suggest that this might have been a more general practice in the early 16th century. The traces of the original bars that he was referring to can be seen in the illustration accompanying his article and we can measure the distance between neighbouring original bars on the bridge side of the rose to be about $5/4$ times the distance between the original bars on the neck side. The bridge position on that lute is further from the rose than later traditions would dictate, so we suspect that its placement was strongly affected by the position of the original bridge.

Hellwig's drawing of the Laux Maler lute belly available from the Nurnberg Germanisches Nationalmuseum indicates traces of earlier bars and an earlier bridge. The earlier and probably original barring seems to have indicated two major bars which straddled the rose centre. This could have had the function of leaving the centre of the rose pattern unobscured but yet being acoustically equivalent to a single bar through the rose centre.

A possible barring and bridge-placing system which is consistent with the earlier pattern on both these lute bellies could be as follows:

1. Place a single or double bar across the rose centre.
2. Divide the space between the neck end of the belly and the (nearest) bar at the rose centre into three parts and place a bar on each of the two positions so generated.
3. Place a bar at the widest part of the belly.
4. Place a bar half-way between this last bar and the (nearest) bar at the rose centre.
5. Place the bridge at $1/5$ th the distance between the end of the belly and the rose centre.

The period of lute-making that we are concerned with here is between the 15th century from which we have the data of Henri Arnault of Zwolle (translated by Ian Harwood L.S.J. II, 1960, 3) and the later Renaissance and Baroque traditions as discussed by Hellwig (G.S.J. XXI, 1968, 129). One might expect a system somewhat intermediate between the systems used before and after, and our suggestion indeed has this character. In common with the earlier pattern there are only two bars between the bridge and the rose, with one being at the point of maximum width. In common with the later barring there is a bar or pair of bars at the rose centre, and (consistent with the basic barring in eighths as described by Mersenne but rarely found in surviving lutes) the space between the rose centre and the neck is divided into three equal parts, accomodating two bars. The number of bars, being five, is intermediate between the earlier three and the later six or usually more.

This is a very tentative suggestion since it is obviously not valid to make general conclusions from just two pieces of data. We therefore invite those who have examined other lute bellies from the early 16th century to contribute their knowledge to this discussion.

We would like to acknowledge our debt to Michael Lowe who first pointed out to us that there might be a relationship between the earlier patterns of these two lute bellies.

FoMRHI COMMUNICATION No. 2.

THE LUTE BELLY BRIDGES ON 15th CENTURY ILLUSTRATIONS
Of RECLUS - a possible explanation.

Illustration: Lucas van Leyden (1489?-1533) 'Music-making couple' 1524.
Signed and dated engraving in Museum Boymans van
Beuningen, Rotterdam. (Inv.4678).



An old woman and a younger man sit together and make music. The man tunes a 5 course lute (with some unusual constructional details for this late date - the engraving is pervaded by an anachronistic feel for detail which Lucas makes into a deliberate feature). The woman plays a 3 string fiddle or rebec-type instrument. The well-drawn bow allows for an exact re-construction and suggests the artist had a thorough knowledge of the instruments he had drawn.

The bowed instrument has: a tall piece; vaulted back; two 'C' sound holes; unusual 'wings' at the top and bottom bolts of the belly; no separate finger-board; hidden tuning pegs?; scroll at the peg-box head. The instrument has three strings with the thickest placed centrally (drone string?) and the two outer strings show no appreciable difference in gauge. The most surprising features, though by no means uncommon in 15thC bowed instruments, are the clearly drawn pair of bridges.

This is an unco-forgable feature of iconography which we have seen a little shy of and in many instances the depiction is conveniently vague to pass it off as artists licence. There is no doubt that some instances reflect extreme ignorance on the part of the artist. But this explanation will not do in many cases of illustration of double bridges and certainly not in this particular instance. Lucas knew what he was drawing and knew that it worked.

On closer inspection, there is much that is revealed in this engraving. The ^{bow} seems to be in contact with all three strings and is playing in the area between the two bridges. As the strings pass over the bridge nearest the neck towards the peg-box, they cut a very acute angle from the parallel position they had with the belly when they were between the two bridges. This gives an extraordinarily high action for the left hand if one expected our usual technique of stopping onto a fingerboard. Her left hand third finger is stopping the top string (though the bow sounds all three) but is not depressing the string anything like forcefully enough to stop it on the neck. This might account for the lack of fingerboard - she does not need one. It would appear that she is pressing the string without any intention of depressing it that far for as she presses harder, the pitch of sounded note will change as her pressure tightens (or releases) the tension of the string between its two bridges (its effective vibrating length). With a string of suitable gauge and tension several notes could, one would imagine, be produced. It would mean of course constant 'glissandi' between every interval and micro-interval (a sound effect I for one had not conceived of in our western culture). An experiment showed that, on an instrument reconstructed fairly close to the illustration, a gut string of the appropriate tension could cope with the interval of a fourth to a fifth - a range appropriate for any folk melodies. It was not tested, but a wire string would of course give a much larger range. Given a highly polished second bridge (which now should be regarded as a 'nut') the pressing action is easy though very different from any left-hand techniques we have inherited from our immediate past. The sound is exciting, encourages improvisation and is wholly convincing and when developed by a skilled player there is scope for a folkloric virtuosity. What with lutes with parchment buzzers, harps with jangling bray pins and fiddles with whining intervals, 15thC western music begins to develop a ~~matrix~~ sound-colour spectrum which will make the 16thC rather tame. I cannot wait to move back a peg or two.

NOTE: It was Michael Sprake and Neil Hansford who first discovered this possibility. It was their ingenuity which contrived the experiments and it was Neil Hansford's instruments which persuaded the veracity of their observations. My role is simply as a reporter.

Anthony Rooley.
October 1975.

Djilda Abbott and Ephraim Segerman

GUT STRINGS

Most young players of early stringed instruments are anxious to become more authentic by using gut strings. Many older players of early stringed instruments started off using gut strings when there were no alternatives, and they are most reluctant about changing back to gut strings now. The problems with gut that they remember and that our research has clarified are:

1. STRING LENGTHS AND HIGHEST PITCHES

Nylon and steel have greater tensile strength than gut, so gut treble strings cannot be tuned so high as these other materials on a given string length. Thus trying to use a gut treble string on a lute with 60 cm string length tuned to g' will lead to disappointment since the string will not last more than a week or so. A pitch of f' would be much more comfortable as well as conforming to early practices of nearness to breaking. Other recommended pitch-length relationships are given in the first two rows of the Table (page 3). When lute or viol tutors recommend tuning the top string as high as it will go without breaking, those relationships between length and absolute pitch (not necessarily the same as the names of the notes they gave - "nominal pitch" - because of varying pitch standards) pertain as well as we can determine it.

The requirement to play their instruments at unaccustomed pitches if authentic strings were used is often a very powerful deterrent to the change by well-meaning players.

2. PITCH DISTORTION ON STRETCHING STRINGS

Pressing a string down onto a fret stretches it slightly. Pressing it hard down behind the fret stretches it some more. The stretching sharpens the pitch. Playing loudly on a string so that its vibrations are large stretches the string, at least for part of its vibration-cycle, which sharpens the pitch. (With loud plucking the pitch is

sharpest at the beginning of the note when the vibrations are largest and it comes down to the "right pitch" as the note dies away.) In each case the rise in pitch is negligible for thin strings but gets quite big with thick strings.

3. PITCH RANGES

Pitch distortion on the bass strings can be reduced by making them more elastic. This is the main advantage of overspun strings where the total mass of the material makes for the low pitch but only the elasticity of the core is involved in the pitch distortion.

On instruments from before the 1660's at least (and probably well into the 18th century for many instruments) overspun strings were not used, and the elasticity of the all-gut thick bass strings was only enhanced by putting a high twist on them when being made. Moderate twist bass strings sounded acceptable to 15th century ears if the pitch was within an octave and a fifth (or sixth) of the highest string just short of breaking on the same string length (see the Table). High twist strings were acceptable to ears of the first three quarters of the 16th century if tuned within two octaves (plus perhaps a tone) of a similarly related highest string. After that Venice Catline maximum-twist strings afforded an open string range of two octaves and a fourth (or fifth). At each advance of string technology the new, more elastic strings were used to improve the quality of courses within the old range besides offering courses that extended the range. There was no significant change in tone quality or cost in these changes, so there was no serious delay in acceptability as there was with overspun strings.

Moderate-twist strings are what is available from modern gut manufacturers. We can soak such strings and give them a high twist. Venice Catline strings are made in quite a different way which commercial gut manufacturers will not try to do. We are experimenting with making them ourselves the only way we can - starting with the raw material from the abattoire, but have not solved all of the problems involved as yet.

Even Venice Catlines do not have anything like the elasticity of overspun strings, so pitch distortion will be a new problem that the player converting to gut will need to cope with.

TABLE: USABLE PITCH RANGES OF THE DIFFERENT TYPES OF GUT STRINGS

STRING LENGTH cm	43	45	48	51	54	57	61	64	68	72	76	81
HIGHEST "SAFE" NOTE ⁽¹⁾ MODERATE TWIST GUT available in all periods.	b'	b ^b '	a'	g [#] '	g'	f [#] '	f'	e'	e ^b '	d'	c [#] '	c'
LOWEST ACCEPTABLE NOTE ⁽²⁾ MODERATE TWIST GUT	e	e ^b	d	c [#]	c	B	B ^b	A	G [#]	G	F [#]	F
LOWEST ACCEPTABLE NOTE ⁽²⁾ HIGH TWIST GUT available from beginning of 16th cent.	B	B ^b	A	G [#]	G	F [#]	F	E	E ^b	D	C [#]	C
LOWEST ACCEPTABLE NOTE ⁽²⁾ VENICE CATLINES available from last quarter of 16th cent.	F [#]	F	E	E ^b	D	C [#]	C	B ₁	B ₁ ^b	A ₁	G ₁ [#]	G ₁

(1) A semitone or two higher is possible but breakages will be frequent.

(2) Up to a tone lower was used sometimes.

The pitches here assume equal temperament and a' = 440 Hz. Helmholtz notation.

4. AUTHENTIC WAY OF COPING WITH PITCH DISTORTION ON FINGERING

The obvious logical way to minimize pitch distortion on fingering is to have the lowest possible action and the lowest possible frets. Making a low action was certainly an authentic practice, but the grading of frets for fine adjustment of the action made them remarkably thick at low positions (near the nut). This implies an aspect of technique that modern players have not yet developed; having the frets positioned flatter than theoretical and controlling intonation by finger-pressure on the string. This aspect of technique offers an authentic dimension for expression yet to be explored by modern recreators of early music on fretted gut-strung instruments.

5. UNIFORMITY

Gut strings, being natural products, are inherently less uniform than alternatives. Historically, metal-strung instruments had frets placed at permanent positions while gut-strung instruments had moveable frets. This was because of the difference in uniformity and the frets were moveable to make the best compromise to correct for out-of-tuneness of the gut strings. Capirola had a most complex system for fixing strings, some with the thick end at the nut, some with the thick end at the bridge, to affect this compromise. Various sources indicate that a string that is out of tune may be better if the direction in which it lies is reversed.

Non-uniform strings give rise to another problem which affects both fretted and unfretted instruments, in that the harmonics of a non-uniform string are out of tune with one another and with the fundamental. Thus they beat with one another instead of developing a steady vibration. On plucked instruments this can cause poor or unsustained tone; on bowed instruments it can, in addition, make the string difficult to control. The extent to which this is a problem depends on both the degree of non-uniformity of the string, and on the acoustic response of the instrument. Generally the more resonant the instrument, the more it is adversely affected by non-uniform strings. This problem can be particularly acute on those extremely resonant instruments which are built in a modern tradition to cater for modern concert hall conditions.

Treble strings are most affected by non-uniformity. Lutes before about 1580 had single first courses because of the great difficulty of getting two treble strings to sound together on all the frets. More uniform treble strings were available from Munich since Capirola's time (1517) but they seem not to have been in general use

until double first courses became standard (in Italy or England, at least). They were called Minikins in England and were very expensive. *

Though Minikins were a vast improvement over other thin gut strings they certainly were not up to the standard of uniformity which we have become used to in nylon or metal wire. Thus lower standards of intonation accuracy are to be expected if using authentic gut.

6. EFFECT OF TREATMENT TO IMPROVE 5.

It is now possible by very careful extensive polishing coupled with electronic testing to get better uniformity than ever before, but the more polishing a string is subjected to, the more microscopic fibres are broken down when they appear at the surface. This tends to lower the tensile strength and invites more breakage.

7. EASE IN TUNING

If a player is converting from nylon to gut on an instrument, he should make sure his pegs are very well fitted since, for the same increment of pitch and the same tension, because of the differences in elasticity and density, he will only have about $3/4$ of the peg movement that he had with nylon. If converting from single-strand iron or steel, he would enjoy 10 times more peg movement than he was used to. Metal stringing of viols can well involve twice the tension of gut, and the steel is often made of twisted strands which increases the elasticity so the increased peg-movement for a given pitch increment could well be down to a factor two or so. If the player is used to fine tuners on his strings, he will have to accept more difficulty in tuning as well as the need (see next section) for tuning more often.

* Import duties in 1660 on 12 dozen knots of minikins was £1 6s 8d while the duty on the same quantity of thick strings was 2s 8d and for comparison that on a dozen lutes made in Cologne with cases was £8. (G.S.J. IX, 1958, 97). In contradiction Mace said that they were the same price. Burwell called a knot (which was a long continuous length of gut) a "bunch" and said that it was hard to get two good strings out of one of them, but those were not minikins. Her explanation of the first two courses on the lute being single parallels that given above for single first courses before 1580's (G.S.J. XI, 1958, 15).

8. TUNING STABILITY

Gut is very sensitive to moisture absorbed from the air and imparted to it from the fingers, so it goes out of tune with changes in atmospheric environment and as a result of playing by people with sweaty fingers. (Increased moisture swells the gut, making the fibre paths longer, thus increasing the tension and raising the pitch - this effect is much stronger than that of increased mass which tends to lower the pitch slightly.

9. EFFECT OF TREATMENT TO IMPROVE 8.

Some modern strings have varnish added to them to resist moisture absorption. The increased density without increased tensile strength resulting from this treatment lowers the breaking pitch and thus decreases the life of treble strings.

10. CHEMICAL ATTACK

Gut strings are more susceptible to chemical attack from sweat, an effect that can decrease the life of strings, particularly treble ones.

11. EFFECTS OF CONVERSION ON NUTS AND BRIDGES

All-gut strings are thicker than overspun strings. When converting to gut on violins the notches on the bridge and nut need to be widened so that the strings run freely. The widening is symmetric around the original positions. This is not the case for lutes because of the closeness of the strings within a course and because of the different type of bridge. To avoid the strings within a course slapping together, the inner string surfaces (nearest to the other string) of that course need to keep their distance, which means that the notches on the nut are widened outwards away from the centre of the course only. On the bridge where the string goes through a hole, that hole is similarly widened outwards, but also upwards as well so as not to lower the action and cause slapping against the frets.

The widening of a notch or hole in a non-symmetric way without making it deeper leaves a flat bottom to it which can cause trouble if conversion back to overspun strings is ever wanted. Replacement lute nuts may be preferred.

To give an estimate of how much an effect we are considering here, let us give Mersenne's statement (p. 79 of Chapman's translation) that the thickest lute string is one line in diameter, i.e. 2.35 mm or 0.093 inches (conversion to modern units on p. 573 of the translation). Overspun lute strings rarely exceed 1 mm in diameter.

In summary, gut strings do not last as long, are more trouble to keep in tune, are inherently more out of tune, and they allow much less latitude in pitches than modern alternatives. In return, if a player agrees to cope with all these disadvantages, he will be rewarded by developing the relationship with his instrument which parallels that of the early players, with the consequent impetus to discover authentic components of technique and tone production which he would otherwise never have predicted, and which will, of course, add to the rediscovery of the life of the music itself.

FoMRHI November 1975 REQUEST FOR INFORMATION

Tony Rooley wants a lute made that is as authentic as possible for the music of John Wilson and Cuthbert Healey. The music indicates that this was a 10 course lute with 9 being fingered by the left hand, and Renaissance relative tuning was used. The period is probably before the middle of the 17th century. Mace's (P.39) discussion of earlier lutes implies 20 rather than 19 strings. Anyone having further information to aid in the reconstruction of this lute please contact Mr. Rooley or the Hon. Sec.

The January 1976 Communications have been published and include:

Bulletin no. 2; report on NRI Design Service: Comm. no. 5; The Geometric Description and Analysis of Instrument Shapes (Abbott and Segerman); no. 6: Some Thoughts on a File of Musical Instruments (same authors); no. 7: Sources of Information on Authentic Lute Construction (same authors); no. 8: Some Manuscripts in the British Library with Musical Instruments and a few other Sources (J. Montagu); no. 8a: Pictures etc. in the Ashmolean Museum (John Downing); no. 9: Comments on the Catalogue of the Victoria and Albert Museum Travelling Exhibition of 1973 (J. Montagu).