

## DESIGN AND STRUCTURAL DEVELOPMENT OF THE LUTE IN THE RENAISSANCE

RAY NURSE (Vancouver)

The six-course lute of the early 16th century enjoyed a place of central importance in contemporary musical life: unrivalled as the ultimate solo instrument, esteemed as the best accompaniment to the voice, and a fixture in most ensembles, the lute was at the height of its influence in mainstream music. But today, in the midst of the present revival, the characteristics of early-16th-century lutes remain shadowy and elusive, and few modern makers have attempted serious, thoughtful reconstructions of lutes from this early period.

Original surviving instruments before 1580 are rare, in a fragmentary state, and invariably exhibit questionable features. Lutes by important makers such as Laux Maler and Hans Frei display a certain convincing uniformity, but in every case have been radically altered by later modifications: the backs are often trimmed, bellies (if original, and how can we be sure?) rethickened and rebarred, and bridges, necks and pegboxes discarded in favour of later styles.

At least two six-course lutes do exist in apparently near-original condition: the Georg Gerle lute (Vienna, Kunsthistorisches Museum, A.35), and the Magno Dieffopruchar lute (London, collection of Charles Beare).<sup>1</sup> Both lutes display enough unusual features that their authenticity, at least in part, has been called into question. Even if original, it is difficult for us to know if they are typical examples from the period. The evidence we have before us is simply too meagre and unique for us to place a great deal of confidence in it.

If we could be sure of these two examples, or even if we should discover an intact original lute of the Bologna school, many questions would remain. A glance at contemporary iconographic sources reveals a myriad of sizes and shapes of lutes of which not a trace remains. The Fugger inventory,<sup>2</sup> from the year 1566, lists 141 lutes in some detail, and the variety of sizes (seven are differentiated) and materials is astonishing when compared to our own limited perceptions. Also, some instruments would have been designed for specific functions (solo, accompaniment or ensemble), a fact which is not apparent from paintings or surviving artifacts. Lutes which may have looked the same on the outside may have sounded very differently.

Clearly, if we are to recreate something of the reality of the world of the lute

in this period, there is a need for creative thinking and experimentation on the part of makers and players. But if we are not to leave reality behind, and reinvent the Renaissance according to our own taste, we have to consider a tremendous amount of circumstantial evidence – surviving instrument fragments, iconographic sources, documentary evidence and especially the character and requirements of music written at the time. In order to fill in some of the many missing pieces in our puzzle, it is productive to construct hypothetical lines of development between what we know of lutes in the 15th century and the lutes of the late 16th century, about which we know a great deal. If some of these hypothetical lines of development should coincide with what we perceive in iconography or documentation, or tend to confirm the validity of the circumstantial fragmentary evidence, we might be able to proceed with more confidence in our reconstructions.

The earliest school of lute-making about which we possess sufficient surviving material to come to firm conclusions flourished in Northern Italy, especially Padua and Venice, during the three decades 1580-1610. The makers of this school were of German origin and most trace their lineage to the instrument-making centre of Füssen; hence they are often collectively referred to as the Füssen school. Some of the makers, such as Magno Dieffopruchar (II), Vvendelio Venere, Michael Harton and Giovanni Hieber, are familiar names today, for their surviving lutes are commonly-used models on which modern makers have based their own work. Other makers of the Füssen school are relatively obscure – Burkholzer, Langenwalder, Hellmer, Greif, Smidt, among others – but their work is at least comparable in quality to the more famous makers. Most remarkable about all these makers is the consistency of design, workmanship and materials displayed in their instruments, a consistency that today is somewhat obscured by later alterations to their surviving work.

I think it is not unrealistic to say that with the present rate of research and the amount of material to study, we will soon know enough to understand clearly the designs and methods of the Füssen school, and we can hope that soon someone will publish a major study of this important subject.

The table at the end of this article presents 30 selected surviving lutes of the Füssen school, made between the years 1578 and 1612. I have chosen these particular lutes because (despite the present altered state in some cases) they are very consistent in design and represent a specific lute type made by this school. If we could gather all these lutes together in one room, in their newly-made condition, we would be struck by their uniformity. They all possess a similar belly shape, a full-rounded back, usually of yew wood, a single rosette, many similarities of decoration and execution, seven or eight double courses, and eight tied frets on the neck. In short, to the uninitiated eye, it would seem as if they were all made by the same maker. But most striking would be the variety of sizes, with string lengths ranging from less than 30 cm. to nearly a metre; there can be no doubt that we are looking at the standard production models of consort lutes of the Füssen school.

I suggest that these lutes were originally conceived and built in sets, and that their design and tonal characteristics were developed and evaluated by the exigencies of the lute consort. Most modern makers have been content to produce single lutes in the smaller sizes only, and despite evidence that larger lutes were preferred in the 16th century, they enjoy little popularity today. Modern makers of viols and recorders, as a matter of course, construct consorts of instruments, and the success of their efforts is evaluated by the effect of the set as a whole. Serious lute makers should also adopt this approach if they wish to understand the reasoning behind the design of these lutes.

It is fascinating to compare similar lutes by different makers of this school, to study points of similarity and to identify elements of personal style. Fig. 1 shows diagrams of the bellies of two very similar instruments, both made in Padua within a decade of each other.<sup>3</sup> Their size, shape and proportions are nearly identical. We see at a glance that their barring patterns are the same. A closer examination of the belly thicknesses and bar dimensions, however, reveals that the Venere lute is more robust, especially with respect to bar thicknesses (but notice that most are also lower in height). Other examples by these makers reveal a similar contrasting approach, and we would expect a subtle but noticeable tonal difference between their instruments. I trust that soon we, too, will be able to discern the differences between a Venere sound, or a Harton sound, in the work of modern copiers!

At this time, the most valuable lesson we need to learn from a survey of these consort lutes is the physical sizes that made up the consort, and how the Füssen makers related size and pitch.

Thomas Mace, in his *Musick's Monument* of 1676, gives instruction in choosing a well-matched consort of viols,<sup>4</sup> advice which is very relevant to our study:

Endeavour to *Pick up* (Here, or There) so many *Excellent Good Odd Ones* [viols], as near *Suiting* as you can, (every way) viz. both for *Shape, Wood, Colour, etc.* but especially for *Seize*.

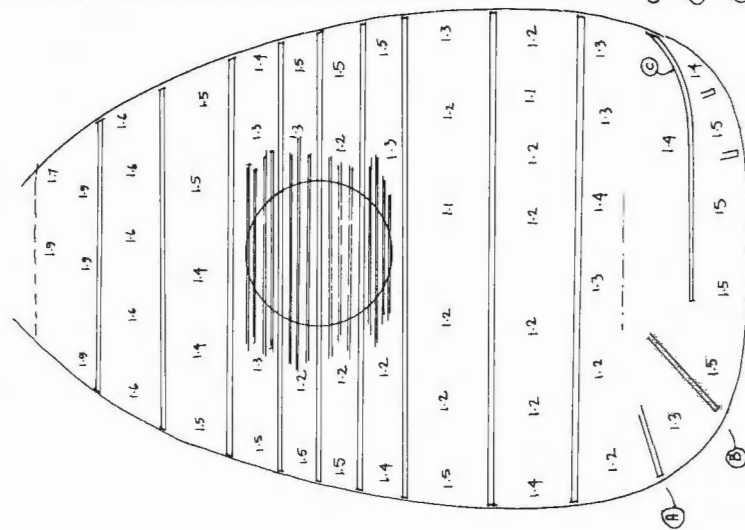
And to be *Exact* in That, take *This Certain Rule*, viz. Let your *Bass* be *Large*. Then your *Trebles* must be just as *Short* again, in the *String*, (viz.) from *Bridge*, to *Nut*, as are your *Basses*; because they stand 8 *Notes Higher* than the *Basses*; Therefore, as *Short* again; for the *Middle of Every String*, is an 8th. The *Tenors*, (in the *String*) just so long as from the *Bridge*, to *F Fret*; because they stand a 4th *Higher*, than your *Basses*; Therefore, so *Long*.

Despite the convoluted language, Mace is clearly describing a method of size relationship based on strict division of the string length (as is used in placing frets), according to the harmonic proportions of Pythagoras. A treble viol, being tuned an octave higher than a bass, has a string length 1/2 as long, and a tenor, being a fourth above a bass, a string length 3/4 the length. Did the lute makers of the 16th century use this method as well?

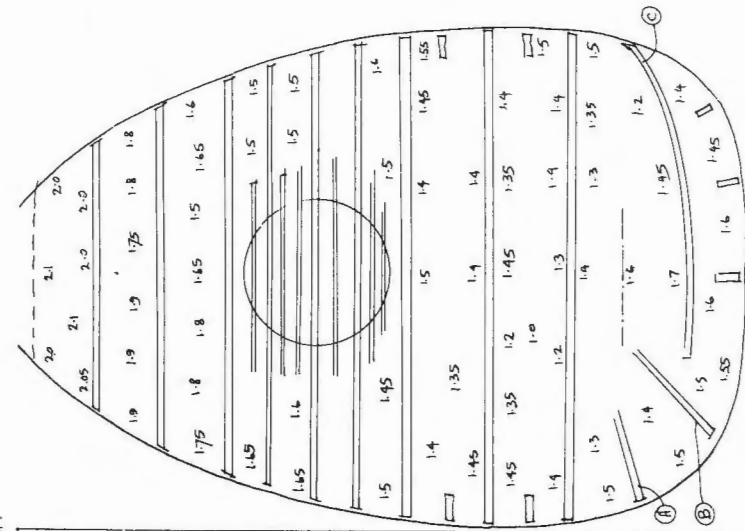
The tunings we should expect for consort lutes, after an examination of lute consort music,<sup>5</sup> have their first strings in d', a', g', c' and d'. The Pythagorean

Bear dimensions in mm.

1599 Hartung Bologna 1808	Venere ex Bingham
3.2 x 13	6.5 x 18
3.8 x 19.5	6 x 21
4 x 25.5	7 x 24.5
3.2 x 9	4 x 8
3.2 x 10	5.5 x 8
3.2 x 10	5.5 x 6
5 x 28.5	7.5 x 25.5
4 x 15	6.5 x 9
4 x 15	6 x 8
3.8 x 2.5	4.5 x 5
3.9 x 11	6 x 12
3 x 6.5	5 x 10



Michael Hartung, Padua 1599  
Bologna, Museo Civico Nr. 1808  
Body length 55.1cm 35 year ribs



Vendelio Venere, Padua  
ex Tony Bingham coll.  
Body length 57.5 19 year ribs

Fig. 1.

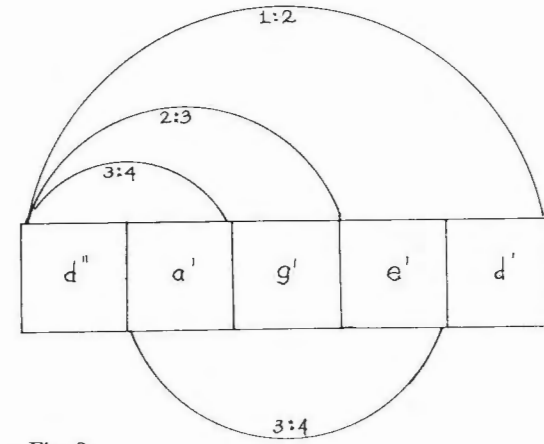


Fig. 2.

relationships between these pitches could be expressed as in Fig. 2. We can use these relationships to compute proportional string lengths, based on any given string length. Taking the 44 cm string-length lute by Venere (Vienna C.39) as a possible descant lute in d, we can extrapolate the following sizes:

nominal pitch	string length (cm)
d''	44
a'	$4/3 \times 44 = 58.7$
g'	$3/2 \times 44 = 66$
e'	$4/3 \times 58.7 = 78.2$
d'	$2/1 \times 44 = 88$

A comparison of these figures with the string lengths of original lutes on the list (in particular Venere's work) shows a surprising agreement. We also now notice that even the tiny Venere lute (Vienna C.41), which we might have thought was a toy, has a string length almost exactly 1/2 the length of the lute in a ( $58.7 \div 2 = 29.35$ ). We can be sure these makers were using Pythagorean proportions to determine the relationships of consort string lengths, and it is also now clear what the nominal tunings of most of the lutes on this list should be.

While it might be argued that the actual pitch of these lutes could be just about anything, I see no reason to assume that it would be lower than normal late-renaissance Venetian pitch (comparable to our own and even higher), as these lutes would have been involved in consorting with other types of instruments (such as organs or viols) as well. In my practical experience, with good gut treble strings, these proposed string lengths are quite possible at a semitone below modern pitch. Given that the art of making chanterelle strings was at a peak around 1600, and that the climate of northern Italy is more amenable to long string life than is that of rainy Vancouver, it is not too much to expect that

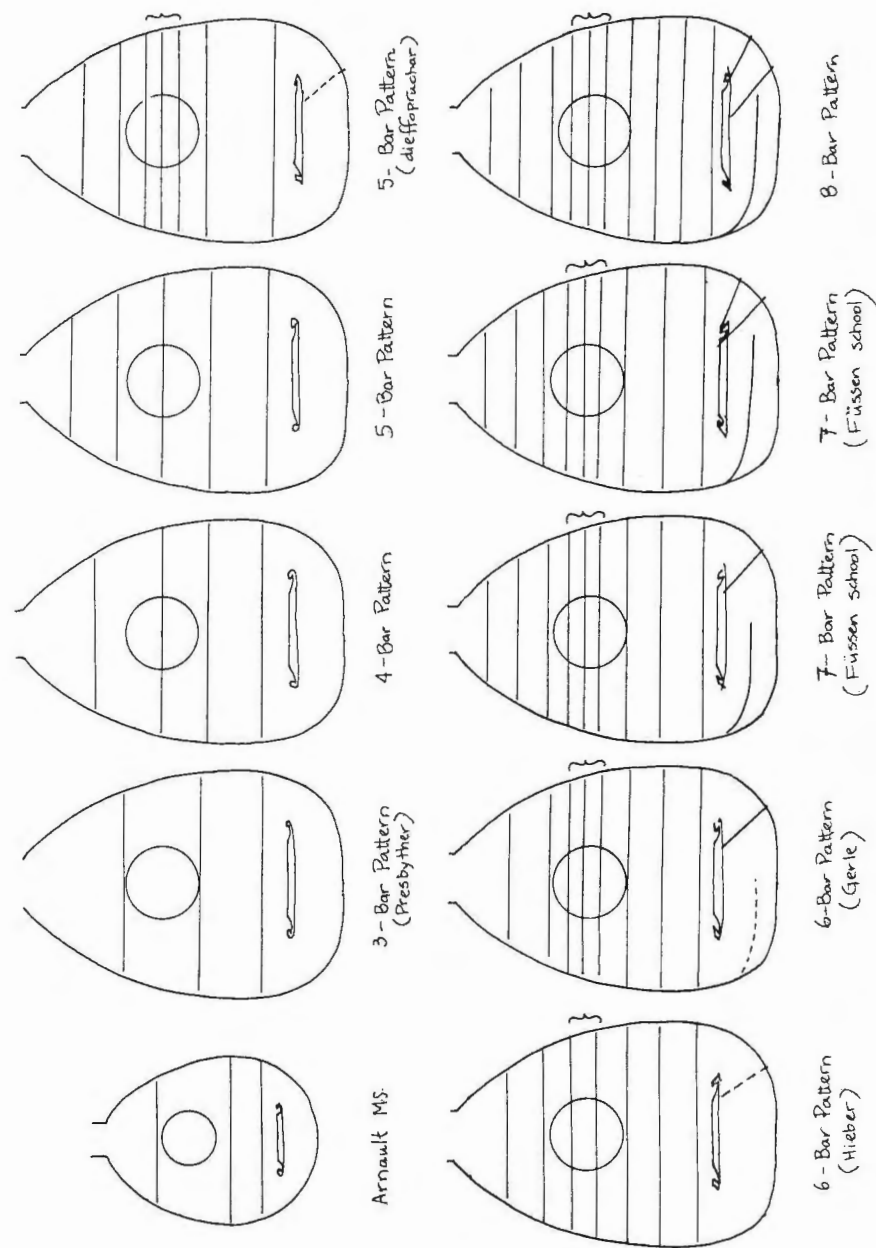


Fig. 3.

players could have tuned another semitone or a even a tone higher than I have tuned. It is notable that the lutes we commonly use today are, for the same tuning, smaller than the Füssen lutes, and this seems to me a radical departure from original practice.

The manuscript of Arnault of Zwolle (ca. 1450) has long been recognized as our most important source of knowledge about 15th-century lute design and construction. The contents have been translated and discussed elsewhere.<sup>6</sup> Arnault's lute would have been a plectrum lute, probably of small size. It is in a different world from the late-16th-century Füssen lutes, but it is possible to imagine lines of development between them.

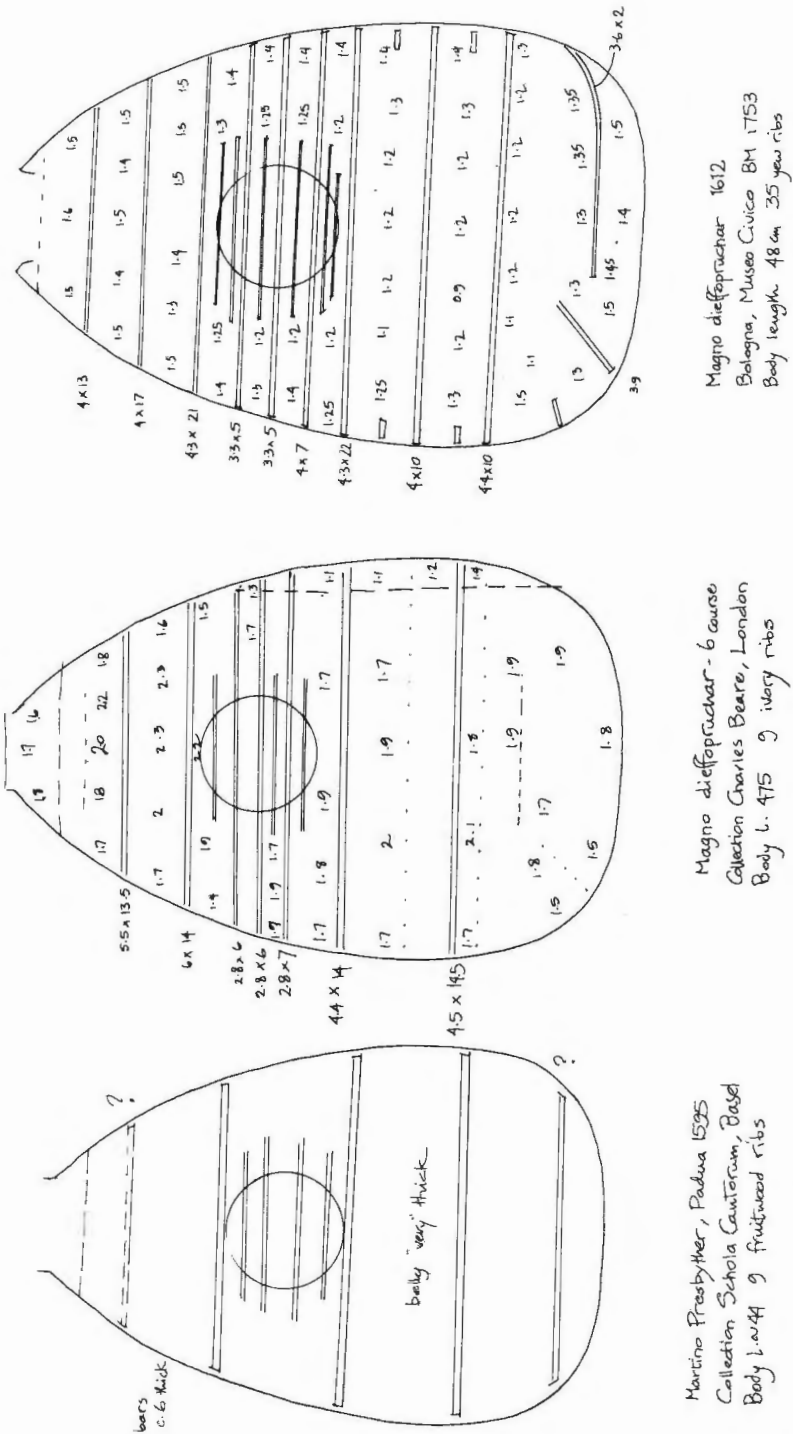
The shape of Arnault's lute, the placement of the rose, bridge and bars, and the length of the neck, are determined by geometrical means, using methods resembling those of later practice.<sup>7</sup> The back of Arnault's lute is semicircular in section, while this is never the case with later lutes. We might assume that some lutes in the early 16th century would also have had semicircular backs, but others would be tending towards the later style. The neck on Arnault's lute is very long, with room for about eleven frets, while the Füssen lutes had a standardized length of eight frets. Iconographical sources of the early 16th century confirm that some lutes had longer necks, while others were very short, with only room for seven frets: perhaps this variety could be explained by the differing musical functions of the instruments pictured.

I have avoided much mention of the obvious value of iconographical sources in this paper, but I should point out here that important exterior details, revealing a great variety of ideas, can be observed. Features which we might have thought atypical, such as long necks, body frets, oval soundholes, and inserted rosettes (suggesting a thick soundboard?), can all easily be seen.

Consideration of the barring pattern given for the lute in Arnault's manuscript leads to a fascinating hypothetical line of development (Fig. 3). Arnault's simple three-bar pattern could be regarded as the beginning of a development which culminates in the complexities of early-17th-century practice. In order to reinforce the weak area created by a carved rosette, a fourth bar would next be added, followed by another bar above the rose to create a symmetrical five-bar pattern, and to help stabilize the neck-body join. The major bar behind the rose might have spoiled the delicate appearance of the carving, so makers substituted two or three smaller bars, together of comparable stiffness to the larger single bar. (These substitutions of multiple bars for a single rose bar are indicated in Fig. 3 by a bracket beside them.) The logical continuation to six-, seven-, and eight-bar patterns, and the appearance of increasingly complex bars around the bridge area, can be traced by following the progression in Fig. 3.

In fact, with the exception of the simple four- and five-bar patterns, all these patterns do exist in surviving lutes in roughly chronological order. The belly of the Presbyter lute (collection of the Schola Cantorum, Basel), which may date

Fig. 4.



from the early 16th century (Presbyter apparently altered the lute to its present eight-course state in 1595), has a three-bar pattern, along with questionable bars below the bridge and near the top block (see Fig. 4). Charles Beare's six-course Dieffopruchar has a five-bar pattern with a triple-bar substitution behind the rose. Both the seven-course Hieber lute (ca. 1580) and the six-course Gerle have six-bar patterns, the former with a double substitution of the rose bar and the latter with a triple. The seven-bar pattern is the standard pattern of the Füssen lutes, and the eight-bar pattern is occasionally encountered in a few late examples, such as the small Sellas arciliuto in The Shrine to Music Museum, Vermillion, South Dakota (ex Witten collection), and a lute made by Giovanni Tessler of Ancona in 1621, in the Museo Bardini in Florence. This evolutionary theory of the development of barring clearly has some merit and deserves our attention; at present, I believe the four- and five-bar patterns are a sort of 'missing link' and may well have been commonly used in early-16th-century lutes.

The gradual addition of bars would lead to an increasing stiffness of the soundboard, unless compensations were made by thinning the soundboard and perhaps using progressively lighter bars as well. Our hypothetical chart of barring development (Fig. 3) could be regarded as indicating a gradual increase in bar strength to compensate for a steady lightening of the soundboard structure over the years. It makes sense that early plectrum lutes would have had relatively heavy soundboards, to soften the violent attack of the plectrum, and that, as players and composers increasingly demanded more sensitive response to the flesh of the fingers, the soundboard structure became lighter and more delicate to improve the quickness of response. In doing so, the soundboards may have lost a certain amount of the solidity, clarity and volume that the heavier soundboard provided.

Surviving fragments tend to confirm the idea that earlier lutes had thicker soundboards as well as fewer bars (Fig. 4). We should be cautious in evaluating apparently original thin soundboards – it is possible that they were thinned at a later time to make them conform to contemporary practice, while soundboards which are thicker than later practice are probably untouched. The Frei lute in the Warwick Museum, for example, clearly possesses an original soundboard which is nearly 3 mm. thick at the lower end of the belly (about twice as thick as one would expect on modern lutes). I believe this 3 mm. thickness is correct, and that the belly of a comparable Frei lute in the Vienna Kunsthistorisches Museum (C.33), which has a thickness of 1.3 mm. at the same spot, has been thinned in the early 17th century.

Many of the points raised in this paper are unorthodox compared to our conventional view of the renaissance lute. I hope that the variety of sizes, structures, and tonal colours implied will interest players and makers, and that further research and practical experimentation will bring us closer to the lute's true identity in this most important period of its history.

TABLE

## Explanatory Notes

- Measurements given reflect the present condition of the instruments.  
 – String lengths are given only for lutes in original disposition.  
 – An asterisk \* after a belly length measurement indicates that the instrument is now fitted with a wider neck than originally, and hence the belly is shorter; for purposes of comparison approx. 1 cm. should be added.  
 – Measurements given in brackets ( ) are not original, but careful estimations of the original state, and can be considered accurate for the purpose of comparison.

		string length	belly length	belly width	no. of ribs	
Vvendelio Venere	Padua Vienna Kunsthistorisches Museum C.41	29.5	21.1	13	11	yew
Vvendelio Venere	Padua Vienna Kunsthistorisches Museum C.39	44	32.1	21.8	19	yew
Vvendelio Venere	Padua Vienna Kunsthistorisches Museum C.40		32.0	21.9	19	yew
Vvendelio Venere	Padua 1592 Bologna Accademia Filarmonica	58.5	43.5	30.1	25	yew
Vvendelio Venere	Padua 1602 Florence Museo del Conservatorio (82 B/62)	58.7	44.0	30.1	35	palisander
Giovanni Hieber	Venice Brussels Conservatoire 1561	59.4	43.4	30.8	13	maple
Vvendelio Venere	Padua 1582 Vienna Kunsthistorisches Museum C.36	66.7	50.0	33.2	13	yew
Vvendelio Venere	Padua 1584 London coll. Robert Spencer		48.5*	32.2	15	yew
Vvendelio Venere	Padua 1603 Darmstadt Hessisches Landesmuseum (67:106)		48.7*	33.1	21	yew
Hans Burkholtzer	Füssen 1596 Vienna Kunsthistorisches Museum 44/N.E.48		49*	33.3	19	ivory
Georgius Greif	Füssen 1590 Darmstadt Hessisches Landesmuseum (67:103)		49.7*	33.6	15	yew
Magnus Hellmer	Füssen Darmstadt Hessisches Landesmuseum (67:104)		48.5*	33.0	23	yew
Magno dieffopruchar	Venice 1609 Florence Museo Bardini 144	67.2	49.8	33.9	35	yew
Magno dieffopruchar	Venice 1610 The Hague Gemeentemuseum Ec 555-1933		48.4*	32.3	35	yew
Magno dieffopruchar	Venice 1612 Bologna Museo Civico 1753/L.M.11		47.4*	34.2	31	yew

Vvendelio Venere	Padua 1578 Braunschweig Städtisches Museum Nr. 51	(53.0)	35.2	13	yew	
Vvendelio Venere	Padua 1585 (?) Leipzig Musikinstrumenten Museum Nr. 492		35.0	33	yew	
Vvendelio Venere	Padua 1592 Yale University Instrument Collection	52.0*	34.7	13	yew	
Vvendelio Venere	Padua 1592 London Victoria and Albert Museum W6-1940	50*	34.6	19	yew	
Magno dieffopruchar	Venice 1607 Prague Narodni Museum No. 657		35.5		yew	
Otavio Smidt	Parma 1612 Bologna Museo Civico 1813	51.8	33.9	35	yew	
Vvendelio Venere	Padua ex. Tony Bingham coll.	(78.0)	57.5	37.0	19	yew
Vvendelio Venere	Padua London Royal College of Music 203	54.2*	36.5	31	yew	
Vvendelio Venere	Padua 1609 Budapest National Museum of Hungary 16	56*	36.5	41	yew	
Vendelinus Tieffenbrucker	Padua Vienna Kunsthistorisches Museum (loan)	57*	37	21	yew	
Michael Harton	Padua 1598 Washington Folger Library	54.6	36.3	35	yew	
Michael Harton	Padua 1599 Nürnberg Germanisches Museum MI 56	(78.0)	(57.2)	37.9	35	yew
Michael Harton	Padua 1599 Bologna Museo Civico 1808	55.1*	37.0	35	yew	
Vvendelio Venere	Padua Paris Conservatoire E548 C232	(87.0)	(63.0)	41.4	35	yew
Michael Harton	Padua Ann Arbor University of Michigan 1045		65.0	42.0	29	yew
Michael Harton	Padua 1602 Nürnberg Germanisches Museum MI 44	93.7	68.4	43.4	35	yew

## NOTES

1. Drawings available from Gerhard C. Söhne (Gerle), and from Charles Beare, 7 Broadwick St., London W1V 1FJ, England (Dieffopruchar). See also S. Barber, *A six-course lute by Magno Dieffopruchar* in *The Lute* (The Journal of the Lute Society) 22 (1982), pp. 47-53.
2. D. A. Smith, *The Musical Instrument Inventory of Raymund Fugger* in *GSJ* 33 (1980), pp. 36-44.
3. Full-size belly drawings of this Harton lute and two others can be obtained from the Germanisches Nationalmuseum, Postfach 9580, 8500 Nürnberg 11, West Germany.
4. Thomas Mace, *Musick's Monument* (London 1676, repr. Paris: CNRS 1958), p. 246.
5. Surveyed in A. Rooley and J. Tyler, *The Lute Consort* in: *LSJ* 14 (1972), pp. 13-24.
6. I. Harwood, *A Fifteenth-Century Lute Design* in *LSJ* 2 (1960), pp. 3-8; R. Nurse, *Henri Arnault's Lute Design* in *Newsletter of the Lute Society of America* 15/3 (1980), pp. 3, 13.
7. See especially the following important articles: F. Hellwig, *On the Construction of the Lute Belly* in *GSJ* 21 (1968), pp. 129-45; G. C. Söhne, *On the Geometry of the Lute* in *JLSA* 21 (1980), pp. 35-54.  
The new glossy book of K. Coates, *Geometry, Proportion and The Art of Lutherie* (Oxford 1985), ignores these earlier pioneering and more informed studies, so we will ignore his book here also.

## SOME ASPECTS OF THE CONSTRUCTION OF ARCHLUTES AND THEORBOES IN VENICE (CA. 1600-1650)

JOËL DUGOT (Asnières)

As recent archive research has shown, Venice was one of the most important centres in the field of musical instrument making, particularly for lutes and instruments of the lute family.<sup>1</sup> The craftsmen of Germanic origin who worked in Venice developed habits and working methods, as well as an aesthetic of lute making, which were so widely adopted as to become what may be called a tradition.

I should like to present here some observations concerning archlutes and theorboes in particular,<sup>2</sup> in the hope that these may be of use in the future for a more general study of lute making in Venice.

### Body shapes

After several previous articles on this subject,<sup>3</sup> it seems worthwhile to look again at the differences between the body shapes of lutes, archlutes and theorboes (see Fig. 1). The lute body is shown only for the sake of comparison.<sup>4</sup> It will be seen that the archlute body is characterized by a very different outline. Until quite recently this was seen as a purely stylistic feature. In my opinion, however, this very rounded shape results from an organological constraint: the short vibrating length of the fingered strings (tuned like a renaissance lute), coupled with the very wide bridge needed to accommodate 13 courses,<sup>5</sup> gives rise to this characteristic shape which could be made more or less graceful according to the talent of the maker.

In the case of the theorbo, the body is always elongated, contributing to the overall elongation of the instrument, on which the distinctive timbre of the long bass strings depends. This large soundbox thus enhances the acoustic qualities of the instrument. These backs are nearly always flattened, to make the instrument more comfortable for the player.

As far as the number of ribs is concerned, the archlute backs now preserved show a clear preference for 15 ribs (of exotic woods or ivory), but some multi-