La Cetra Cornuta : the horned lyre of the Christian World

Young, R.C.

CHAPTER 4 - A Field Guide to the Cetra - Part by Part

The title of this chapter has been carefully chosen. A significant portion of the study of nature is concerned with observing different features of animals and plants, for example, to understand how they contribute to the whole organism. A "field guide" is a guide book in this enterprise. In his dialogue on ancient and modern music, Vincenzo Galilei wrote briefly about the different parts of the kithara, in a text which, for us, throws much-needed light on the perception of what 16th-c. musicians thought about their ancient counterparts, including their musical instruments.[1] Giovanni Battista Doni (1595-1647), writing around 1630, dissected the ancient kithara more precisely.[2] He would have been right at home in the 15th century.

Both of these writers provide us with clues to understand the mentality of the Humanists, if not medieval culture in general, concerning the Classical kithara. Especially when they were able to read - first in Latin, later also in Greek - source material by Aristotle, Julius Pollux, Homer and other ancient authors, about specific components of the kithara, their fascination concerning the central instrument of Antiquity only increased. We, in this chapter, want to try and get inside that mentality, looking at the chordophone part by part, component by component.

The observations that follow are not limited, however, to the Humanist period of the cetra's story (described in this study as the last of three phases, beginning in the second half of the 14th c.). The features discussed below are summarized from all three periods. To try and make conclusions about instrument forms and usage from iconographical sources, a certain chronological consideration or real-time factor must be kept in mind: the features displayed in an image are, to a greater or lesser degree, a reflection of something that already existed when the artist executed the work. If this assumption is reasonable, what average time-span should we imagine that the cetra form or feature had been in use?

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[1] Edited in Galilei 2003.

[2] Edited in Palisca 1981.

Artists during these centuries worked from models, within conventions, and they did not freely invent any objects, themes or iconographical programs.[3] A reasonable answer to the tricky question of the chronological difference between the earliest conventional use in daily musical practice and the earliest appearance in the (now surviving) visual arts could be: one or two decades, but in some cases, more.

4.1 La Forma della Cetra

4.1.1 Shape The general frontal shape of the body is comprised of multiple aspects which include length-width proportion, lines of sides (curved or non-curved), line curvature of end, presence of an appendage at the end of the body to which the strings may be fastened ("base"), and shoulder form. Two very general adjectives used to describe cetra body shapes are "spatulate" and "ovoid" (see **Glossary**), although a thorough perusal of **Chapter 3** will show that there are many variations under each of these broad types.

The 'classic' spatulate shape is generated by combining two fundamental geometrical shapes carrying Christian symbolism, the circle (eternity) and the square (four corners = four extremities of the Cross), as follows: using a compass, describe a circle with center point A and draw a horizontal line marking points B and C on the outside of the circle. Then, using the length B - C (the diameter of the circle), draw a perpendicular line rising vertically from B to point D and a perpendicular line rising vertically from C to point E. Connect D to E to complete the square, forming the upper corners of the spade.

In effect, there are three important variables at play in any spatulate body form, the shoulder, the side and the end. General shoulder types are determined by the angle of the end of the resonator where it joins the neck, i. e., line D - E of the drawing above. In its most classic type, D - E intersects the neck at a 90-degree angle.
An early example of this classic spatulate form is the *pandura* in **Pl. 32**, albeit with side cutouts. A Roman *pandura* with a smallish spatulate body is apparently depicted in **Pl. 22**

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[3] Scheller 1995 fascinatingly documents this statement.

(c. 100 AD), although the image is not entirely defined regarding body form. In any case, the spatulate form strongly manifested itself on the Eastern *pandura*, in many different varieties (**Pl. 28 - 33**; **35 - 40**). One of these early varieties has incurved sides which flare out, going towards the bridge at the lower body end, into a more circular shape than most other early examples. **Pl. 29** and **36** outline this form.

The earliest Italian plucked necked-chordophone with a spatulate form is **CE 1**, the shape being a fundamental criterium of the definition of the early cetra. Tellingly, the term *cetra* was also used in 14th-c. Tuscan and Umbrian literature to mean "small shield" of spade or roundish shape.[4] But the double meaning of shield and cetra/cithara was much older than the 14th century: astute readers of the present essay may remember the discussion of the Shield of Harmony in **Chapter 1**, where Musica's main attribute in Martianus Capella's 5th-c. exposition of the Seven Artes Liberales was a magical metal shield, emanating wondrous sound, rather than the expected cithara or lyre. An attribute of Rhetoric, in Gothic iconography of the Seven Liberal Arts, was sometimes a shield and sword, suggesting eloquence as the best defense, and the double-edged etymology of *cetra* is therefore not coincidental.[5]

During the 14th c., a wider variety of body forms than those previously seen manifests itself. With the exception of **CE 11**, with its slightly waisted, hornless, vielle-like body from c. 1270-1300, the tulip form and the straight-sided spade shape had been predominant in the 13th c., and the early-14th-c. Assisi cycle **CE 15** is a veritable celebration of tulip-shaped body forms. After the Assisi frescoes, the sources seem to form themselves into two groups, the first consisting of illumination work from Neapolitan or Neapolitan-Bolognese manuscripts, and the second of frescoes done in Florentine style. The former study group, consisting primarily of miniatures, offers limited data due to the physical limitations of the medium. The miniatures themselves are not large and often the instruments shown within

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[4] See the *Tesoro della lingua Italiana delle Origini* online , http://tlio.ovi.cnr.it/TLIO/ (entry: CÈTRA (2) s.f), accessed 06.01.2018.

[5] See Stahl 1977, 156, for a translation of Martianus Capella's description of Lady Rhetoric with her weapons to defend and attack.

are tiny. Details, therefore, are often sadly lacking among these sources. Regarding body form, the Neapolitan depictions are predominantly oval-shaped, without horns, although **CE 16** provides a lovely example of an elongated Antelami shape, with similar horns to the Parma specimen. But in general, the smallness of these cetra images precludes details and sometimes suggests a kind of default body shape, simplified and vielle-like.

The Florentine works, meanwhile, contain interesting if not provocative, body types. These can be distinctly cornered, that is, pointed, on both the upper and lower bouts of the body (**CE 19, 22**). None of these examples is shown as a fully frontal, uncovered instrument; we only see parts or glimpses of the shape. Such body types might seem more related to forms of the psaltery than to traditional shapes of the cetra.[6] Yet the morphological proximity of the cetra to the vielle seen since the earliest Romanesque sources (Appendix I, Ex. 5) is still applicable in the 14th c. (and will continue well into the 16th c.), and both the rectangular Florentine and oval-shaped Neapolitan examples are in some ways closer to the vielle than to the cetra. There are no wooden frets in evidence, and the neck, if shown at all, is relatively narrow, terminating in a lute-style peg-head (**CE 22**). Similarly, when the upper bouts are visible, there is no sign of any horns, but the bouts are sharply cornered, as mentioned above.[7]

The rectangular or squarish body-shape is clearly manifested on Italian bowed instruments by the 15th c. (Appendix I, Ex. 17, 20, 24, 25), and an earlier example by non-Italian Magister Theodoricus at Karlštejn Castle, shows a decidedly Italian influence in its style

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[6] The ancient Biblical pairing of cithara and psalterium was examined in Chapter 1; for an interesting conflation of these two into one instrument in Trecento art: see Appendix I, Ex. 27, Nardo di Cione.

[7] These isolated examples also happen to bear a shape resemblance to certain English citoles sometimes referred to in modern research as holly-leaf citoles (Wright 1977, 8). Because the earliest English specimens pre-date the earliest Florentine example (CE 20) by many decades, and because the holly-leaf shape re-appears in a 16th-c. painting with a certain proximity to Florence (Appendix I, Ex. 26), one cannot help but wonder whether an element of the English citole manifested itself as a fashion in 14th-c. Florence. This would be a very large assumption to make based on only two (atypical and problematic) iconographical sources. Somewhat more credible might be the possible relation between App. I, Ex. 26, and the 14th-c. English citole; for more on this, see discussion later in this chapter, section 4.4.

(Appendix I, Ex. 16).[8] The instrument is not depicted with a bow; it might have been plucked or bowed. In any case, all of these instruments have been influenced by the squared-off shapes of the 14th-c. Florentine cetra variants.

Two other 14th-c. examples depict what might provocatively be proposed as a Latin cithara (or *guiterne latine*) from a Parisian context. The first item, Appendix I, Ex. 14, is a copy dated 1362 of Johannes de Muris' *De musica speculativa secundum boetium*, containing a drawing on f. 45v of musical instruments mentioned in the treatise. Among these is a necked chordophone of spatulate shape with incurved sides and a fretted fingerboard, labelled *chitara*, a spelling more Italian than French. The second example is a well-known image from the Berkeley treatise of 1375 which might be taken for vielle (Appendix I, Ex. 15). I suggest that it is more likely to represent a Latin cithara than a vielle for at least three reasons: there is no bow depicted and the strings are attached at the bridge, the tuning it illustrates is the Boethian cithara, and it is paired with a gittern, thus illustrating the contemporary Parisian literary pairing of *guiterne latine* and *guiterne moresche*.[9]

By c. 1460, cetra types featuring stub-horned or hornless shoulders and a straight-sided or gently waisted body appear in Florence and the Veneto (**CE 30**), which continue in various forms for the remainder of the later cittern's life as a body type.[10] These variants are easily confused with another instrument type with a gently waisted body, the plucked *viola* or *viola da mano*. Two important features distinguishing the cetra from the *viola* are the prominent kollopes-frets (**CE 30**), and string attachment at the end of the body rather than at the bridge. The peghead of the *viola* became standardized by the late 15th c. as a sickle-form extension of the neck with lateral rather than frontal pegs. Its strings were gut, as opposed to the metal strings of the cetra. An early example of a *viola da mano*, or something very close to it, is Appendix I, Ex. 18, dated 1425 - 1440. If the dating and source

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[8] On the works of Theodoricus, see Buchner 1974.

[9] Young 2015, 94-98. This study arrives at contradictory results regarding the precise meaning of *guiterne latine* and *guiterne moresche* compared with the research published in Wright 1977.

[10] CE 33, 35 and 46 seem to represent a distinct sub-type, possibly identified with the Veneto region.

of Ex. 18 are reliable, the question of the history of the *viola da mano* becomes urgent, for this instrument is usually assumed to have come to Italy from Spain.[11] To my knowledge, a similar instrument in Spain is not documented until the second half of the 15th century. Further pursuit of this question, however, is outside the scope of the present study.

The 15th c. is clearly a rich period in terms of variety of cetra forms, large and small. Driven by the Humanist hunger for Antiquity, this is truly the Golden Age of the cetra, continuing into the first decades of the 16th century. The novelty of instrument types, in general, found in Italian art increases at this time, to the extent that one might feel overwhelmed with the sheer volume of new forms and syntheses of older types. Were such fanciful objects real, or simply the product of a painter's over-active imagination? Emanuel Winternitz addressed this question in an essay in 1956 by introducing the idea of "stage" instruments, i.e., used in theatre, as opposed to real instruments.[12] In this case, "real" means "functional in playing music" and "stage" can mean (although not necessarily) "non-functional, cannot play music".

Such exuberant expressions of Humanism as these "fantasy" instruments, which may include elements of the kithara, lyre or other Classical instruments, must always be understood as being of allegorical substance. This does not preclude the possibility that they were ever built or played: Leonardo's horse-skull *lira da braccio* was a real instrument, as was the *lyra barberina* of Doni.[13] Whether such ingenious instrument images were actually played or not is of secondary interest in comparison to the allegorical meaning and moral identity that they bring to the scene depicted.

The continuity of the body form of the cetra remained intact during these decades. Increasingly, its form was assimilated by other stringed instruments, such as the hurdy gurdy or bowed *viola* or rebec (see Appendix I, Ex. 20, 30).

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[11] Woodfield 1988.

[12] See Winternitz 1979, Chapter 16.

[13] On Leonardo's *lira*, see Winternitz 1982; on Doni's instrument see Palisca 1980 and Palisca 1981.

4.1.2 Base The flat, wide extension off the bottom of the Roman kithara is the base, so called because of its apparent function as a stabilizer for the instrument to stand upright without support. The Byzantine *pandura* had prominent end projections which anchored the strings, while earlier Roman instruments show less pronounced body end projections, although this may be as much a fault of the most common medium in which they were depicted - sarcophagus stone carving - as anything else; we can assume they had some functional part for string attachment, whether a wide-ish, flat extension, or a smaller button-type, as the bridge was not a string anchor.

The kithara base appears on some lyre-family instruments by the 9th c., including the fingerboard cithara shown in **Pl. 14**, and on lutes in **Pl. 43** and **62** (an earlier example - Winternitz's "eureka! missing link" mosaic - from the 6th c. may show a broad base, however the proportional realism may also be questioned, again due to medium and style). It would seem clear that **Pl. 14** and **62** - works from the 9th c. - must share a common model or set of models, in terms of morphology, of earlier, Italian origin.

On the cetra, the base always has the function of string anchor. On the Classical kithara, the base may have facilitated string anchoring, but it also could stabilize the instrument in a standing position. Similar to the cetra, the pandura always depended on a wooden projection off the end of the body in order to fasten the strings. Bridges which were glued to the soundboard, and to which strings were fastened, seem to have appeared first on Arabic lute forms, versions of which turn up in the paintings in the Cappella Palatina in Palermo dating to the mid-12th century.[14] Using these Sicilian sources to project backwards a bit chronologically, we can imagine that glued-bridge construction was being practiced already during the 11th century by Arabic luthiers (unequivocal sources which would place this type of construction before the 11th c. are unknown to me).

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[14] Kapitaikin 2011.

Carolingian *pandura* forms naturally inherited the end projection from their Byzantine cousins. Yet if one of the Utrecht Psalter drawings is reliable (**Pl. 62**), the kithara-style base had been adopted on some lutes to serve as the string-holder. Much more common, however, was the *pandura*-style end projection, in various forms (including the Christian lily or trefoil) as seen on the surviving Byzantine *pandurae* and on the artifact from Corinth (**Pl. 35-40, 49**). The kithara-style base is seen on a number of 13th-c. cetre (**CE 6, 8, 9**), some four centuries after the Utrecht Psalter lute. Logic would suggest that lute forms existed in Italy in the intervening centuries which featured a similar base to anchor the strings, and part of this gap is filled in with the 11th-c. models used for the Hamilton Psalter (**CE 3**), copied in the 12th century.

Looking at the Catalog data, we might be tempted to conclude that some or many 14th-c. cetre had no end projection on the body. This is due to half of all Trecento sources being Neapolitan manuscript miniatures, and three-quarters of these show instruments without bases; the physical size of the cetra images is so small as to preclude the detail of a base. Meanwhile, the other 50% of Trecento cetra sources are frescoes, with incomplete or unclear body views showing no base, with the exception of one of the Assisi cycle (**CE 15k**) which seems to feature a base of modest proportions. Three instruments found in two somewhat larger miniatures (**CE 20**) from the second half of the century all show prominent end projections, suggesting that the Trecento cetre normally had them.

By the 15th c., from **CE 23** on, most of the sources which show the bottom of the body of the cetra have a base. A few exceptions are **CE 29, 33,** and **35**, although some artists may simply have left this feature out as an unimportant detail of the body form. Other sources show a more elongated form, such as **CE 7** and the significantly later **CE 23**. It is interesting that **CE 23** has adopted such a wide, dominant base for the body, for this is one of the new features that can identify it as something new, a cetra that references the Classical kithara in new ways: a Humanist cetra.

4.1.3 Horns Emanuel Winternitz's "missing link", or "cittern with atrophic kithara features….precisely the same atrophic features which puzzled us in the citterns of

Mersenne and 17th-century Dutch genre painting", was shown in **Pl. 29**.[15] The single strongest "kithara feature" for Winternitz were the "wings", or in his own words, "If we turn this instrument (ed.: **CE 32** in **Chapter 3**) over and rest it on its base, we can hardly fail to see behind its shape the spectre of the ancient kithara with its arms extending from the body: these arms have shrunk into the "wings" of the more modern instrument."[16]

These "wings", or "horns" (the term used by Renaissance literary references and which I would prefer to use), may take different forms in general shape (straight, as **CE 10a**; out-curved, as **CE 6**; incurved, as **CE 12**), in length, in width (tapering or non-tapering), and in size proportional to body.[17] Some body shapes have shoulders simply consisting of two straight lines intersecting to form an angle (**CE 1**), while others use curved lines. An intersection is not always present as a morphological feature on images of the instrument - upwards of one quarter of all cetra sources showing that section of the body do not have them, a fact which suggests that the theory of Winternitz (concerning the presence of horns as a primary defining feature of a cetra) was overly simplistic.[18]

In Neapolitan miniature painting from the second third of the 14th c., the lack of horns on depictions of plucked instruments can lead to uncertainty in ascertaining whether or not a particular image is to be understood as a cetra or a viola. The same problem exists to a lesser extent in North Italian miniature painting of the 12th c., where similar spatulate-bodied, necked chordophones may be found both played with a bow and plucked, and

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[15] Winternitz 1961, 228-29.

[16] Winternitz 1961, 225.

[17] See Chapter 5 for selected literary references.

[18] Wilhelm Stauder correctly made this point in 1979 as a refutation of Winternitz (Stauder 1979, 226).

even earlier in a handful of Byzantine miniaturess showing waisted body forms.[19] In later depictions of the 15th and 16th centuries, an occasional absence of shoulder horns is less confusing, for other features to be described below, such as the large wooden frets, string-attachment extension and peg-head type never seen on the lute, all confirm the image as a cetra.

The frescoes of the Elders at Anagni (**CE 4**) show a selection of cetra types which, together with the Hamilton Psalter (**CE 3**) include all basic possibilities of body shapes, with and without horns. The Hamilton miniatures show more detailed and exaggerated body features, which may have to do with the medium type, physically small details of a miniature: the salient characteristics must be recognizable in order to represent the iconographic identity as David's cithara. **CE 3b** is reminiscent of the geometric form seen in **Pl. 41**, the frontispiece of the Carolingian Stuttgart Psalter. Its long neck points to its heritage with the pandura of the pre-Carolingian period that has been discussed in **Chapter 1**. Yet **CE 3b** is apparently the last gasp of this body shape, for no further examples follow it.

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[19] Regarding the 12th c. sources, compare, for example, the bowed instruments shown in two miniatures from Mantova, Biblioteca Civica PS C III 20, f. 1v-2, reproduced in Bachmann 1973, II, 106, with CE 1. For an example of a Byzantine source, see Pl. 73.
The Italian vielle in the period under consideration had, broadly speaking, two types of body form, waisted and oval. It was argued in Chapter 2 that the presence of horns on the bodies of 11th and 12th century necked chordophones helped to differentiate two otherwise very similar instruments into plucked vs. bowed, concerning the identity of the instrument and how it generated sound. The close proximity of vielle and cetra body forms continued into the 16th c., and this has been noticed in modern research, which has sometimes described the cetra as a "plucked vielle", or the vielle as the "forerunner" of the cetra, which does not reflect the historical chronology presented by the sources. See, for example, Geiringer 1943, 92.
In the Quattrocento, too, the vielle and cetra manifest themselves as a pair in terms of shared musical function for the Humanists as the *lira da braccio* and cetra. Both were used primarily to accompany solo singers improvising *strambotti* and other courtly text forms, and were not used musically to make florid counterpoint as described by Johannes Tinctoris for the *viola cum arculo* and lute, inventing ornate proportional melodic diminution. For Tinctoris' first-hand description of a performance with two *viole*, refer to his treatise at http://earlymusictheory.org/Tinctoris/texts/deinventioneetusumusice/#paneo=Edited (accessed 06.12.2017). The absence of a specific mention of the *lira da braccio* in Tinctoris' treatise, written during the 1470's at a leading Humanist court (Naples), is but one of many puzzling questions about what he left out of his commentary; the omission might have to do with a certain disdain on the part of the Belgian theorist for instruments which were not normally used to play Franco-Burgundian style vocal polyphony (see his comments on the cetra in Appendix II).

Cetre from the 12th and 13th c. manifest body shapes which are common in sources of later centuries. **CE 3a**, a 12th-c. work based on earlier models, finds, for example, a striking parallel in **CE 12** from at least 100 years later. Similarly, **CE 6** shows an early "tulip" shape, with larger, outward-curving horns that will take related forms in the Assisi cycle (**CE 15i**, **15l**, **15p**), including some examples with elongated bodies (**CE 15k**, **150**). Instruments from the 14th c. continue the 13th c. forms, but by the fourth decade of the century, some manuscript miniatures of Neapolitan origin show hornless bodies (**CE 17, 18, 20**) while another work in Florentine style, a fresco from the second half of the century, provides some evidence for experimental body shapes (**CE 19**). **CE 22**, an early 15th c. panel joins this Florentine example with a lute-style peg-box, raising the question of whether it is, in fact, a cetra. Although we cannot see the lower end of the body, the pointed shoulders are clearly suggestive of the cetra form.

The hundred years between c. 1420/30 and c. 1535 sees a flourishing of many different body shapes for the instrument, which can be posited to have been divided in two different constructional types. The first was the traditional form in which the resonator, neck and peg-head were all carved from one block of wood, and the second was a newer type of built-up construction, achieved by glueing the back to the sides and joining the neck to the body, or possibly glueing the back to one piece from which the sides, neck and peg-head had been carved.[20]

The new constructional method which this study proposes would have gone hand in hand with the "parts" mentality, and it began with the horns, or more accurately, with the yoke of the kithara. **CE 34** (c. 1490) shows a clearly articulated "yoke" on a cetra (**Pl. 93**):

[20] Forrester 1988, 61, sees built-up construction as having begun around the mid-16th c.: "The small constructed (Italian) citterns would seem to originate in Paolo and Girolamo Virchi's experiments." It is important to bear in mind that there is no 100% proof of built-up construction before the second half of the 16th century.

Plate 93: Giovanni Pietro da Birago, Engraving: Virgin of the Rocks with Child, c. 1490, detail showing cetra.

The yoke is the slightly curved piece of wood at the end of the body where the neck joins the body. The pointed ends of the peace form the horns, and there is a clear line of separation between this piece and the sound-board of the instrument. If this were the only data from which to make judgment, we might interpret the image as having a one piece carved out body, possibly also including the neck, on top of which a fingerboard has been glued. But other sources points to a different conclusion. The works of Giovanni da Verona include three intarsiated cetre and one relief carving; a fourth intarsia, a bit earlier, was

probably done by Giuliano da Maiano. These intarsie are **CE 32, 36, 39** and **43**. All four instruments appear to be of built-up construction because, to begin with, if these artists had wished to depict carved instruments, it certainly would have been within their level of technical skill. It would be hard to imagine that the horns on these instruments, for example, were carved out of one block of wood. In the case of **CE 32**, we are fortunate in that the perspective of the work allows us a detailed view from the back of the neck joint construction. The neck has been glued to a cross piece, a "yoke" (**Pl. 94**):

Plate 94: New York, Metropolitan Museum of Art, Gubbio studiolo (Giuliano da Maiano?, 1478-1482), detail of cetra.

Judging from the direction of the grain in the wood, the yoke seems to be cut from one piece, including a heel protrusion to seat the neck, and the horns which also show the same wood grain. It should be emphasized that the *intarsiatore* did not have to show the neck joint in this way, for the heel of the neck could easily enough have been formed from one piece of wood in the intarsia. Yet this was not the case, and much trouble has been taken by the artist to show the details, as realistically as possible, on this cetra.

Other images suggest a similar constructional method. **CE 30, 25a-c**, and perhaps **23**, share certain features with the intarsie. If **CE 23** indeed represents a constructed cetra, it would provide evidence that some builders were using it in the 1420s or earlier. There seems little doubt that by the 1440's-1450's, constructed cetre were in fashion. Research on 16th c. cittern construction has concluded that two types were known, carved and built-up, and that built up cittern construction began around the middle of the 16th century; a further conclusion for that period associates built-up construction with smaller sized instruments, whereas larger citterns were carved out of one piece of wood.[21] This observation seems to have been valid already in the 15th-century, where the examples which have been mentioned above all appear to have been smaller sized cetre.

4.2 Il Corpo della Cetra

4.2.1 Body Depth Body depth is uniform in all detailed examples before **CE 32** (c. 1480) or possibly **CE 30**, insofar as the perspective of the depiction allows judgement; tapered depth begins with these, then **CE 36** (1490's), **39, 43, 47** (same artist as **CE 36,** Giovanni da Verona), **CE 45** (1510-1520), **CE 48** (1525) and **CE 49** (1526). The number of examples with this clear taper or shallowing of the body depth towards is 8 out of 52 total. It is therefore inaccurate to claim, as some researchers have, that the cetra always had a tapered body - it

[21] Forrester 1988, 60-61.

did not until the very late stage of the Humanist form.[22] The tapering depth was one of the features devised by Humanist artists in emulation of the sound-chamber of the kithara and/or the tapered contour of the chelys-lyre's tortoise shell. These ancient resonator shapes, observable and available to anyone aesthetically interested in Imperial culture on numerous sarcophagi and other monuments known to the Quattrocento, represented a logically consistent and plausible derivation for what was seen as the re-invented kithara of the Classical Age. That artists such as Gentile da Fabriano, Raphael and Filippino Lippi were studying such monuments in the 15th c. has been discussed in **Chapter 2**. For further comment on the tapering side profile of the cetra resonator, see section **4.4** below.

4.2.2 Back As mentioned previously, two different kinds of body construction are seen in sources beginning in the second third of the 15th century. Similarly, surviving 16th-c. citterns are of two kinds, those carved from one piece and those of built-up construction, the latter typically with backs of glued-together ribs.[23] Built-up construction could also include joining a one-piece back to the sides with glue. 16th-c. instruments have slightly arched backs, according to the research of Peter Forrester. Earlier cetre may also have had subtly arched backs, or they might have had ridged backs like the Classical kithara depicted in countless Greek and Roman sculptures. The latter would seem logical for the Humanist cetra, which was inspired in certain features by the Classical kithara. Conclusive data regarding the profile(s) of the back of the cetra is lacking.

4.2.3 Sides The sides of the body may be flat or incurved. Incurved, carved sides are also seen on the vielle and lira da braccio While many cetra depictions show flat sides, there is one early and one late source clearly showing inward carving or scalloping of the sides, **CE 8** and **CE 44.** On the latter, the cetra is shown in a rare rear view from behind the angel's left shoulder, enabling the viewer to study the shoulders, neck and peg-head from behind.

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[22] Examples of publications describing the tapering body depth as a fixed characteristic include Burzik 1994, Segerman 1999 and Tyler 2001.

[23] See Forrester 1988 for a discussion of the two types of construction.

The rendering looks suggestively like one-piece carved construction, although we cannot be certain this was the artist's intention.

CE 32, CE 30 and possibly **CE 23** show single or double holes in the side of the cetra. For what purpose were the holes drilled? At least two ideas come to mind. The first hypothesis has to do with sound, which would be fine-tuned or adjusted through the placement of holes allowing air to escape from the sides as well as from the soundboard. Gubbio (**CE 32**) has a circle of holes on the soundboard, and two holes approximately halfway down the side, placed next to each other on a parallel plane to the edges of the top and back. Schifanoia (**CE 30**), on the other hand, shows what looks like an inset rose and a single hole on the side. This is a much more difficult source to glean details from, given the state of the fresco and partial covering by the female figure directly in front. What looks to be a hole in the side could in fact prove to be the end of the woman's hair braid, pending a definitive close-up examination. Were this the case, we would still have the contemporary Gubbio source, which is unequivocal in the data it provides.

According to Tucci and Ricci's research on the later *chirarra battente* in Calabria, this instrument type also featured holes on the sides called "ears": "The players very often drill two little holes, called orecchie (ears of the guitar), in each side, at the point of the central bouts. This is done when the sonority of the instrument is not considered 'open' enough; the players say that the ears 'give vent' to the guitar."[24] It is possible that the holes on the cetra had a similar function.

A second possibility seems more plausible, however. This has to do with method of building briefly discussed above under "Horns", so-called built-up construction. Peter Forrester wrote about the presence of side-holes in the context of the *chitarra battente;* rather than open the sound, he noted, the holes may "indicate a particular method of construction. Filled in, they also exist on the Ashmolean Stradivari guitar, and on a six-

[24] Tucci and Ricci 1985, 83-84.

string circa 1790 guitar in my own possession."[25] If the methods of cetra construction in the sixteenth century were to be imagined, say, as having been used from the mid- or earlier 15th c., with smaller instruments more identified with built-up construction and larger ones carved from one piece, then holes in the side or sides would have been used to attach the long thin strip of wood (to be heated and bent into a U-shape to form the sides) to a mould. A separate back was glued onto this side piece, and a separate neck block was attached. The sound-board was glued on next, followed by the frets to finish off the basic construction of the cetra.

4.2.4 Sound-board 16th-c. surviving citterns have arched tops achieved primarily by gluing the top to arched braces underneath to counteract the downward pressure of the bridge under the tension of the metal strings.[26] Metal strings are presumed to have been a 15th-c. innovation for the Humanist cetra (see Strings section below), and logic would suggest that 15th-c. sound-boards were similarly constructed, i.e., arched via brace attachment. This leads to the next question: was the sound-board of the cetra, prior to the 15th c., arched? Downward string pressure was always a factor, also with gut strings. It therefore makes sense that cetra tops were either somewhat arched - probably the most likely scenario - , or supported by a sound-post (an internal post under the bridge) - less likely as a violin-associated modern concept - , or of substantial thickness to counteract pressure from above, detrimental, perhaps, to the response and vibration of the top.

An interesting example specific to the cetra sound-board is the early 16th-c. work of Fra Giovanni da Verona at Monte Oliveto outside of Siena (**CE 39** and **43**). **CE 39** was made during the years 1503-1505, with a one-piece top which cracked, possibly because the wood used for the inlay had not yet completely dried. The second example from 1511 - 1512 apparently sought to address the problem encountered by the first inlay by using a three-piece top, with less chance of cracking. In any case, the different construction of the

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[25] Forrester 1986, 64. The author also points out that "the metal strings and string fixing (ed. of the *chitarra battente*) are copied from the cittern...the bend in the sound-board could also come from cittern construction."

[26] Forrester 1986, 63.

intarsia, as regards the top of the cetra, is dramatically obvious. A majority of sources would suggest that one-piece top construction was the norm, and that a three-piece top construction was a response to avoid the (embarrassing) problem of intarsia wood cracking, at least for this particular setting, Monte Oliveto Maggiore.

4.2.5 Rosette Part and parcel of the top was the rosette, also called the rose. Over the study period here undertaken, there were two kinds, the circle of holes, and the inlaid carved rosette. The Monte Oliveto *intarsie* mentioned above are clear examples of the latter. Carved inlaid rosettes, in medieval plucked necked-chordophones, were typically used on gitterns and on those (fewer) cetre which did not have the more typical circle-of-holes rosette. Examples appear from the mid-15th c. (**CE 30** possible, **CE 31** also possible), but some of the Assisi cetre (**CE 15j**) might be interpreted as having this already in the early 14th century. Lutes, by contrast, normally had rosettes that were carved out of the same wood as the top itself. Why? Possibly because lute tops were by heritage and tradition thinner, more delicate, whereas the smaller gittern and cetra tops were thicker and better able to incorporate a superimposed rosette without acoustic compromise. To speculate further, perhaps gitterns and cetre may have been more home-made (with add-on rosettes by specialized craftsmen), as opposed to lutes having been made by more professional/ specialized lute builders.

4.2.6 Bridge Another critical part of the top was the bridge. The strings run over the bridge to the end projection, with one exception among the Catalog Entries detailed enough to show this part of the instrument; in **CE 29**, the strings are attached at the bridge. In this particular case, the artist may have confused the viola da mano with the cetra, although anomalies are not uncommon in music iconography. While it is not impossible for metal strings (the documented string material during this Humanist period according to Tinctoris) to be fixed to the bridge, virtually all other examples have strings running over the bridge, attached to the end, or attached to a kind of tailpiece-bridge.[27] The Anagni Elders cetre (**CE 4**) feature such a device, itself attached to the end projection,

[27] For the Tinctoris string reference: http://earlymusictheory.org/Tinctoris/texts/deinventioneetusumusice/#paneo=Translation

which presumably had "feet" to raise the attached strings to a playable height above the sound-board. **CE 7** shares this feature. Another early source is **CE 3**, where the artist(s) took the trouble to draw curved bridges on some examples.

Two common bridge shapes emerge on those images detailed enough to see the form of the bridge. 15th-c. depictions often show a single, thinnish bar with feet at either end, which in some cases, for example **CE 32**, hardly looks robust enough to support the downward pressure of the strings. Yet it is simply too common to write off as fantasy. Could it have been a metal bar? It is seen during the Humanist period when the cetra had metal strings. The second, later type is the "aqueduct style", of substantial construction with multiple arches and feet, which is mainly associated with the works of Giovanni da Verona.
An interesting, early Humanist cetra bridge is the bulky one found on **CE 23**, partially covered by the angel's hand holding the plectrum. Although it is difficult to be sure what the artist was trying to depict, it seems extremely wide, apparently made of the same wood as the block frets, the color of which is the same. This fresco, painted in the 1420's, is the first full-blown Humanist cetra, with the exaggerated features described in **Chapter 2** that began with **CE 21**, the Incoronation of Gentile da Fabriano. **CE 23** is bolder and more innovative than **CE 21**, and the bulky bridge may remind us of the massive rectangular kithara bridge seen on the kithara on the left in **Pl. 26**. This cetra bridge, along with the special frets (see **Frets** section below), new neck-into-body joint (indicating built-up construction?), prominent horns and multiple-circle rosette strongly suggest something new and eye-catching: a modern evocation of the Classical kithara, using elements of ancient sculptures and newly translated Greek texts, such as Pollux, mentioning the parts of the kithara.[28]

Sound-boards were in some cases decorated with inlay, paint, gilding and possibly relief carving. The earliest decorated tops are from c. 1310-1315 in **CE 15l** (red-white herringbone edge painting, or perhaps binding inlay?) and **CE 15m** (black-white herringbone edge; red-white-black squared inlay or painted ornament). One-hundred-and-thirty years later, the

[28] Concerning the parts of the kithara, see the discussion on the treatise of Doni below.

next decorated tops appear, **CE 25**, with carved (or painted?) medaillons, roses, vines and portraits in Classical style. Relief carving, inlay and painting would all have been possible, although we may wonder about the acoustic responsiveness of a top thick enough to be relief-carved on a relatively small plucked instrument. Fancy ornamentation? These are the exalted cetre of Apollo, Musica and Mercury, with suitable decoration.

4.3 Al Collo della Cetra

4.3.1 Neck length A general observation from the iconographical material shown in **Chapter 3**, is that the length of the neck of a cetra does not exceed the length of the body, and it will often be shorter, or even considerably shorter, than that dimension. The evolution of the instrument at the end of our period (from 1540's on) is a process, broadly speaking, of the neck becoming longer in proportion to the body. The neck width reduces in dimension as the block kollopes-frets (see **Frets** section below) are increasingly replaced by a one-piece fingerboard with thin metal frets.

4.3.2 Peg-head The earliest cetra peg-heads, like most later ones, have frontal pegs and a three-part shape such as a trefoil - a powerful Christian symbol associated with King David, the Trinity and Purity (**CE 3**).[29] This occurs more often than not on a three-stringed cetra. If the trefoil was not used, a variation upon a three-pointed shape might be employed (**CE 4**). Round or ovoid peg-heads were also used (**CE 5, 10**) from c. 1200, and more rarely, rectangular form as well. These peg-head forms were usually tilted back at a slight angle, although they could be quite flat as well. How artists represented the angle of the peg-head (which was never as much as the angle of the lute peg-box) was a matter of stylistic diversity, occasionally with confusing results for the modern viewer (**CE 6**, where the back-tilting peg-heads are drawn from a side-angle perspective).

In some cases, this "stylistic diversity" has led to perplexing modern interpretations. Let us take the example of **CE 13**, a Bolognese source from the last decade of the 13th-c. (**Pl. 95**):

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[29] A solitary exception to frontal pegs is **CE 39**.

Plate 95: San Lorenzo de El Escorial, Biblioteca de El Escorial, MS. a.I.5., f. 235 (1290-1300), detail of cetra.

The modern viewer might be forgiven for asking, what is the form of the neck on this instrument? Some researchers have seen this miniature as evidence for arguing that the citole was indeed known in Italy, following the assumption that the neck of this

instrument has a large hole in it.[30] This hole is then presumed to have the same function as the so-called "thumb-hole" which was part of the one-piece carved construction of the citole. Another source, however, provides an answer to the question of neck form in **CE 13**. It is a miniature from the so-called Hamilton Bible, a Neapolitan work from four or five decades after **CE 13 (Pl. 96)**:

Plate 96: Berlin Kupferstichkabinett MS 78 E 3, f. 463 (14th c.),
detail of Elders with cetre (?).

[30] Burzik 1995, 376-377, misleadingly takes this image as evidence for the citole in Italy, without any knowledge of the wider iconographical context.

These instruments seem to be something in between cetre and gitterns (or lutes). The peg-heads and circle-of-holes rosettes are not found on the latter two instruments. The strings, seen very faintly in this photo, apparently are attached at the end of the body. But the body shape is more evocative of a gittern, and while cetra may be the best name for these, a few more features - such as horns, or prominent frets - would be welcome, in order to feel secure that these do indeed represent cetre. In any case, the nature of this artist's rendering makes it clear that there is no thumb-hole depicted in **CE 13**.

The addition of a carved head at the end of the frontal peg-head probably began during the first half of the 14th century (**CE 17**). This had been in use since the 13th c. on the Italian *chitarra* (gittern), the small lute which had been adopted in western Europe, probably first in Spain, spreading from there to northern Italy, from Arabic cultural contact.[31] The two 14th-c. sources showing carved heads, **CE 17** and **CE 21**, are both Neapolitan, suggesting a possible origin of this feature there. Applying the convention of a head carving to the cetra may have had to do with an increasing Humanist interest in the cetra as a revival of the kithara during the period of Petrarch. In any case, by the second half of the 14th c., the carving of human heads was being used on the some cetre as a nod to figure-sculpture of Antiquity, and by c. 1450 animals, birds and other creatures real and mythological, were turning up on the peg-head (**CE 26, 30**).

The symbolism of the carving may or may not be clear, but Apollo-related symbolism is the most common for the cetra, as Hermes created the chelys-lyre (cetra, in this case) for him. Hence, a head of a human often looks like a young woman or child, which suggests a Muse as one of the nine Muses seen with Apollo on Mt. Parnassus; a woman's head can also be one of the three Graces often depicted with Apollo, or Lady Musica. A lion, dragon or dog's head can stand for the three-headed monster associated with Apollo in the Renaissance, or a wolf can also be linked to him.[32] Carved peg-heads had been seen one to two centuries before, from the late 13th c., on Italian examples of the gittern, a lute type of Arabic

[31] Note that this exportation from Mozarabic Spain of the gittern in the late 12th/ 13th c. was the opposite of the exportation from Italy to northern Spain of the cetra in the 12th century.

[32] Clark 1974, 26.

heritage, in the spirit of Gothic droleries, but perhaps already referencing Apollonian symbols. The lack of surviving cetra depictions showing a carved head before the later 14th c. does not prove that this feature was unknown before the 14th c. Indeed, it is possible that the gittern inherited this feature from the Romanesque or Franciscan cetra, for carved-head gittern iconography begins only at the end of the 13th century.

4.3.3 Pegs The peg-head held the pegs, and the most common peg type for the cetra is T-shaped, of smaller size than many modern early plucked instrument replicas, with a narrower shaft than that commonly seen on depictions of lutes. The earliest detailed image showing these is the Giotto fresco, **CE 14**. In between **CE 15** and **CE 24**, there is a period of over 100 years from which no source shows peg details. **CE 26** supplies welcome detail about peg shape (T) and how the pegs are placed on the front surface of the peg-head.

The number of pegs seen in detailed 15th- and 16th-c. catalog entries varies from eight or nine to twelve (we shall return to the general question of number of strings later in this chapter). A handful of early sources also display twelve pegs (**CE 8** and **14**, for example). In the case of **CE 8**, the twelve pegs are clearly grouped into three rows of four pegs each. Placing four pegs in a row would not be practical for stable tuning, as the string attached to each of the four, with the exception of the peg nearest the nut, would rub against another peg or pegs in between it and the nut. Thus it would seem that this detail of the sculpture was not completely accurate, and that a real instrument would have staggered pegs to facilitate tuning stability. **CE 26**, on the other hand, shows a much higher level of realism, where the pegs have been staggered irregularly and placed on a faceted front surface of the peg-head, with three different surface planes so that each peg handle (the top of the "T", so to speak) has as much free space as possible around it to facilitate access by the left hand to turn the small peg. And speaking of detailed depictions, some catalog entries provide excellent detail of how the strings pass over the nut and are wound around the pegs. Exemplary in this regard are **CE 15j** and **15k**.

4.3.4 Neck Profile "Neck profile" refers to the cross-sectional profile of the neck. The profile of the neck has been described as follows: "From the 16th-century onwards…the neck is commonly half cut away from behind the fingerboard on the bass side to form a

channel along which the left-hand thumb can slide."[33] Another way of describing the profile would be to image a "P" which has been turned 90 degrees to the right. Such a neck profile, unique among all necked chordophones in our historical period, has little to do with facilitating rapid shifting of the left hand. Rather, it is a formal constructional gesture recognizing the identity of the instrument as a cetra, which continued to feature kollopes-frets (see next section of this chapter) on the cetra as late as c. 1535 (**CE 51, 52**). During the 1520's and 30's - possibly a decade or two earlier, in some cases - these large wooden frets which projected off the fingerboard on the bass side were replaced with a somewhat thinner fingerboard, made from one piece of wood and featuring thin inlaid frets of metal or other hard substance, as on the earliest source showing this from 1526 (**CE 49**). **CE 44** shows a cetra neck from the back during the first decade of the 16th c., which still features the wooden block frets. They are glued on the neck, which is centered on the instrument, as it is on all iconographical sources of sufficient detail to judge (**CE 29, 33, 35, 44?, 45, 46, 47**). These sources portraying the centered neck are important, because it might otherwise be assumed that the 15th-c. cetra already had an offset neck like 16th-c. examples. It did not. The 16th-c. instruments have shaped the back of the neck to echo the time-honored tradition of kollopes-frets, so important as a defining part of the Humanist cetra, as we shall presently discover in the next section **Frets**.

4.3.5 Hook Another feature to be examined is back of the peg-head, which "typically is formed to include a large, hook-shaped protruberance from which the instrument can be hung."[34] In fact, three Catalog entries show a hanging cetra. **CE 7** portrays a musician playing the instrument with a thin white cord or string attached at both ends, without the "protruberance" described above, passing over his shoulder like a modern guitar strap (this feature is quite unique; I have not seen any other lute family instrument shown with such an accessory in the corpus of iconography of this period). **CE 30** depicts Apollo with a cetra hanging from his right wrist from a cord wound around the peg-head, with a hook behind the neck (with a hole in it that the string does not pass through), and **CE 39** presents a

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[33] Tyler 2001. The author adds that this neck profile "enables the player to execute the rapid shifting to high positions required in much of the cittern's solo repertory."

[34] Tyler 2001.

cetra hanging inside a cabinet from a string passing around the upper neck and frets, not from the hook which is visible on the back of the peg-head.

There is no direct evidence that the main purpose of the hook was to hang the instrument up. The hook appears on some examples of the Humanist cetra beginning around 1470 (**CE 31).** Just eight out of fifty-two Catalog entries show a hook. There are two kinds of hooks, thin and thick. Thin hooks appear to be more consistent with built-up construction, as in the *intarsie* of Fra Giovanni da Verona (**CE 36, 39, 43**). These have the approximately the thinness of the horns, and do not seem to be from a carved block.[35] Thicker hooks (**CE 32, 45**) seem closer to one-piece construction for the entire body/neck/peg-head unit.

The hook had a practical function and a theoretical one. The practical purpose is shown clearly in **CE 44**. Because the frets project off the bass side if the neck, the player's left hand cannot grasp the neck with the thumb as on the thinner lute neck, for example. The hook provides a stabilizer against which the hand can rest. Half of the sources show a small hole in the hook, to which a cord could be attached, as in **CE 36**. The same knotted cord is shown on the triangle next to the cetra in **CE 36**, which is used when playing to hang the triangle, suggesting that the same purpose applies to the cetra's cord, which could be placed around the wrist, as in **CE 30**.

For the theoretical function of the hook, we have to begin by stepping outside our proper period of study. The earliest post-Renaissance "musicologist" to undertake a detailed study of forms of the ancient kithara was Doni, whom we might regard as a late Humanist. Doni designed a new type of Antiquity-inspired lyre which he described in the treatise *Lyra Barberina amphichordos*, finished by 1635 but only published in Florence in 1763.[36] Putting his new creation into context, he provided a detailed discussion of the ancient kithara as well as a catalog of drawings collected from his studies of local Roman monuments. In Palisca's study of Doni's work, he writes "Chapter V details the parts of the lyre and

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[35] An exception is CE 33, which is not a work of Giovanni da Verona but probably Giuliano da Maiano. This shows a hook which looks carved from the same piece as the neck and peg-head (?).

[36] Facsimile edition and commentary in Palisca 1981.

kithara… Some of the kitharas display *kerásbola*, which are *kténia* or ornaments added to the *ancones* in the form of tooth-like protruberances" (**Pl. 97**): [37]

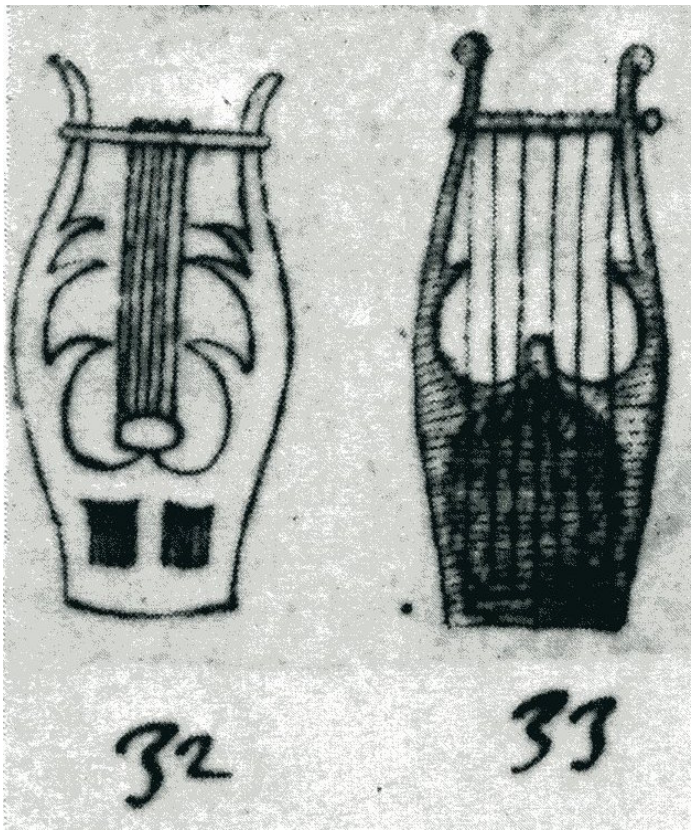

Plate 97: Two examples of "tooth-like" ornaments on kitharas depicted on Greek coins; drawn by Giovanni Battista Doni, c. 1630, for his treatise *Lyra Barberina amphichordos;* reproduced from Palisca 1981.[38]

Before Doni, writers such as Vincenzo Galilei had made reference to Julius Pollux' Roman-era description of the parts of the kithara, which the Renaissance knew in Latin translation. An edition published in Basel in 1541, for example, included the term *cubiti*

[37] Palisca 1981, 40-41.

[38] Palisca 1981, 52-53, Pl. 9a.

(from *cubitus*, "elbow") in reference to the "tooth-like" ornaments.[39] **Pl. 98** shows a Byzantine kithara with pronounced "tooth-like" ornaments:

Plate 98: Mariamin, Syria, mosaic showing Roman kithara, 4th c.[40]

Maas and Snyder, too, discuss the "points" on the Classical kithara as a consistent ornamentation on the instrument throughout its period of use.[41]

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[39] From IVLII POLLVcis Onomasticon…Rodolpho Gualtero Tigurino Interprete Basel 1541: Julius Pollux, Dictionarium, Libri IV, Caput Nonum.

[40] www.alamy.com, alamy stock photo. See Paraskevi 2010 for a detailed discussion of the mosaic.

[41] Maas and Snyder 1989, 66-67.

The Humanists, then, made a conscious adaptation of this feature on their cetra during the second half of the 15th century. Modern research has consistently viewed the hook on the cetra as having been taken over from its supposed predecessor the citole, which typically had a so-called "thumb-hole", or hole in the deeply extended spine of the neck, where the player placed their thumb to hold the instrument when playing.[42]

The same argument for the citole as the predecessor to the cetra is often summoned regarding the tapering body depth first seen on the cetra around the same time as the hook, to which the response is the same: it appeared on the Humanist cetra as an emulation or reference to the shape of the *echeum* or resonator of the kithara, which had a keeled form and tapering depth when viewed from the side.

This, in other words, is the theoretical function of the hook. In most of its features, including the hook or "tooth", the Humanist cetra copies the Classical kithara in a visible and obvious way, if one views it through period eyes. Palisca's remarks on Doni's treatise may now be recalled:

> "Chapter V details the parts of the lyre and kithara. The *cornua* in the early lyres were curved upright members often made from animal horns and were hollow to amplify the sound. They were later replaced by the *ancones*, in the shape of two S's, one inverted against the other, called *pecheis* in Homer and Hesychius.... The yoke, *synzygós*, a wooden horizontal member supported by and crossing the two *cornua* or *ancones*, held the strings through *clavicula* or *kollopes*, later termed *kolláboi*...to tune the strings. Some of the kitharas display *kerásbola*, which are *kténia* or ornaments added to the *ancones* in the form of tooth-like protruberances...Doni believed the two wooden upright arms in the marble sculpture of the Mattei villa supported a kind of fingerboard. The *magas* is a square, somewhat incurved, table with an opening at the bottom to receive the strings, which passed over the table as a kind of bridge. In the Mattei kithara the *magas* was hollowed underneath and there was an orifice that admitted sound, the *echeum*, and a grating, analogous to

[42] See for example, Wright 1977, 31.

> the roses of modern instruments, protected this cavity from dust…The kithara was held to the player through a *balteus* or strap…Finally Doni described the use of T-shaped tuning keys (*epitonia*) seen in certain polychordal kitharas, as in that reproduced from a marble exemplar owned by Cassiano dal Pozzo."[43]

For further comment on the hook, see section **4.4** below.

4.3.6 Strap The one and only source showing a kind of shoulder strap, thinking of modern guitar, is **CE 7**. Strictly speaking, this is not a "strap", as in "belt", but a cord of some kind. The function however is the same: it goes over the shoulders to hold the instrument as one plays in a standing position. It is shown on a mid 13th-century instrument, which is significant because this is the period before the Humanist hook or "tooth-like protuberance" started appearing after the middle of the 15th century. As stated above, the hook gave leverage against the left wrist to stabilize the instrument while playing, in as much as the left hand thumb was blocked so to speak by the projecting kollopes-frets. During this period, a short cord is sometimes seen threaded through a small hole in the hook, presumably to be looped around the wrist for additional stability when playing (usually done standing up, by the way), or possibly, to free up the left-hand for other use while the cetra hangs from the left forearm (see **CE 30**).

4.3.7 Parts: Summary Parts that have been previously discussed in this chapter may now be seen with a broader theoretical background following Doni's essay and Classical writers such as Pollux: Base = *magas*; Horns = *cornua*; Yoke =, *synzygós;* Rosette = *echeum* grating; Body = *echeum*; Hook = *kerásbola*/*kténia*; Pegs = *epitonia*. Even the strap or cord (*balteus*) is specifically depicted in one source. The Plectrum (= *pecten* or *plectrum*) will be discussed in the String section below. The Humanist cetra uses Wire strings (= *fila* : Pollux). The prolific use of circular holes to form the rosette on the Sound-board, and on the Sides, may relate to an aspect commented upon by Maas and Snyder: "Many of the

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[43] Palisca 1981, 40-41.

(Classical) kitharas have small circles on the soundbox…usually at about the height of the bridge, or a little above…they can also be present on the back of an instrument."[44]

I have intentionally left one component out of the list so far, which will now be treated, frets. These, like the other components, also received a Humanist adaptation (and were one of the first components to have done so as part of the instrument's evolution in the early 15th c.), but we shall begin with frets from earlier centuries.

4.3.8 Frets: Forms The history of frets on lutes effectively begins with the surviving Byzantine *pandurae* discussed in **Chapter 1**. Solid evidence for fretted instruments prior to these is simply not at hand, although the idea in itself is worth entertaining. A Hittite source (14th c. B.C.; see **Pl. 17**) presented in the opening chapter has been discounted by Richard Campbell as proof of the existence of a fretted lute in the ancient Near East.[45] The Byzantine instruments are dated c. 5th - 8th/9th centuries, and were of two types, fretted and unfretted.[46] Frets were also of two kinds, tied-on gut (or sinew of some kind), or thin pieces of wood glued into slots cut into the fingerboard. Of the seven surviving lutes, three have slots cut out to receive glued-in wooden frets.[47]

Iconographical sources showing fretted chordophones are few and far between before the end of the 12th century. Prior to the Antelami relief in Parma, there are only the two Utrecht Psalter instruments (**Pl. 65b - 66a**), which indeed echo the Byzantine *pandurae*, plus the Ivrea Psalter miniature from c. 1000 (**Pl. 70**), which clearly manifest frets. The line markings on one of the Fenollar instruments (**CE 2**, Elder 5) and Hamilton Psalter (**CE 3b**) are not unequivocal instances showing frets.

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[44] Maas and Snyder 1987, 67.

[45] Campbell 1968, 15-16.

[46] Dating from Vendries 2012, 101. Eichmann 1994, 43, thinks that some examples might be as early as 3rd c.

[47] See Table 23 in Eichmann 1994.

Happily, two depictions from three-dimensional sources more than make up for the lack of information in earlier visual iconography concerning cetra frets, **CE 5** (Antelami, **Pl. 99)** and **CE 8** (Ferrara Duomo, **Pl. 100**):

Plate 99: **CE 5**, detail of frets.

Plate 100: **CE 8**, detail showing frets.

Both show substantial, rectangular fret forms which can only have been made of wood on a real instrument; Tinctoris will explicitly confirm wood as the fret material some two hundred years later.[48] Both sculptures bring up the question of the prominence of the frets: why are they so bulky and massive? One might argue that if the strings were made of metal, the frets would wear less quickly, from constant contact with metal, than with soft material such as gut, which is seen on other instruments (for example, gitterns, a bit later in the early 14th c.). After all, we know from Tinctoris that the cetra had metal strings, at least during the second half of the 15th century.

Yet that in itself does not prove that the instrument necessarily used metal strings two hundred years earlier. In the 12th and 13th c., it shared important features with the vielle (such as string number, three, with bordun strings, plus general body form and size), an instrument which never had metal strings. In addition, as we will see in the section below on **Strings**, there were certain good reasons that the cetra of the Humanists consciously adopted metal strings as a novelty for their re-invented cithara. And if the case of the *pandurae* can offer any clues, it shows that wooden frets could be (and were) used for gut-strung instruments of earlier periods.

The bulkiness of the sculpted frets might be accounted for, in part, by the medium of stone carving in the late 12th and 13th centuries, where there were practical limitations to what amount of detail could be sculpted. In the case of the Antelami cetra, the detail is such that the strings have been sculpted as well. This suggests that the size of the frets is just as the artist thought they were in reality, for he could have made them thinner (like the bridge), had he wanted to. In the instance of Ferrara, no strings are shown, probably because there are twelve pegs, and to carve that number, or anything close to it, was out of the question in terms of material; furthermore the viewer stands at a considerably greater distance on the ground below than is the case in Parma.

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[48] Baines 1950, 23.

As Ricardo Eichmann pointed out in 1994, there is also the question of how exactly wooden frets functioned.[49] At a thickness of two to five millimeters, the pandura wooden frets he discussed were considerably thinner, in relative proportion, to the Parma/Ferrara cetra frets, yet the problems of physics are the same: are the tops of the frets flat, rounded or slanted, i.e., saw-toothed, whether with the higher side towards the bridge or towards the nut? The precise point where the string is stopped when the finger is pressed down, in other words, could be one of three possibilities, depending on the shape/plane of the top surface of the fret: the front edge, the back edge, or somewhere in the middle.

On both sculptures, the top surface of the fret appears to be flat. This will be a consistent feature observed on all wooden cetra frets up to the early 16th c., as far as the particular visual sources showing frets allow a judgement to be made. None show frets rounded on the tops, which would mean that when the finger is pressed on the fret, the highest part of the "hill" is the precise fretting point.[50] This would also be a good way to produce a buzz, as for example the sound produced by a graded bridge on a modern Indian sitar.

Similarly, there are no unequivocal sources showing saw-toothed frets, with each fret surface sloping up, going in the direction of the bridge.[51] An examination of the catalog of sources produces no iconographical examples of this system before c. 1500, although one could conceivably argue that such inclined-surface frets could look flat from a distance. Yet the level of detail in some earlier sources clearly refutes this claim (**CE 32**).

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[49] Eichmann 1994, 118.

[50] CE 26a is a detailed relief carving of a cetra where its placement in the church in Rimini allows a detailed close-up inspection, confirming that the fret tops are flat. See my pencil rubbing of this source reproduced in the catalog section for this entry.

[51] Scalloping is a logical development of the earlier block system, where the intonation of metal strings may be compromised or inconsistent if the spaces in between the blocks are too large, potentially allowing differing placements of the finger and degrees of finger pressure. Scalloping, in effect, angles the surface of the fret block to increase in height as one nears the fret edge, which has now become the bridge-facing edge of the block, rather than the nut-facing edge. In other words, the player now presses the finger directly on the surface of the block rather than pressing the finger on the space behind the block.

So the tops of the frets appear to have been flat in their construction, at least in a majority of images with enough detail to examine. The next question arises, were all frets of uniform height, or were they stepped, each getting lower as they proceeded toward the bridge? With this question come others concerning perspective and intention of the artist. The fret block height appears to have been uniform, again, in a majority of sources where this detail can be examined. **CE 8**, **CE 25a**, **CE 25b** and **CE 32** offer especially productive opportunities to examine the issue, showing an unmistakably uniform fret height, as seen in **Pl. 101 - 102**:

Plate 101: **CE 25a**, Detail showing flat-topped frets.

Plate 102: **CE 32**, detail showing flat-topped frets.

The sources **CE 36**, **CE 39** and **CE 43**, all by the *intarsiatore* Giovanni da Verona, seem to suggest a uniform height, although the angled perspective rendering has not been altogether successful in these three works, which are clearly all based on the same studied model. **CE 47**, on the other hand, is also by Giovanni, in the medium of relief wood carving, and this instrument features a uniform fret height (**Pl. 103 - 105**):

Plate 103: **CE 36**, detail showing frets of apparent uniform height.

Plate 104: **CE 43**, detail showing frets of apparent uniform height.

Plate 105: **CE 47**, detail showing frets of apparent uniform height.

Many of the sources just discussed are from the period 1450-1520. The earlier Assisi cetra cycle c. 1315 brings some new information about fret forms, which are also of wood, and of less bulky size. The total number of 16 instruments (**CE 15a - 15p**) may be divided into two groups **15a - 15h** and **15i - 15p**. The first eight (**15a - 15h**) are held by Elders facing to the side, holding cetre that are cut off by the borders of the medallions within which they must fit. This means that only part of the fingerboard, neck and peghead, and very little of the body, is shown on these instruments. None of the cetre in the group (**15a - 15h**) are being played. Three of this group show no frets (**15a, 15f, 15g**) and five (**15b, 15c, 15d, 15e, 15h**) have just one fret (or bridge?) in a high position on the fingerboard (**Pl. 106, 15c**); one (**15g**) has neither frets nor strings (**Pl. 107**):

Plate 106: **CE 15c**, detail showing single fret (or bridge?).

Plate 107: **CE 15g**, detail showing fretless / stringless cetra.

Seven of the eight instruments in the second group (**i - p**) are being played, and the eighth (**l**) is being tuned. All of these are in frontal position and fully visible. All, with the exception of (**l**), have uniform frets of triangular cross-section. The number of these triangular frets varies from six to nine or ten, depending on whether the first fret functions as the nut or not. To stop a note, the finger is placed behind the pointed ridge of each triangular block, over the gap in between the fret in question and the one behind it. The following example, **Pl. 108** (**15j**), clearly shows a seven-fret cetra, with an eighth fret functioning as a nut:

Plate 108: **CE 15j**, detail showing frets of triangular cross-section.

Another example shows the second fret type used in the Assisi cycle. This is the same rectangular block form as Parma and Ferrara, but it occurs only once in the entire Assisi group **CE 15 (Pl. 109)**:

Plate 109: **CE 15l**, detail showing non-triangular frets. The uniform coloring on the fret ends and neck side might suggest one-piece carved construction for the entire instrument including the frets.

These fret-types are the kinds depicted in iconographical sources from the dates described. Other types - for example, flat-planed stepped frets of decreasing height - are physical possiblities, but are not shown in any source. A fundamental premise of this study can be reiterated here: our point of departure in interpreting any image must be to trust the morphological information which the artist is presenting, unless there is reason not to (for example, the work has undergone restoration).

For a discussion of fret systems (diatonic vs. chromatic), see the following section of this chapter. Before leaving the Assisi cycle, we might ask, why would some instruments have just one fret, or in three cases, no frets at all? Elders **a - h** are in the act of offering their cithara to the Throne of God, as they do in many medieval depictions of the Apocalypse, also with crowns and incense bowls. There is no reason for them to offer unfinished or dysfunctional instruments to God, and similarly no reason for an instrument which is not being played to be incomplete for that reason, i.e., because it is not actually being played.

The reason may rather lie elsewhere. There is a feature seen on some vielle depictions which apparently changes the musical function of the instrument.[52] This is a kind of 'bridge' situated about half-way down the string length, attached to the soundboard close to where the neck joins the body. No surviving document specifically names this device, or describes its function, but we might imagine this kind of vielle or cetra (as in Assisi) as a non-melodic, bordun instrument, having the same function as a string drum, perhaps with a 'snare' or 'buzzing' tone color like a bray harp or snare drum. In any case, such an instrument would have had a kind of amplifying, noise-maker function (harmonic of course), appropriate to and required in a formal ritual at the highest court level, perhaps also as a processional ambience. Such instruments are entirely absent from the 21st-c. Early Music practice, and indeed, modern observers of such instruments in medieval / early Renaissance art might scarcely imagine, when seeing an instrument like the vielle, that there could have been such violin ancestors that never played a melody.

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[52] See, for example, the vielle in fresco Madonna in Gloria of Simone Martini and Cenno di Francesco in S. Lorenzo al Ponte, San Gimignano; Martini also painted frescoes in the Lower Basilica in Assisi, where the cetre under discussion are found.

By now, astute readers will have noticed that some cetre were given overly long fret blocks which extend out past the edge of the fingerboard where there are no strings, off the neck, in certain cases markedly so (see detail of **CE 25a** in **Pl. 95** above, for example). These elongated frets are apparently non-functional, for there are no strings above them, which might otherwise suggest that they allowed "bordun" strings to be stopped (and thus no longer be "bordun" strings). Upon closer perusal of the sources, it will be determined that these elongated fret blocks are a feature of 15th c. cetre, beginning with **CE 21**. The elongated frets have at least two streams of influence, one more theoretical, the other more practical, requiring some explanation.

The background, on the theoretical side, for these prominent blocks, has to do with the identity of the cithara according to Classical sources, translated from Greek, which became widely circulated within the educated circles of Humanist schools and courts, starting with the commentaries of Pietro d'Abano on the 13th-c. translation of Aristotle by Bartolomeo da Messina. The *Expositio problamatum Aristotelis* and *Mechanica* are two important examples of texts which contained precious information about the structure of the cetra, to use the vernacular term.[53]

The Classical kithara had no frets, as we saw in **Chapter 1**, because it had no neck. It did have a type of component which regulated the tuning of each string, called in Greek κολλοπες or κολλοβοι and in Latin *clavi chordarum* or *claviculi;*[54] Helen Roberts described these early Greek devices for tuning each string:

> "It seems likely from the literary and pictorial evidence that the early Greeks used a different and less efficient tuning device, consisting of a roll of hide and string which was turned in one piece to alter string tension. We gather from the scholiast Eustathius commenting on Homer, Odyssey 21. 406-9, that tough hide from the necks of oxen or sheep was used for the tuning peg or kollops. This hide is itself

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53 A recent publication has proposed Archytas of Terentum as the author of the *Mechanica*; see Winter 2007.

54 In Pollux *Onomasticon, Libri IV, 62* (Bethe 1966, 219), and Doni *Lyra barberina, Cap. IV, 19 - 23* (Palisca 1981, 99), respectively.

> called kollops and some of the animal fat was left on the skin. For each string a strip of sticky hide was wrapped around the yoke, and after a few turns the string was included, the roll being turned so that the string went diagonally across itself. The same tuning mechanism is still in use today on the kissar, a primitive lyre-type instrument found in East Africa and Abyssinia. These lumps of animal hide would inevitably be rather bulky and cover much of the surface of the crossbar."[55]

The same author wrote in 1980,

> "The fourteenth of the Mechanical Problems attributed to Pseudo-Aristotle deals with the principle of leverage. The question posed is why big kollopes are easier to wind around one and the same crossbar than smaller ones. The entire significance of the passage for our purpose is that the kollopes moved around the crossbar as a centre, and the longer they were, the greater the leverage and the easier they were to tune."[56]

Pseudo-Aristotle's reference to the functional advantage of larger kollopes is noteworthy. During the Roman period, the tuning devices shown on the cross-bars of depicted instruments had a different form than the earlier Greek ones, as Karl von Jan noted in 1882 in *Die griechischen Saiteninstrumente*:

> "Instruments (ed: of the kithara type) from the Roman era commonly had devices attached perpendicularly to the cross-bar which have been compared to a *capotasto* (ed: a large fret attached to the fingerboard for the purpose of stopping the strings) on a guitar....these small wooden blocks project out at a right-angle to the strings; when hastily rendered or reduced to a minimal-size figure, they appear as a small

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[55] Roberts 1980, 60 (footnote 28).

[56] Roberts 1980, 60 (footnote 28). In 1999 John Landels wrote: "Another interpretation of the tuning mechanism has been put forward by Dr Helen Roberts. The word kollops is sometimes confused by ancient writers with the word kollabos, which apparently meant a kind of bread roll. This may be a simple confusion of similar-sounding words, but it may have more significance. The kollopes may have been short wooden rods, shaped roughly like a baguette, about 8-10 cm (3-4 inches) long. They could have been placed against the crossbar, with the top end of each string anchored to the middle of its rod, and wound around above and below the crossbar in a particular way, so that turning the kollops would adjust the tension" (Landels 1999, 53).

wooden board. One finds this apparatus regularly on the wall paintings of the destroyed Campanian cities (ed: i.e., Pompeii and Herculaneum), indeed also on some statuary works."[57]

In a mosaic from the Roman settlement Caesaraugusta (Zaragoza) of the 2nd - 3rd c., we see the set of kollopes projecting out frontally, under the cross-bar of the lyre being played by Orpheus (**Pl. 110**):[58]

Plate 110: Caesaraugusta (Zaragoza, 2nd - 3rd c.), mosaic showing Orpheus.

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[57] Jan 1882, 18. The original text reads, "an den Instrumenten aus römischer Zeit ganz gewöhnlich seitwärts vom Querstab eine Vorrichtung angebracht ist, die man mit dem Capotasto einer Guitarre oder dem Pedal einer Harfe verglichen hat, welche beide die Bestimmung haben, die Saiten um einen Halbton zu erhöhen. Es sind dies längliche Brettchen, auch wohl cylinderförmige Hölzer, welche im rechten Winkel zu der Saite vorne herausstehen ; bei flüchtiger Zeichnung oder bedeutender Verkleinerung der Figur erscheinen sie als ein einziges compactes Brett. Man findet diesen Apparat regelmässig auf den Wandbildern der verschütteten campanischen Städte, doch auch ähnliches an einigen statuarischen Werken." The English translation above is mine.

[58] Photo: https://www.flickr.com/photos/28772513@N07/6802248829 (accessed 18.12.2017).

A 4th-c. Roman mosaic of Apollo and Marsyas at Paphos, Cyprus, shows a similar set of long, rectangular kollopes beneath the cross-bar at the top of the instrument (**Pl. 111**):[59]

Plate 111: Paphos, Roman mosaic of Apollo and Marsyas (4th c.).

[59] Source: https://www.123rf.com/photo_18613515_apollo-from-the-4th-century-roman-mosaic-of-apollo-and-marsyas-at-the-house-of-aion-paphos-archaeolo.html (accessed 10.10.2017).

A 1st-c. fresco near Pompeii features an instrument with the same elongated wooden kollopes as the previous two sources (**Pl. 112**):[60]

Plate 112: Murecine, "Inn of the Sulpicii", fresco (1st c.).

[60] Detail from a fresco at the "Inn of the Sulpicii" at Murecine, near Pompeii. Photo: https://sites.google.com/site/ad79eruption/neighbouring-area/murecine (accessed 10.10.2017)

Karl von Jan's excellent study of the Greco-Roman kithara, as well as other instruments, is the earliest published in-depth account concerning the details of the kollopes, quoted above.[61] Hortense Panum saw Jan as the researcher "who more than any other has singly endeavoured to discover (in "Die griechische Saiteninstrumente," Leipzig, 1882) the ancient methods of tuning"; and regarding Roman kollopes, little has been added to our state of knowledge since Jan's work.[62]

Jan was, of course, not the first historian to delve into the ancient cithara. In 1632 Giovanni Battista Doni completed his essay *Lyra Barberina*, in which he introduced and described his newly-invented lyre as a presentation to Pope Urban VIII.[63] The main part of his work was in fact "a history of the Greek lyre, kithara and similar instruments, indeed, the most ambitious history of these instruments ever written," in the words of Claude Palisca.[64] Doni examined a number of Greco-Roman monuments local to Rome, and he described the components of the ancient instruments depicted on them.

While he knew of kollopes and their function as string tuners, thanks to his familiarity with ancient literary sources, he questioned their representation in art, noting in his commentary: "Where are the *claviculi* or *κολλοβοι* which, the grammarians teach, were provided in kitharas and in lyres and without which the strings cannot be easily tightened?"[65] In another passage, Doni is puzzled by "an oblong table parallel to the yoke of the kithara…with its upper surface grooved." In the three images shown above (**Pl. 110-112**), we see the "oblong table" (or "long board", a better translation than Palisca's for

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[61] Jan 1882.

[62] Panum/Pulver 1940, 44.

[63] Published in Florence in 1763, *Lyra Barberina* was completed in 1632; see Palisca 1981, 1.

[64] Palisca 1981, 1.

[65] Palisca 1981, 37. Palisca translated Doni's *claviculi* as "pegs" rather than the clearer meaning of "wooden elongations" as in "keys" on a keyboard, which better corresponds to the Roman iconography. Doni's text reads: *Ubi enim claviculi, sive κολλοβοι, quos in Citharis, Lyrisque fuisse diserte Grammatici docent, nec sine iis facile fides intendi possunt?*

tabellam oblongam) just below the yoke (cross-bar) of the kithara, with the upper surface "grooved" (or "marked with lines," for *marginata*) to show the spaces in between the parallel wooden blocks.[66] Two more Roman sarcophagus reliefs with Apollo (**Pl. 113**) and Achilles (**Pl. 114**) show a kithara with the kollopes "board" just below the cross-bar at the top, with "grooves" or lines cut in the top (see Doni's remark above); the diagonal X-markings on the front side of the kollopes "board" was an artistic convention representing the overlapping string end tied around each of the individual wooden kollopes, anchoring the string so that it could be tuned by pressing up or down on the block, pivoting on the cross-bar, to increase or lessen the string tension as desired. **Pl. 114** is of special interest, too, for the kollopes "board" found at the end of the fingerboard of the *pandura* on the right:

[66] Palisca 1981, 39. Doni's full Latin passage reads: *Vides autem in posteriori (prior enim mutila est) circa mediam regionem nescio quid eminere tabellam videlicet oblongam iugo citharae parallelam, cui altera inferne circa fundum respondet superiori parte marginata, quam chordotonum esse ubi fides religabantur nequaquam ambigo.*

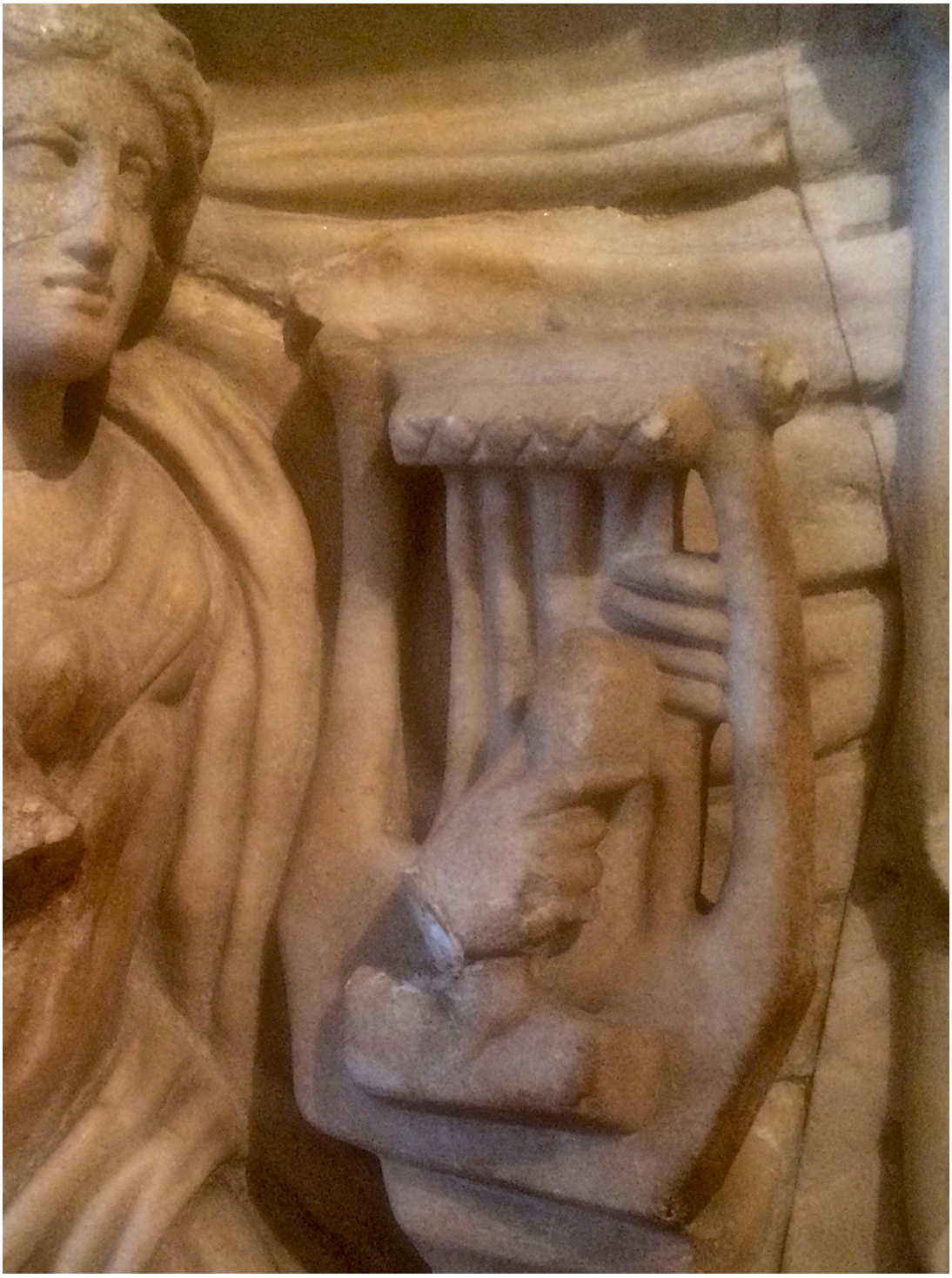

Plate 113: Berlin, Altes Museum, Sk 844, Roman sarcophagus relief with Apollo (c. 200).

Plate 114: Paris, Louvre Museum: sarcophagus in marble showing Achilles at the court of King Lycomedes, detail of musicians with cithara (l.) and pandura (r.); Museum Inv. No. Ma 2120(Athens, c. 240)[67]

[67] Schlesinger 1910, 322 - 323; Panum (1915) 1971, 213; Behn 1918, 97; photo: http://ancientrome.ru/art/artwork/sculp/gr/headstone/hea037.jpg (accessed 10.10.2017).

Pl. 115 shows a late representation, c. 1000, of a Classical lyre-cithara with kollopes:

Plate 115: Bern, Burgerbibliothek, Cod. 88, fol. 4v: Germanicus, *Aratea* (diagram of the constellation *Lyra,* c. 1000)[68]

[68] Photo: http://www.e-codices.unifr.ch/en/list/one/bbb/0088 (accessed 15.08.2017).

What, finally, do these kollopes found on cithara images in Roman art have to do with the cetra? They were the model for the new over-long fret blocks which are first seen in the sources discussed in **Chapter 2** (**CE 21**, **23**, **24**) which are a defining feature of the Humanist cetra. Emanuel Winternitz provided significant input when he published his article "Musical Archaeology of the Renaissance in Raphael's *Parnassus*" in the early 1950's.[69] In it, he demonstrated that Raphael had used a Roman sarcophagus from the late 3rd c. as a model for the musical instruments that he depicted in his *Parnassus* frescoes (1511) in the Stanza della Segnatura at the Vatican, in particular for the kithara of Erato in Raphael's work.[70] The instrument of Raphael is not a contemporary cetra of the early 16th c., but a fantasized version of an ancient Roman kithara. It has no trace of any kollopes, but is relevant to our discussion insomuch as it presents the case of an illustrious artist who, when painting musical instruments, was heavily influenced by Classical models. Along a similar line of argument, I propose that Gentile da Fabriano, Luca della Robbia and their contemporaries did precisely the same thing, and that this can be shown through his rendering of large wooden block frets on the neck of the cetra. A detail showing the kithara in Raphael's painting is shown in **Pl. 116**, with the model sculpture of the Mattei sarcophagus shown in its present state, next to a drawing of the presumable state when Raphael saw it (**Pl. 117**):

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[69] First published in *Rendiconti della Pontificia Accademia Romana di Archeologia* XXVII, reprinted in Winternitz 1979, 185-201.

[70] The same sarcophagus (now called "Mattei sarcophagus") and cithara had been discussed in Doni's *Lyra barberina* (Vol. 1, tav. V); for a recent look at it, amplifying the commentary of Winternitz, see Rostirolla 2010, 189-194. Deciding which Muse is which, in Renaissance art and in this particular work of Raphael, can be problematic, as Winternitz pointed out (Winternitz 1979, 186, footnote 1). He feels that the figure in question is Erato, whereas Rostirolla sees the same figure as Euterpe (Rostirolla 2010, 191).

Plate 116: Vatican, Stanze di Raffaello: Parnassus, Raphael, c. 1511, detail of kithara of Muse Terpsichore.[71]

[71] Photo: https://upload.wikimedia.org/wikipedia/commons/c/cd/Raffael_077.jpg (accessed 27.09.2017).

Plate 117: Rome, Palazzo Mattei, so-called Mattei sarcophagus: detail of kithara in its present damaged state (l.), on the right is a 15th c. sketch by Francesco di Giorgio (now in Florence, Uffizi, Gabinetto dei Disegni, 326 A.R.) which clearly shows the kollopes.[72]

[72] Photo source: Winternitz 1979, Pl. 88.

As Winternitz explained, the reason why Raphael's kithara based on the Mattei sarcophagus kithara lacks kollopes is that the artist apparently did not understand their function on the instrument.[73] That artists working around 1500 such as Raphael and Filippino Lippi made iconographical quotations/citations from Roman models is well-known; that they did this also when rendering musical instruments in their works, has been convincingly demonstrated by Winternitz and others.[74] If we take a painting of a musical instrument by the artist Francesco d'Arezzo, or perhaps an anonymous painter

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[73] Winternitz stated that the state of the kithara shown in the sketchs "was evidently the condition at Raphael's time (ed.: the kollopes were intact)...we have here simply a lack of technical-functional understanding, and Raphael's way out of the dilemma was to omit what he did not understand" (Winternitz 1979, 196), and it is one reason why it has been argued that the Parnassus kithara is not based solely on the Mattei sarcophagus but is rather an amalgamation of multiple sources (see Rostirolla 2010, 194). Although the Mattei kithara and the head of its Muse were severely damaged after the 17th c., we know that it originally had kollopes thanks to an engraving in *Lyra barberina,* and to a text published by Giovanni Gaetano Bottari in 1737 (*Sculture e pitture sagre estratte dai cimiterj di Roma pubblicate gia dagli autori della Roma sotterranea ed ora nuovamente date in luce colle spiegazioni*) describing it on p. 60-61: "..the strings are attached above to those wooden sticks (joined as on a zampogna; in this case it is perhaps the device that allowed the regulation of the intonation) which cross the yoke, leaving almost half of them behind the same yoke to be able to secure the strings, pushing them down with the force of leverage....these sticks do not pass through the yoke, but only pivot on it." See Rostirolla 2010, 193, for the original text of Bottari.

[74] What has not been adequately emphasized is the parallel situation between composition in music and in the visual arts in epochs before Raphael, that is, the practice of quotation and referral. In music history literature this is commonly called "intertextuality", a concept upon which, in fact, all forms of Western art are based. It can be applied to any period of music history, but it seems to us to have been an especially vibrant tradition in the art music culture of the late 14th century. This is due, in part, to the dominating legacy of the poet-musician Guillaume de Machaut who, already by his death in 1377, had become a pre-eminent figure for artistic emulation. It has become increasingly possible, say in the last 50 years, for music historians to find an extensive network of shared melodies and texts, forming a pool of material that formed ongoing dialectical exchanges between poets, musicians, artists and others.
If we take a musical work such as *Sus une fontayne en remirant*, a 3v *virelai* of Johannes Ciconia from c. 1400, we have a composition formed as a new entity from three different text-music quotations from three *ballades* of Philipoctus da Caserta; out of these citations, or references, if one prefers, a new poetic text has been made, as well as a new polyphonic composition. While this particular work has, and rightly so, taken a position of high respect in modern medieval music history, it becomes more and more apparent that this is the tip of the iceberg; this was, as a process of citation, normal. For further information on *Sus une fontayne en remirant,* see Apel 1970, xxxiv.

working with him c. 1420-30, decorating the Basilica di Santa Caterina di Alessandria in Galatina (**CE 23**), we have an analogous situation of artistic procedure. The presence of an angel playing a cetra is a citation of the cetra-playing angel who visited St. Francis in his vision at Rieti (see **Chapter 2**, 183-186), and without knowing anything further about the context of the work, the viewer understands a Franciscan context, as indeed this church is. The "quotations" or citations from Roman art used on this instrument are in reference to the Roman kithara. They are (1) prominent kollopes, (2) horns connected to the resonator which run on a parallel plane to the strings, following a gentle S-curve and flaring outwards at the end, (3) a broad, cornered flat base to which the strings are attached, (4) angel plays using a plectrum, and (5) concentric circles on the soundboard suggestive of circular ornaments on the cylinder kithara and other forms (see **Pl. 41**). Other kithara references, such as a keeled-back resonator, are possible but not provable here.

The cetra painted in the Polyptych of the Coronation of the Virgin by Gentile da Fabriano (**CE 21**, 1408) shares some of these "quotations", but prominent kollopes are not found in any source before it. Sadly, the peg-head in both **CE 21** and **23** is not shown; as mentioned above regarding peg-heads, the presence of a carved head on the cetra seems to be an early Humanist innovation, as on **CE 20** or **CE 17**, and any models used for **CE 21** and **CE 23** may well have featured a carved head.[75]

One music theorist wrote about the cetra and its frets, Johannes Tinctoris. He used the Latin term *elevationes ligneas quas populariter tastas appellant* to denote the kollopes blocks, a term that has been translated as "wooden elevations on the neck…known as frets" and "wooden raised parts that are popularly called 'frets' " in English.[76] When the popular on-line Google translator renders *elevationes* as "extenuations", which might suggest a dimension orientation of width on the fingerboard rather than height (extended frets on the bass side are the obvious visual characteristic of the kollopes-style frets), one may

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[75] The presence of a lute-style bent back peg-head on CE 23 is something I regard as an anomaly; see Comments of CE 23.

[76] The first is Baines 1950, 23, and the second <http://earlymusictheory.org/Tinctoris/texts/deinventioneetusumusice/#paneo=Translation> (accessed 12.01.2018).

wonder whether “elevations” or “raised parts” are the most accurate interpretations in this context.[77]

Meanwhile, to translate *tastas* simply as “frets” is to risk forgetting the concept that the sense is equally “keys” as in keyboard (for ex., *Tastatur* in German), i.e., rectangular shaped pieces of wood of a certain width/length proportion. This meaning of the word “key” is thus directly linked to the Latin translation of the treatise of Pollux on the parts of the kithara; to the group of terms from the (Renaissance) Latin version of Pollux given at the end of the section **Neck Profile/Hook/ Strap** of this chapter, we will now add *clavi chordarum*, literally “keys of the strings” in the sense of pitch changers. These are the kollopes of the kithara, and the keys on *all* keyboard instruments (*clavichordum* etc.) owe their origin to them, whether their modern practitioners are aware of the background, or not.

In summary, there are four types of fret forms seen on cetra images:

Type 1 - Wooden slats, rectangular form of moderate width, with presumed flat-planed tops of uniform height, spaces in between; 12th c. or earlier - 14th c. (**CE 5, 8, 15l**).

Type 2 - Wooden triangular segments, inverted V-edge tops of uniform height, spaces in between; c. 1300 (**CE 15**).

Type 3 - Wooden blocks, broad rectangular form, elongated (= kollopes), with flat-planed tops of uniform height, spaces in between; c. 1400 - c. 1520’s (**CE 21 - 39** et al.).

Type 4 - Wooden blocks without spaces in between (or single wooden fingerboard), saw-toothed tops with higher edge on bridge side of block (edge sometimes reinforced with inlaid wire), with inclined-planed, scalloped tops or fret segments; c. 1500 - continues through 16th c. (**CE 40, 49**?).

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77 <https://www.google.ch/search?q=google+translate&oq=google+ta&aqs=chrome.4.69i57j0j69i60l2j0l2.5975j0j4&sourceid=chrome&ie=UTF-8> (accessed 12.01.2018).

4.3.9 Frets: Diatonic vs. Chromatic The configuration of the frets refers to whether they are chromatically or diatonically arranged on the fingerboard of the cetra. The offspring of the cetra is the 16th-c. cittern (see **Chapter 1**, **Pl. 2**), and about half of the surviving citterns of the 16th c. had diatonic frets, the other half being chromatic. The pros and cons of diatonic fretting have been discussed by Louis Grijp, who correctly pointed out that on a long-necked instrument such as the cittern, diatonic fretting can facilitate orientation.[78] This was also helpful to the majority of players, who were amateurs; it allowed them, to some extent, to be less fussy about their finger placement. One important difference between the 16th-c. cittern and the cetra is that the cittern frets were metal rods hammered into the fingerboard, which could also be broken up into segments. Cetre, on the other hand, only used wooden blocks whose edges generally spanned the full width of the fingerboard, and they had considerably shorter, wider necks. They were, in effect, substantially different instruments from their 16th-c. cousins, and a feature found on the later cittern may or may not be assumed to have been on an earlier one.

Before discussing diatonic vs. chromatic, one must first consider temperament, which, from more or less all documents of music theory concerning our period of study, is so-called Pythagorean tuning.[79] This system looks back to Boethius and was transmitted throughout the Middle Ages and into the Renaissance. It was closely tied to the monochord, which was used to demonstrate the intervals: 2:1 (octave), 3:2 (fifth), 4:3 (fourth) and 9:8 (whole tone). From these four, all the other intervals of the medieval scale (*musica recta*) could be generated. Two whole tones produced a major third (81:64). To generate a semitone, a major third was subtracted from a fourth, leaving 256:243. This semitone 256:243 could then be subtracted from a whole tone 9:8, leaving a larger semitone 2187:2048. There were thus two different-sized semitones in Pythagorean tuning, which is, simply formulated, the most important difference between that system and modern equal temperament with all semitones equal.

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[78] Grijp 1981, 86-89.

[79] A useful summary of Pythagorean tuning, giving interval size also in cents, is Herlinger 1987, 5-9.

Pythagorean tuning was ideal for Gregorian chant, that is, monophonic music, where the melody leads to a goal or cadence; each of the Church Modes was thus defined by its *finalis* or ending note. Within the unfolding of the melody, the smaller semitone often "leaned" toward the final note, creating a tension of expectation regarding where the melody would finally end. By the early 14th c., with polyphony well-established in sacred and secular music, the Pythagorean tuning system was evolving to accomodate the rules of counterpoint, with the rise of chromatic pitches outside of the notes needed for Gregorian chant. Changes were afoot in theory writings, including an increased awareness of the compromise between tuning on the monochord and tuning in actual vocal practice.[80] The scale system described in music theory during most of the cetra's period under discussion here was, then, Pythagorean. Many words have been spent in modern research discussing whether the cetra had chromatic or diatonic frets, as both types were made during the 16th century. The term "chromatic frets" refers to a fret-layout on the fingerboard of consistent semitones, beginning at the nut and progressing up the neck, moving toward the bridge. "Diatonic frets" refers to a fret-layout which does not feature consecutive semitones, but rather mixes whole tones with semitones in various possible ways. There is no theoretical source discussing this aspect of the instrument, so our conclusions must come from music theory, contextual music repertory and iconographical sources.

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[80] Musical sound is subjective and relative, not absolute, because human hearing is subjective and relative. In the early 14th century, the singer Marchetto da Padova stepped outside of Pythagorean mathematics when he acknowledged that pitches measured on the monochord and those that are intentionally sung may not necessarily be the same. Theory and practice diverge, number and sound harmonize in compromise, so to say. Singers strived to follow the monochord as best they could - there was no other authority or reference to follow - yet the reality was the spirit of compromise. They sang counterpoint, and correct counterpoint progression requires the application of *musica ficta* (i.e., chromatic pitches outside the system of Gregorian chant), a system subjected from the outset to a variety of interpretations, including that of Marchetto. When we remember that there was no such thing as absolute pitch, or pitch standard, and that modes (or 'keys') were movable and subject to transposition, we cannot be too surprised that a music theory source like the Berkeley treatise (Paris, 1375) recognizes the reality of compromise in Pythagorean tuning, where *musica ficta* pitches are described in terms of equal temperament (sic).

Music theory considerations will now be outlined. Our study period extends over some four centuries for the cetra. For the question chromatic vs. diatonic frets, music theory knew only diatonic music for the first half of this time span. A musical scale which included chromatic pitches grew out of the practice of polyphony in Western art music during the 14th c., because counterpoint consists of progressions of intervals, and interval progressions require rules. So-called imperfect intervals preceded perfect ones, so, for example, when a sixth was followed by an octave, it had to be a major sixth, not a minor one. If, for example, a tenor melody descended from "e" to "d", then the upper melody against this had to move not from c' to d', but from c#' to d', making a semitone movement in the upper voice. In the original scale system (*musica recta*) of medieval music, the only semitones in the scale were between "e" and "f" and "h" (b natural) and "c". By the end of the 13th c., chromatic notes such as "c#" were just beginning to be recognized in music theory, but it was not until many decades after this that a fully chromatic scale becomes recognized by some theorists.[81] But this shift toward a chromatic scale (so-called *musica ficta*) is very far removed from our cetra, at least before the 14th century. Diatonic frets are appropriate, in any case, for a pre-14th-c. cetra; in terms of everything we know about music theory, there would be nothing practical to do with a chromatic fingerboard. This will change, however, with the advent of the 14th century.

Contextual music repertory shall now be considered. Medieval music might be divided into two types, literate and non-literate, with some overlap. "Literate" means art music, both sacred and secular, of church and court, following practices and rules that were codified in written sources. This included, but was not limited to, polyphonic music of different forms. Musical instruments played a relatively small role in art music, judging from written sources, until groups of like-colored instruments became fashionable courtly and civic entertainment by the mid-14th c., such as the shawm band (the sole exception to this was the organ, which had a role in church and ceremonial music since before the inception of our period).

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[81] For an early discussion in a treatise about musica ficta, see Ellsworth 1984, 53-67; for a general study on the topic in medieval music, see Brothers 1997.

During the 15th c., instruments came into their own, performing vocal-style polyphony in various groups and, like a choir, doing so typically with like-colored instruments in different sizes. Johannes Tinctoris, one of the few 15th-c. theorists to write a treatise on instruments, and the only one to mention the cetra, made it very clear that instruments were of value primarily for their use in playing vocal-style polyphony; the ones which were not (or could not be) used in this way were "imperfect".[82]

The cetra was most assuredly, for Tinctoris, an imperfect instrument. He described it as being used by "rustics" (illiterate musicians with no understanding of music theory and counterpoint) "to accompany light songs and to lead dance music" (ed: Baines); another translation (earlymusictheory.org) has "peasants" instead of "rustics".[83] This is but one of many puzzling statements, concerning different instruments, in Tinctoris' treatise. For, specific to the cetra, we know from literary descriptions that the instrument was used in performances at the highest courts in Humanist Italy (like the *lira da braccio*, the instrument of Leonardo da Vinci).[84] Furthermore, it seems impossible that Tinctoris would not, during his 20-year career at Naples, including visits to other courts, have heard such a performance. His disdain tells us that the cetra was not used for sophisticated polyphony.

If it is true that the cetra was not commonly used for instrumental music in Franco-Flemish style - in contrast to the lute - , it was sometimes also played at court by masters of polyphonic music.[85] We learn this reading Antonio Cornazano's *Sforziade* Canto VIII ("Laudes Petri Boni Cythariste"), lines 25-27, written in 1459. Cornazano describes a banquet performance of the famous Ferrarese musician Pietrobono following the wedding of Francesco Sforza and Bianca Maria Visconti (Pirrotta has argued convincingly that the

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[82] For the first translation in English of Tinctoris' Latin treatise c. 1480, *De inventione et usu musice*, see Baines 1950.

[83] Baines 1950, 25; < http://earlymusictheory.org/Tinctoris/texts/deinventioneetusumusice/#paneo=Translation> (accessed 12.01.2018).

[84] For a study on Leonardo and the lira da braccio, see Winternitz 1982.

[85] For a first-hand account of lute playing heard at Italian courts c. 1470-80, see that of Tinctoris translated in Baines 1950.

performance described took place in Milano in 1456, when documents confirm that Pietrobono was visiting the Sforza court):[86]

> "Cantava in cetra ad ordinata frotta
> l'amor d'alcun moderni chi s'appretia:
> come el Signor d'Arimini hebbe Ysotta."[87]
>
> ("He sang with the cetra to an attentive audience
> contemporary love stories of how Sigismondo Malatesta
> conquered Isotta degli Atti.")[88]

This brings up the subject of repertory and social context, which are also relevant to the question of fret disposition and musical function. The two kinds of music of rustics or peasants were explicitly stated by Tinctoris, dance and song. Dance would mean presumably non-courtly dance, which would exclude the polyphonic *bassadanza* and courtly *ballo*. It would suggest simple social dances such as the round dance or *carole*.[89] We can also presume some overlap between courtly arrangements and performances and street fair or barnyard dance music, with popular dance tunes known by all levels of society.

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[86] Pirrotta 1966, 140.

[87] Pirrotta 1966, 144.

[88] This passage is not unknown in modern music history literature, yet it continues to be understood as referring not to an actual cetra, but to a lute or some other symbolic, poetic instrument. Pirrotta wrote, "Pietro Bono whom we better know as a lutenist, is described by Cornazano as a singer accompanying himself on an unidentified string instrument classically named a 'cetra'...although the reason for this choice is quite evident, for there was no place in Cornazano's revival of the Homeric climate for anything less than a classical rhapsodist, we must admit that also in real life Pietro Bono was a 'cantore a liuto' as well as a lutenist" (Pirrotta 1966, 140-41). Lewis Lockwood comments on the same passage, "Cornazano speaks of a 'cetra' but may not mean so literally" (Lockwood 1984, 100). Why not, actually? We know that Pietrobono played the lute and the gittern...yet we cannot imagine that he played a third type of plucked instrument as well, a documented instrument tailor-made to accompany the genre of song he was singing?

[89] Sources containing Italian dance music before the 15th c. are rare. The most famous collection of works are found in the manuscript London, British Library, MS Additional 29987

Melodies played or sung would probably have been modal, that is, with little chromaticism or use of *musica ficta*. The same would apply to rustic songs, which would be accompanied, at the simplest level of musical skill, by playing the tune, in unison or at the octave with the voice. Beyond these basics, some idea of stylistic possibilities may be gained by studying the 2v songs in the so-called Rossi Codex, a secular song collection from the Veneto which is thought to be a collection representing local styles perhaps from the mid-14th century.[90]

This is not to say that all rustic musicians or street performers were elementary-level amateurs, but a song accompaniment would not have been about Franco-Flemish counterpoint style of Dufay or Ockeghem. In the 15th and 16th c., as with the *lira da braccio*, chords would have been used to support the voice, typically by a *cantarino* or professional singer of formulaic, rhymed verse in a *piazza*, or courtly *improvisatore*, with "correct voice leading" being of low priority (again, like the *lira da braccio*).[91] Just a smattering of written music exists for the *lira*, demonstrating that it, too, played dances and song accompaniment with bad voice leading and chord inversions, sometimes, that might have been frowned upon by a master such as Alexander Agricola.[92] The specific poetic song forms included *sonnetti*, *strambotti* and *capitoli*.[93]

Overall, the primary type of song which called for accompaniment from the cetra during its entire history, naturally, would have been the *lauda*. Monophonic, modal, humble, with devotional text, it was the quintessential Franciscan musical form, practiced at the most humble levels of society everywhere in Italy. It also overlapped with any and all secular melodies, to which new words were applied.[94]

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[90] See Pirrotta 1960 for an edition and discussion of the Rossi Codex.

[91] Glimpses of this repertory, in terms of surviving pieces, are elusive but not impossible to find. One source for a handful of pieces is the manuscript Montecassino, see Pope and Kanazawa 1978.

[92] The extant *lira* pieces have been transcribed and discussed in Jones 1995.

[93] For more on these forms see Cavicchi 2014.

[94] For a definitive study on this tradition, see Wilson 2009.

Iconographical sources, the final consideration topic to decide whether to use diatonic or chromatic frets, are often read in different ways by different readers, leading to conflicting interpretations. Careful study with the visual sources confirms that, while later sources (say, from the last 100 years of our study period) strive for a higher degree of realism and precision then earlier ones, it is exceedingly rare that an image of a fingerboard with frets can be relied upon for a literal and precise rendering of fret placement, which can simply be measured and transferred into practice on an instrument on stage. In short, accurate fret placement was not a high priority for most artists, even those with the highest Renaissance aspirations of correct rendering. Whether we expect realism or not, the sources we are concerned with are not photographs.

Of the Catalog entries in **Chapter 3** showing frets, none show anything but regularly-spaced frets, with the exception of **CE 23** and **36**, which feature a larger distance between the first two frets than between all the rest (see Comments for **CE 36**). There is not one image which depicts the irregular spacing that a diatonic fret layout would feature, with the exception of the partially-diatonic fretting shown in **CE 49**.[95] If depicted accurately, what would a diatonic fretboard look like? When we speak of diatonic fretting, which interval series should we consider?

We now go back to early medieval music theory and back to tetrachords. **Pl. 86** in **Chapter 2** shows a tetrachord chart. The first tetrachord in *Musica enchiriadis* of the 9th c. is the one shown on the left, D - E - F - G, or in interval terms, tonus - semitonus - tonus.[96] Three frets would be needed to play these intervals, the first would be up a whole-tone from the open string, the second a semitone higher, and the third a whole-tone above that. But the early monuments show four or five frets: the only two early sculptures, **CE 5** and **CE 8**, have

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[95] In the words of musicologist Louis Grijp, "In spite of the exactness of the depictions, especially that of the intarsie, we cannot discern any difference between major and minor seconds, an important argument against fully diatonic fretting" (Grijp 1981, 91).

[96] This is the first tetrachord given in the treatise because these intervals - in this order - provide the finals for the Church Modes, Dorian, Phrygian, Lydian and Mixolydian.

four and five frets, respectively. We can easily add a fourth fret to give a whole-tone above the third fret, and we could also add a fifth fret above that. In fact, having five diatonic frets would allow the hexachord pattern, ut-re-mi-fa-sol-la, to be played moving up the frets on each string respectively; each string would thus be a kind of monochord unto itself, conforming with the solmization system associated with Guido d'Arezzo c. 1000 (**Chart 1**):

Chart 1 (Solmization syllables and corresponding fret numbers in diatonic fretting):

Solmization syllable	Fret number
Ut	(open string)
Re	1
Mi	2
Fa	3
Sol	4
La	5

There are other tetrachords that might be imagined for our diatonic fret system: semitonus - tonus - tonus, or tonus - tonus - semitonus. Tonus - tonus - tonus is not a tetrachord at all, and for a four- or five-fret layout, it goes into chromatic pitch territory, and thus seems a highly unlikely candidate for a 12th-c. cetra. It will soon be necessary to test these layouts in practice. Before doing so, we will need to decide on what the tuning should be.

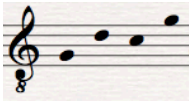
Because **CE 8** has no strings (it does have twelve pegs but their string-grouping configuration will be considered later), we will use **CE 5**, the cetra with four strings. The starting point for the four-string cetra tuning must be the treatise of Boethius. The tuning is described:

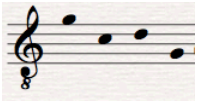
> "In the beginning Nicomachus reports music was truly simple, since it was composed of four strings. It continued in this state until the time of Orpheus. In this period the disposition of strings was such that the first and fourth strings

> sounded the consonance of the diapason, while the middle strings each in turn sounded the diapente and diatesseron with the strings nearest them and those most distant."[97]

This means that however one visualizes this tuning (= whether one starts on the bass or treble side of the fingerboard, in modern violin terms), it has a so-called re-entrant pitch series: if we take G as the pitch of the first string, the result would be either

G d c g or g c d G.[98]





Note that Boethius specifies no pitch, only the relative intervals. We have chosen to put the lowest string at G because this could be a realistic lowest string on a cetra, given the general string length. "Re-entrant" indicates that string pitches do not consistently ascend (or descend) as one crosses the four strings moving from one side to the other.

That the language used for the tuning description by Boethius is potentially confusing, might be confirmed by a late 14th-c. Parisian treatise, which endeavors to present the material from Boethius with a modern update using contemporary string instrument images.[99] The Berkeley Treatise begins by presenting the four-stringed Boethian tuning as the "Tetrachord of Mercury", rather than the "Quadrichord of Mercury" specified by the

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[97] The specific word order in Boethius comes from the lowest primary number proportions 2:1, 3:2, 4:3. For the passage in translation with commentary, see Bower 1989, 30.

[98] To explain my use of letters to indicate specific pitches: I follow the medieval system of writing pitch names. Capital letters are used to indicate all notes on the bass-clef (f clef) staff except the low G (bottom line) which is indicated by the Greek letter Γ, and the highest line (a) which is a small-case letter. The range of notes covered by examples given for cithara / cetra tunings in the text is limited to the octave starting at G (a fourth below middle C): G a b h c d e f g.

[99] The treatise is the so-called Berkeley treatise, after the library at the University of California Berkeley where it is held. For the original Latin and an English translation, see Ellsworth 1984.

ancient author (a tetrachord by music-theoretical definition would have to have four strings within a fourth, whereas the literal Boethian tuning spans an octave: G d c g). It seems at first sight that the Berkeley author has confused what Boethius actually wrote, but there may be some method to the madness. "Tetrachord", after all, does mean "four strings", so perhaps Berkeley has consciously changed both name and tuning order of the strings; but there is also a certain similarity with material found in an earlier Parisian treatise of Jerome of Moravia, whose third vielle tuning (GG d c'c') might possibly be related to Berkeley's Tetrachord of Mercury tuning.[100]

The Tetrachord tuning in Berkeley was illustrated with a drawing of four parallel horizontal lines, using alphabetical letters to mark points of division on the lines ("strings") to show proportional lengths; 2:1, 3:2, 4:3 and 9:8 are the only intervals contained within the fours strings, so to speak (**Pl. 118**).

[100] Page 1979.

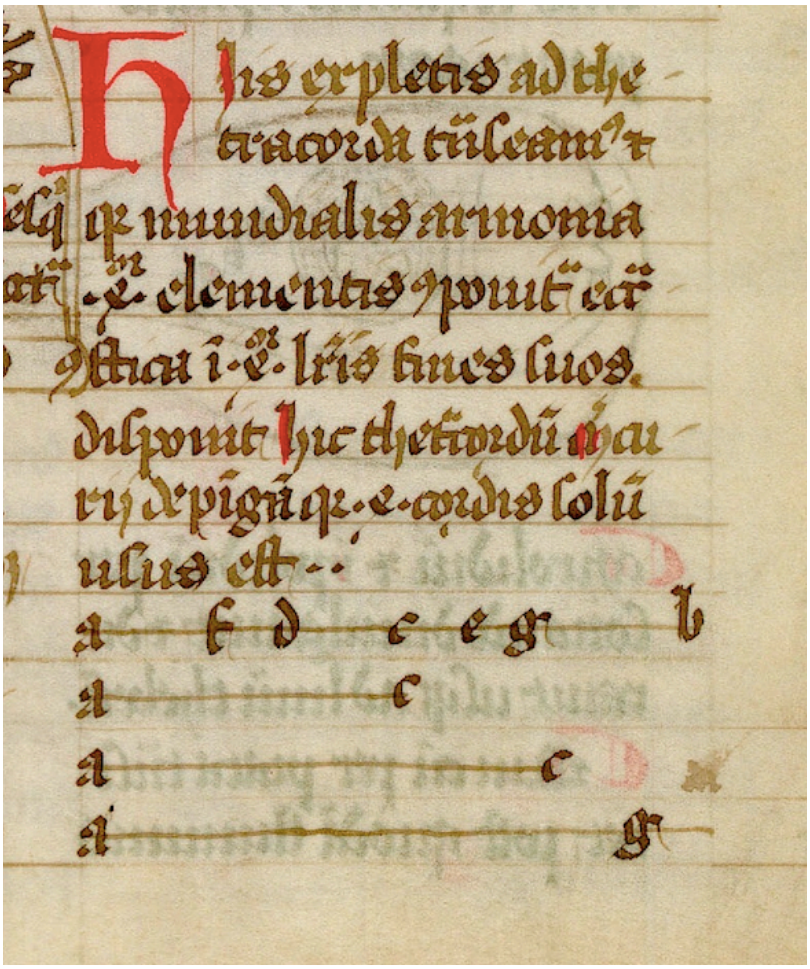


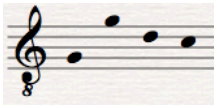
Plate 118: Berkeley Manuscript, p. 51: detail showing "Tetrachord of Mercury" illustration; the uppermost line or "string" marks division points with alphabetical letters to produce the intervals of octave 2:1 (second line down), fifth 3:2 (third line down) and fourth 4:3 (third line down).[101]

Next, Berkeley shows a different four-string tuning on a necked chordophone (**Pl. 119**). We have transposed it to put the lowest string at G to better facilitate comparison to the tunings shown above; it is G A d g. Here the same four intervals are present, but with a changed configuration. Like Boethius, this tuning has the octave between the outer strings. But here, the 9:8 *tonus* is in a different position, from "G" to "A" one tone higher. The next

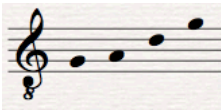
[101] I wish to express my gratitude to the Music Library at the University of California at Berkeley, where in April 2015 I was allowed to examine the Berkeley Manuscript.

string after “A” is a fourth higher, and the last string is a fourth higher again. In short, this is a variation upon the Boethius tuning, as was Berkeley’s first Tetrachord tuning; related to Boethius, with the same intervals, but not exactly the same interval-order of the strings.

Berkeley, Boethius tuning
“Tetrachord of Mercury.”



Berkeley, altered Boethius tuning
“Cithara of Albinus” (see **Pl. 119**).



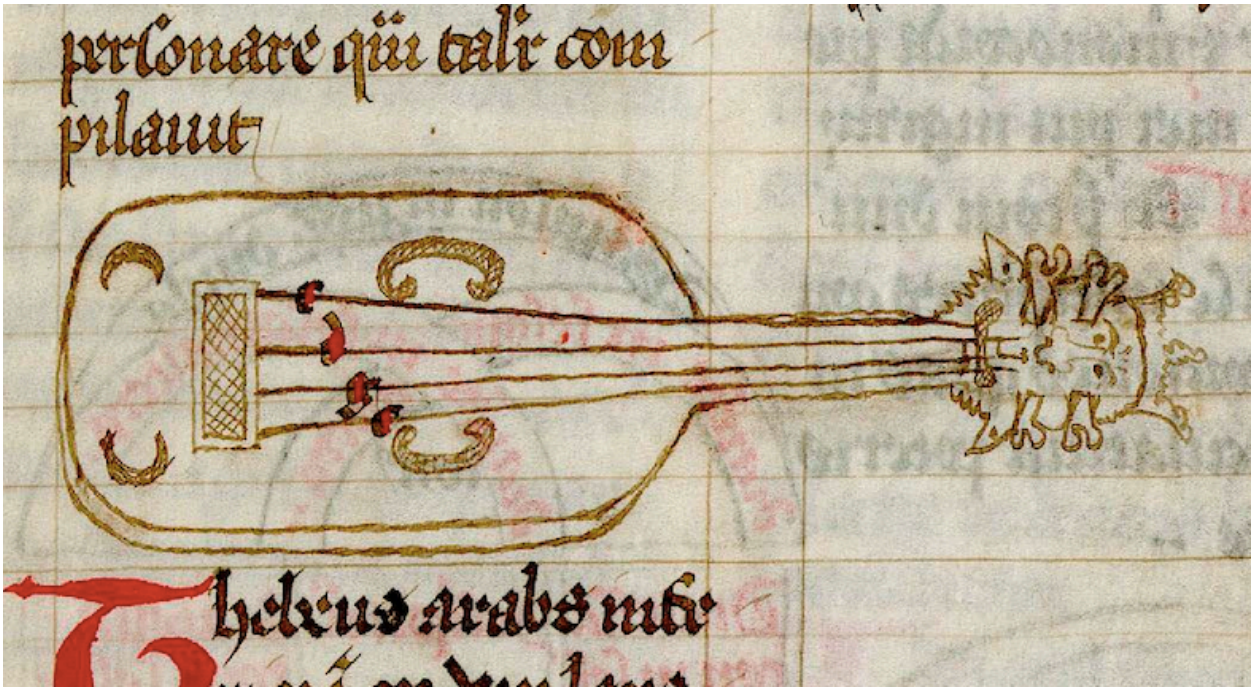
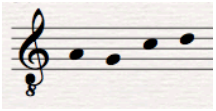


Plate 119: Berkeley Manuscript, p. 52: detail showing four-stringed chordophone to illustrate the evolving “Tetrachord of Mercury” tuning. The letters read from low to high strings, c d g c, and the description makes it clear that the last string is an octave higher than the first.

Berkeley was dated by its scribe to January 1375.[102] About 100 years later, we find the only explicit tuning information for the four-string cetra in the treatise of Tinctoris. I wish to argue that the usual understanding of Tinctoris' Latin has been misread in modern literature. His Latin passage reads, "Ab ipsa etiam lyra instrumentum aliud processit, ab Italis, qui hoc compererunt, cetula nominatum, super quam quattuor enee vel calibee chorde, ad tonum et tonum, diatesseron, ac rursus tonum, communiter disposite tenduntur" (Baines: "Yet another derivative of the lira is the instrument called cetula by the Italians, who invented it. It has four brass or steel strings usually tune: a tone, a tone, a fourth, and back again a tone"; earlymusictheory.org (edited): "From the *lyra* likewise proceeded another instrument, named by the Italians, who devised it, a cittern, upon which four brass or steel strings, commonly disposed by a tone, a fourth, and back a tone, are stretched"). Both translations assume that Tinctoris begins with the highest string and that the following intervals he gives are descending.[103] The second translation reads "et tonum" as a mistake, as it seemingly describes a five-string instrument in Baines' literal translation, in contradiction to the previous statement of Tinctoris that it has four strings. "Ac rursus tonum" is understood in both translations as going back in the opposite direction, i.e., no longer ascending but now descending. The resultant tuning for both translations, with G as the lowest string for comparative purposes, is A G c d:



It may be possible, however, to understand "ac rursus tonum" as "going back to the original interval," but one octave higher. There is a second problematic tuning passage in the treatise, describing the Turkish tambura, which could shed light on the sense of this one: "tres chordas habet ad diapason diapentem ac diatesseron" (both translators give "it has three strings tuned to octave, fifth and fourth" as the translation). This would be a four-string tuning, rather than the correct number of three strings. Tinctoris means, rather, that

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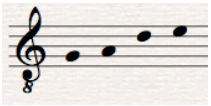
[102] Ellsworth 1984, 182-183.

[103] Like Boethius, Tinctoris names no specific pitch, instead giving intervals between open strings.

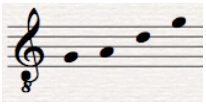
there is an octave between strings 1 and 3, a fifth between 1 and 2, and a fourth between 2 and 3. Literal modern translation, in this case, brings questionable results.
The four-string instrument drawn in Berkeley uses precisely the tuning described by Tinctoris in his cetra passage, if we allow the meaning suggested above. The traditional interpretation of the Tinctoris cetra tuning - shown above - is musically problematic in a period where the instrument surely played chords of some kind when accompanying improvised singing of *ottave rime* and other forms. Its musical function would have shared aspects with its sister instrument, the *lira da braccio*, which was primarily chordal. If there is one thing to be learned from Berkeley regarding tunings, it is that they (practical instrument tunings) were inspired and adapted from Boethius. This was already the case for the vielle tunings of Moravia c. 1300, and it is without doubt the case for the cetra of Tinctoris, for we have seen how the Humanists reinvented their instrument, adapting features from the kithara of Antiquity in fresh ways for a necked chordophone. The cetra tuning given by Lanfranco in 1533 (see Appendix II) is also music-theory related (hexachord), as well as referencing Boethius.

We have now suggested a different reading of “ac rursus tonum” than the commonly-cited Baines/earlymusictheory.org translation, keeping Boethius in the background. A similar interpretation of Tinctoris’ cetra tuning was proposed by musicologist Louis Grijp independently in 1981, taking a different meaning for “ac rursus tonum”:

(Grijp)



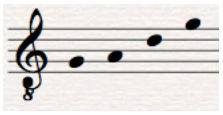
(Young)



Let us see in **Chart 2** what these tunings, as well as a few other related ones, do if applied to a diatonic cetra, by illustrating which notes would be available according to various diatonic fretboard configurations:

Chart 2: Eight "test configurations" with different tunings and diatonic fret patterns ("open" = open string, "M2" = major second, "m3" = minor 3rd).

Test 1 - Adapted Boethius tuning #1



open	M2	m3	4th	5th
g	a	b	c'	d'
d	e	f	g	a
A	H	c	d	e
G	A	B	c	d

Result: provides full *musica recta* note system.[104]

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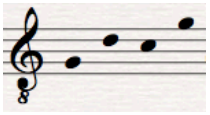
Test 2 - Literal Boethius tuning



open	M2	m3	4th	5th
g	a	b	c'	d'
c	d	eb	f	g
d	e	f	g	a
G	a	b	c	d

Result: less good than previous one because (1) no H at all and (2) more repetition and awkward (illogical) positions of notes.

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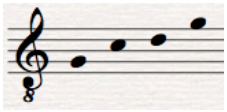
Test 3 - Adapted Boethius tuning #2



open	M2	m3	4th	5th
g	a	bb	c'	d'
d	e	f	g	a
c	d	eb	f	g
G	A	Bb	c	d

Result: no H = not possible to play in G durum hexachord.

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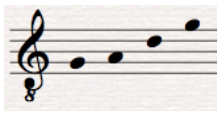
[104] *Musica recta* refers to the traditional medieval scale without chromatic notes, i.e., the white notes on a piano keyboard, so to speak.

Test 4 - Adapted Boethius tuning #1

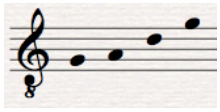


open	m2	m3	4th	5th
g	g#	b	c’	d’
d	d#	f	g	a
A	Bb	c	d	e
G	G#	Bb	c	d

Result: not convincing….provides un-needed pitches.

****

Test 5 - Adapted Boethius tuning #1



open	M2	M3	4th	5th
g	a	h	c’	d’
d	e	f#	g	a
A	H	c#	d	e
G	A	H	c	d

Result: has no B or b, often needed!

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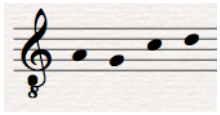
Test 6 - Literal Tinctoris tuning



open	M2	m3	4th	5th
d	e	f	g	a
c	d	eb	f	g
G	A	B	c	d
A	H	c	d	e

Result: impractically limited compass with pointless fret positions for melodic play.[1]

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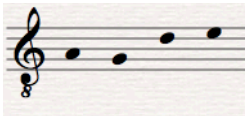
Test 7 - Adapted Tinctoris tuning #1



open	M2	m3	4th	5th
e	f#	g	a	h
d	e	f	g	a
G	A	B	c	d
A	H	c	d	e

[1] In his much later *Misurgia universalis* (Roma, 1650), Athanasius Kircher gives this tuning for the four-course “ultramontane” cittern; see Crane 1956, 48, 56 for the relevant passages in English.

Result: very limited: could be chordal around G major-only with limited melodic play on top two strings. This is slightly more useable than the literal Tinctoris tuning, but not really convincing and/or practical.
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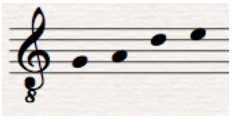
Test 8 - Adapted Tinctoris tuning #2



open	M2	m3	4th	5th
e	f#	g	a	h
d	e	f	g	a
A	H	c	d	e
G	A	B	c	d

Result: provides full musica recta note system, also the leading tone to g, f#.
****

For the four-string diatonic cetra, Tests 1 and 8 are clearly the most logical choices for fret configuration by providing a full range of notes. There are not many sources in the Catalog which are strong candidates for diatonic fretting after the 14th century. For a later diatonic instrument, **CE 32** presents quite a realistically placed fret layout, if the bridge is moved further back (it seems much too high up in the middle of the sound-board). This can be easily tested by measuring the open string length, assuming everything is visible, and then finding the positions on the string where the fourth and the fifth should be fretted. These two intervals - especially the fourth - should be reliable common intervals to any diatonic or chromatic fingerboard. They are correctly placed in **CE 38**, a clear example of chromatic frets. Following our earlier conclusions concerning fret blocks, it will be the back edge of the block (the edge facing the direction of the nut) which is the actual fretting edge, and to stop the string, the player presses the fingertip on the space behind the fret block. This is an important consideration when measuring fret positions in iconographical sources.

The Moravia tunings should also be considered as options for the early-14th-c. cetra, especially for types shown in the cycle **CE 15**. These include cetre which have a bordun string or string-pair off the fingerboard, like the vielle, and there is no question that some cetre by this time had chromatic frets (**CE 15i**). The first Moravia tuning is for a five-string

vielle with the strings grouped into two pairs and a single bordun, d Gg d'd'. Moravia's second vielle tuning, also for five strings, is grouped into one pair and three singles, d Gg d' g''. The third tuning GG d c'c' was already mentioned above in connection with the Berkeley first Tetrachord tuning.

The second vielle tuning is described by Moravia as being able to play all forms of music, which implies playing polyphony and using chromaticism, at least as a possibility.[105] I see no reason why a chromatically fretted cetra, with a similar string configuration as described in Moravia, would not have been capable of doing the same thing, especially at a time in Italy when French fashion was a noticeable cultural influence.

To summarize: for a 14th-c. cetra with chromatic frets, also with bordun strings, Moravia is a viable model, in particular the second tuning.

Ultimately, to decide whether an image shows diatonic or chromatic frets, the following points may be observed:

(Chromatic)

- There is a relatively high number of narrow frets (**CE 15i, CE 30, CE 35**), such as eight or more.
- The source is 14th c. or later.

(Diatonic)

- There is a fewer number of frets, up to seven but often less.
- The iconographical source is dated before the 14th century.
- Blocks are of relatively wide form, or have pronounced distances between frets.

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[105] In Page's translation, "Another tuning is necessary for secular songs and for all others - especially irregular ones - which frequently wish to run through the whole hand... that which is most difficult serious and excellent in this art is to know how to accord with the *borduni* in the first harmonies any note from which any melody is woven. This is certainly easily known from the suitable second hand, which is only used by advanced players"; (Page 1979, 91-93).

Now that we know something about the permutations and possibilities of cetra fret configuration, we need to understand the factors concerning the number of strings represented on a given instrument.

4.3.10 Strings: Number, Grouping The data concerning the number of strings of the cetra is consistent, at least if we confine ourselves to sources of music theory. Boethius described the cithara of Mercury as a "quadrichord" or instrument with four strings; the development of different melody types, i.e., modes, in ancient Greece, was presented by the same author using the figurative comparison of "adding strings" to the cithara. A list of musicians, each the inventor of a new mode, progressively increased the number of strings of the cithara, culminating in the addition of an eleventh string by Timotheus of Milesia.[106]

The reception of Boethius during the Carolingian period continued the implicit idea of a four-stringed cithara in the use of graphic drawings of four-line staves indicating the pitches of the tetrachord (see **Pl. 85 - 86** in **Chapter 2**). The ubiquitous authority of Boethius' treatise throughout the Middle Ages ensured that the concept of the four-string cithara was part of the study of music as part of the Quadrivium. Another impetus for the authenticity of the four-string cithara came from D'Abano (c. 1250-1315), as the earliest widely-known commentator on Greek texts, including works of Aristotle. His commentary to the Third Problem in the *Exposition problematum Aristotelis* (1310, Padova) concerning musical intervals, acoustics and related matters, specifically mentions the *cythera* as having four strings.[107] D'Abano's stature as a figure of authority was well established by the mid-14th c., and it would only continue to increase throughout the 15th c. at the Humanist courts and universities, so fixated upon ancient culture.

One such Humanist court was that of Ferrante in Napoli, where Johannes Tinctoris wrote, among other works, the treatise *De inventione et usu musice* during the 1470's. It remains the unique organological work which contains specific information about the cetra,

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[106] Bower 1989, 29-36.

[107] Page 1986, 149. See also discussion above in Chapter 2, 192-193.

confirming the number of strings to be four. Some fifty years after Tinctoris, Giovanni Maria Lanfranco (1533) described the number of strings on the cetra as six.

Not everyone understood the cetra as an instrument with four strings. A different view was propagated by Christian writers, one which was supported, in the main, by sources of visual art from the Romanesque through the 14th century. As we read in **Chapter 2**, Gioacchino da Fiore, the 12th-c. Calabrian mystic, spoke of the three strings of the cithara, with their symbolism of the Theological Virtues.[108] In fact, three-string lute forms go right back to early Byzantine culture (pandura, see **Chapter 1**) and iconography, and already by the Carolingian era, three is the standard number of strings; the obvious Christian symbolism does not need further elaboration here. A glance at the entries before c. 1400 in **Chapter 3** will show that three is the default number of strings for the proto-cetra (Romanesque) and Gothic cetra.

There are, however, notable exceptions to this statement, starting with Benedetto Antelami's sculpted cetra of four strings (despite its Psalm context). Then there is the important and extensive cycle of depictions in the Lower Basilica at Assisi, which contain sixteen cetre, of which one example (**CE 15g**) has no strings. Twelve of the remaining fourteen have bordun strings (= off the fingerboard, not "stoppable" with the left hand on the fingerboard), either as a single string or a pair. At least three cetre (**CE 15j, 15n, 15p**) show pairs of strings, that is, grouped together into three courses. These are, effectively, three-stringed cetre, in conformity with Gioacchino da Fiore's description.
Regarding the number of strings represented on any cetra image, it will be well to remember two key points. First, there are two indicators showing the number of strings on a given cetra, the number of pegs in the peghead, together with the number of strings drawn on the body and/or fingerboard. Second, there is the possibility that a larger number of strings may be grouped into various configurations of courses, where each course functions in effect as one string.

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[108] See 184-185 above.

The number of pegs and the number of strings found on a cetra, many times, do not agree, especially with limitations of medium or size. Matching the numbers exactly was sometimes a low priority for the artist, who was charged with depicting a recognizable cithara as an attribute within a specific context, focusing more on general form and playing position, for example. Pegs will often be present even when strings are not; the opposite is rarely true.

When strings are present, they may be laid out singly on the fingerboard, or grouped in pairs (or even three together as a triple course). A precedent for an early necked chordophone with strings configured as a pair, tuned in unison, is the Byzantine pandura.[109] This instrument consistently had three strings, with the two on the right side of the fingerboard (seen vertically and frontally), placed close together, and the third set at a wider distance from these two.[110] In terms of playable strings, this was a two-string instrument, with two independent sets of frets, one for each string. The fret set belonging to the string pair typically had a greater number of frets than the set under the single string, sometimes substantially more; active melodic playing may therefore have been reserved for the pair of strings, and they may have been strung as a pair so that if one broke, the player could continue playing.

The earliest treatise which implicitly confirms the disposition of courses on a necked chordophone in Western Europe is that of Jerome of Moravia (Paris, c. 1280). Like the cetre in the Lower Basilica at Assisi some thirty years later, Jerome's vielle had its five strings grouped into two courses plus a single bordun string off the fingerboard, although other strings configurations were used as well. This configuration for the vielle was already well

[109] Eichmann 1994, 65.

[110] Eichmann 1994, 65, mentions that two examples later had a fourth peg added, but that the original number was three.

established in Italy, as a miniature from a Bolognese Bible c. 1250 - 1262 clearly shows (**Pl. 120**):[111]

Plate 120: Los Angeles, Getty Museum, Ms 107, f. 209v (David plays five-string vielle with two courses and single bordun)

A handful of early cetra examples depict instruments with twelve pegs, beginning with **CE 8**, the Ferrara Duomo. As stated previously in the comment section of this item's catalog entry, the number of strings is heavily symbolic, with the 24 Elders representing 12 Apostles and 12 chieftains of the tribes of Israel.[112] Further symbolism can be seen in 12 x 12 = 144, suggesting the 144000 blessed souls saved after the Last Judgement. There is also

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[111] Getty Museum, Ms 107, f. 209v: Initial B showing Christ, with David playing vielle. <http://www.getty.edu/art/collection/objects/257766/unknown-maker-initial-e-monk-reading-initial-b-christ-with-david-playing-the-harp-italian-about-1250-1262/?dz=0.6565,0.6730,1.62> (accessed 10.10.2017)

[112] Marchi 2011, 214.

non-Biblical symbolism at work here. The prime numbers through 12 include the fundamental proportions of the Pythagorean monochord: 12:6 = 2:1 (octave), 9:6 = 3:2 (fifth), 12:9 = 4:3 (fourth) and 9:8 (whole tone).

Could this cetra have had three courses of four (unison) strings each, as perhaps suggested by the three clear "rows" of four pegs in the peghead? It is not impossible, although a four-string course would be unprecedented on any necked chordophone in the Middle Ages or Renaissance, and is supported by no known iconographical examples. Four unison strings grouped together into courses would seem to invite practical tuning problems on a fretted instrument such as this. Then there is the question of the bordun, for this same monument provides the earliest unequivocal evidence for the bordun string on a cetra, and this feature is shared with the Assisi instruments mentioned above. Bordun strings, when shown on instruments like those in **CE 15**, are either single strings or two strings in a course. A three- or four-stringed bordun course is unknown at this time.

A second instrument of the same period shares twelve as the number of depicted pegs: Giotto's fresco at the Scrovegni Chapel in Padova (**CE 14**). The fresco is somewhat deteriorated and the strings are not all clearly discernible, but the upper four strings may be grouped into two double courses (?) and the instrument might have had a bordun string or course (?). The visible part of the instrument (the lower half is blocked by another figure) is strikingly similar to the Ferrara cetra, and these two also bear some resemblance to the Cimabue cetre in the Upper Basilica at Assisi c. 1280 (**CE 10**). Though severely deteriorated, both of these examples had many strings; sadly the number of pegs is impossible to discern. **CE 10b** probably had twelve strings (eleven are visible as I count). It seems entirely plausible that the three sources **CE 8, 10** and **14** are related. See Comments section of **CE 8** for further discussion of the relationship between the three.

In sum, the Cimabue-Ferrara-Giotto cetra is a definite model type from the last quarter of the 13th c., which has twelve strings, bordun strings (one or two) and possibly two upper courses of two strings each. A first proposal for the stringing configuration would be a four course instrument plus the bordun: 2 (B) / 3 / 3 / 2 / 2. An argument in favor of this would

be that the top two courses in **CE 14** are each double courses. A second proposal would be three courses plus a bordun: 3 (B) / 3 / 3 / 3. The tuning possibilities for both of these string configuration proposals will be discussed below. What about a six-course disposition of 2 / 2 / 2 / 2 / 2 / 2 ? Unfortunately, the deteriorated state of Giotto's fresco precludes a definite conclusion. There is, however, no confirmed description of any kind of plucked necked chordophone in Italy with six courses until that of Tinctoris in the 1470's - some two hundred years later - and that is a description of an early Renaissance lute.

Later iconographical sources for the cetra, beginning around the time of Tinctoris with the fresco at the Palazzo Schifanoia in Ferrara (**CE 30**, c. 1470), sometimes show an instrument with twelve pegs. **CE 36** and **39** (c. 1494-c. 1520) are further examples with twelve pegs, both by Giovanni da Verona; another work of his, **CE 47**, actually shows 11 peg holes with a presumable 12th present at the upper end of the peghead. None of these 12-string cetre clearly feature a bordun nut-bridge arrangement as the earlier ones did. The treatise of Lanfranco (1533) describes the cetra as a six-course instrument of eight strings total: 1 / 1 / 1 / 2 / 2 / 1.[113] A first proposal for string layout for a five-course instrument with twelve strings would be: 3 / 2 / 3 / 2 / 2 (c. 1485-c. 1515?) and six course from c. 1500 on: 2 / 2 / 2 / 2 / 2 / 2 , following the example of the six-course instrument in **CE 38** (1498).

Within a period of one hundred years or less, from Antelami to the Ferrara Duomo, we have gone from a cetra with ostensibly four single strings to one with twelve strings, with little iconographical evidence as to their configuration in courses. The Assisi cycle **CE 15** (c. 1315), on the other hand, provides a number of clear images of three-course configuration (three single strings in one case, **CE 15l**) and one example, **CE 15k**, with four single strings, perhaps grouped as 1 / 1 / 2 ? After **CE 15**, we enter an unfruitful period for surviving cetra iconography, which lasts almost a century, until **CE 21**, Gentile da Fabriano (1408). From here through to the end of our study period, cetre will have four, five or six courses. **CE 21** has four double courses. By the 1420's, five double courses appear (**CE 23, CE 24, CE 26**), as well as examples with four, five and six single strings, grouping unclear (**CE 25a, b, c**).

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[113] For the original text and English translation of Lanfranco, see Appendix II.

During this period until c. 1460, five courses appear to be the most common configuration. In the 1460's we again see four double courses (**CE 30**) and a return to twelve pegs (?) in **CE 31** (c. 1470). Nine single strings in **CE 32** (c. 1478-1482) strongly suggests a four course configuration, 2 / 3 / 2 / 2, and is contemporary with Tinctoris' treatise confirming that the cetra has four strings. Meanwhile, **CE 35** (1485-1495) has ten pegs and presumably five double courses. Four, five and six-course cetre are all in evidence from 1500 on through the end of our period, c. 1530. Again, Lanfranco stipulates in 1533 that the cetra has six courses.

4.3.11 Strings: Material As organological forerunners to the cetra, the Byzantine *pandurae* introduced in **Chapter 1** were instruments with strings of gut (or sinew of some kind).[114] Sheep-gut strings, for musical instruments, are documented since late Antiquity and presumably are of more ancient heritage.[115] They remained *the* string type for all stringed instruments throughout the Middle Ages and into the Renaissance, with just a few exceptions.[116] Which are the exceptions?

For the pandura, Eichmann has argued that metal strings are out of the question because there would be different profiles of wear on the nuts of these instruments (I would also question the status - feasibility, availability - of metal string technology during these centuries); silk strings, he argues, had not yet found their way West from China during this period.[117] A unique late 12th-c. chronicle of Gerald of Wales tells of the use of bronze strings by Irish musicians, presumably in reference to the cithara, although whether this term meant "pillar harp" is unclear.[118]

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[114] See Page 1986, 223, for a reference to a 5th-c. Psalm commentary which mentions that the cithara "has strings from the intestines of a sheep."

[115] Page 1986, 223.

[116] Silk strings were used in place of gut, rarely, as a luxury commodity, to those with means, from the 13th c.; see Page 1986, 216. See more recently Koster 2015, 86, on gut string use in the 13th and 14th c. outside of Italy: "To judge from written sources, strings were rarely made of silk or horsehair in the vicinity and period of the citole when gut was the predominant string material of organic origin."

[117] Eichmann 1994, 65; for more on metal string manufacture, see below.

[118] Page 1986, 231.

The next reference is by the 13th-c. English Franciscan Bartolomaeus Anglicus in *De Proprietatibus Rerum* (c. 1250), where the strings of the *psalterium* "are best made from 'latten' and also from 'silver.' "[119] This is repeated by another Franciscan, Aegidius of Zamora, in his *Ars Musica* c. 1300. From about the same time comes the anonymous *Summa musice*, which mentions *cordas metallinas, intestinales vel sericinas* (strings of metal, gut or silk) as possible string types.[120]

Contemporary with the cetra cycle in the Lower Basilica in Assisi was the writing of the head Franciscan in all of France, the Parisian scholar and churchman Nicholas de Lyra, whose very name echoes the ancient instrument (he came from a town in France called 'Lyre'). In his treatise *Postilla* (c. 1320) - which would have been familiar to the Franciscan community in Assisi - he included a commentary upon Psalm 150:4: *Laudate eum in cordis……ere seu intestinis* (Praise Him upon strings, that is, on instruments having strings of bronze or gut).[121]

Three of the five sources which have been mentioned in this section are written by Franciscans, and they mention metal and gut strings. The 13th-c. Franciscans Bartolomaeus and Aegidius associate latten (brass) and silver strings with the psaltery, perhaps with an implication that the cithara, as the instrument of earthly humility, uses, by contrast, gut strings. For this reason, and because of the string configuration similarities to Jerome of Moravia's vielle pointed out above (which was clearly a gut-strung instrument), it is reasonable to assume that the Franciscan cetra, like its Romanesque predecessor, normally used gut strings.

Metal strings should, however, not be categorically discarded as a possibility for the stringing of the instrument during these periods, remembering the textual sources named above, but also the bulkiness of the wooden frets shown on **CE 5** and **CE 8**. These are not

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[119] Page 1986, 236.

[120] Page 1986, 238.

[121] Page 1986, 239.

kollopes frets, for Antelami's cetra is dated some 200 years before the earliest appearance of kollopes, and an artistic mentality supporting the adornment of the cetra with features of the Antique kithara is hardly discernible during his period. The robustness of the fret dimensions might suggest the use of metal strings; in any case, wood is a much more durable and less expensive material than gut, especially for an instrument used by common people and clerics

By the 1470's, following Tinctoris, the cetra used metal strings. When and why did the change from gut to metal occur?

As described in **Chapter 2**, during the later 14th and especially the 15th c., the cetra underwent a conscious morphological transformation. That is to say, it took on new features which, for the Humanists, made it more resemble the Classical cithara/cetra they could see in Roman sculpture, for example, and read about in ancient authors. One of the novelties was a new kind of string material, possibly under the influence of Franciscan authors such as those mentioned above (for whom metal was a viable string material and the one they mentioned first), but the new fashion for metal strings was also, in part, thanks to the influence of translations of Aristotle (by d'Abano; see **Chapter 2**) and Pollux (*fila*, "wires"; see above). The Aristotelian passage in question reads: "We see that a thin and stretched string that is struck repercusses the air with numerous impulses before it ceases, so that the jingle persists for a long time after the blow, for which reason the medium is filled with the jingle. With a thick and loose string, however, this does not happen."[122]

The context of this passage, for a 15th c. Italian reader of Classical Latin texts on music, is worth noting. Due to recent technological advances in metal string manufacture (on this, see below), metal strings came into their own during the first half of the 15th c., and

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[122] Palisca 1985, 55. This is a translation by Palisca of d'Abano's commentary to Aristotle's *Problemata* 11.19. The original passage reads: *Videmus enim quod tacta corda subtili et tensa repercutit aerem pluribus ictibus antequam cesset unde tinitus diu remanet post tactum quare medium tinitu repletur. In grossa vero corda distensa non evenit illud*.

brought a fashionable, new sound color to instruments both old and new.[123] The sound was invariably described as "sweet", *mire suavitatis* (of wonderful sweetness), *melodia multum dulci* (with / having very sweet melody), while the term *grossa corda* or *cordas nervales grossas* meant a thick gut string, problematic in terms of achieving resonance on a plucked lute.[124] The thin string is twice described above in the Aristotlian commentary with the Latin word *tinitus* ("jingle", a metallic sound), just as Paulus uses *tintinnabulum* as his term for "bell".

John Koster has recently investigated the progress that was made in the later 14th c. as regards metal string manufacture:

> "The technology of wire drawing seems to have undergone significant development by the second half of the 14th century, when clavichords and harpsichords were first developed. These instruments require thin iron or brass strings, drawn down to a fifth of a millimeter or less....after about 1400, the great centre of wire drawing in Europe was Nuremberg, where the drawing of iron and brass wire was divided into several separate trades using different tools to draw wire successively to different stages of fineness. Water power was used to draw rods into thick wire, then heavy duty capstans, followed by lighter capstans. At the end of this last stage, the wire was about half a millimeter or so in diameter...By about 1370, a new specialized wire-drawing trade, that of the Scheibenzieher (the fine wire-drawer), appeared in Nuremberg....As there was great continuity in the *Scheibenzieher*'s trade, which had been conducted over centuries by members of the same families, one can infer from surviving wire made by the *Scheibenzieher* in the 18th century that they took as

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[123] See the multiple new keyboard and multiple older forms of psaltery described by Paulus Paulirinus of Prague, c. 1460, in Howell 1980.
In 2015, John Koster summarized the current state of information from the Middle Ages pertaining to metal string manufacture in the Middle Ages. He mentioned artifacts (drawn wire of brass and silver found at Viking sites in Scandinavia) as well as written documents (the 12th-c. *De diversis artibus* of Theophilus; a 12th-c. Irish work, *Colloquy of the Ancients,* describing a cruit-lyre? - with three strings, one each of iron, bronze and silver). Segerman 1999, 77 - 78, asserted that iron was "unusable" as a string material on musical instruments before the late 14th century.

[124] The Latin terms here are cited from the treatise on instruments by Paulus Paulirinus; see Howell 1980, 19-20.

> their raw material the end product of the old wire-drawing trades, that is wire about 0.55mm thick, which was eventually called gauge zero. The *Scheibenzieher* drew it one pass finer and called that gauge one; a second pass produced gauge two, and so on eventually to gauge 12, about 0.15mm in diameter……each gauge was about nine-tenths the diameter of the preceding one."[125]

The new technology, producing thinner metal strings, also benefitted the cetra, with its relatively short string length. Regarding earlier types of metal strings used, for example, on 13th-c. instruments, Koster wrote that there was some evidence that they "were quite thick, perhaps half a millimeter or more in diameter," judging from the "robustly constructed medieval Irish, or better, Gaelic harps".[126] Iconographical sources from the period of Tinctoris which show details of string sizes (**CE 32**, the Gubbio *instarsia* c. 1478-1482) show a narrow range of string diameters, in contrast to depictions of gut-strung lutes from the same era. The discussion of possible tunings outlined above confirms that between all of the open strings, there was a relatively narrow tessitura on the cetra; Tinctoris' four-course instrument had an open string range of - depending on the interpretation of his Latin text - a fourth to an octave only (a six-course gut-strung lute, by way of comparison, had a two-octave open string range). The limited tensile strength of brass and iron strings, in comparison to gut, surely was a primary factor for the compressed range of the cetra tuning(s).

By when had the shift to metal strings on the cetra happened? It is impossible to say with precision. It is clear that one source, earlier than Tinctoris, **CE 26** (c. 1440-1450) represents metal strings on the cetra. In this painting, a cetra is rendered alongside a five-course lute; while the (gut) lute strings are a brownish, darker color, the cetra strings are bright gold in color and thinner in diameter than the thicker lute strings on the lower courses (**Pl. 121**):

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[125] Koster 2015, 88.

[126] Koster 2015, 88.

Plate 121: Ortona, Museo Diocesano, Volto Santo di Lucca, Joculatore Domini, detail.

The dating of **CE 26** is not precise, but it would seem to fall within the period 1440-1450 as a best guess. If this is correct, we can assume that the practice of using metal strings had been happening for a decade or two before this, perhaps more. This could support the proposition, consonant with the literary references within a Humanist performance context (see Appendix II), with the available (German-made) strings described above, and the manifestation of other new features, that metal strings were being used by the 1420's / 1430's as the standard stringing on the cetra. It is possible that this was already established practice by c. 1400. And to conclude this section on strings and stringing, although the arguments outlined above strongly favor the use of gut as the normal string material prior to the 15th c., it is not impossible that earlier cetre, also 13th-c. examples, were strung with metal strings.

4.3.12 Plectrum The cetra was normally played with a plectrum. Already in the late 11th c., **CE 1** shows a tethered plectrum being used to play. This feature goes all the way back to the Classical kithara, where plectrums were connected to the kithara: "All of the instruments of the lyre family are played by means of plectra and all customarily have the plectron attached to the instrument by means of a cord. The kithara normally has it fastened to the bottom of the sound box..."[127] While it is not possible to trace an unbroken series of iconographical sources leading from the proto cetra all the way back to the late Roman kithara, it seems reasonable to assume that this was a feature of early lute family instruments which had likely continued to be practiced on Byzantine and Italo-Byzantine chordophones. While the precise form of the plectrum is indistinct in this miniature, it was held between the thumb and first finger, very much in modern guitar style.

Early sources are not always detailed in this feature, but some do show it. **CE 5** shows a massive, oblong plectrum apparently made of a hard substance such as wood, bone or horn. The end which is in contact with the strings seems somewhat narrower than the opposite end. **CE 7** shows a cord tied to both ends of the cetra, not attached to a plectrum

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[127] Maas and Snyder 1989, 68.

but extending, as a support strap, over the shoulders of the player. **CE 12** shows a long, thin white plectrum which possibly could be a feather shaft. The Assisi Elders in **CE 15** use thin, flexible plectra that might be thinly worked feather shafts, or sections of old instrument strings perhaps. In some cases they look not very different from lute or gittern quills from the same period.

The 15th c. brings some new information about plectrums. **CE 23** shows what looks like a thickish string that has been folded in half, and the "fold" is used as the pick. Perhaps it was a thin piece of some other material - a strip of leather hardened through some process? A strip of tree bark? Quills or feather shafts are also in evidence. **CE 34** shows something very close to a writing quill, as does **CE 40**.

In sum, there is little substantial difference between the plectrums used on lutes, gitterns and cetre in the 15th c., even though the cetra had metal strings. This could also suggest that players switched between these three chordophones, using the same kind of plectrum which they were used to. The most illustrious exponent of this practice seems to have been the gittern / lute player Pietrobono of Ferrara, who on at least one documented occasion at the Sforza court in Milano, performed on the cetra.[128]

4.4 Il Nome della Cetra

We may now briefly consider the question of the word "cetra" and related terms found in Italian literary sources. Appendix II contains a selective list of sources which can be divided into six categories: Biblical, Classical, Performative, Legal, Figurative and Definitive. "Biblical" refers to passages echoing the Bible, for example, the book of Psalms or Genesis 4.21 (Jubal etc.). "Classical" has to do with Greek-Roman mythology references, usually related to Apollo, Mercury, Orpheus etc., or a particular story, while "Performative" outlines an historical or historically-inspired event. "Figurative" means a general allegorical-poetical reference, "Legal" indicates a legal record or document, and

[128] See Appendix II, XV-6.

"Definitive" defines or describes the physical and/or functional characteristics of the object, within the context of a dedicated pedagogical treatise.

There is a plethora of different spellings and phonetic variants of nouns, adjectives and verbs related to the instrument that has been the subject of our study. The online TLIO (*Tesoro della Lingua Italiana*) lists the following word forms of the noun: *cedera, cedra, cera, cetara, çétara, cetare, cetera, cetere, ceteri, cetr', cetra, cetre, cietera, citara, citare, cìtare, citera, cytara, cytare, cythari*.[129] Missing here are the terms *cetura* and *cetula*; see Appendix II.

To return to our cornerstone monument **CE 5** of Benedetto Antelami, as seen in the list of sources provided in Appendix II, the term *cetera* is known from literary documents datable to the end of his life, that is, the first decades of the 13th century. The only vernacular text from the late 12th c., the anonymous *Ritmo di Sant'Alessio*, uses the spelling *cythari* (in singular form: *cythara*). Phonetically this term is already very close to *cetera*, which is the most encountered 13th-c. spelling for the instrument. A cetra player is typically designated *ceteratore* and the verb *ceterare* is similarly generated by the noun. How do we know for certain that *cetera* was the name used for the spatulate lute seen since c. 1100 in Italian visual art? Dante (see Appendix II, Item XIV-4) refers to it as a stringed-instrument with a neck, and the word cetra was also used in 14th-c. Tuscan and Umbrian literature to mean "small shield" of spade or roundish shape, suggestive of the body form of the instrument.[130]

We must also remember that the variant cetra terms given above in the *Tesoro della Lingua Italiana* list were sometimes used to designate an ancient kithara or other instrument.[131]

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[129] < http://tlio.ovi.cnr.it/TLIO/> (accessed 12.01.2018).

[130] See the *Tesoro della lingua Italiana delle Origini* online , http://tlio.ovi.cnr.it/TLIO/ (entry: CÈTRA (2) s.f), accessed 06.01.2018.

[131] A case in point is entry XV-5 in Appendix II, which describes a scene cut in relief on a gemstone owned by Lorenzo de' Medici, where Apollo is holding a *citera*. The stone, which is housed today at the Museo Archeologico Nazionale in Naples, shows an antique kithara in Apollo's hand, although other contemporary works inspired by this one show other instruments such as the lute; see Poeschke 2000, 159-161.

Both the Introduction and **Chapter 1** above addressed the fact that the Latin term *cithara*, with a multiplicity of phonetic spelling variants and versions in various vernacular languages, carried a generic meaning of "stringed instrument". While there may be many literary examples of the use of "cetra" where we cannot be certain which specific instrument (if any) the writer had in mind, there are enough cases of reasonable certainty to first consider the possibility that the term is referring to the chordophone that has been the subject of this study. See Appendix II for selected examples: each literary source has to be examined individually and considered within its context to know (or to guess) which instrument is involved. In some sources it may be a lyre, or even a bowed instrument such as those described by Tinctoris under the term *viola*.[132]

Tinctoris, who worked at the Neapolitan court during the 1470's and 1480's, described the cetra of that period, leaving us the only surviving music-theoretical text about the instrument. He used the name *cetula* rather than cetra. I have been unable to find any reference, anywhere, to another occurrence of this specific term.[133] The Spanish cultural context of the Aragonese court would account for what must be a Spanish influence upon the name, or a Spanish audience for his treatise. *Cítola* had been used since the 13th c. in Spain to denote the citole, which had faded from fashion there and elsewhere in Europe

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[132] "But there is another viola, devised (as they say) by the Greeks, differing from the lute not only in shape (like that) but also in the disposition and striking of the strings. Indeed, for it either three single strings, as in most, in a pair of fifths, or five (as in some) tuned thus and by unisons, are stretched unequally, that is swellingly, so that the bow (when its string, made of horsehair, is straight) touching one, according to the player's pleasure, leaves the others unstruck." <http://earlymusictheory.org/Tinctoris/texts/deinventioneetusumusice/#paneo=Translation>
Tinctoris speaks here about a larger, waisted bowed instrument, and a smaller unwaisted one, the rebec. The invention by Greeks can refer to the Byzantine tradition of bowing from the 10th c. or earlier, which spread to the West, or perhaps to the rise of the *lira da braccio*, during Tinctoris' period, as an emulation of a Classical instrument, a new kind of lira. It is thus unclear from his comment whether Tinctoris is thinking of the *lira da braccio* or the vielle. The main argument for the latter is his description of a performance in Bruges, in which he heard two *viole* playing polyphonic music, of which he very much approved. Were they two *lire da braccio* or two vielles? The vielles could play single lines such as tenor and superius, whereas the *lire da braccio* could not (they are to a large extent chordal instruments).

[133] This is not the only *unicum* instrument name usage in Tinctoris' treatise; there are two others, *demi-luth* for the French version of the *viola da mano*, and *marionetta* for rebec (Baines 1950, 22-23).

north of the Alps during the late 14th c.; we know of at least one very late reference to the *cítola* in Navarre in 1412.[134] The name continued in use in 16th- and 17th-c. Spain, both for "mill clapper" (a wooden part of the mill-grinding equipment which made a rhythmic noise when in use) and for the late cittern.[135] That Tinctoris uses a Spanish-derived word obviously related to citole, yet at the same time clearly states that the instrument originated in Italy, supports the view outlined at the end of **Chapter 1**: the cetra was exported via pilgrim and trade routes to northern Spain and Provençal areas.[136]

The etymological similarity between *cetula* and *cítola* brings up the question of the relationship between the cetra and the citole. Were they one and the same instrument? Was the citole the direct ancestor of the cetra, as so often claimed in modern organological research?

Chapter 1 presented iconographical evidence of Italian provenance for the existence of chordophones with salient cetra features at least 100 years before the earliest citole depictions; it was argued that the later manifestation of the citole in Spain, France, England and Germany was a response to, and/or adaptation of, the Italian chordophone. From its beginning, the citole deviated from the cetra in significant ways: it featured thumbhole-construction (see Glossary) and a different resonator shape, both frontally and laterally (tapering in depth toward the end of the resonator).

As the citole faded from fashion at the end of the 14th c., the cetra got a second wind, so to say, as it was re-invented into what this study has called the Humanist cetra. The first unambiguous new characteristic of the Humanist cetra was the kollopes fret-system, inspired by Roman sarcophagus sculpture and other sources of Greek-Roman art; the

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[134] Wright 1977, 26-27.

[135] Molina 2015, 108.

[136] The earliest occurrence of the term citola has sometimes been cited as late 12th c. (Wright 1977, 25) from the Provençal poem *Daurel et Beton*, which, however, is a single and by no means reliable source regarding dating. According to Paul Meyer, the date could be sometime during the first half of the 13th c. (Meyer 1880).

kollopes "tuners" (= for the cetra: frets) were also present in translations of Classical texts describing features of the kithara.

Some of **Chapter 3**'s cetra images show two new features beginning around 1470: a tapering body depth and a "hook" or projecting point behind the peg-head. Both of these features have been discussed earlier in this chapter in conjunction with the Classical kithara, and can be found on some examples of that instrument in Greek-Roman art.

They shall now be considered from a secondary perspective of background which runs parallel to the Classical kithara narrative. The contemporaneous appearance of these two features on selected cetra images - features that might be understood as displaying a superficial similarity with the citole - with the use of the term *cetula* could suggest that these constructional traits were consciously applied in imitation of the citole. Furthermore, when one of these two features appears, the second one is also present; eight iconographical sources from the period 1470's - c. 1520 have both, whereas only one has a hook, presumably without a tapering body, and just two show a tapering body with no hook.[137] Despite the link described earlier in this chapter between the two morphological traits and the ancient kithara, they seem to have appeared on the cetra considerably later than the kollopes-frets.

Such an argument for referencing the citole would run as follows: although Humanists were obsessed with Classical Antiquity, they were also avid readers of heroic chivalric tales of knights and battles (examples: Boiardo's *Orlando innamorato*; Ariosto's *Orlando furioso*) from Carolingian and Arthurian cycles.[138] The fashion of these "ancient" stories, especially in a city like Ferrara (where the earliest "citolised" cetra - **CE 30** - was depicted, if one

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[137] The catalog sources showing both hook and body taper are CE 31, 33, 38, 39, 41, 45, 47 and 49. CE 46 shows a cetra with a hook and shallow upper body (no view of lower part), while CE 50 and 51 have tapering bodies without a visible hook (in the case of 51, a hook would not be visible even if there were one).

[138] Both works have a Ferrarese provenance; Matteo Maria Boiardo (1440-1494) wrote *Orlando innamorato* for Duke Ercole d'Este, while Ludovico Ariosto (1474-1533) continued Boiardo's work with his own under the patronage of Isabella d'Este.

subscribes to the argument), meant that the epic Carolingian and Arthurian characters and anecdotes were also present in musical performances that might have included such a *cetula*. Also fashionable in Ferrara in the last decades of the 15th and opening years of the 16th c. were Spanish-style musical instruments, for example the *liuto ala spagnola* (*viola da mano*), a personal favorite of Isabella d'Este.[139]

This hypothetical scenario offers the only plausible explanation for Vincenzo Galilei's bizarre comment 100 years after Tinctoris, that "the English, before other nations, first used the cetra" (see Appendix II, XVI-5). Galilei is thinking of Ariosto's *Orlando furioso* (which he quotes in another passage concerning the cetra) and he associates the "ancient" citole of the English/French, gone since almost two centuries by the time of Galilei, with that Golden Age.

A few conclusions concerning cetra terminology follow below:

Vernacular texts using *cetra* and *cetera* should be given the benefit of the doubt as referring to the contemporary necked chordophone, unless there is descriptive or contextual evidence to suggest a broader meaning. These are, overall, the most commonly used names beginning in the first half of the 13th century.

A Latin text with Humanist orientation (15th c., most typically) containing any related word-form should be looked at in terms of the categories listed in Appendix II (Biblical, Classical, among others). There are plentiful examples which are clearly referring to the ancient kithara (see XV-5), with Figurative and Biblical being categories containing perhaps a higher percentage of generic usage for the terms. Caution is needed when assigning a generic reading to a Performative text.

Courtly love poems in the vernacular are common throughout the 14th c. (as well as before and after). They coincide to some extent with secular-based works in the visual arts, for

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[139] See Prizer 1982, Prizer 1999 and Lorenzetti 1996.

example **CE 20**, and any cetra-related terms used in vernacular love poetry can suggest the contemporary instrument.

It is useful to consider name-meanings in light of an overview of iconographical sources for any given period. The sheer volume and consistency of visual images in the 15th c. may also suggest that these depictions are the popularly perceived associations in the minds of anyone reading the text in question. Around 1500 there seems to have been an increase in the volume of fanciful, stage-prop forms of the kithara and the lyre, which could perhaps reflect a loosening of terminology regarding the instrument type.[140] Within the general body of chordophones at this time, however, the cetra remains in the contemporary form presented in **Chapter 3**.

[140] See Winternitz 1979 for many visual examples of these types around 1500 and later.