Citterns in French public collections. Instruments and musical iconography
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Citterns in French Public Collections. Instruments and musical iconography

Early citterns dating from the sixteenth and seventeenth centuries are quite few in France and, to our knowledge, are limited to five examples. However, due to their rarity and exceptional quality, they can claim to figure in the first rank of the main international collections. It is paradoxical that from France – a land where the cittern had a certain fame (with printed music and tutors, i.e. by Adrian Le Roy, traces of his practice in Mersenne, Trichet etc.) – no instrument seems to have been preserved, and among those studied here, four are obviously Italian.

In this paper, our aim is only to shine a little more light on these and to contribute to their better knowledge and appreciation. The analysis of five of the oldest instruments in the Musée de la Musique, presented in chronological order of their construction, will give us the opportunity to formulate some remarks and to compare them with other citterns preserved in Europe, as well as with iconographical documents.

1. Cittern by Giovanni Salvatori, Brescia area (?), mid-sixteenth century (?)

This very attractive instrument (Fig. 1) has often been reproduced in publications (for instance, in the article Cittern in the Grove Dictionary of Musical Instruments¹). It entered the Musée Instrumental in the Parisian Conservatoire (now the Musée de la Musique) in 1873 (Inv. E. 543), when the famous collection Julien Fau, partly formed with instruments coming from the Correr-Contarini family of Venice, was purchased.²

Fig. 1: Cittern by Giovanni Salvatori, Brescia area (?), mid-sixteenth century (?) (Paris, Musée de la Musique, E. 543).

The maker of this instrument is identified by two identical and symmetrical marks, integrated into the decoration of the back (Fig. 2). Coats of arms, which are difficult to identify, are surrounded by the inscription «IOVANNI SALVATORI D.P.». Although the style

of the instrument is Brescian, recent researches into the Archives of that city have produced no reference to this name.  

Fig. 2: Cittern by Giovanni Salvatori, Brescia area (?), mid-sixteenth century (?): the back (Paris, Musée de la Musique, E. 543).

If this instrument is generally considered as one of the oldest, that are certainly due to the fact that it is made in one piece: the set formed by the body, the neck and the pegbox is carved from one block of maple with no knots and with a large grain (Acer pseudoplatanus). However, some specifications concerning the carved head of the pegbox, presented in detail later in this paper, could allow us to suggest a date compatible with the flourishing dates of Gasparo da Salo, i.e. after 1563. One can notice, anyhow, that the shape of the body has a very simple geometrical design, comprising half a circle (lower part of the body) and quite straight shoulders coming up to the block of the neck. The typical inclination of the ribs is due to the fact that the surface of the back is slightly smaller than that of the belly. We can also notice the splendid intarsia inlay continuing over the ribs, which is typical of Brescia (it was often imitated), and the special style of ornamental carving («wings» at the top of the ribs, hook at the back of the pegbox, traces of tools), comparable with the work on a cittern preserved in London at the Victoria & Albert Museum (made by Augustinus of Urbino, 1582). The same characteristics are visible on a fine drawing preserved at Princeton University. This unknown Italian artist had probably in front of him a one-piece instrument, with a pegbox ornamented with a hook at its back very similar to the Salvatori model. On the other hand, its fretting being diatonic, the real instrument reproduced was probably an earlier model. One can also notice the fine details of the bridge and the very interesting system for hanging the instrument at the shoulders (the cord is missing). Two other iconographical documents also show one-piece instruments which have this type of pegbox with an opened scroll: the first one is an

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anonymous painting from the Italian school (Fig. 3), preserved in the Louvre\(^7\) (in this case, the cittern is entertaining a ‘merry company’ of drinkers, one of the most popular roles for the instrument during the seventeenth century); the second one is a magnificent allegorical painting by Orazio Riminaldi (Pisa 1593–1630), exhibited in the Palazzo Pitti in Florence\(^8\), representing *Amor victorius*. This time the cittern symbolises Music, and Amor is the master of all Arts.

Fig. 3: Unknown painter, *Réunion de buveurs*, Rome, first half of the seventeenth century (Paris, Musée du Louvre).

Let us come back to the carved head of a female figure on the cittern by Salvatori (Fig. 4). Her coiled plaits and her ruff are identical to those found on a cittern branded «Gasparo da Salo», which is preserved in the Ashmolean Museum in Oxford.\(^9\) An X-ray photograph of the Salvatori pegbox shows very clearly that it is a set-in, carved head: it is perfectly adjusted and mounted to the pegbox with a wooden dowel. The similarity to the Gasparo da Salo cittern is an argument to suggest that the Salvatori could belong to the Brescian school. It could also allow us to formulate a hypothesis concerning its date, around the beginning of da Salo activity, i.e. 1563.

Fig. 4: Cittern by Giovanni Salvatori, Brescia area (?), mid-sixteenth century (?); the pegbox (Paris, Musée de la Musique, E. 543).

Because of its one-piece construction, the soundboard (in *Picea excelsis*) and the fingerboard of the Salvatori cittern are the only pieces added on. The soundboard with very fine grain displays also purfings in intarsia and a pretty rose, set in and probably made of several layers of wood with parchment motifs. The fingerboard, also in maple, has 19 chromatic frets (in brass), inserted and blocked. The lower part of the fingerboard is decorated in ink by a mermaid motif at the edge. This motif is connected with the symbolism of music as (fatal?) seduction.\(^{10}\) This instrument has six double courses of strings (string length: 49 cm),

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fixed at the bottom of the body with a 'comb' which is carved out of the whole block (not set in).

Pegs are inserted frontally and the mortise is not hollowed right through. During a careful cleaning to prepare the collection for the opening of the Musée de la Musique, an examination under binocular microscope showed that some corners of carved parts had, under the varnish, some traces of polychromy and gilding. It seems natural to believe that this instrument was decorated, like citterns by Virchi (see below), and it is likely that it has been re-varnished at least twice since its construction.

An X-ray of the body shows a very simple inner structure, with two struts glued above and below the rose. Their tips are inserted into the ribs. Apart from damage caused by insects, this instrument is in an exceptional condition. Its highly elaborate character emphasises even more the lack of documentation to certify its origin.

The importance of this model is confirmed by two exceptional iconographical documents. The first one is a painting by Antiveduto della Grammatica (1570/71–1626), executed around 1619–1621 and preserved in a private collection in England, which represents Terpsichore.11 The painted instrument is astonishingly similar to the real instrument by Salvatori, with its one-piece body and carved female head. In addition, we can notice the fifth string, which is twisted, the chromatic fretting, and the very precise bridge. The veneer in the middle of the fingerboard is remarkable. Antiveduto della Grammatica is presenting the Muse of dance according to the description published by Cesare Ripa in Italy in 1593 in his Iconologia:

«Si dipingerà parimente donzella di leggiadro, & vago aspetto, & terrà la cetera mostrando di sonarla, harà in capo una ghirlanda di penne di varij colori, trà quali saranna quelli di Gaza, & starà in atto gratioso di ballare.»12

The second document strongly related to this instrument is a Parisian engraving, certainly made after the former painting, which repeats the same composition and the same instrument. It is an Allegory of Music, engraved by Michel Lasne (ca. 1590–1667) in the middle of the

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seventeenth century, which is preserved in the Bibliothèque Nationale de France. The female figure singing and playing the cittern is the same as above (Fig. 5). The «ghirlanda di penne» is replaced by a nightingale. The cittern and the method of holding it are the same. But the engraver sat the musician down and put on a table many accessories symbolising music and harmony. Lasne seems to have followed strictly the instructions of Ripa which had been available in Paris since 1643:

«A woman playing a cittern with a broken string, and in place of the string there is a grasshopper. On her head she has a nightingale, that most famous bird, and at her feet a great cask of wine [...] The grasshopper represents music as pictured in a particular event which happened to a certain Eunomio who, when playing one day in competition with Aristoxenus the musician, broke a string in the middle of the most sweet playing and immediately a grasshopper flew above the cittern completing with its song [...] Wine is pictured because music was found to content the soul just as wine does and also because a good and delicate wine greatly helps the melody of the voice [...]».

Fig. 5: Michel Lasne (ca. 1590–1667), Allégorie de la musique, ca. 1650 (Paris, Bibliothèque Nationale de France, Département des estampes et de la photographie, Ed 27).

In both allegories, the cittern is in any case the precious attribute of dance and music: a new incarnation of the lyre, like the lute, at the high period of these two art-music instruments.

2. Cittern by Girolamo Virchi, flourishing in Brescia during the second half of the sixteenth century

This instrument has belonged to the Louvre (Inv. MR R 434, Fig. 6) since 1828, when the painter Pierre Revoil (1776–1842) gave it to the museum. In 1995 it was deposited in the Musée de la Musique, where it is now exhibited. Pierre Revoil was one of the «troubadour»
painters who tried, during the first third of the nineteenth century, to give to their historical scenes (those with «revisited Middle Ages»), a maximum of authenticity by using the appropriate objects. In that context, this cittern belonged to the property room of this artist. Considered by him to be a medieval musical instrument, it was used at least three times in his work: *Jeunes filles et troubadour à une fontaine*¹⁶, *Troubadour et lévrier*¹⁷, and *Jeune fille au luth*¹⁸, all dated around 1820.

Fig. 6: Cittern by Girolamo Virchi, flourishing in Brescia during the second half of the sixteenth century (Paris, Musée de la Musique, on loan from the Musée du Louvre, D, MR R 434).

This instrument has the following branded mark: «HIERONIMUS BRIXIENSIS», surrounded by a coat of arms, with here and there the letters «I» [for Ieronimus] and «V» [for Virchi]. The identification with the mark of Girolamo de Virchi is confirmed by documents preserved in the Archives of Brescia.¹⁹ Several occurrences of this maker’s name allow us to follow his career between about 1520 and 1574 (the date on another cittern built by this master and preserved in Vienna).

With this instrument, we have an example of another method of construction, probably closer to violin- and lute-making. It consists of assembling the body with thin pieces, adjusted and fixed by gluing them. One of the most interesting aspects of this technique concerns the back of the instrument, which is used as a «pattern» to build the body. In fact, the ribs are adjusted around the back (and not upon it, as for violins and guitars). Because of that, it is not useful to have a mould for the construction. The ribs are glued at the side of the neck block and the join would be visible when not hidden by the small turned wooden motifs in the shape of balusters, glued here and there at both side of the neck. These motifs are underlined by small gilded brass flowers inserted in the wood at each tip. All these specifications contribute to a lighter construction, which makes sense when considering the delicacy of the general profile.

There are few differences in general morphology with the former instrument. Only the outline of the body shows, in the design of the shoulders, more flexible curves. Apart from the luxuriant carving decorating the pegbox, this instrument is ornamented with moderation: the soundboard is surrounded with a double purfling with triples. The rose, prepared separately, is

¹⁷ Rouen, Musée des Beaux-Arts, Inv. 975-4-3202, Chaudonneret *Fleury Richard et Pierre Révoil* (see footnote 15), p. 158, no. 108, Fig. 258.
¹⁸ Ibidem, p. 159, no. 119, fig. 261.
flat and made of wood (Fig. 7); the fingerboard has a double purfling (carved inside the wood and coloured with ink) and, at one end, is also decorated in ink with the motif of a mermaid along one edge. The materials used are the same as for the Salvatori cittern. The fingerboard has 18 frets whose actual disposition means that it is partly diatonic. But that is due to a later change. It is quite clear that it was originally chromatic (apart from between frets 17 and 18 where there is one tone). The small blocks supporting the brass frets are possibly made of marsh oak (in french : Chêne des marais).

Fig. 7: Cittern by Girolamo Virchi: the rose (Paris, Musée de la Musique, on loan from the Musée du Louvre, D, MR R 434).

All the original pegs are lost, but the instrument is built for six double courses (string length: 42 cm); the string attachment, at the bottom of the body, is made with small nails in brass (are they original?). Concerning the decoration, we have to mention that this cittern stayed abandoned for decades and was covered by a thick coating of dirt hiding partly the painted decoration and even the colour of the varnish. When it was cleaned, the original polychromy appeared together with traces of gilding on the pegbox (Fig. 8). The reddish-brown varnish could be original. 20

Fig. 8: Cittern by Girolamo Virchi: the pegbox (Paris, Musée de la Musique, on loan from the Musée du Louvre, D, MR R 434).

The X-rays show evidence of two features in common with the instrument by Salvatori: first, the method of attaching the carved head (even if here it is a metallic screw with a long thread), and second, a very basic bracing (Fig. 9), necessary to maintain its flatness.

Fig. 9: Cittern by Girolamo Virchi: the bracing (Paris, Musée de la Musique, on loan from the Musée du Louvre, D, MR R 434).

Apart from a little shrinking of the back and the changes of the frets (they were not moved, but some of them were replaced and cut down to obtain a semi-diatonic fretting), this instrument is in an incredible «original» state. Hidden in the storage vaults of the Louvre, it stayed ignored but preserved.

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20 Results of an analysis under X-ray fluorescence. See table 2 (Study of pigments on the cittern by Virchi).
3. Cittern ascribed to Girolamo Virchi, Brescia, sixteenth century, rebuilt by Antonio Stradivari (?)

This instrument reaches certainly the pinnacle of cittern making in the sixteenth century (Fig. 10). It was purchased for a very large sum by the Musée Instrumental of the Conservatoire in 1889 (Henri Croué, the vendor, was the son-in-law of Delphin Alard, the famous violinist who bought it at public auction after the death of his father-in-law, Jean-Baptiste Vuillaume21). Considering it in general, it is very close to the former cittern, but the refinement in many details is unique. One can notice the back made of six maple ribs, delicately curled, slightly bowed (and separated by purflings with triples). This last detail kept the maker from putting his branded mark at the top of the back, as on the former instrument (we will come back later to this point). The carved decoration is astonishing in subtlety and imagination. Once again, there are good reasons to think that the carved parts also had originally some polychromy.

Fig. 10: Cittern ascribed to Girolamo Virchi, Brescia, sixteenth century, rebuilt by Antonio Stradivari (?) (Paris, Musée de la Musique, E. 1271).

An X-ray of the pegbox confirms that the carved head is once more attached with a metallic screw. Apart from a double purfling, the soundboard has no decoration and no rose. In fact, what is even more astonishing is the label glued on the inner side of the back. It seems to attribute the instrument to Antonio Stradivari: «Antonio Stradivarius Cremonensis/Faciebat Anno 1700», followed by a printed motif «A+S» surrounded by a double circle. Charles Beare, when examining the instrument in 1993,22 concluded that the instrument was probably made in Brescia, by Virchi, and that the label could be authentic. He thought also that the varnish is very close to a Cremonese type. The most likely hypothesis is that Stradivari modified the cittern but it is very hard to say precisely what the extent of this intervention was. The soundboard, which is indeed very flat, could have been changed and, at least, the rose taken away to allow the label to be read. The changes concern at least the bracing (Fig. 11), which has one strut more than usual and probably a new varnish.

Fig. 11: Cittern ascribed to Girolamo Virchi, Brescia, sixteenth century, rebuilt by Antonio Stradivari (?) (Paris, Musée de la Musique, E. 1271).

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21 Regarding the circumstances of this acquisition and the identification of the instrument, see Géreau, Aux origines du Musée de la Musique (see footnote 2), pp. 271-272.

22 Unpublished tape report, Archives of the Musée de la Musique.
But there arose another question concerning the mark of Virchi, when we compared this instrument with the famous cittern that belonged to the Archduke Ferdinand II of Tyrol, who probably commissioned it (it is dated 1574 by an inner label), and which is preserved today in Vienna at the Kunsthistorisches Museum\textsuperscript{23}: as one can see on this gorgeous instrument, Virchi’s branded mark could not get a place at the top of the back, firstly because of its shape, and also because of this carved coat of arms, surrounded here and there by two caryatids. For that reason, we find the mark on the front side of the pegbox (Fig. 12). At this point we could expect to find a mark at the same place on the Parisian instrument because its back is also irregular. But nothing appears there, even under ultraviolet light! For us it is evident that the original mark on the Parisian instrument was intentionally rubbed and scraped. Because the original burning was quite deep, it was necessary to eliminate a great deal of wood. This is obvious if we compare the pegbox of an anonymous cittern, of the same school and period, built in the same style (Oxford, Ashmolean Museum)\textsuperscript{24} with the Parisian pegbox (Fig. 13). The carved purfling outlining the front of the pegbox is regularly diminishing on the anonymous instrument; whereas on the Parisian one, the same purfling shows a clear and sudden thinning down in the middle, at the level of the fourth peg, showing that some wood was taken over to suppress all the traces of a rival: Hieronimus Brixiensis. For the dealer with few scruples, probably much later than Stradivari’s modification, it was very important to attribute this instrument only to the Cremonese master, so as to get a maximum amount of money – not justified with the name of Virchi, who was quite forgotten at that time.

Fig. 12: Cittern, Girolamo Virchi: the branded mark (Vienna, Kunsthistorisches Museum).

Fig. 13: Cittern, anonymous (Oxford, Ashmolean Museum) and Cittern ascribed to Girolamo Virchi, Brescia, sixteenth century, rebuilt by Antonio Stradivari (?)(Paris, Musée de la Musique, E, 1271).

Coming back to the description of the instrument, we can notice that the fingerboard has 18 chromatic frets (apart from between frets number 17 and 18 where there is a full tone: it is the same disposition as on the Virchi cittern no. 2. The original frets where replaced but not moved. The string length is a bit bigger here (6 × 2 courses; 44.6 cm). The pegs, which seem to


\textsuperscript{24} Boyden, \textit{Catalogue of The Hill Collection} (see footnote 9), p. 39, no. 33; «Cittern, Italian, seventeenth century», fig. 33. See also Dassenno et Ravasio, \textit{Gasparo da Salo} (see footnote 3), p. 35.
be old, are not like those in Vienna. With a double lobe, they are more like the lute pegs that we can observe in the musical iconography of the sixteenth century. Finally we can notice the care for perfection in the small detail of the carved mermaid, at the end of the fingerboard (Fig. 14). Apart from the modifications mentioned, this cittern is in quite a good condition.

Fig. 14: Cittern ascribed to Girolamo Virchi, Brescia, sixteenth century, rebuilt by Antonio Stradivari (?): the fingerboard (Paris, Musée de la Musique, E. 1271).

4. Anonymous cittern, Low-countries or France (?), end of the sixteenth century (?)

On this large cittern (string length: 62.6 cm, Fig. 15), one can immediately notice the diatonic fretting. Building materials are the same as for the former instruments: maple without knots for the body, the neck and the fingerboard; spruce for the soundboard. This construction is much less delicate than in Brescia, even if there is a purfling decoration on the back, the ribs and the soundboard. The rose is not very elaborate and could be not original. The construction procedure is the same as for the Virchi (back as pattern). The pegbox and the neck are carved from the same piece of maple. The type of pegbox differs here, because the pegs are inserted laterally. The carved head, even if interesting, cannot be in competition with the three first citterns. Strings are attached at the bottom of the case with a 'comb' which is carved out of the whole block (not set in): a quite archaic detail. The stringing had probably four courses (2 x 2, 2 x 3 + 2) with two supplementary strings going through two cylindrical canals bored through the neck. It was probably a drone device, emphasising a popular use of this cittern. The fingerboard has 18 frets (among them five are diatonic). The name of the notes is indicated with gilded painting in front of each fret, and a letter made with black ink indicates a French system of tablature. These last details allow us to think that this cittern was used outside Italy and probably by a non-professional.

Fig. 15: Anonymous cittern, Low Countries or France (?), end of the seventeenth century (?) (Paris, Musée de la Musique, on loan from the Musée des Arts Décoratifs, D. 32026).

Apart from the inconsistent suppression of the back reinforcements (it is actually strongly warped because of this; Fig. 16), there is no transformation, just many holes and galleries caused by insects. The surface of the varnish shows many unskillful retouches. We would like to find, in iconographical documents, some evidence of the drone device.
Fig. 16: Anonymous cittern, Low Countries or England (?), end of the seventeenth century (?): the bracing (Paris, Musée de la Musique, on loan from the Musée des Arts Décoratifs, D. 32026).

5. Ceterone, Anonymous, Italy (?), beginning of the seventeenth century

This last instrument is also a large cittern, unfortunately without a name, but attracting attention because of its morphology and the quality of its construction (Fig. 17). It was part of the Louis Clapisson collection, initiating the Musée Instrumental in the Conservatoire in 1861, but was probably never exhibited. It is a fine instrument with a snakewood case (*Piratinera guianensis*), with a back made of 28 ribs separated with ivory purfling (Fig. 18) and made of five pieces. The neck and the pegbox are also covered with strips of snakewood and ivory purfling. The soundboard (spruce not yet analysed) is surrounded by a double purfling decorated with foliated scroll inserted into the soundboard (glue paste and animal black). The rose is made of several layers of wood above one in parchment. At the side of the bass strings, we can observe the traces of a bridge, more narrow, devoted to bass strings. The fretting seems to be original, and chromatic, but two segments are shifted at the sixth string.

Fig. 17: Ceterone, Anonymous, Italy (?), beginning of the seventeenth century (Paris, Musée de la Musique, E. 46).

Fig. 18. Ceterone, Anonymous, Italy (?), beginning of the seventeenth century (Paris, Musée de la Musique, E. 46).

The stringing is today hard to imagine. The pegbox contains twelve pegs (6 x 2 ?), but it was notably cut down. At this point, there are two rival theories. This uncompleted pegbox could indicate:

- firstly, a ceterone – like the example by Campi, preserved in the Museo Bardini in Florence\(^{23}\). It has an equivalent in the *Concert* (Fig. 19) painted by Rutilio Manetti (1571–1639): it is clear that two strings are stretched outside and over the first pegbox;
- secondly, a cittern with only one pegbox, as in another painting by the same Manetti representing *Amor victorius*, executed in the first third of the seventeenth century.

\(^{23}\) Handwritten label: «Gieronimo Campi fecit (?) / Innocentio (?) Peretti il luc., fero (?) inventore (?)».
(Dublin, National Gallery of Ireland)\textsuperscript{26}. Points in common with the real citern are numerous: a deep body with many purflings; body/neck joint covered with a turned baluster; sharp curve of the pegbox. Once more the lower string is twisted.

In either case – ceterone or citern – it was an instrument with a lengthening of the bass strings: the traces of a second bridge are evidence of this.

Fig. 19: Rutilio Manetti (1571–1639), Concert [Rome, Spiridon collection (since 1942)]

The interesting concordance between the different styles of instruments represented in the Musée de la Musique, and in these first-class paintings, underline the fact that they are specially representative of the high period of the Italian citern and that they are of specially high quality.

\textsuperscript{26} Inv. no. 1235. Cf. Sergio Benedetti, in: Exhibition catalogue Colori della Musica (see footnote 8), p. 156, no. 21. Oil on canvas, 178 x 122 cm, ca. 1624–1627.
Appendix 1 : Fretting study on some citterns (by Jean-Philippe Echard, Laboratoire de recherche et de restauration du Musée de la Musique)

Five instruments have been studied:

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<th>Maker</th>
<th>Date</th>
<th>Country</th>
</tr>
</thead>
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<td>Salvatori, Giovanni</td>
<td>16th</td>
<td>Italy</td>
</tr>
<tr>
<td>E.1271</td>
<td>attrib. Virchi, Girolamo</td>
<td>16th</td>
<td>Italy</td>
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<td>Italy</td>
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<tr>
<td>E.46</td>
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<td>D.32026</td>
<td>anonymous</td>
<td>17th</td>
<td>? France</td>
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<th>Instruments</th>
<th>Maximum length</th>
<th>Maximum width</th>
<th>Thickness of body (max. &amp; min.)</th>
<th>Diameter of rose</th>
<th>Number of frets</th>
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<td>850</td>
<td>288</td>
<td>78/42</td>
<td>84</td>
<td>19/ chromatic</td>
<td>6 x 2 : 490</td>
</tr>
<tr>
<td>Girolamo Virchi Paris, Musée de la Musique, on loan from the Musée du Louvre, D. MR. R. 434.</td>
<td>690</td>
<td>218</td>
<td>43.5/17</td>
<td>60</td>
<td>18/ chromatic except 18= 1 ton</td>
<td>6 x 2 : 420</td>
</tr>
<tr>
<td>Attr. to Girolamo Virchi Paris, Musée de la Musique, E. 1271</td>
<td>730</td>
<td>227</td>
<td>47/20.5</td>
<td>55</td>
<td>18/ chromatic except 18= 1 ton</td>
<td>6 x 2 : 446</td>
</tr>
<tr>
<td>Anonymous, Paris, Musée de la Musique, on loan from the Musée des Arts Décoratifs, D. 32026</td>
<td>983</td>
<td>330</td>
<td>68/36</td>
<td>73</td>
<td>18/ with 5 diatonic</td>
<td>12 pegs, present nut for : 5 x 2 Hypothesis : 2 2, 3 x 2 +2 x 1</td>
</tr>
<tr>
<td>Anonymous Paris, Musée de la Musique, E. 46</td>
<td>915</td>
<td>345</td>
<td>85/33</td>
<td>97</td>
<td>19/ chromatic fret no. 6 divided for two strings</td>
<td>12 pegs for th « petit jeu »</td>
</tr>
</tbody>
</table>

Table 1: Measurements of the described instruments.

The fretting of these instruments does not obviously correspond to an equal temperament. The goal of this study is to highlight similarities and differences between the intervals defined by the
frets of these instruments, even if the complete characterisation of the temperament of these instruments is too big a task for us.

Method:

Distance from each fret to the nut has been measured with a precision rule. The error in measurement has been estimated to 0.3 mm. In order to compare frets placements on instruments having different vibrating lengths, the measurements of fret positions have been normalised to 100 (arbitrary value).

The following intervals have been studied: minor second (semitone), second, third, fourth, fifth, sixth, seventh, octave and ninth. For these intervals, the fret positions on five instruments have been compared to theoretical positions following the Pythagorean scale or equal temperament. The results of these measurements can be seen on Fig. 20, which is a schematic view of the fret positions corresponding to diatonic intervals on the citterns' fingerboards.

Fig. 20: Scale view of the fret positions.

Appendix 2 : Polychromy study on the cittern of Virchis, D.MR.R.434.
(Study conducted at the Musée de la Musique by Jean-Philippe Echard, Laboratoire de recherche et de restauration du Musée de la Musique.)

Some traces of colour are still present on the pegbox of this cittern. Using X-ray fluorescence (a non-destructive and no-sampling method to detect elements in a material), these colours have been analysed.

Finally, one of the four decorative buttons near the neck-to-body junction was analysed: we detected copper and zinc and, in lower quantities, gold and mercury. We suppose that the brass buttons have been gilded using the mercury amalgam method.

<table>
<thead>
<tr>
<th>Studied parts</th>
<th>colour</th>
<th>major elements</th>
<th>minor elements</th>
<th>hypothesis</th>
</tr>
</thead>
<tbody>
<tr>
<td>face</td>
<td>white</td>
<td>Lead</td>
<td></td>
<td>lead white</td>
</tr>
<tr>
<td>monster’s mouth</td>
<td>red</td>
<td>lead and mercury</td>
<td>iron and calcium</td>
<td>Vermillion (mercury sulphur) and lead white</td>
</tr>
<tr>
<td>eye (black glass ?)</td>
<td>black</td>
<td>manganese, iron and cobalt</td>
<td>calcium, potassium, lead ?</td>
<td>the black colour is probably due to manganese and/or iron oxide</td>
</tr>
<tr>
<td>bead (white glass ?)</td>
<td>white</td>
<td>lead, potassium</td>
<td>manganese, iron, calcium and cobalt</td>
<td>lead white as a component of the material ?</td>
</tr>
<tr>
<td>gilded parts</td>
<td>golden</td>
<td>mercury, gold</td>
<td></td>
<td>golden leaf used for gilding</td>
</tr>
</tbody>
</table>

Table 2: Study of pigments on the cittern by Virchi, D. MR. R, 434.