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Reviewed Article:

Reconstruction of some String Instruments from the Ceiling Paintings of the Palatine Chapel of Palermo and the Cathedral of Cefalù, 12th Century

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This study explores two hypotheses regarding the use of date palm (*Phoenix dactylifera*/*Phoenix canariensis*) wood for the manufacture of plucked string instruments (in

this case the lute) and ceramics for bowed instruments (rabāb), drawing inspiration from exceptionally significant iconographic sources.



The sound of the lutes carved from date palm wood, with leather soundboards and silk and gut strings, is harmonious and enchanting, markedly different from the modern Oriental oud with its nylon and metal-wound guitar strings.

Introduction

The musical iconography of Sicily has been the subject of my research for many years. Among the many depictions of musical instruments that I have identified in works ranging from the 5th century BCE to the 18th century CE, the most original testimonies appear to be those of the 12th century preserved in Palermo and Cefalù. The abundance of depictions, their accuracy, and the singularity of the observed details make them a rare and privileged source for the study of medieval lutherie in the Mediterranean and Europe. I have conducted this research since 1997, with various experiments until 2014. Since 2021, I have focused my activities on the philological reconstruction of the musical instruments depicted in Palermo and Cefalù and on the study of the

archaeology of Islamic Sicily to which the paintings belong.

The Paintings

The paintings were created in the first half of the 12th century when the two churches were erected: the Palatine Chapel in the Royal Palace of Palermo (inaugurated in 1143) and the Cathedral of Cefalù (begun in 1131, consecrated in 1267) at the initiative of King Roger II of Altavilla (Anzelmo, 2014). The style, techniques, and colours suggest the same school or even the same artists. There is a clear Persian influence, raising questions about why such paintings are found inside Christian temples. The explanation could lie in the enlightened tolerance of the Normans, but while the commission of the mosaics in Palermo to Byzantine artists is documented, that of the paintings in both locations is not. The ceilings of the Palatine Chapel are intact and constitute a unified work, whereas the paintings of Cefalù are only surviving fragments of a lost ceiling, now placed in a location in which they are not visible. It may be that the painted panels of Cefalù originally belonged to a smaller room, such as a sacristy or choir loft (Carapezza, 1994), thus being part of a complete and easily accessible work-still, this does not explain the Islamic nature of the decorations. Similarly, some scholars, including Dr. Paolo Valentini of Palermo, believe that the entire central ceiling of the Palatine Chapel was part of another building, probably the court of Emir Jafar, built around 1050, dismantled and preserved during the siege of Palermo, recovered by the Normans, and used for the chapel of the royal palace due to its inestimable value. In addressing these questions, carbon-14 analysis could be decisive.

Palatine Chapel of Palermo

The figures with musical instruments are situated on the ceiling of the central nave and of the two side naves (Johns, 2010). There are some differences between these two locations.

The central nave ceiling is in *muqarnas* (a particular construction typical of Arab architecture) The ceiling shows a series of scenes narrating stories from the Islamic narrative repertoire. Eight octagonal stars bear inscriptions in Kufic script, which are not Quranic verses but auspicious messages: strength, health, and power, likely directed at the Emir before King Roger. In all cases, the details are indistinguishable because the paintings are in dim light 18 meters from the observer on the ground. What appears is a large patch of vibrant colours in a dense texture reminiscent of a large carpet, requiring binoculars to observe the ceiling details and a telephoto lens to take photos from the ground. The musician figures, some of whom appear to be female, are mostly arranged in pairs. The characters face each other while playing different instruments: a large four-course lute/small three-course lute; large lute/three-string rabab; small lute/two-string rabāb. The instrument pairs are always in the following relationships: tenor/alto, alto/soprano. The musicians are surrounded by foliage and small vases (See Figure 1), sometimes seated at the base of a palm tree, in a crossed-legged or overlapping-leg posture (See Figure 2).

The side naves are covered by parallel beams defining long and narrow compartments. In the right nave, there is a rabāb player and, higher up, a lute player. On the left, there are three five-course lute players and three players of slightly different plucked string instruments. The decorative intent and tendency to imitate the central nave's style are clear, but there is no trace of an organized narrative in successive scenes. According to Guettat (2000, p. 67), five-course lutes came into use in the 13th century, with almost certainly wooden soundboards.

All the paintings mentioned have undergone various restoration interventions: in the 18th century (with repaints and integrations), immediately after the last war, between 1949 and 1953, and recently, between 2005 and 2008. The restorers' reports explain some of the modifications to certain pictorial portions and certify the overall good conservation status, without significant damage from molds and wood parasites.

Cathedral of Cefalù

Some of the paintings are visible today on the wall at the entrance of the Museum of the Cathedral, but they do not depict human figures. The others, documented photographically in a single publication (Carapezza, 1994), are located among the beams of the central ceiling of the church. The conservation state of the paintings, which seem to have never undergone restoration, appears mediocre. The depicted instruments are large four-course lutes, small three-course lutes almost identical to those seen in the Palatine Chapel, plus a peculiar lute with a horseshoe-shaped body. There are also depictions of mermaids and dancers. It is suspected that these fragments belonged to a previous building, integrated into the Christian church, which would have allowed them to survive, relegated to an inaccessible location. It

would be desirable to place them in the Museum, after adequate conservation and restoration work.

Additional sources of information and comparison

The sole analysis of the figures from Palermo and Cefalù would not be sufficient to fully identify the musical instruments or authorize credible reconstruction work. Fortunately, we have other sources of information and comparison on this subject, which can encourage us to undertake our complex and, in some points, uncertain task. We can rely on the testimonies of theorists such as al-Kindī (9th century) and al-Fārābi (10th century), and about musicians like Ziryāb (9th century). The most important studies I have consulted in this regard are those of Righini (1983), Guettat (2000) and Paniagua (2018). From these works, a fairly comprehensive profile of the history of the medieval lute (*ūd*) can be derived. We know from various sources the tunings, the materials of the strings and plectra, and we have indications regarding the construction of the instruments. From the analysis conducted in (Paniagua, 2018, pp.15-24), it is evident that the lute originated in Persia under the name of barbat and is a monoxylous instrument with a leather or wooden soundboard and four single strings (like the current Berber *loutar*). It was brought by the Arabs to Mecca, where the strings became four double and the soundboard wooden. Finally, Ziryāb is credited with the idea of constructing the ribbed body and adopting the plectrum made from a bird's feather. In this form, the instrument spread through the Maghreb to Andalusia. Additionally, Paniagua (2018) offers an interesting photographic survey presenting 180 depictions of the lute from the 7th to the 15th century, grouped by geographic area. Observing the 18 depictions from the 10th to the early 13th centuries from Persia, Syria, Egypt, and Spain and comparing them with the nine images from the Palatine Chapel of Palermo, the uniqueness of the Sicilian lutes is immediately noticeable. They feature a transverse band between the neck and the soundboard, visible only in one non-Sicilian example from Egypt. There is only one other possible comparison with the Sicilian instruments: the miniatures from the *Cantigas de Santa Maria* (circa 1284), which, although at least a century and a half later, depict lutes and rabābs. The lutes are of similar size to the Sicilian ones, showing five pairs of strings and multiple decorations (perforations?) on the soundboard. One of the two-string rabābs is similar in overall shape to one in the Palatine Chapel, but its pegbox is like that of the lutes and not falciform like the Sicilian ones.

Lutes

The lutes in the Sicilian paintings come in two sizes: the larger one with four courses of strings (five in some cases) and a straight pegbox, and the smaller one with three courses of strings and a falciform pegbox ending with a zoomorphic head. The instruments always are depicted frontally, so the exact shape of the body is unknown. It is supposed to be rounded and of a depth equal to half the width of the soundboard, according to the indications of Al Kindi

(Bouterse, 1979). The outer profile of the soundboard blends seamlessly with the neck, without angles.

Four-course Lutes

Most of the instruments belong to this group. It is unknown if the top of these instruments was made of wood or leather. The presence of black marks on the soundboards might indicate perforations in wooden material, which are attested by two Arabic sources of 10th and 11th centuries (Paniagua, 2018, p.105). The sound passes through these circles and "M"-shaped small cuts (See Figure 3). On the contrary, they could be paintings on leather as well. In this case, the sound could emerge from the perforations in the transverse band noted in all the Sicilian instruments. In the most beautiful and complete example of a large lute, in the right nave, we observe that the two designs traced on the soundboard are not symmetrical, and the circles would not be possible as perforations even in wood (See Figure 4).

The bridge is never entirely visible because it is covered by the player's hand. A thin black strip with protruding feet can be glimpsed, suggesting a floating bridge, essential on a leather soundboard but also compatible with a wooden soundboard, as in traditional Iraqi oud (See Figure 5). The proportion between the length of the neck and the soundboard appears like that of the modern Oriental ūd, not that of the Tunisian oud (*ūd tounsī*), the Moroccan oud (*ūd ramāl*), or the Algerian *kwitra*.

Five-course Lutes

Four five-course lutes are in the left nave. They are smaller than the four course lutes, but have the same shape and similar black marks on the top (See Figure 6), except a central rosette drawing, also visible in the horseshoe "lute" of Cefalù.

Small three-course Lutes

These instruments are very frequently depicted, and almost universally with the same characteristics: pear-shaped body, falciform pegbox with a zoomorphic head, transverse decorative band, except in one case (See Figure 2 on the right), no decoration on the soundboard, except in one case. It is possible that all these instruments had leather soundboards and mobile bridges, not belonging to the category of classical ūd. The denomination seems dubious. It could be called a *small ūd* or *qītāra*.

Other forms of Lutes

In the left nave, different forms of lutes are depicted. One of them has a holly leaf shaped body ending with a straight edge and a narrow round neck, no visible pegbox, no soundholes, two double strings (See Figure 7). It is very similar to the horseshoe-shaped "lute" in Cefalù. Another lute shows a straight pegbox and pegs very similar to those of modern loutar.

Rabāb

These bowed instruments come in two sizes: short-necked with two strings and long-necked with three strings. The dimensions of the soundboard seem to be consistent and its profile uniform, resembling an onion shape (See Figures 8-9). The distinction between the neck, the transverse band, and the white soundboard, likely made of leather, with only one exception (See Figure 10), is clearly noticeable. The name "*rabāb*" refers to a series of bowed instruments spread from the Maghreb to Iran with various shapes. In modern-day Morocco and Algeria, the instrument is small-sized, with a scale length of about 34 cm, carved from a single piece of wood, with a leather soundboard, perforated wooden or brass fingerboard, and two strings elevated above the neck (rather than pressed against the wood). In Iran, the neck is rounded, inserted into a hemispherical wooden body covered with leather, and the strings, ranging from three to four, are pressed by the fingers against the wooden neck. No current instrument matches the shape of those depicted in the Palatine Chapel, which closely resemble some small lutes in the Sicilian paintings.

Reconstruction of lutes: materials and techniques

According to Paniagua (2018, pp.93-104) and Bouterse (1979) the large lute (*ūd*), with a ribbed body and a wooden soundboard, was introduced into the Arab world as early as the 9th-10th century. Previously the Persian barbat was carved in a solid block and had a skin or wooden top. Carving a large lute from a single block of wood is neither easy nor convenient. There is uncertainty about the choice of wood, the shape to give the body, the risk of cracks and splits, and the control of thicknesses. In the construction of current Moroccan *loutars*, lute-like instruments of considerable size, the body is carved from a single large piece of softwood, such as poplar or willow, with a width close to that of the *ūd* but certainly shallower. A rounded neck is then applied and held firmly in place by the robust leather glued and tied to the body. This is made more resistant with one or two transverse wooden bars glued inside. A carved lute has the robustness to withstand the tension of the leather soundboard, whereas a thin-ribbed instrument must necessarily have a wooden soundboard mounted and glued to the upper edges.

How were these Sicilian lutes made? In my opinion, they could have been constructed using both techniques. Small lutes were carved, for example. Concerning the big lutes, it may be that innovations did not spread as rapidly as we might imagine today. Considering technical improvements, one must consider the conservative tendency of taste, of listeners and makers, and the sensory/affective attachment to the aesthetic values of tradition. Maybe monoxylous instruments with leather soundboards were not yet entirely obsolete, and perhaps the others were not fully established, so I chose the more archaic solution to also test the construction process and the acoustic outcomes of a nearly unattempted lute-making operation. Benjamin Trimao Sinox, a renowned Breton luthier, used half a trunk of oak, the only tree offering the necessary dimensions he had at hand. The manufacture of this

instrument, with a wooden soundboard, cost him an extraordinary amount of time and effort. Certainly, oak seems the most unlikely choice due to its extreme hardness and specific weight. One might rather consider a Lebanon cedar (*Cedrus libani*) or a well-cut and sufficiently seasoned poplar (*Populus alba*). I had built an experimental monoxylous *manouche* guitar using half a trunk of Lebanon cedar (final weight gr.2400) which seemed quite a formidable task. Not wanting to encounter the same difficulties and wanting only traditional hand tools (as opposed to mechanical tools), I found a solution by observing the paintings in the Palatine Chapel. The only tree depicted is the palm, under which the musicians play, one with the large lute and the other with the small one (See Figure 2).

Body from date palm Trunk

The palm in question can be identified as the date palm (*Phoenix dactylifera*). The very similar *Phoenix canariensis* grows abundantly in Sicily, although currently threatened by the spread of a parasite (*Rhynchophorus ferrugineus*). For this reason, many plants have died and have been cut down in recent years (See Figure 11). The trunk of the date palm, like that of all palms, is a material that cannot be properly called wood, being composed of spongy tissue reinforced with a dense network of fibers. In fact, botanists liken it more to grass than wood. This material has no practical use in woodworking or construction, and seemingly much less in lutherie. Thus, I began the work despite the negative opinions of many experts, but the surprises were positive from the beginning. The trunks I had chosen had been on the ground for some time and were heavy and very moist inside.

Working Process

After removing the outer surface, I began to shape the piece using a saw, axe, and a draw knife. Cutting and carving were very easy (See Figure 12). The material in that state was soft and pliable. After roughing out the external shape, I proceeded to hollow out the body, and again, the material was removed surprisingly easily using the axe at first and then common wood gouges, still finding moist fibers even in depth (See Figure 13). In just two days, I achieved a piece that would take at least two weeks to work using any wood, even with the help of electric tools. To control the thickness of the various parts of the body, I made about twenty tiny inspection holes, intending to close them upon completion. When the fibre dehydrates completely, it becomes stiff and strong. I stopped at an average thickness of 5-10 mm. In one of the specimens, I made (arbitrarily, following the model of Turkish saz) an 8 cm diameter hole at the base of the body, into which I glued a rosette, both to lighten that part and to provide more sound exit options. To prevent the body, as robust as it is, from being deformed by the strong tension of the leather that I would apply as the soundboard, I decided to apply an internal wooden cross support (See Figure 14) as I had seen done in *loutars*, thus ensuring stability both longitudinally and transversely. In small lutes, this internal structure is not necessary.

Leather Soundboard

The goat leather soundboard can have a thickness of 0.3 mm or even more, up to 0.9 mm. The processing is the same as for the leather used in the construction of Sicilian drums and tambourines. I bought mine from drum maker Fabrizio Fazio of Gangi (EN) and from traders of Sahel. The leather is soaked for a day, then glued to the edges of the body and the central bar with hide glue and secured with wooden pegs, which are trimmed when the glue and leather are completely dry (See Figure 15). The leather does not touch the transverse reinforcement bar, which remains a couple of centimetres below.

Transverse Band

The transverse band is of primary importance in identifying the Sicilian instruments, both large and small, plucked and bowed. It is a unique feature in all the iconographic panoramas known to us. When I built the first replica of the small lute of Cefalù in 1997, I had little time to delve into it and only photographic reproductions of the article by (Carapezza, 1994), and for the Palatine Chapel, poor black-and-white photographs (Gramit, 1986). So, as Guettat (2000, p.169) recalls, I had interpreted this band, which appeared dark, as a step to complete the entire contour of the leather soundboard (See Figure 16). Later, I obtained quality iconographic material, which I personally and directly procured. I discovered that this band is decorated with designs and is level with the soundboard. Analysing its colour, I realised it could be a metal band, probably brass, as seen in some Algerian rabābs preserved in museums. As the example in the Metropolitan Museum, NY. It would not be just a decoration. If we interpret it as a perforated band, it might serve as an exit for sound to leave the instrument without perforating the leather soundboard. This feature could confirm that the material used for the soundboard was leather. The leather soundboard rests on a transverse strip to which the edge of the brass band, 0.2 mm thick, is also attached. The opposite side rests on a small step placed under the fingerboard. The lateral edges of the band are folded and nailed to the outer sides of the body. I must point out that the small lute with a swan head without a transverse band (See Figure 2 on the right) sounds as good as the others built with the perforated band, despite having no perforations in the soundboard or the body.

Keyboard, bridge, strings, plectrum

The olive wood keyboard, 4 mm thick, is decorated with the classic "pinecone" motif and glued to the neck. The bridge, when partially visible in the paintings, appears very close to the lower edge of the soundboard, is very thin and long, with two feet.

Finishing

The first instruments I made were finished with a coat of shellac or wax (See Figure 17).

The vibrating string length is 60 cm. The strings are made of natural gut except for the chanter, which are made of silk. Tuning: A2, D3, G3, C4, diameters 1.25, 0.83, 0.70, 0.50. Final weight gr. 2100 (See Figure 18). A second replica weighs gr.1400.

In the small lute, the vibrating string length is 44 cm, the tuning G3, C4, F4, thus reaching the sound F of the theoretical fifth string of Al Farabi, not practicable on the large lute (Guettat, 2000, p.67). The diameters are 0.85, 0.63, 0.50. Final weight gr.900 the larger, gr.600 the smaller (See Figure 19).

The plectrum for both instruments is made of bull horn, 8 mm wide, thickness 0.5 mm.

Reconstruction of Rabāb: materials and techniques

Normally, the current instruments called rabābs are carved from a single block of wood or with a sculpted wooden body and an applied cylindrical neck and have shapes quite different from those we see in the Sicilian paintings. There are two execution techniques: without pressing the strings on the neck, as in the two-string Moroccan rabāb, or pressing the strings against the neck, as in the three and four-string Iranian rabāb or the Turkish rabāb. The Sicilian rabābs have a shape very similar to the small Sicilian lutes, where the body and neck are in one piece, the pegboxes are mainly falciform ending with heads of canids with sharp muzzles and pointed ears (*Cirneco dell'Etna*?, a typical Sicilian dog breed), birds or felids.

One-piece wooden Body

I reconstructed the two rabābs, the short two-string one and the longer three-string one, by carving the body/neck block from a single piece of Lebanon cedar (*Cedrus libani*), keeping the external dimensions of the body unchanged, achieving thicknesses of about 4-5 mm. This is a task that has been well-explored in medieval lutherie and presents no novelty.

Glazed ceramic resonance Box

I noticed that often behind the players, both rabāb and lute, in Palermo and Cefalù, there are vases that have dimensions, shape, and colour very similar to those of the instruments (See Figure 9). Considering the significant contemporary production of Palermo glazed ceramics (Mangiaracina, 2013; D'Angelo, 2004) and the manufacture of *Naqqarāt* and *Darbūka*, I wanted to try making ceramic rabābs with the help of the expert ceramist of Randazzo, Carmelo Ruffino, known as "Lucio". In the years following 2005, I created a series of functioning prototypes of these instruments (Severini, 2015).

Working Process

A plaster mould is made using the body of one of the monoxylous rababs. Inside this mold, the body of the instrument is shaped using grey sedimentary clay typically used for making

vases and other objects, aiming for a uniform thickness not exceeding 4 mm. Holes are made to accommodate the string holder peg, the wooden neck pin, the holes for attaching the leather, and the metal band. Once dry, the body is extracted from the mold and smoothed with abrasives (See Figure 20). The piece is then fired, painted with the only three colours used at the time: ochre, brown, and green, except in the areas to be glued to the leather soundboard and the neck. After applying a coat of glaze, it is fired a second time, and the piece is finished. At this point, the spruce neck is glued, using animal hide glue, secured with a beech pin into the terracotta heel. The joint is reinforced from above by the olive wood fingerboard. A wooden crossbar is fixed inside the body to support the straight edge of the leather, which is glued using animal hide glue and wooden pegs that are then cut off (See Figure 21).

Transverse Band

The perforated brass transverse band is fixed between the support bar of the leather and the fingerboard, exactly as in the lutes. This band confirms itself as a fundamental and distinctive element of Sicilian lutherie. It demonstrates the necessity of creating sound exits when the soundboard is leather without perforations. If there is little doubt about the use of leather for the soundboard in rabābs, with only one exception (See Figure 10), the presence of the transverse band in lutes also provides an additional reason to believe that the soundboards of the latter were made of leather.

Keyboard, bridge, strings, tuning, bow

The olive wood fingerboard, 4 mm thick, is glued to the neck. The nut and bridge in the two-string rabāb are tall to allow playing without pressing on the fingerboard, as in the traditional Moroccan rabāb. In the three-string rabāb, I provided for the possibility of pressing the strings on the fingerboard, so the nut and bridge maintain the strings at the appropriate distance. The strings in both instruments are made of natural gut, except for the highest string, which is made of silk. In the three-string rabāb, I chose two types of tuning: C4, C4, F4, diameters 0.80, 0.80, 0.50 or C4, G3, F4, where the middle string is the lowest, diameters 0.80, 1.05, 0.50. The scale length is 44 cm, as in the small lute, but the strings are single, with greater tension.

In the small rabāb, the scale length is 33-34 cm, tuning: F4, Bb4, diameters: 0.85 and 0.50. (See Figures 22-23).

The bow used is the same for both instruments: orange wood and black horsehair. It has an extremely simple construction, as is still used for traditional bowed lyres made in some areas of Calabria.

Weight comparison

	2 strings	3 strings
Cedar wood rabāb	600 grams	680 grams
Ceramic rabāb	1180 grams	1220 grams / 900 grams
Modern Moroccan walnut rabāb	860 grams	

Evaluation of the acoustic performance of the reconstructed Instruments

The sound of the lutes carved from date palm wood, with leather soundboards and silk and gut strings, is harmonious and enchanting, markedly different from the modern Oriental oud with its nylon and metal-wound guitar strings. The monoxylous cedar wood rabāb have a sweeter sound compared to those with ceramic bodies, whose sound is very lively and bright when plucked, with a faster attack transient and higher volume than the wooden ones when played with the bow.

Conclusions

Practical experimentation has shown the concrete possibility of creating well-functioning musical instruments based on the interpretation of iconographic and written sources, as well as hypotheses about the use of new materials, according to plausible insights and considerations, even where no archaeological remains are available. Researchers could examine literary sources and materials from archaeological excavations in order to find out witnesses about the use of date palm wood and ceramics in lutherie. I recall the discovery of a 5000-year-old ceramic object found in Rome a few years ago, considered the body of a musical instrument (Rossi, F., 2018). Among the ceramic materials of Islamic archaeology, fragments of rabābs might be found, as well as percussion instruments such as naqqarāt and darbūka made of ceramics.

🔖 **Keywords** music & musical instruments

🔖 **Country** Italy

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| Gallery Image



FIG 1. LUTE PLAYER. PHOTO BY LORENZO DANIELE.



FIG 2. TWO LUTE PLAYERS UNDER A DATE PALM. PHOTO BY LORENZO DANIELE.



FIG 3. "M" SHAPE SOUND HOLES. PHOTO BY GIUSEPPE ANTONIO SEVERINI.



FIG 4. LUTE PLAYER. PHOTO BY LORENZO DANIELE.



FIG 5. MOVABLE (?) BRIDGE. PHOTO BY LORENZO DANIELE.



FIG 6. FIVE-COURSE LUTES. PHOTO BY LORENZO DANIELE.



FIG 7. HOLLY-LEAF SHAPE LUTE (CETRA). PHOTO BY GIUSEPPE ANTONIO SEVERINI.



FIG 8. TWO STRINGS RABAB. PHOTO BY LORENZO DANIELE.



FIG 9. THREE STRINGS RABAB. PHOTO BY LORENZO DANIELE.



FIG 10. SOUND HOLES. PHOTO BY LORENZO DANIELE.



FIG 11. PHOENIX CANARIENSIS TRUNK. PHOTO BY GIUSEPPE ANTONIO SEVERINI.



FIG 12. SHAPING THE BOWL. PHOTO BY GIUSEPPE ANTONIO SEVERINI.



FIG 13. CARVING INSIDE. PHOTO BY GIUSEPPE ANTONIO SEVERINI.



FIG 14. WOODEN BARS. PHOTO BY GIUSEPPE ANTONIO SEVERINI.



FIG 15. GLUING THE TOP. PHOTO BY GIUSEPPE ANTONIO SEVERINI.



FIG 16. CEFALÙ LUTE RECONSTRUCTED IN 1997. PHOTO BY GIUSEPPE ANTONIO SEVERINI.



FIG 17. WAX FINISHING. PHOTO BY GIUSEPPE ANTONIO SEVERINI.



FIG 18. FOUR-COURSE LUTE. PHOTO BY GIUSEPPE ANTONIO SEVERINI.

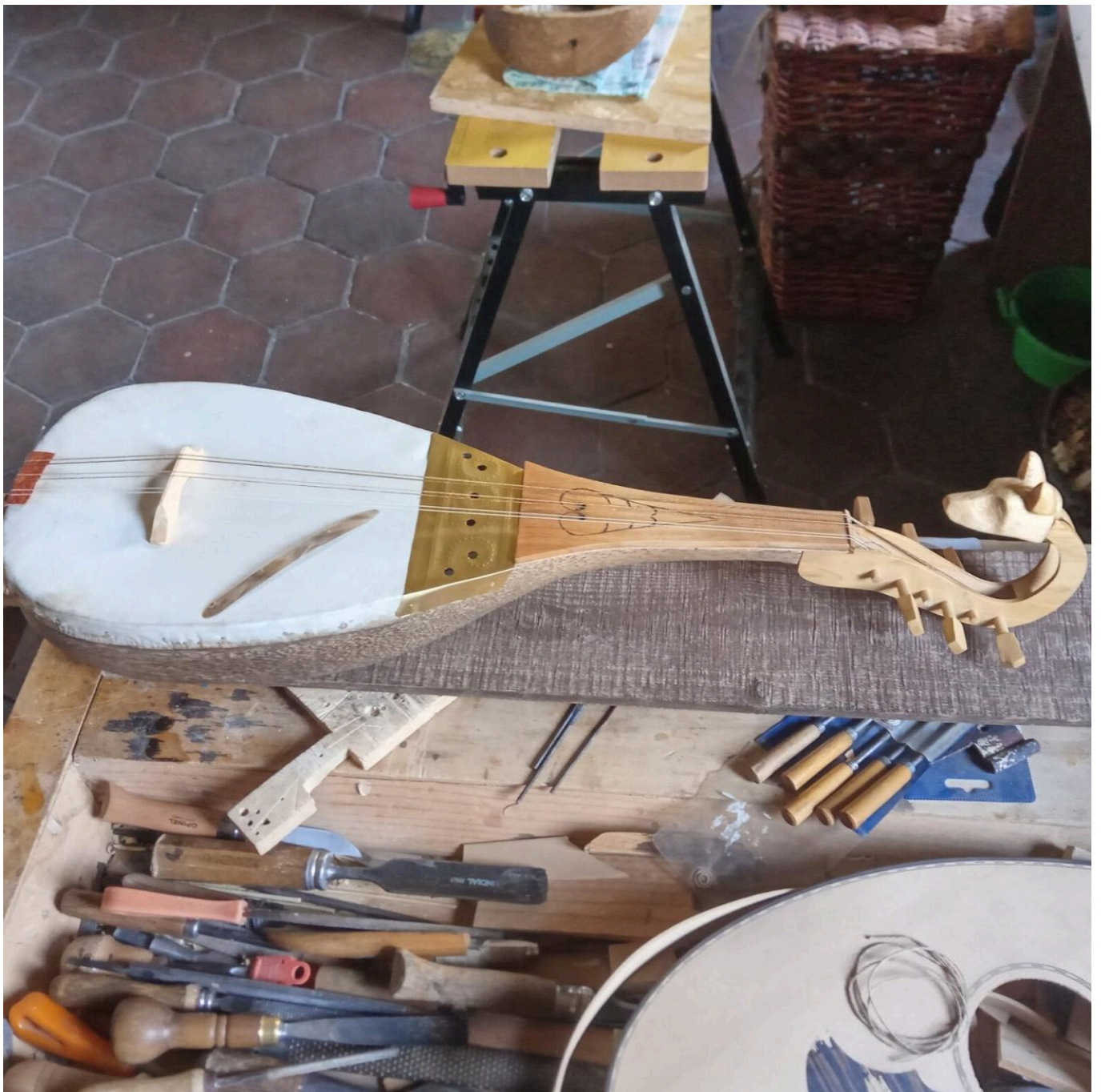


FIG 19. THREE-COURSE LUTE. PHOTO BY GIUSEPPE ANTONIO SEVERINI.



FIG 20. ROUGH CERAMIC SOUND BOX. PHOTO BY GIUSEPPE ANTONIO SEVERINI.



FIG 21. CERAMIC SOUND BOX AND WOODEN NECK. PHOTO BY GIUSEPPE ANTONIO SEVERINI.



FIG 22. TWO CERAMIC RABĀB, BACK VIEW. PHOTO BY GIUSEPPE ANTONIO SEVERINI.



FIG 23. TWO CERAMIC RABĀB, FRONT VIEW. PHOTO BY GIUSEPPE ANTONIO SEVERINI.