The Arm-Crossbar Junction of the Classical Hellenic Kithara

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In this paper attention will be focused on only one aspect of construction of the large, classical kithara of the ancient Greeks: the junction of the crossbar with the arm.

As far as it is known to the writer, there have been five scholarly attempts at a reconstruction of the kithara in the last twenty years: that of Helen Roberts (England 1980), of Daniel Paquette (France 1984), a verbal reconstruction, of Martha Maas and Jane McIntosh Snyder (United States 1989), another verbal reconstruction, of Annie Bélis, (France 1992), and of Bo Lawergren (United States 1994).[1]

It will be demonstrated here that in all of these five cases the proposed arm-crossbar connection is incorrect. There exists hard, decisive evidence, seemingly overlooked by these scholars, to support the above claim: the kithara of the Parthenon Frieze (see Fig. 1, a–d). Figure 26 on the Slab holds his kithara at an angle to the marble background, allowing us to see behind it; a close examination of the arm is quite revealing.[2]

Before we proceed to examine the relief, let us make the following three points on methodology:

1. The hypothesis that the sculptor (Phidias or a pupil of his) created an image of a real instrument, that is, the form given to the marble was dictated by organological verity – no artistic liberties were taken, such as purposeful modelling in order to create shadows, an artefact which would enhance the perception of depth.

2. The appreciation that the single lateral view of the instrument as depicted on the vase Bern 12409 (see Fig. 5) is a rather unhappy attempt by the ancient painter to show the instrument in profile. Undoubtedly, serious mistakes in perspective have been made. Observe, for example, the incorrect rendering of the scroll at the "foot" of the "arm" and that of the ornate arm support systems, both in frontal view!

3. The axiom that the Parthenon kithara is the same instrument as those depicted on numerous classical vases: the large, wooden instrument of professional musicians. In the chart given as Fig. 3 are collected all the kithara depictions in Paquette (1984): time (between 520 and 400 BC) increases along the horizontal from left to right in increments of ten years; the dots represent the kithara depictions in Paquette (the corresponding numerals are those given by Paquette).[3] The Parthenon kithara (large dot) dates from around 440 BC, when Phidias and his pupils are said to have completed the sculptures of the temple.

The Slab is kept in the Akropolis Museum.[4] Fig. 1b shows the detail of the junction of the upper arm with the crossbar. To the left of the arm can be seen the badly mutilated head of the kitharist and to the right below the fingers of his left hand. The intersection of the arm with the crossbar is carefully modelled, and so is the elaborate snake-like construction underneath it. Fig. 1c is a near-profile of the arm as seen from the left: the arm is in contact with the marble background; clearly, the crossbar is thicker than the arm. The

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1 Mention must also be made of the kithara constructed by Giorgos Polyzos (Hellas 1989). The maker has, however, made it clear several times in public that his intention was not to create an instrument of archaeological accuracy in all respects, so it will not be included in the present discussion. The kithara reconstructed by Kent (in Schlesinger 1939 Pl. 15) was obviously not based on any evidence, despite Schlesinger's claim that it was based on "a vase painting (red on black)" in the British Museum: tuning apparatus, bridge, tail piece, sound box are all wrong.

2 For a discussion of the Parthenon Frieze see Boardmann/Finn (1985, 242); Robertson/Franz (1975); Παλαγγιά(1983, 55 with Fig. 5).

3 The following table contains, in chronological order, the classical kithara depictions in Paquette:

520: 33,36	500:16	500–475:43	480:18,24,27	480–470:26
480–460:19	475:17,46	470: 15,38	470–460:25,40	460:32,39,44
455:29	450:28	430:20,35	420:31	400:50

4 We should like to thank Ms. Aliké -Isméné Trianté and Mr. Alexandros Mantés of the First Ephoreia of Preclassical and Classical Antiquities for granting us permission to examine the Slab in detail. Thanks are also due to Ms. Eiréné Kephalidou of the Akropolis Museum for the information provided over the telephone.

"disc" which lies immediately below the crossbar projects by a certain amount, however not as much as the crossbar. The same applies to the "tail" of the "disc", which widens up on the way down (Fig. 1c and 1b. See Fig. 2 for items in quotation marks!).

Fig. 1d is a three-quarter view of the arm as seen from the right, a near profile, and it is quite revealing: the arm is completely lifted off the marble background, and stands out in virtually full relief along this edge. We have here, therefore, the "missing" third dimension, that of depth, of the arm, which, unexpectedly, is much smaller than its width by a factor of nearly seven (width = 4.1 cm; depth = 0.6 cm $\Rightarrow$ w/d = 6.833 $\approx$ 7). It has up to now being thought that the arm must have been much deeper, so as to receive the crossbar inside it in one way or another. It is here shown clearly that the crossbar surrounds the arm, in other words the arm penetrates the crossbar. Therefore, the upper arm of the kithara would have undoubtedly been solid, a wooden plank, and not a deep, hollow resonator, as is unanimously believed. It is also clear (see Fig. 1b) that the slender upper arm rests on the "bow" (the arch-like element tangential to the "disc" and its "tail"), which ends at the point where the "horse-shoe" touches the lower arm. The base of the upper arm-plank would, therefore, have had the shape of this "bow"; this is supported by the fact that the depth of the triangle formed by the "disc", the "tail" and the "bow" is the same as that of the part of the arm which surrounds the "disc". The "bow", as can clearly be seen, forms, in effect, a curved platform upon which sits the arm. On a coin from Olynthos of the 4th cent. BC (see Fig. 7), it is apparent that the plane of the upper arm lies behind the plane of the "disc" and its "tail".

Whether "disc" and "tail" are separate elements attached to the slender arm, or whether they are cut out into the wood, cannot be ascertained from the Parthenon relief. It however seems more probable for these items to have been attachments: an upper tail-end, say, of the facade wall of the lower arm. It would be logical to think of the deeper lower arm is hollow; had it been solid, an unnecessary weight would have been added to a portable, quite voluminous instrument. "Discs" were also fitted on the back (see Fig. 4: a rare instance of a back view of the kithara).

We are thus led to the following design propositions:

1. The lower arm is hollow, becoming more slender as it ascends. Front and rear walls of the lower arm end in shallow cylinders ("discs"), which create a case into which is accommodated that part of the upper arm which lies below the crossbar.

2. The right end of the base of the upper arm rests on the "bow", which in turn is propped up by the elaborate system "capital-column-base-head-horseshoe buttress", which leans against the inner wall of the lower arm. Undoubtedly, the function of this system is to provide reaction in the opposite direction to that of the tension in the strings.

3. The left end of the base of the upper arm rests on the side wall of the lower arm. It is not necessary to think of this part of the base as continuing to the left the curve of the "bow"; it could have very well been straight, in an ascending direction. It is actually probable that the small "outcrop" which we so often come across in vase paintings of the instrument, and whose shape varies from a simple "sphere" to an elaborate "butterfly", marks the point where the arm meets the side wall. This "outcrop" is placed on the border of the upper with the lower arm (fourteen instances in Paquette's collection).[5] There is only one instance, on the coin from Olynthos (4th century BC) mentioned earlier (see Fig. 7), where the "outcrop" is placed relatively high up, at the level of the "disc". The execution of the image of the kithara on this coin is admittedly precise and detailed, and this would urge us to give weight to this piece of evidence. However, as it stands alone against all other depictions of the instrument, we should be justified in withdrawing it from our evidence, as regards the position and function of the "outcrop". As far as it is known to the present writer, an adequate explanation of the presence and role of this element has never been given.

The design proposed above has been realised in a paper model. In Fig. 14a are laid out all the parts which make up the junction, before assemblage: upper arm, front and rear "discs" and "tails", "outcrop", "bow", and the elaborate "support system". Fig. 14b shows a three quarter view from the right, after all the parts have been assembled.[6]

It is worth pointing out that, in principle, the same type of junction appears on the lyre (*chelys*) of the Elgin Collection in the British Museum. This is a prototype instrument found in the beginning of the 19th cent. in a grave on the way from Peiraias to Eleusina. It is dated to the period from

[5] See Paquette 05, 17, 18, 19, 24, 25, 26, 27, 29, 38, 39, 44, 46, 50.

[6] Of course, the rear unit "disc-tail" is not straight as it is in this model; it follows the curvature of the wall of the lower arm, where the great bulge of the resonator is deflated. This can clearly be seen on the second Parthenon kithara, whose back is turned to us (see Fig. 1a, on the right). However, the shape of the back of the lower arm is beyond the scope of this paper; in any case, it does not affect the present discussion of the arm-crossbar junction.

the 4th to the 1st cent. BC. Both arms and crossbar are of sycamore wood, and survive in good condition. The upper arms are shaved down to an orthogonal cross-section (see Fig. 8). The crossbar is penetrated by the arms, and rests on two "horns", one on the front and one on the back of each arm. These "horns" seem to be the equivalent of the "discs" on the kithara.

It is very probable – although there is no hard evidence on this – that in the other kind of kithara, the smaller, horseshoe/ "cradle" type (see Fig. 11), the upper arms were also "cased" inside the lower arms. Figs. 12a, 12b show the present writer's reconstruction of the instrument.

In the light of these observations, let us now discuss the scholarly reconstructions mentioned earlier.

A. Helen Roberts (1980), after an examination of vase paintings only, proposed the following design (see Fig. 15): upper arm shallow above the crossbar, deeper below it. Upon the step thus formed Roberts places the crossbar, presumably gluing it into position. The "discs" are not independent members, but mere ornaments cut out into the arm, and not intended to support the crossbar, which lies at some distance from the "discs". The two different depths of the upper arm, the crossbar which does not surround the arm, the absence of a rear "disc", and the purely ornamental nature of the "disc", are four points in Roberts' proposition, which are not supported by the evidence from the Parthenon.

B. Daniel Paquette (1984, 90–98 and 241–242) worked, again, solely from vases (Paquette 1984, 241, Fig. 20). The following five points of his thesis are of relevance:

1. The upper arm is hollow, functioning as a complementary resonator.[7] As we have seen, this is not true; the upper arm is a solid plank.

2. The crossbar is located in a groove, dug out in the upper arm. This is not true; the crossbar embraces the arm.[8]

3. The scroll is a metal spring encased in a shallow cylindrical hollow opened up in the arm,[9] with its one end fixed at a point in the sound box (lower arm).[10] This is not true, as this element is a "disc", projecting from the surface of the arm.

4. The elaborate system on the inside of the lower arm is also a metal spring, in the shape of a horse-shoe,[11] whose function is, also, to counteract the tension of the strings. The use of a spring in this fashion is, however, not necessary, since the crossbar, operating as a strut, will provide the required resistance.

5. The upper arm is able to oscillate in and out to a certain degree with the help of the spiral spring, about the point of attachment of the spring to the lower arm.[12] This cannot be the case, since the crossbar, functioning as a strut under axial pressure would not allow even the slightest perturbation of the upper arm.

C. Maas and Snyder (1989, 65–67) based their verbal partial reconstruction not only on an examination of vase paintings, but also of reliefs and gems. Their claim (Maas/Snyder 1989, 66) that "the arms of the kithara … are turned at an angle, and their upper sections lean forward somewhat" is opposed by the Parthenon kithara, whose facade is clearly straight. It is instruments of later periods which exhibit this, marked sometimes, frontal curvature, like that in Fig. 13. Presumably, Maas and Snyder have given too much credit to the untrustworthy evidence of the vases Bern 12409, mentioned earlier (see Fig. 5), and Athens 1241, a side view of the smaller, "cradle" type (see Fig. 6). A second point put forward by these scholars (Maas/Snyder 1989, 66), that "the crossbar … appears to be placed in front of the arms, resting in grooves just above the spiral ornaments" is also refuted by the Parthenon evidence: the crossbar is not imbedded in the arm, on the contrary, it surrounds the arm.

D. Annie Bélis (1992) used her two reconstructed kitharas in a concert of ancient Hellenic music in Delphi in the summer of 1992. The instruments were constructed by Jean-Claude Condi (see Fig. 16).[13] The arms of these kitharas are much deeper than those of the Parthenon instrument. The crossbar, nesting in a groove cut into the arms at the front, does not surround the arm, as in the Parthenon kithara. The "discs" are purely ornamental, providing no support for the crossbar, while the "discs" on the back are missing altogether.

E. Bo Lawergren (1994) based his reconstruction of the kithara on iconographical evidence from

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7 Paquette (1984, 95) "les bras supérieurs… donc aptes à fournir un supplément de résonance".

8 Paquette (1984, 95) "le joug est logé dans un encastrement horizontal"; p. 96 "le joug … appliqué sur les bras".

9 Paquette (1984, 95) "une spirale… logée dans un evidement circulaire du bras"; p. 241 "le ressort en spirale… devait agir dans l'arrondi creusé à la base du bras".

10 Paquette (1984, 241) "le ressort en spirale devait être fixe à la fois sur la caisse par son extrêmité".

11 Paquette (1984, 241) "comme la spirale, ces parties devaient être en metal"; p. 241 "fer à cheval".

12 Paquette (1984, 241) "le point P [point at which the spiral is attached to the resonator] servait alors de charnière souple permettant aux bras basculer légèrement".

13 We should like to thank Jean-Claude Condi for allowing us to photograph the instrument in Delphi in 1992.

vases, coins and gems. He is inclined to accept that there existed two types of the instrument, one with a fixed, immovable frame, and a 5th cent. BC variety, with a movable, elastic frame. He reconstructed the second type but acknowledged that he is not certain that the design he proposes is close to reality.

In this reconstruction (see Fig. 17) the upper arms are hinged to the lower arms by means of leather straps or pieces of thin wood. The elaborate "support systems" are metal springs (slender wooden branches are suggested as plausible ancient equivalents), which allow the upper arms to rotate in and out about the axes of the hinges. The "discs" are rotating "wheels", upon which "skates" the crossbar during the inward and outward motions of the upper arms. The inward motion of the upper arms, with a resulting downward displacement of the crossbar is caused by the left hand exerting pressure on the strings. When the pressure is released the metal springs push the upper arms and the crossbar back into their equilibrium position. In this way each string may produce more than one note.

The above design is not supported by the evidence from the Parthenon: upper and lower arms do not meet along an edge. Classical reliefs of kitharas (unlike the majority of two-dimensional representations on vases) show this clearly (e.g. Figs. 9–10). The "point" contact of upper to lower arms seems to have been a convention only amongst vase painters. The "outcrop" is not taken into consideration. What should be its function in an instrument with hinged arms?

However, as Lawergren proposes a possible existence of two varieties of the classical concert kithara, it could be argued that the type depicted on the Parthenon is not of the "elastic" but of the "solid" type. However, in the absence as yet of any three-dimensional evidence which would support Lawergren's thesis of an "elastic" variety of classical kithara the present writer is unable to uphold such a possibility.

It could further be argued that, by analogy, the "cradle" type of kithara, also, could not have possessed an "elastic" frame, as suggested by Lawergren (1985). His "cylinders" at the joints of the arms to the soundbox, even if cylindrical in shape, could not have been hinges, about which the arms of the instrument rotated in and out.

Conclusion: the slender and solid upper arms of the kithara were not part of the resonator of the instrument, and as a result they should have not contributed in any significant way to the amplification of the sound of the strings.

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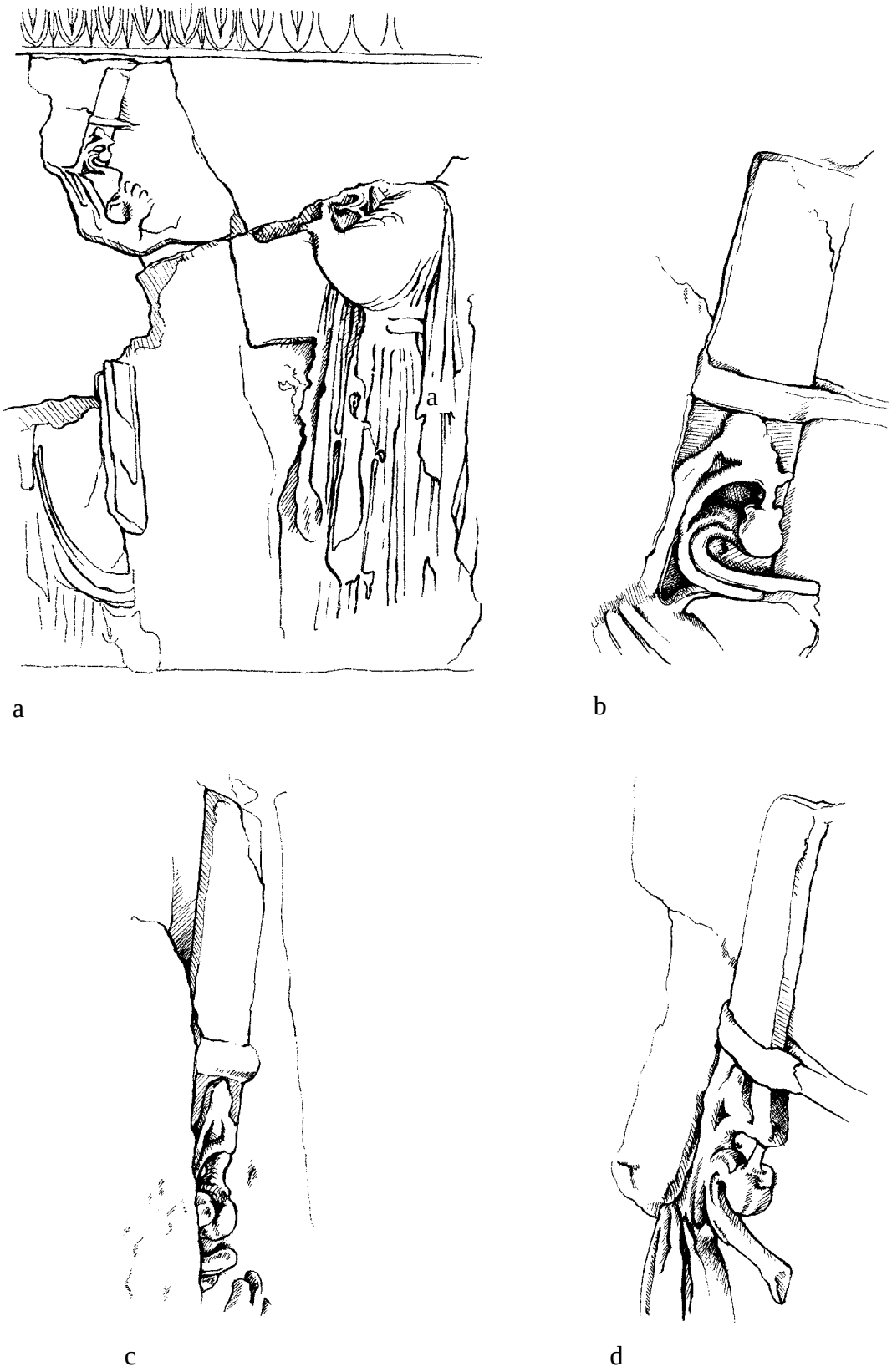

Fig. 1 Parthenon, North Frieze, Slab No VIII. Athens, Akropolis Museum.
a. Two kitharists, Figs. 26 and 27;
b The surviving part of the upper arm of the kithara held by Fig. 26;
c Three quarter view of the upper arm, seen from the left;
d Three quarter view of the upper arm, seen from the right
(drawings by Daniel Arendt after photographs taken by the writer).

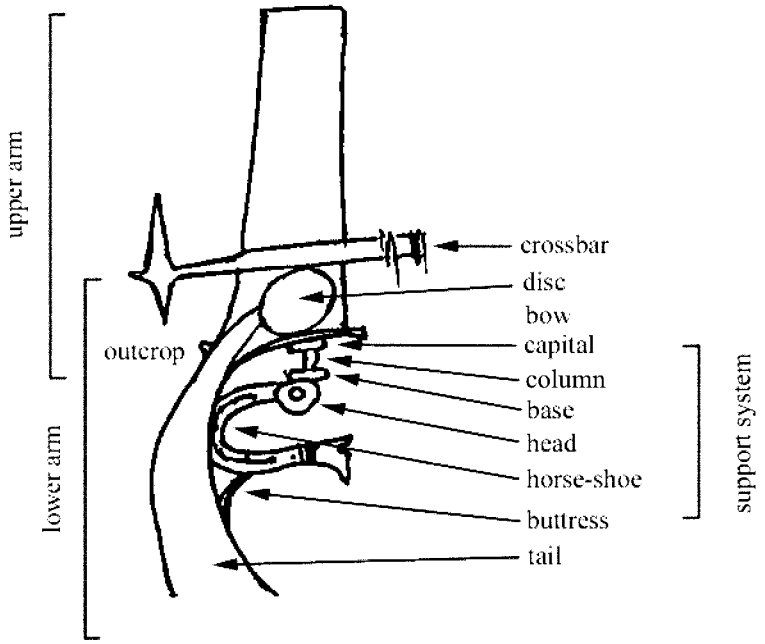

Fig. 2 Upper and lower arm, with their parts (drawing by the writer).

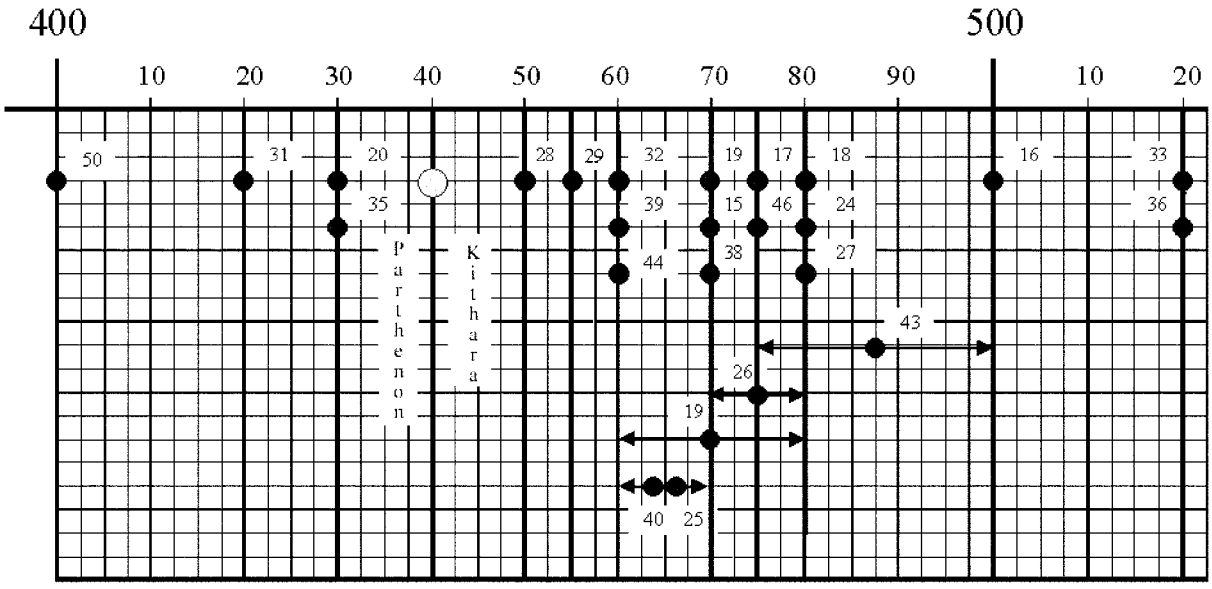

Fig. 3 Chronological chart of the classical kithara depictions in Paquette 1984 (drawing by the writer).

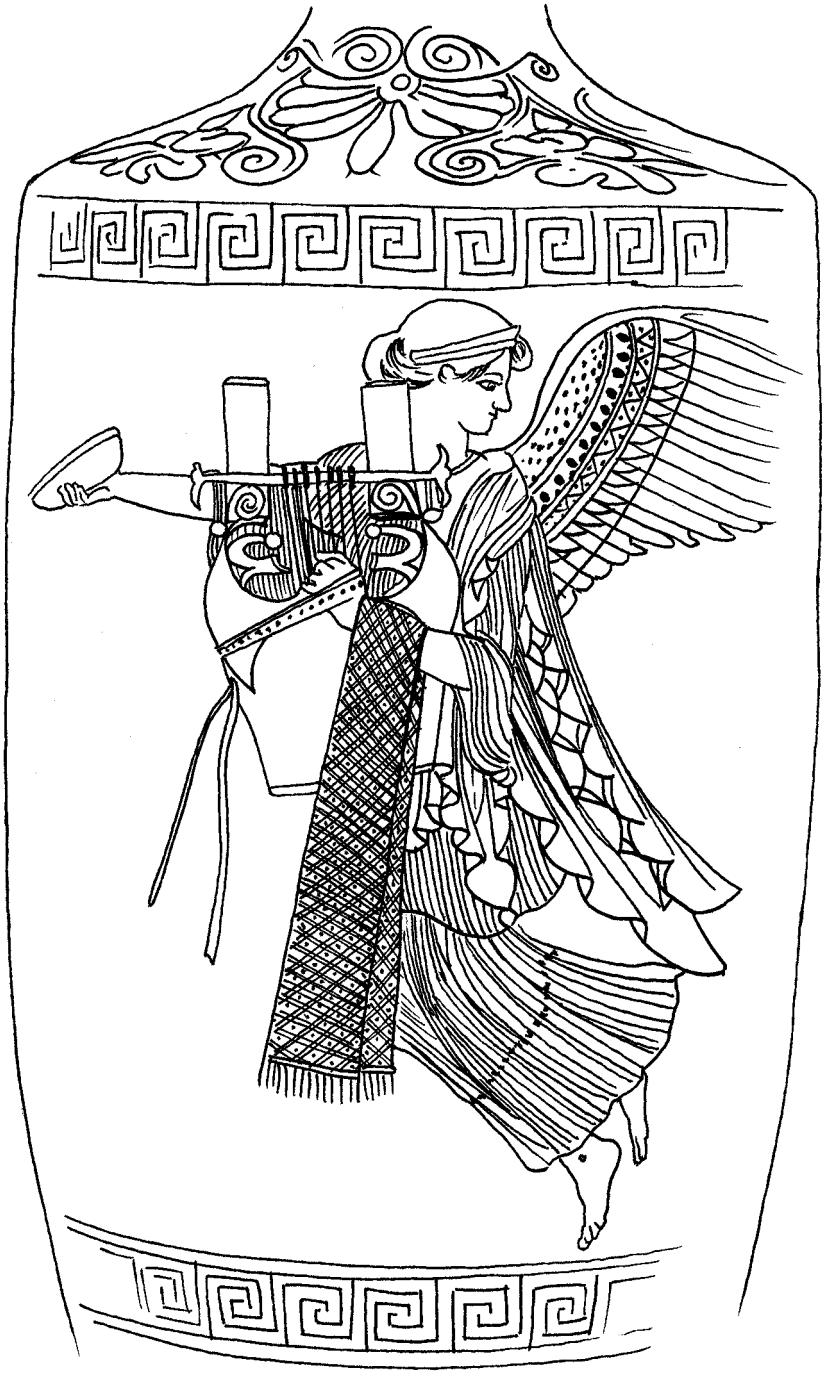

Fig. 4 Red figure pelike. Classical. New Orleans, Museum of Art. Nike with kithara (back view) and phiale (drawing by Daniel Arendt after a photograph in Shapiro 1992, 59).

Fig. 5 Attic red figure hydria, detail. Bern 12409. Apollon and Artemis at libation
(drawing by Daniel Arendt after a photograph in Maas/Snyder 1989, 77 Fig. 16).

Fig. 6 Attic red figure pyxis, detail. Athens 1241, Muses on Mt Helikon
(drawing by Daniel Arendt after a photograph in
Maas/Snyder 1989, 158 Fig. 6).

Fig. 7 Olynthos, tetradrachm. Boston 581. 4th cent. BC. Kithara in relief
(drawing by Daniel Arendt from a photograph in
Grunauer Hoerschelmann 1988, cover).

Fig. 8 One of the arms of the Elgin Collection lyre (*chelys*) in the British Museum
(drawing by the writer after a photograph taken by him).

Fig. 9 Chania, Krete, Akroteri, Cave of the Bear. Clay plaque, relief. 5th cent. BC Apollon with kithara (drawing by Daniel Arendt after a post card).

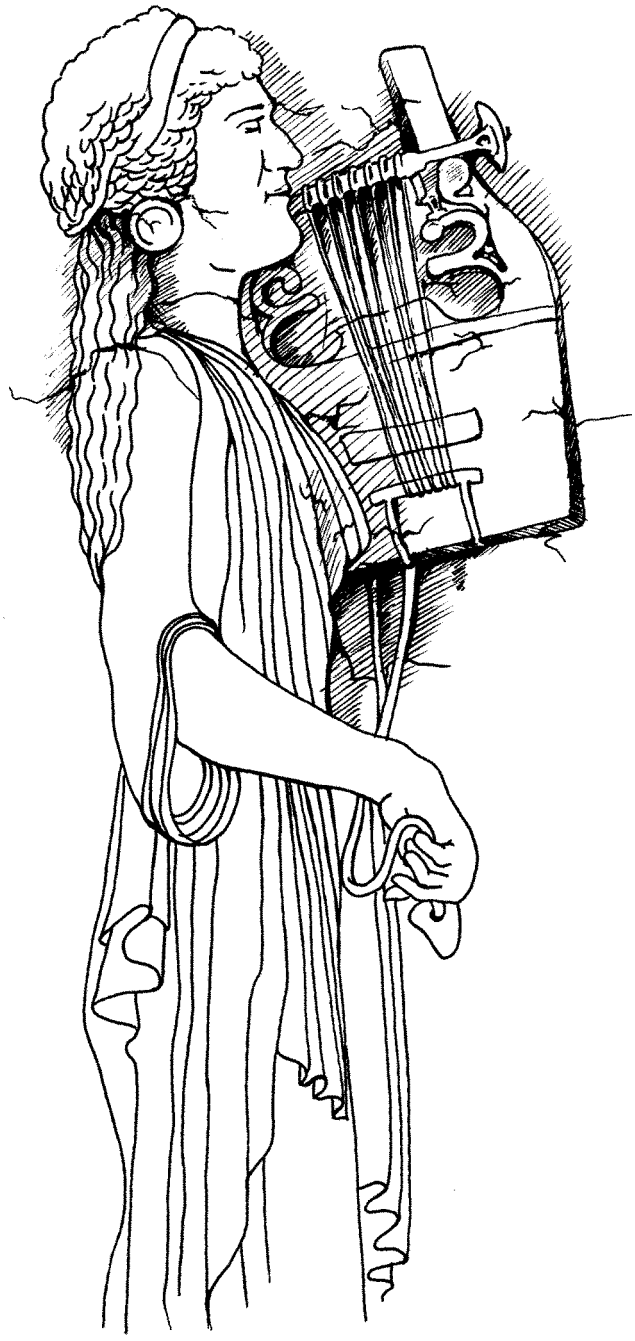

Fig. 10 Gümüşçay, Cannakale (Troas), Türkye. Marble sarcophagus, relief, detail, woman with kithara (drawing by Daniel Arendt from Sevinç et all. 1998, 315 Fig. 16).

Fig. 11 Attic white ground lekythos, Muse on Mt Helikon (detail). München, Staatliche Antikensammlung und Glyptothek (photograph by Koppermann).

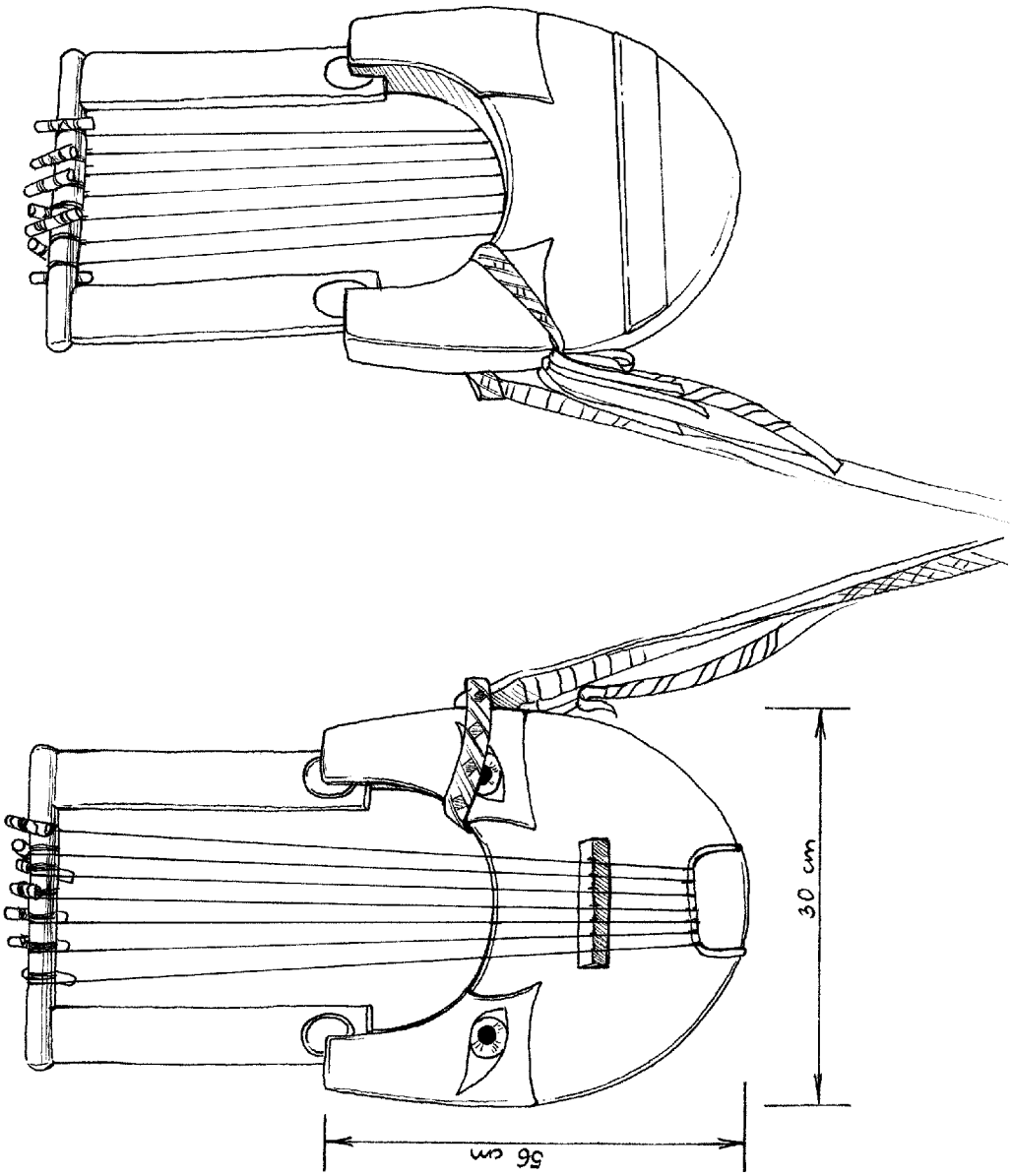

Fig. 12 "Cradle" kithara reconstructed by the present writer: front view (a.), back view (b.)
(drawing by Daniel Arendt after a photograph taken by the writer).

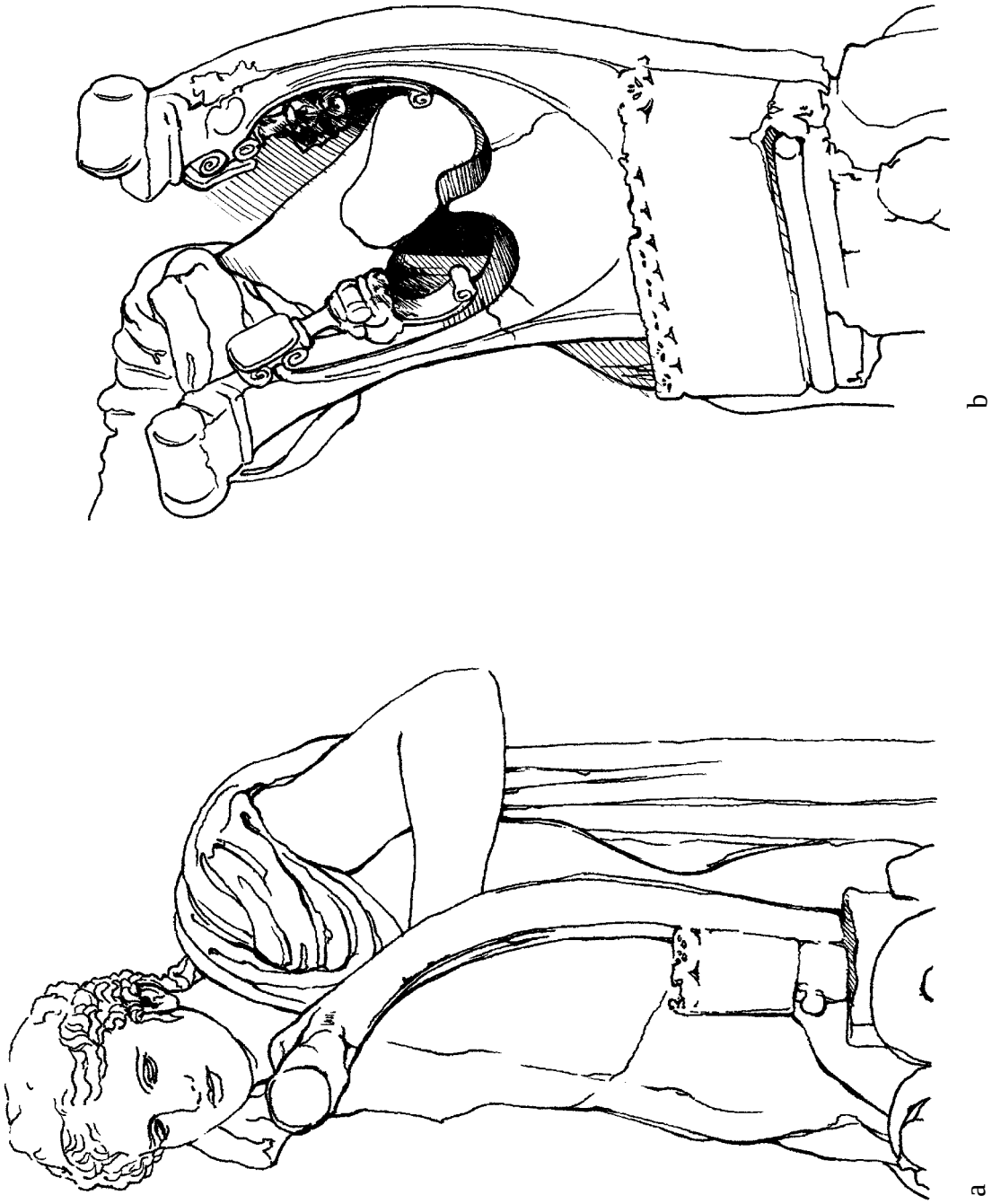

Fig. 13 Apollon with kithara, Hellenistic Marble statue, two views (British Museum London) (drawing by Daniel Arendt after photographs taken by the writer).

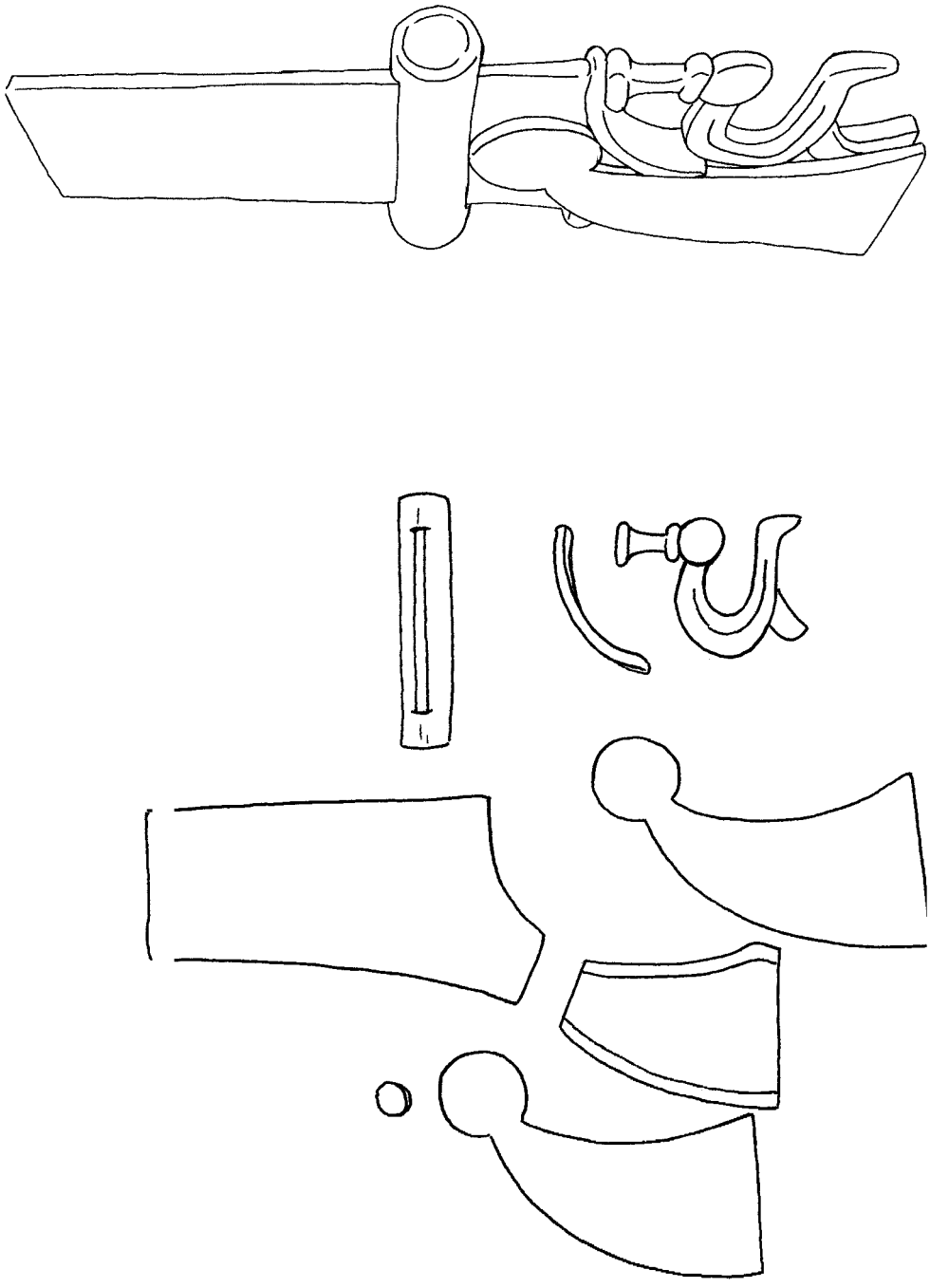

Fig. 14 Paper model of the arm of the Parthenon kithara: the parts before assemblage (a.); the parts assembled; a three quarter view from the right (b.) (drawings by Daniel Arendt based on a photograph taken by the writer).

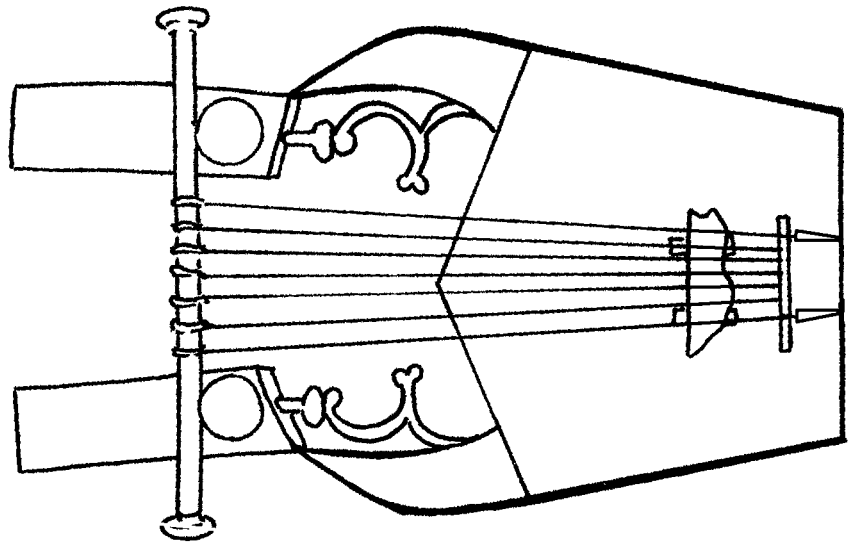

Fig. 17 Kithara reconstructed by Bo Lawergren (drawing by Daniel Arendt after a drawing in Lawergren 1994, 1033, Abb. 14).

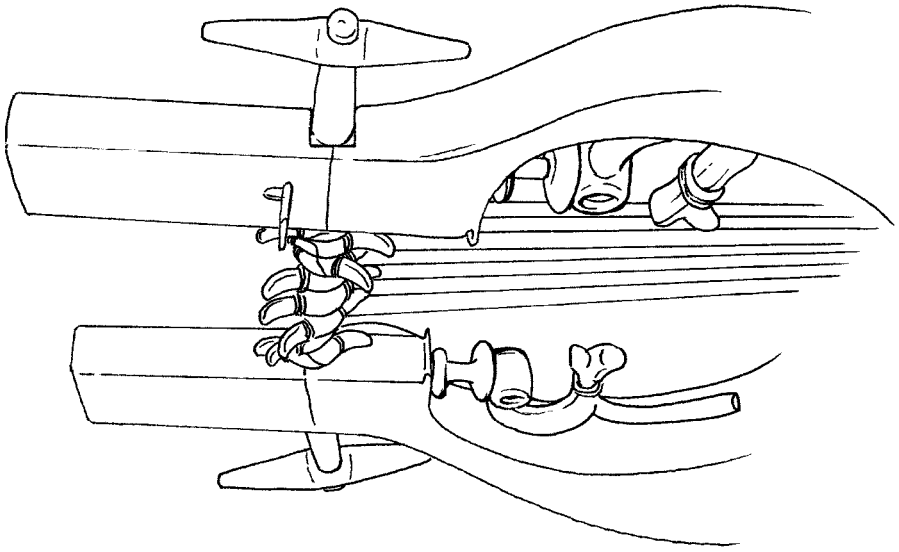

Fig. 16 Kithara reconstructed by Annie Bélis and Jean-Claude Condi (drawing by Daniel Arendt after a photograph taken by the writer).

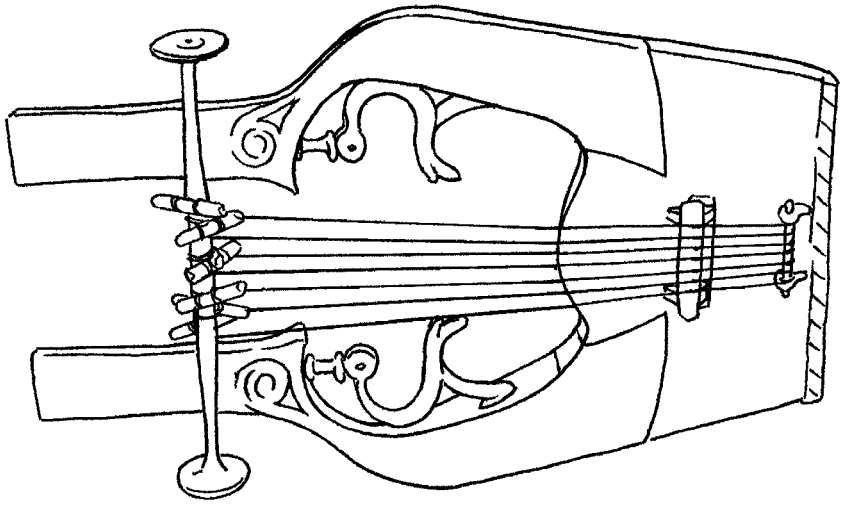

Fig. 15 Kithara reconstructed by Helen Roberts (drawing by Daniel Arendt from a photograph in Roberts 1980 Pl. 32).