



BRILL

ORIENS 51 (2023) 71–103

ORIENS

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Al-ʿūd, pípa, Lute: An Ancient Greek Perspective on Their Prehistory

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Abstract

Starting from early Arabic sources, the absolute pitch of the Early Abbasid *ʿūd* is considered and related to evidence on pitch usage in Roman-period sources. Similar instruments, it is argued, must have existed already in late antiquity. Iconographic evidence takes us back to late Classical Greece, whose music would have provided especially fertile ground for designing such a lute. In contrast to the traditional tuning in fifths and fourths throughout, lutes with equidistant design had also existed for a long time, likely also on precursors of the *ʿūd*. The association of this style with the name of Manṣūr Zalzal must therefore be reassessed.

Keywords

lute – oud – ancient music – music archaeology – Arabic music

Preposterously, the title of this contribution promises a view on varieties of an instrument type from the perspective of a music culture that predated these varieties by many centuries – easily a millennium, regarding the formation of the technical concepts and vocabulary on which Greek and consequently Roman musical thought remained based until the end of antiquity. But I hope to show that these lutes and especially the *ʿūd* may be more closely connected with Greek theory than the traditional music-historical outlook would suggest, and to start a discussion regarding what this may mean, if anything, in terms of historical relationship.

Published with license by Koninklijke Brill NV | DOI:10.1163/18778372-12340019

© STEFAN HAGEL, 2023 | ISSN: 0078-6527 (print) 1877-8372 (online)

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First we need to agree on a working definition of what the title is meant to refer to. *Al-ʿūd* is the well-known Arabic name for the short-necked lute that has formed the backbone of Islamicate music theory from its earliest extant writings on; a name that lives on even though the instrument underwent a major refinement when it lost its frets during the Middle Ages. In the early period, others would have called it *barbaṭ*. The question of its prehistory has customarily been phrased as that of the origins of the short-necked lute, or especially that with a roughly pear-shaped body.¹ It has been traced back to Central Asia in the first centuries CE, with early depictions in Gandhāran art.² A few centuries later it had spread to China and Japan in the East as well as Europe in the West, where it subsequently received various modifications according to the diverse musical needs of its new hosts.

However, while the shape of a lute may be of some consequence regarding its sound and possibly available playing techniques, it has little bearing on the accessible pitches. The boundaries of the possible gamut are largely determined by the vibrating lengths of the strings, their material, and the length of the fretted (or fingered) region on the neck. The characteristics of the available scales, on the other hand, depend on the distribution of the frets (if there are frets), and to a lesser degree on the intervals between the open strings.

As a consequence, a music-historical viewpoint that is interested in the development of tonalities (in the widest sense of the word) cannot achieve its goal by looking for pear shapes. Modern guitars, for instance, especially within popular music from the late twentieth century CE on, come in an astounding variety of shapes, which would hardly serve as meaningful criteria of classification for the said musical purposes. Less extravagantly, grand and upright pianos are much the same instrument regarding what music can be played on them. There is no doubt that similarities of instrument shapes can tell us a lot about dissemination. One must only avoid the pitfall of a reverse conclusion: dissimilar shapes need not necessarily indicate dissimilar musics. A history of ancient lutes that wants to access overarching questions beyond outward appearances must therefore acknowledge the musical primacy of fretting, vibrating length, number of strings and their material.

So we may need to define a more tonality-centered concept of ‘*ūd*’ for our present purpose: what kind of instrument would an Early Abbasid *ūd* player be able to take up and play without too much adjustment? As is well known,

1 Cf. e.g. Laurence Picken, “The Origin of the Short Lute,” *The Galpin Society Journal* 8 (1955): 32–42.

2 Cf. Ciro Lo Muzio, “Classificazione degli strumenti musicali raffigurati nell’arte Gandhārica,” *Rivista Degli Studi Orientali* 63, no. 4 (1989): 257–84.

such an instrument would have had four strings of approximately 60cm vibrating length³ and only four frets, one for each finger. Of these, the outermost, typically stopped by the index finger, would be situated a whole tone from the nut, the innermost, assigned to the small finger, at a fourth, and its neighbor, the ring-finger fret, a semitone from it. The remaining one, second from the nut, was tuned differently in different traditions, according to al-Fārābī.⁴ Not long before, however, al-Kindī seems only to know a single option, roughly at half the distance between its neighbors, and consequently cutting the tone between them into two semitones of slightly different sizes; the same stance is taken by the Iḥwān aṣ-Ṣafā’, and it is implicit in the description of Ishāq b. Ibrāhīm al-Mawṣilī’s early system by Ibn al-Munaḡḡim.⁵

Such a design appears quite natural in a lute (sub-)culture which adheres to two principles: firstly, that the position of the left hand on the neck does not normally change, so that frets and fingers are associated; secondly, that tones and semitones play a defining (though not necessarily exclusive) role in the musical environment. The former leads to a restriction to merely four frets, one for each finger. For the early ‘ūd, this is evident because the frets are identified by the names of the associated fingers; consequently an enumeration of the tonal system could proceed “finger by finger, string by string.”⁶ Tones and semitones, similarly, are as important in Islamicate musics as they had been in ancient Greece, though appearing along microtonal ‘variations’ in these cultures, in contrast to their exclusivity in ancient Chinese theory, in what we know about music in cuneiform-writing cultures, and in most of mainstream ‘Western’ music.

3 Eckhard Neubauer, “Der Bau der Laute und ihre Besaitung nach arabischen, persischen und türkischen Quellen des 9. bis 15. Jahrhunderts,” *Zeitschrift für Geschichte der arabisch-islamischen Wissenschaften* 8 (1993): 310.

4 Abū Naṣr Muḥammad al-Fārābī, *Kitāb al-Mūsīqī al-kabīr*, ed. by Ġaṭṭās ‘Abdalmalik Ḥašaba with revisions and introduction by Maḥmūd Aḥmad Ḥifnī (Cairo: Dār al-kātib al-‘arabī li-ṭ-ṭibā’a wa-n-naṣr, 1967), 508–11. For the context of early Arabic discussions of the ‘ūd, cf. e.g. Liberty Manik, *Das arabische Tonsystem im Mittelalter* (Leiden: Brill, 1969); George Dimitri Sawa, *Music Performance Practice in the Early ‘Abbāsīd Era 132–320 A.H./750–932 A.D.* (Toronto: Pontifical Institute of Mediaeval Studies, 1989); Eckhard Neubauer, “Al-Ḥalīl ibn Aḥmad und die Frühgeschichte der arabischen Lehre von den ‘Tönen’ und den musikalischen Metren, mit einer Übersetzung des *Kitāb an-Naḡam* von Yaḥyā ibn ‘Alī al-Munaḡḡim,” *Zeitschrift für Geschichte der arabisch-islamischen Wissenschaften* 10 (1995–96): 255–323.

5 Abū Ya’qūb ibn Ishāq al-Kindī, *Risāla fī Ḥubr ta’līf al-alḥān* 1, ed. by Robert Lachmann and Mahmud el-Hefnī (Leipzig: Kistner & Siegel, 1931), viii–x; 21–22; Iḥwān aṣ-Ṣafā’, *Ep.* 5.8, ed. by Owen Wright, *Epistles of the Brethren of Purity: On Music* (Oxford, New York: Oxford University Press, 2011), ٧٣–٧٦, 111–18; Yaḥyā b. ‘Alī b. Yaḥyā b. Abī Maṣṣūr al-Munaḡḡim, *Kitāb an-Naḡam*, transl. by Neubauer, “Al-Ḥalīl ibn Aḥmad,” 304–5.

6 Ibn al-Munaḡḡim, *Kitāb an-Naḡam*, transl. Neubauer, 300.

Human fingers are very evenly spaced and do not encourage a system of frets that would combine tone and semitone steps. They might therefore play a sequence of either three tones or three semitones. The former option, however, would require short lutes of comparatively high pitch. Otherwise, we are left with precisely the sequence of three semitones that we find attested, which is comfortably available at the typical string lengths of short-necked lutes. Three subsequent semitones, of course, can never belong all to the same heptatonic (or, *a fortiori*, pentatonic) scale, not even in the ancient Greek 'chromatic genus', which incorporated a sequence of merely two consecutive semitones. As a consequence, modulating capabilities will come built into the instrument, as an almost inevitable result of human physiology.

The space between nut and first fret, in contrast, is not subject to physiological restraints. Another semitone at this position would appear a waste of pitch range; on the other hand, an interval larger than a tone would lead to gapped scales, at least as far as the diatonic is concerned, which formed the implicit and explicit basis of ancient Greek music, which is exclusively attested in the cuneiform system, which we find once more dominant in the Roman period, and which is presupposed in the early Arabic sources, starting from the ninth century. An interval of a tone between nut and frets is therefore again the most natural choice.

As a result, the interval between the open string and the small-finger fret, consisting of a tone and three semitones (rsss), forms a fourth, precisely the interval that bounds the tetrachord, the fundamental building block of ancient Greek harmonic theory, its reflexes in early Arabic musical writings, and ultimately in *maqām* music. A lucky coincidence?

Whenever frets are made the simple way, either by binding string material or gluing a piece of wood perpendicularly across the neck, each fret will affect all strings in (nearly) the same way. The scale fragment defined by the frets thus replicates at intervals that correspond to the relative tuning of the strings. What these intervals may most reasonably be also depends on their number – and vice versa. Seeing that the Ancient Near East, the ancient Greeks and Romans and the Arabic writers all considered notes an octave apart more or less functionally identical, one might primarily consider configurations that warrant replication at the octave. Other factors that may govern the tuning of the open strings are: an inclination to exhaust the possible pitch range, on the one hand, and the maximization of consonant intervals between simultaneously available notes, on the other.⁷ Given the identical microscales on all strings, the

⁷ In contrast to a long-held developmental belief, at least intervallic harmony of simultaneous notes is explicitly attested for Classical Antiquity (cf. e.g. Andrew D. Barker, "Heterophonia

latter was most straightforwardly assured by tuning these in consonances – which in the ancient understanding primarily included octaves, fifths and fourths. A combination of a fifth and a fourth additionally ensures a universal duplication of pitches at the octave.

Alternating fourths and fifths thus might extend the scale to infinity, were it not for the physical limits of the strings, which break when stretched beyond a certain pitch, and cease to give a musically useful sound when slackened too much. Open strings of identical material and the length that we find on the ‘ūd may support a range of hardly more than an octave plus a fifth; a larger gamut may be realized by combining different materials, notably gut for the bass (*bamm*) and silk for the treble (*zīr*) string⁸ – an option that may have become available in late antiquity, though it is, as far as I know, only attested as late as the Arabic sources. At any rate, with strings of uniform material, a tuning of the considered pattern could hardly exceed four strings, spanning either an octave plus a fourth (two fourths separated by a fifth) or an octave plus a fifth (two fifths separated by a fourth).⁹

As we have seen, both the general distribution of the frets and the number of strings of the early ‘ūd can be derived from a small set of partially anatomical, partially musical axioms which we know to have applied. However, the same is not true for the tuning of the open strings. Instead of an ‘expected’ alteration of fifths and fourths, the sources agree that the historical ‘ūd was most typically tuned in fourths throughout. As a result of the missing ‘disjunctive’ tone that would complete the octave after two fourths, the pair of treble strings is out of phase with the two bass strings. This shift of a tone in fact separates the two halves of the instrument by two steps in the circle of fifths: in comparison with the low strings, the higher appear shifted towards the flat keys. This is certainly remarkable: even though each string spanned a fourth,

and Poikilia: Accompaniments to Greek Melody,” in *Mousike: Metrica, ritmica e musica greca in memoria Di Giovanni Comotti*, ed. by Bruno Gentili and Franca Perusino (Pisa/Roma: Istituti Editoriali e Poligrafici Internazionali, 1995), 41–60) and indirectly in all the cultures that used doublepipes or strumming techniques on the lyre – i.e. everywhere between the Near East and Spain.

8 Using the formulas in Djilda Abbott and Ephraim Segerman, “Strings in the 16th and 17th Centuries,” *The Galpin Society Journal* 27 (1974): 48–73, the available range for gut strings of 60cm length is calculated to 2020 cents, and for silk strings, 1630 cents. The combination of both materials increases the range to 2610 cents, more than two octaves, paving the way for the addition of a fifth string. (The preceding calculations assume a plucking position about 7cm from the bridge, a plucking string displacement of no more than 4mm, and an acceptable pitch shift within the attack period of 20 cents).

9 The former amounts to 1698 cents, the latter to 1902 cents.

much as a Greek tetrachord did, the four similarly divided fourths of the four strings cannot play the role of corresponding structural units within the same non-modulating scale.

Nonetheless the partially chromatic layout of the frets mitigates the phase shift, because it still allows projecting a single non-modulating diatonic scale across the instrument's entire range. Insofar the sources imply that 'ūd music was diatonic music – a scale would generally omit either the middle-finger or the ring-finger fret¹⁰ – there is good reason to regard this single scale as fundamental for the instrument, at least in a historical sense. It is therefore also the only one in which every note in the high range has a counterpart in the low range and vice versa, since the low middle fingers here correspond to the high ring fingers.¹¹ Expressed in relative modern note names without accidentals, this unique scale runs like shown in Figure 1,¹² starting just with the first letter of our alphabet. A lucky coincidence?

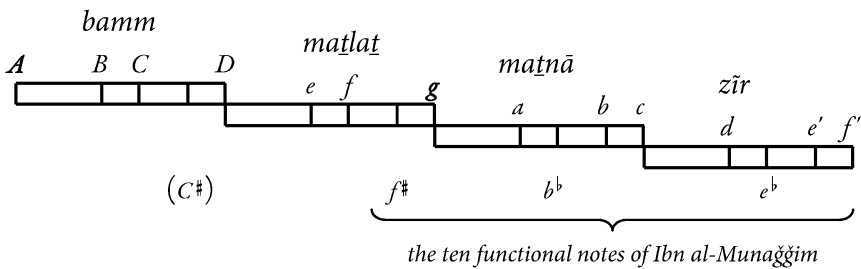


FIGURE 1 Matching a diatonic scale to the typical 'ūd tuning (pantonic variant)

Note: I introduce the term 'pantonic' for a tuning generated exclusively by alternating fifths and fourths, which leads to segmenting the octave in terms of whole tones, first to an anhemitonic pentatonic, then to a heptatonic scale, and finally, when the whole tones overlap, to a full chromatic scale in the modern sense, albeit with semitones of two different sizes. The traditional term 'Pythagorean' should be abandoned as historically misleading and wrongly Eurocentric, apart from being loaded with esoteric associations.

10 Ibn al-Munaḡḡim (*Kitāb an-Naḡam*, transl. Neubauer, "Al-Ḥalīl ibn Aḡmad," 301; 310–11) relates the teachings of Ishāq b. Ibrāhīm al-Mawṣilī, whose quasi-modal nomenclature refers to that dichotomy on the *maṭnā* string.

11 For the importance of octave counterparts on the 'ūd in the period in question, cf. al-Kindī, *Risāla fī Ḥubr ta'līf al-alḡān* 1.1–3, ed. by Lachmann and el-Hefnī, viii–ix; 21–22; Ibn al-Munaḡḡim, *Kitāb an-Naḡam*, transl. Neubauer, 304–5.

12 This 'natural' transcription is used by Neubauer ("Die acht 'Wege' in der arabischen Musiktheorie und der Oktoechos," *Zeitschrift für Geschichte der arabisch-islamischen Wissenschaften* 9 (1994): 387; "Al-Ḥalīl ibn Aḡmad"), in contrast for instance to a rendition based on G (e.g. Owen Wright, "Ibn Al-Munajjim and the Early Arabian Modes," *The*

Apart from that bass note *A*, we learn that *g*, sounded from the open second string (*matnā*) was pivotal as the reference note (*‘imād*) for the tuning of the instrument (and others).¹³ However, we must notice that the note from the open *matnā* is both the lowest of the higher and the highest of the lower range. Consequently, it lacks an octave counterpart, unless the bass string is relaxed by one tone. In standard tuning, therefore, we would expect that in spite of its role as a reference note, *g* is less useful as a tonal center than are the other notes from the same string.

Can we know the typical absolute pitch to which the early *‘ūd* was tuned, or at least a range within which it was typically tuned? Two potential clues may guide us: on the one hand, the relation to the human voice; on the other, the physics of strings. The latter defines absolute boundaries: as discussed above, four strings of a single material tuned in fourths basically exhaust their potential. The early medieval *‘ūd*, however, combined gut and silk strings. Its four strings might thus have been tuned to any pitch between the low boundary for gut and the high for silk.

The *Iḥwān aṣ-Ṣafā’*, on the other hand, describe all strings in terms of silk strands and state that the treble string was stretched close to the point of breaking.¹⁴ This cannot be true, because it would preclude adding a fifth string, tuned a fourth above the original *zīr*, as had occasionally been done by the time of Ibn al-Munaḡḡim and became customary later.¹⁵ The original treble

Galpin Society Journal 19 (1966): 28; Sawa, *Music Performance Practice*) or even *C* (Manik, *Das arabische Tonsystem im Mittelalter*).

- 13 Ibn al-Munaḡḡim, *Kitāb an-Naḡam*, transl. Neubauer, “Al-Ḥalīl ibn Aḥmad,” 302; cf. Neubauer, “Bau der Laute,” 321–22.
- 14 *Iḥwān aṣ-Ṣafā’*, *Ep.* 5.8, ed. Wright, ٧٣–٧٦, 111–18. Much later, Aḥmad b. Muḥammad al-Maqqarī considered silk strings the historically older material, apparently reversing the historical development; cf. Henry George Farmer, “The Origin of the Arabian Lute and Rebec,” *The Journal of the Royal Asiatic Society of Great Britain and Ireland*, no. 4 (1930): 773.
- 15 Ibn al-Munaḡḡim, *Kitāb an-Naḡam*, transl. Neubauer, “Al-Ḥalīl ibn Aḥmad,” 303; cf. Neubauer, “Bau der Laute,” 306. By the way, without any historical context, the description of the *Iḥwān* would make good internal sense. A silk string of about 60cm length tuned a minor third below breaking would sound about an F4 (c. 345Hz), resulting in a melodic gamut within the two higher strings of *C4–B4*^b. This is a rather convenient range for a male voice singing an octave lower, a bit low perhaps. But the fifth string as well as the following considerations contradict such a reconstruction. It is difficult to see what went wrong with the *Iḥwān*’s account. Did they erroneously transfer the close-to-breaking rule from the five-stringed lute to the older form, or perhaps a rule that had applied to gut strings to silk? Note that few musicians would actually experiment with the breaking pitch, and that the rule to tune something close to breaking is entirely useless as a practical advice.

string must therefore have been comparatively slack, at least a fourth further removed from the breaking point of silk than would have been necessary. Coincidentally, the difference in breaking pitch between silk and gut of reasonable quality is also about a fourth.¹⁶ Apparently the partially silk-strung *ūd*, as long as it had only four strings, therefore played at a pitch that was also accessible to an instrument with gut strings throughout. Quite possibly the relation between voice and instrument had remained stable even after the adoption of silk, advantage of whose full potential was taken only later when the range was augmented by a new treble string. In East-Asia, in contrast, where silk strings were customary, the vibrating string length was increased by a fourth (from about 60cm to about 80cm¹⁷), so that the instruments would optimally play in the same range as the smaller Western variant did with gut strings.

A high-quality gut string of 60cm length is expected to break at about 340Hz. The highest advisable tuning, allowing for plucking and strumming the string without breaking it, is about a minor third lower. A gut *zīr* might therefore have been tightened up to around 290Hz or a tiny bit higher, which would place the open *matnā* at approximately 215Hz, no more than a quartertone below modern A₃. Without compromising the sound of the bass string too much, the instrument might have been tuned up to about a major third or even a fourth lower. However, for certain modes *ūd* players used to lower the bass string by a tone, down to the octave below open *matnā*.¹⁸ The ‘normal’ *bamm* tuning must therefore be sought at least a tone above the lowest possible pitch.

Considerations regarding the range of vocal performances are necessarily less precise. The best starting point is the reported feat of prince and short-time caliph Ibrāhīm Ibn al-Mahdī to sing the same melody in four different octave registers.¹⁹ This is unlikely if that melody would have unfolded over an octave or more; on the other hand, it might have been less impressive

16 Cf. Abbott and Segerman, “Strings in the 16th and 17th Centuries”; Nicolas Lynch-Aird and Jim Woodhouse, “Comparison of Mechanical Properties of Natural Gut and Synthetic Polymer Harp Strings,” *Materials* 11, no. 11 (1 November 2018): 2160. Note that high-quality gut is typically used for lute treble strings, where the instrument requires only a single string that is resistant to high strain, in contrast especially to harps, where many strings are subjected to similar tensions (and frequent breaking is therefore no viable option). For *ūd* strings snapping during performance, cf. Ibn al-Munaḡḡim, *Kitāb an-Naḡam*, transl. Neubauer, “Al-Ḥalīl ibn Aḥmad,” 307.

17 Kenzō Hayashi, Shigeo Kishibe, Ryōichi Taki & Sukehiro Shiba, *Musical Instruments in the Shōsōin* (正倉院の楽器) (Tokyo: Nihon Keizai Shinbunsha 1967), 82.

18 Al-Kindī, *Risāla fī l-Luḡūn wa-n-naḡam* 2; cf. Neubauer, “Bau der Laute,” 324–5.

19 Abū l-Faraḡ al-Iṣfahānī, *Kitāb al-Aḡānī*, ed. by Muḥammad Abū l-Faḡl Ibrāhīm et al. (Cairo: al-Hay’a al-miṣriyya al-‘amma li-l-kutub, 1970–74), 10:100–1, cf. Neubauer, “Al-Ḥalīl ibn Aḥmad,” 301–2 n. 152.

he was a kind of Barry White or David Bowie; a Prince might have sung two octaves higher but only one lower, while an Axl Rose might have added even a fifth register.

The account of Ibrāhīm's vocal ambitus thus betrays that the overall range of the higher two strings on the *ūd* covered rather the higher part of the common vocal range. This accords with string physics, which had suggested tuning the *zīr* not much lower than *B*₃. The upper limit of the common range, in turn, cautions from tuning it higher, as this would push its small-finger fret beyond that range – especially keeping in mind that even higher notes were sometimes played on this string. This places *matnā* around *F*_{♯3}, *matlat* at about *C*_{♯3}, and *bamm* around *G*_{♯2}.

How precise are these results? On the one hand, they depend on the vibrating length of the open strings, for which 60cm is only an approximate value, depending on the exact extent of the 'finger' by which the early sources describe the construction of the *ūd*; however, we can be reasonably confident that the actual length differed by no more than about a quartertone, more probably in the direction of lower pitch. On the other hand, the common vocal range is a crucial factor. We have started from modern values, but these are nicely corroborated by data from Greco-Roman antiquity. If all remains of ancient notated vocal music are evaluated, the octave within which the largest number of notes falls is precisely the one that starts from our presumed upper limit downwards (in Figure 2, 'DAGM best-fit vocal octave').²¹ Expressed in ancient notation, this octave ranges from *hyperypátē* ΦF up to *paranētē* UL; the absolute pitch of these notes is known from mutually corroborative evidence.²² Our tentative ascription of the open *bamm* to *G*_{♯2} also agrees perfectly with Eckhard Neubauer's interpretation, who started from different sources and inferred A and G as possible values on the basis of modern vocal ranges.²³

21 According to our latest data, 2474 extant vocal notes fall within this octave, as compared with 2358 for the octave a semitone lower, and 2315 for that a semitone higher; data pool: notes clearly read according to Egert Pöhlmann and Martin Litchfield West, *Documents of Ancient Greek Music: The Extant Melodies and Fragments* (Oxford: Clarendon Press, 2001).

22 Cf. Stefan Hagel, *Ancient Greek Music: A New Technical History* (Cambridge: Cambridge University Press, 2009), 68–94; Stefan Hagel, "Notation," in *Companion to Ancient Greek and Roman Music*, ed. by Eleonora Rocconi and Tosca Lynch (Hoboken, NJ, USA: Wiley Blackwell, 2020), 297–310.

23 Neubauer, "Acht 'Wege'," 387; Neubauer, "Al-Ḥalīl ibn Aḥmad," 304, based on al-Kindī, *Risāla fī l-Luḥūn wa-n-naḡam*, ed. by Zakariyyā Yūsuf, *Mu'allafāt al-Kindī al-mūsīqīyya* (Baghdad: Maṭba'at Šafīq, 1962), 15, and Ishāq al-Mawṣilī *ap.* Ibn al-Munaḡḡim, *Kitāb an-Naḡam*, transl. Neubauer, "Al-Ḥalīl ibn Aḥmad." However, I fail to understand the argument for G in "Acht 'Wege'," n. 54 – if the open *matnā* is an octave above A, would the *bamm*, two fourths below, not become B instead of G? Cf. also Gerhard Söhne, "Zum

As is also shown in Figure 2, the dominant string instrument of antiquity, the cithara, not only also played in the higher region of the common vocal range, but exceeded it by a whole tone. Though we do find its highest note, *nétē* ΘΜ, in the vocal scores, it is far less frequent than its lower neighbor, *paranétē* ΥΛ (16 vs 162 instances). According to Ibn al-Munağğim’s report of the teachings of the Mawšili school, the range of the regular ‘ūd frets was extended by changing the hand position on the treble string: by shifting the fingers away from the nut by two fret positions, the ring finger became able to play the note a semitone above the highest fret.²⁴ In the respective passage, Ibn al-Munağğim is only interested in enumerating the set of functional notes within the octave, so he does not discuss the role of the small finger in this playing position, which would just reduplicate the note obtained from the open *maṭnā* an octave below. In fact, this note must have been used as well. Otherwise there would have been no point in moving the hand forth and back over two frets; a shift of one fret would have sufficed, accessing the additional semitone with the small finger instead of the ring finger. By the attested shift of two frets, however, the upper limit of the ‘ūd becomes virtually identical with that of the ancient cithara, reflecting the latter’s divergence between its strings and the typical vocal range by the requirement of changing the playing position in order to access the same additional tone.

If our reconstruction of early ‘ūd pitch is correct, the analogies with structures found in ancient music do not stop here. The pitch of the open *zīr* echoes that of ancient (‘Lydian’) *mésē* Ι<, the pivotal note of lyre tuning and the system of ancient notation alike. The open *maṭnā*, in turn, the primary reference pitch of the Arabic sources and as such the lowest note and starting point of Ibn al-Munağğim’s enumeration, reflects ancient *hypátē* CC, originally the lowest string on the lyre before *hyperypátē* ΦF was added. A fourth lower, the higher of the two bass strings, *maṭlat*, appears to have sounded the ancient note Π, which forms a frequent bass note in the scores and seems to have featured prominently in doublepipe design at least from Hellenistic times on.²⁵ The pitch of the open *bamm*, finally, is deeper than ancient melodies normally reached. Only a single fragment plunges down to that region, doing so mainly

Versuch der Rekonstruktion einer frühen arabischen Laute,” *Zeitschrift für Geschichte der arabisch-islamischen Wissenschaften* 9 (1994): 366.

24 Ibn al-Munağğim, *Kitāb an-Nağam*, transl. Neubauer, “Al-Ḥalil ibn Aḥmad,” 303.

25 Stefan Hagel, “Reconstructing the Hellenistic Professional Aulos,” in *La Musa dimenticata: Aspetti dell’esperienza musicale greca in età ellenistica*, ed. by Maria Chiara Martinelli (Pisa: Edizioni della Normale, 2009), 356–61.

for a single line of text, duplicating its normal range an octave below for special effect, reminiscent of the register changes reported for Ibrāhīm Ibn al-Mahdī.²⁶

A more detailed relation between the suggested approximation of early *ūd* pitches and the notes of Roman-period song is displayed in Figure 3. Apart from the relative prominence of the notes associated with the open strings, especially when compared with their immediate neighbors, the most striking coincidence is the absence of Θ , which falls right within the undivided whole tone on the lute, above the index-finger fret. This is all the more noteworthy because in ancient theory Θ forms part of the *Unmodulating System* of the natural key, so that its omission from Roman-period singing comes as a surprise.²⁷ On the other hand, the lute design does not provide for P , which would fall on the corresponding position on *matnā*. Among the keys (*tónoi* or *trópoi*) that are found in use in the Roman era, P is particular to the Lydian, which corresponds to a ‘Dorian’ lyre tuning in the citharodic terms that Ptolemy uses. Consequently an *ūd*, when transplanted into late antiquity, would not be able to play in this key, but only in the ‘sharper’ keys of Hypolydian, Hyperiasian and Iastian, which respectively represent ‘Hypodorian’, ‘Phrygian’, and ‘Hypophrygian’ cithara tunings.

The musical fragments from the Roman period span more than two centuries. Things become even more interesting when we stop treating the corpus as monolithic. In Figure 4, the notes statistics is restricted to those sources which Pöhlmann and West unequivocally date after 200 CE. Astoundingly, the note P appears unattested in this period. Instead, the diagram now looks as if it was meant to illustrate *ūd* music: *matnā* is the centre of melodic movement, which

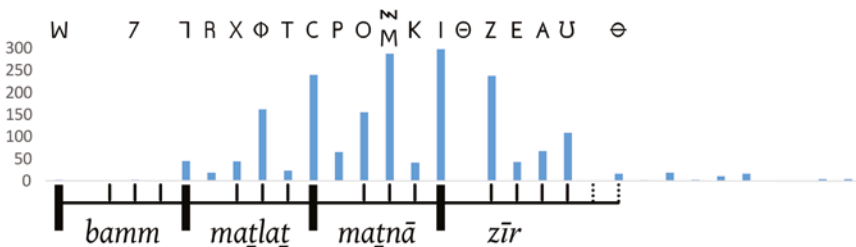


FIGURE 3 Reconstructed *ūd* pitches and frequency of Roman-period vocal notes
Data pool: notes clearly read according to Egert Pöhlmann and Martin Litchfield West, *Documents of Ancient Greek Music: The Extant Melodies and Fragments* (Oxford: Clarendon Press, 2001)

26 Pöhlmann and West, *Documents of Ancient Greek Music* no. 41.i.4–6; for a corrected transcription see Hagel, *Ancient Greek Music*, 300–2.

27 Cf. Hagel, *Ancient Greek Music*, 95–96.

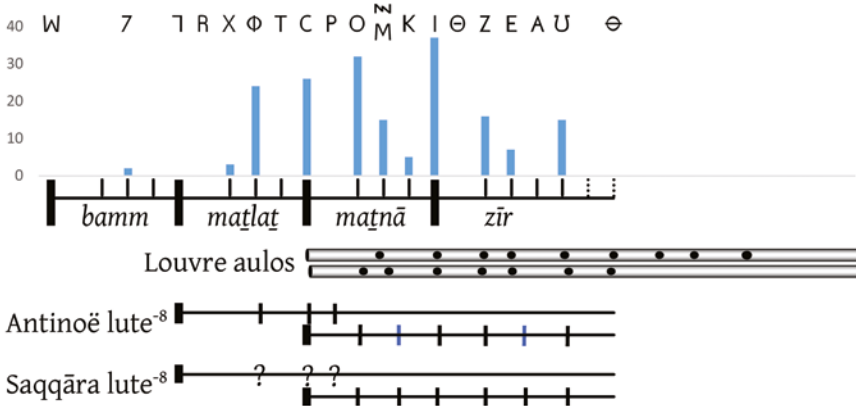


FIGURE 4 Frequency of vocal notes in sources dated after 200 CE and reconstructed pitches of the early *ūd*, the Louvre aulos, and the Antinoë and Saqqāra lutes (originally an octave higher)
Data pool: notes clearly read according to Pöhlmann and West

often also ventures up to the highest fret of *zīr* and also one note beneath the open *maṭnā* to the middle-finger fret on *maṭlaṭ*. The most typical key is the Hypolydian, which would combine the open strings and index-finger frets with the middle-finger frets, omitting the ring fingers.

A similar sidelining of P appears in the design of the Louvre aulos, also shown in Figure 4, which could play along a cithara tuned to Hypolydian and might just as well accompany an early *ūd*. The common bass note of its two pipes might even exemplify Ibn al-Munaḡḡim's statement that the open *maṭnā* provided the tuning standard for wind instruments.²⁸

We find only one seeming discrepancy between late-Roman-period note statistics and the earliest information about *ūd* music, according to which the melodies were generally realized on the two higher strings. The important note Φ, which formed the bass string of the post-Classical kithara, called *hyperypátē* or *diápemptos*, can only be played on *maṭnā*, the third string. However, it appears that precisely this note also featured so prominently in Early Abbasid music that it triggered a blatant inconsistency in Ibn al-Munaḡḡim's account. On the one hand, he insists that notes an octave apart are equivalent to a degree that does not warrant attributing different functions to them, and consequently catalogs the notes from the bass strings only as duplicates.²⁹ Accordingly, when discussing the notes that are mutually compatible or

28 See above, note 14.

29 Ibn al-Munaḡḡim, *Kitāb an-Naḡam*, transl. Neubauer, "Al-Ḥalīl ibn Aḡmad," 304–5.

incompatible within a single (simpler) composition, Ibn al-Munağğim generally refers only to the treble strings. On the other hand, he departs from this convention in the case of the two highest notes from the *matlat*, to which he refers notwithstanding the fact that their octave counterparts, sounded from *zīr*, are also enumerated.³⁰ Where the higher instance on the *zīr* is inconspicuously realized from the normal small finger fret, it is impossible to see what would have prompted the duplication of this functional note in Ibn al-Munağğim's list other than the simple fact that it was indeed accessed in regular melodies, for instance as a lower 'leading note' toward the open *matnā*.³¹ In this way, the concordance between the notes of Roman-period melodies and those provided for by the earliest Arabic source of which we know in sufficient detail becomes almost perfect.

All this suggests considering a much closer connection between the music of Roman-period Egypt and Early Abbasid Baghdad than one might have dared to assume. In turn, we must wonder whether such a connection might also have included a continuation in lute culture. From the regions that formed the Roman empire, no lute imagery seems to survive from before the Arabic conquest that resembles the characteristic pear shape of the *ūd*; the surviving late antique and early Byzantine lutes show a very different form and typically have only three strings arranged in two courses.³² Some Roman-period iconography, in contrast, distinctly shows four strings.³³ At the same time, pear-shaped lutes turn up in Gandhāran art, with four strings, wherever the nature of the source suggests counting these.³⁴ When such instruments arrived in China a

30 Ibn al-Munağğim, *Kitāb an-Nağam*, transl. Neubauer, "Al-Ḥalīl ibn Aḥmad," 312.

31 For the respective pitch as a leading note in ancient music, see Stefan Hagel, "Leading Notes' in Ancient Near Eastern and Greek Music and Their Relation to Instrument Design," *Studien zur Musikarchäologie (Orient-Archäologie)* 10 (37) (2016): 135–52. Note that when describing the open *matnā* as the lowest note of the human voice, Ibn al-Munağğim (*Kitāb an-Nağam*, transl. Neubauer, "Al-Ḥalīl ibn Aḥmad," 304), is evidently talking about its lower octave counterpart, a whole tone below the standard tuning of the *bamm*.

32 See below, n. 38.

33 Cf. Christophe Vendries and Sibylle Émerit, "Autour du luth d'Antinoé: musique et culture dans l'Égypte byzantine," in *Le luth dans l'Égypte byzantine: La tombe de la « Prophétesse d'Antinoé » au Musée de Grenoble*, ed. by Florence Calament, Ricardo Eichmann, and Christophe Vendries, (Rahden/Westf.: M. Leidorf, 2012), figs 22–23. The apparently 7 strings on the crude-looking lute of fig. 21, if not resulting from carelessness or adopted from the canonical number of (archaic) lyre strings, would have to represent courses of mostly two strings.

34 Cf. The Airtam frieze, Hermitage Museum, St. Petersburg (<https://twitter.com/RawBcnRic/status/1321241183054663681/photo/1>, accessed 2021-11-29); Cleveland 1980.15 (<https://www.clevelandart.org/art/1980.15>, accessed 2021-11-29); Indian Museum, Kolkata 5136 (https://commons.wikimedia.org/wiki/File:Gandharan_Lute.jpg, accessed 2021-11-29);

few centuries later, to be transformed to the *pípá* 琵琶,³⁵ they seem to have featured the same four strings and four frets in TSSS spacing that the Arabic sources describe; this is most obvious from the famous eighth-century specimens that are preserved intact in the Shōsōin at Nara, Japan. Only later does the *pípá* acquire its modern abundance of frets, apparently inspired by the long-necked round-bodied *ruǎn* 阮.³⁶ The common fundamental design of *pípá* and ‘ūd strongly suggests that it had already defined their common ancestor, which may take us back to the fourth century CE, before it reached China, or even the first century CE, if we assume that, along with the shape and the number of strings, the arrangement of frets had also remained constant during that period. At any rate, before the East-Asian and the Western branches of the instrument split, it appears more than likely that an ‘ūd-like design existed in Central Asia contemporaneously with the aforementioned Roman-Imperial musical evidence, which fits so well with Ibn al-Munaǧǧim’s account. This, in turn, may suggest that the four-stringed lutes found in the iconography from the Roman Empire, albeit differently shaped, shared the typical TSSS fret design and/or playing position that, as we have seen, is most natural for lutes from a diatonic music culture whose strings exceed the length within which the human fingers can access a series of notes belonging to a single heptatonic scale.

These considerations may find circumstantial support from more distantly related instruments. In the repertory of seven extant late antique or early Byzantine lutes, commonly but misleadingly termed ‘Coptic’, a particular variant stands out: firstly for its comparatively small size; secondly because two items of virtually the same musical design have been preserved; and thirdly because their original fretting is known and they are therefore uniquely well understood.³⁷ In contrast to the ‘ūd, or any instrument with tied frets, these

Rome, Museo Nazionale di Arte Orientale 426 (Lo Muzio, “Classificazione Degli Strumenti Musicali Raffigurati Nell’arte Gandhārica,” fig. 4; <https://twitter.com/DalrympleWill/status/1321138999642198018/photo/2>, accessed 2021-11-29).

35 The term *pípá* (originally pronounced something like /biɪbʷa/) might derive from *barbat*; cf. Henry George Farmer, “Reciprocal Influences in Music ‘twixt the Far and Middle East,” *Journal of the Royal Asiatic Society* 66, no. 2 (1934): 328; Shigeo Kishibe, “On the Origin of the p’i-p’a,” *Transactions of the Asiatic Society of Japan, Ser. 2* 19 (1940): 259–304; Picken, “The Origin of the Short Lute,” 33.

36 On the relation between *pípá* and *ruǎn* and the development of the terminology, cf. Ingrid Furniss, “Wenren Strumming the Ruan: The Chinese Elite’s Assimilation of a Foreign Lute,” *Imago Musicae* 30 (2018): 7–37.

37 Ricardo Eichmann, *Koptische Lauten: eine musikarchäologische Untersuchung von sieben Langhalslauten des 3.–9. Jh. n. Chr. aus Ägypten* (Mainz: Philipp von Zabern, 1994); Ricardo Eichmann, “Strings and Frets,” *Studien zur Musik-Archäologie (Orient-Archäologie)* 1 (6)

came with different sets of wooden frets for different strings: merely three for the bass string, but six for the treble course which consisted of two strings that were almost certainly tuned to the same pitch. With only two courses, we cannot easily pinpoint the absolute pitch of these instruments; but it is possible to determine their relative scales. In a recent publication, guided only by the evidence from Roman-period music and still unprejudiced by the considerations the present contribution is putting forward, I have tentatively suggested tuning their treble strings an octave above the lyre *hypátē* C, and their bass string a fourth lower, an octave above $\bar{7}$. This would put their treble course precisely an octave above the pitch we have above derived for the *ʿūd* (cf. Figure 3). We can now evaluate this suggestion by comparing the sizes of the instruments, on the working hypothesis that their respective treble string tensions were comparable, i.e. removed from breaking tension by about the same amount. Assuming that the *matnā* of the *ʿūd* was tuned an octave below the treble course of the smaller lutes, this would put the *zīr* of the *ʿūd*, which was tuned a fourth above *matnā*, a fifth below that treble course. The respective length difference between the approximately 60cm vibrating string length on the *ʿūd* and about 39cm on the smaller lutes in turn amounts to about 745 cents. This differs from the hypothetical fifth by less than a quartertone – an astounding coincidence given the overall flexibility of string tunings. The two lines of reasoning thus gain additional support from each other. Most importantly, the apparent octave relationship between the two types of lute exists irrespective of their potential links to the musical pitches of the ancient musical documents. After all, four-stringed lutes resembling the *ʿūd* had existed centuries before the extant late antique small lutes were built, at least in post-Hellenistic Central Asia, alongside differently-shaped four-stringed cousins in the Mediterranean sphere. A close musical connection between the two types, making the apparently younger sort of the treble version of the older should therefore come at little surprise.

How would that relation bear out in detail? Above all, the idea of a ‘treble version’ is not at all reflected in the basic design or playing technique, just as the idea of ‘octavating’ is not implemented simply by producing a half-size instrument. Being pitched a fifth higher, as far as string length is concerned,

(2000): 35–46; Florence Calament et al., eds., *Le luth dans l'Égypte byzantine: la tombe de la Prophétesse d'Antinoé au Musée de Grenoble*, *Orient-Archäologie* vol. 26 (Rahden/Westf.: VML, Verl. Marie Leidorf, 2012); Ricardo Eichmann, “Extant Lutes from the New Kingdom and the Coptic Period of Ancient Egypt,” in *ICONEA 2011: Proceedings of the International Conference of Near Eastern Archaeomusicology held at Senate House, University of London, December 1, 2 and 3 2011*, ed. by Richard Dumbrill. (London: ICONEA, 2014), 23–35; Stefan Hagel, “Coptic Lutes’ Scales: Finding a Robust Approach,” in *Klänge der Archäologie*, ed. by Claudia Bührig et al. (Wiesbaden: Harrassowitz, 2021), 165–73.

the late-antique lutes allowed for heptatonic fretting. Operating on shorter strings, where similar distances create larger intervals, the left hand was here able to access five successive notes of a heptatonic scale on a single course without changing position. On the downside, the absence of additional semitone steps precluded modulation to other tonalities: melodic modal variety was only attainable by the selection of different focal notes. Since the melodic course was already comparatively close to breaking tension, no further treble string could be added; instead, in contrast to the *‘ūd*, any melody that exceeded five notes required changing the position of the left hand on the neck, as is customary with long-necked lutes.

Nevertheless, the total melodic gamut of both instrument types is identical. The pair of fourths that the treble strings of the *‘ūd* form, is implemented as a single series of frets on the melodic course of the smaller lutes. The spacing of those frets furthermore reflects the physical requirements of the *‘ūd* by starting both fourths with a whole-tone step. Instead of implementing a combination of tone and semitone, the remaining interval is split in two physical halves and consequently roughly two three-quarter-tone steps, resulting in a much more physiological fret spacing. The ensuing kind of tuning with its neutral thirds is incompatible with the tenets of ancient Greek music theory, but was, in mathematically idealized form, described by Claudius Ptolemy, who famously called it the ‘even diatonic’ (*diatonikón homalón*). As a part of actual music culture, it is not described until al-Fārābī’s *Kitāb al-Mūsīqī al-kabīr*. Here it surfaces as an alternative *‘ūd* fretting associated with the name of the famous lutenist Maṣṣūr Zalzal aḍ-Ḍārib from the first half of the ninth century. This fretting contrasts with both the diatonic-chromatic scales of the earliest Arabic sources and the slight deviation from these whose distinctive fret al-Fārābī knows as the ‘Persian middle finger’ (*al-wuṣṭā al-furs*).³⁸ Importantly, although the musical result is very similar to Ptolemy’s account, al-Fārābī’s math works out differently by the twentieth part of a tone,³⁹ so that we can be certain he is not following ancient tradition but tries to describe the musical practice of his own time, even though this did not result in a structure that lends itself to a description in terms of small integers, as would satisfy the philosophical aesthetics of a Pythagoreanising tradition.

Otherwise the small late-antique lutes implement a scale whose intervallic structure appears tailored to the melodic requirements that surface from the early Arabic sources. If their open treble course was indeed tuned an octave

38 Al-Fārābī, *Kitāb al-mūsīqī al-kabīr*, ed. by al-Ḥašaba, 510–11.

39 While one would need to bisect the distance between index and small finger fret in order to imitate Ptolemy’s even division, al-Fārābī splits that between the the ring finger and the Persian middle finger, which in turn sits halfway between index and ring finger.

above the open *maṭnā* of the *ʿūd*, the frets of this course lay out a heptatonic scale precisely up to an octave above the highest fretted note of the *ʿūd*, played by the small finger on *zīr*. Whole tones reflect those between nut and index fret on the *ʿūd*, while the equidistant nature of the instrument realized the intervening notes right between the standard diatonic/chromatic middle and ring fingers of the *ʿūd*, so that they created the notes an octave above the ‘Zalzalian’ middle fingers. Perhaps most strikingly, the note a whole tone below the open *maṭnā*, which, as we have argued above, was included in the typical melodic repertory in spite of being realized on *maṭlat*, was played in the same manner on the lute from Antinoë: a fret for it is provided on the bass string (the bass fret positions are lost on the similar instrument from Saqqāra).⁴⁰

The tonal correspondences between two instruments, which are so unlike each other at a first glance, are astonishing, and it is difficult not to regard the late antique lutes as a sort of missing link between Roman-Imperial and Early Abbasid music. However, if the similarities are not dismissed as coincidental, they also do not suggest a development from the earlier small lutes to the later large ones. This is because the precise arrangement of frets and intervals is all but natural on the *ʿūd* – above we have discussed how its design responds to the physical requirements of string material and finger spans. On the smaller instruments, the same tonal structure appears as a random choice out of various possibilities. If anything, the late antique lutes must have been designed to reflect the tonality of larger instruments, not the other way round. This accords with our former conclusion that four-stringed lutes very similar to the *ʿūd* had been around centuries before the extant small lutes were manufactured – almost certainly in Central Asia, but quite probably also in the Mediterranean, where they lacked the pear-shaped design that was to become the hallmark of the instrument.

Limited by their own physical constraints, the extant small lutes however did not implement a design corresponding to the TSSS frets we need to expect for that pre-*ʿūd* on the basis of the East-Asian tradition and the early Arabic writings, but the three-quarter-tone steps and neutral thirds that we find later associated with the name of Zalzal. This is perhaps the most puzzling aspect in our story: how would a musical structure that had existed for centuries become associated with a specific musician of the ninth century? Did he really introduce it to the *ʿūd*? If so, what about the otherwise so close structural match between a ‘Zalzalian’ *ʿūd* and the small late-antique lutes? Moreover, if Iṣḥāq

⁴⁰ Apart from this fret, the bass string has one for the fourth (from which it could easily be tuned to the treble course) and one a semitone higher, corresponding to the ‘neighbor of the index’ fret described by al-Fārābī, which would add the missing *parypātē* P⊔.

al-Mawṣilī was his student who held him in the highest esteem,⁴¹ why do we fail to find the slightest reflex of Zalzal’s near-equidistant fretting in his teachings as relayed by Ibn al-Munağğim?⁴² Or is the connection between Zalzal’s name and the near-equidistant tetrachord only circumstantial? Notably, though al-Fārābī first introduces the Zalzalian middle finger as the roughly equidistant one, he makes it later clear that this is not the universal practice: others place Zalzal’s fret quite differently, at a distance of a *le’imma* (*baqiyya*) from the ring-finger fret, i.e. a small ‘Pythagorean’ semitone instead of the larger known as the *apotomé* that the old standard tuning employed there. Al-Fārābī describes how expert musicians establish the required fret position with precision by temporarily retuning the lowest string.⁴³ It lies close to the ‘Persian’ middle finger, less than a twelfth of a tone above it. Instead of a neutral third, this version of a ‘Zalzalian’ middle finger creates a perfectly pure minor third with the open string as well as a pure major third with the index fret of the next higher string,⁴⁴ at the expense of precise octaves and fifths wherever a middle-finger fret is involved. This much smaller modification – shifting the fret by an eighth of a tone instead of more than a quartertone – therefore makes eminent musical sense. In contrast to the neutral-third ‘Zalzalian’, the frets of this alternative pure-third ‘Zalzalian’ retain an obvious sequence of a tone and three semitones (cf. Figure 5) by merely switching the positions of the larger and one of the smaller semitones. In this way, all the notes preserve their basic identity, much as in modern Western music notes are perceived as identical whether they are played on a tempered instrument or in pure thirds, for instance by a string ensemble. Consequently it is no great wonder that what we know of Iṣḥāq al-Mawṣilī’s system did not distinguish these two fine tunings.⁴⁵

41 Cf. Eckhard Neubauer, “Mawṣilī, al- Family,” in *Grove Music Online* (Oxford: Oxford University Press, 2001).

42 Cf. Owen Wright, Christian Poché, and Amnon Shiloah, “Arab Music,” in *Grove Music Online* (Oxford: Oxford University Press, 2001).

43 Al-Fārābī, *Kitāb al-Mūsīqī al-kabīr*, ed. by al-Ḥaṣāba, 517–19. Al-Fārābī’s Persian and near-equidistant Zalzalian middle-finger frets are also described in Muḥammad b. Aḥmad al-Ḥwārizmī, *Mafātīḥ al-‘ulūm* §18, ed. by Eilhard Wiedemann, “Beiträge zur Geschichte der Naturwissenschaften LXVI: Zur Geschichte der Musik,” *Sitzungsberichte der Physikalisch-Medizinischen Sozietät zu Erlangen* 54–55 (1922–23): 7–22.

44 Al-Fārābī’s description in terms of a fourth minus two adjacent *le’immata* places the fret at a theoretical 317.6 cents from the nut, which is indistinguishable from the 315.6 cents of a perfect minor third.

45 It may be significant in this context that the same indifference is found within al-Kindī’s work, where the numerical fret positions reported in his *Risāla fi l-Luḥūn wa-n-naḡam* (cf. Neubauer, “Bau der Laute,” 327) do not reflect the tuning in fifths and fourths he describes in his *Risāla fi Ḥubr ta’līf al-alḥān*. Instead, the middle-finger fret posited in the former work numerically embodies the pure thirds of the alternative ‘Zalzalian’ (30:25 =

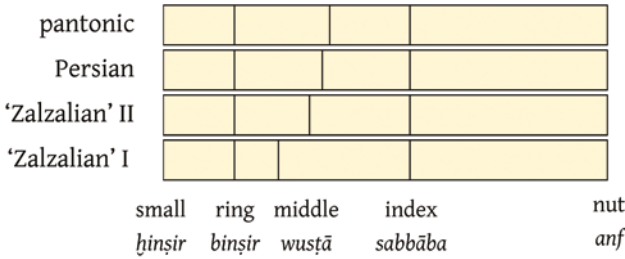


FIGURE 5 Relative *ūd* fret positions for Al-Fārābī's pantonic (also Ibn al-Munaḡḡim, al-Kindī I, Iḥwān aṣ-Ṣafā'), 'Persian', and 'Zalzalian' tunings

It is striking that the two versions of 'Zalzalian' middle-finger positions differ more from each other than does one of them from the other recorded positions of the same fret. Apparently, any upward displacement of the fret from its pantonic or 'Persian' standard had somehow come to be called by Zalzal's name. But it is hardly conceivable that the historical Zalzal introduced more than one option without further distinction. Most probably, his innovation concerned one particular tuning, whose designation was later generalized when the two different traditions had met on an equal footing: both could easily be understood as analogous, if variously extreme, deviations from the old pantonic standard. Which one would originally have been Zalzal's? Within the context of the transmitted musical concepts from his environment, a slight adjustment towards resonant thirds appears a priori far more credible than the creation (or adoption) of a radically different tuning that stands in unmitigated opposition to contemporary as well as somewhat later outlines. The documented age of the equidistant variant points in the same direction: it would be much more difficult to explain how it might have come to be perceived as an 'invention' of the Abbasid era. Finally, even though al-Fārābī introduces the equidistant 'Zalzalian' first, when he later uses the term in the context of quantifiable interval sizes, he often takes it for granted that the reader understands that the less extreme variant is meant – apparently confirming that this should somehow be regarded as the 'truer' variant.⁴⁶

6:5). Accordingly, the position of this fret agrees with al-Fārābī's account of the latter within 1mm; this is not the place to discuss the implications in depth.

46 Al-Fārābī, *Kitāb al-Mūsīqī al-kabīr*, ed. by al-Ḥaṣaba, 676 (tuning the *ṭunbūr al-Baḡdādī*); 727–54 (tuning the *ṭunbūr Ḥurāsānī*); 841–44 (tuning instruments with open strings). The apparent exception is 817, concerning the *rabāb*; but here the account is purely theoretical, since the notes in question are neither defined by frets nor by the tuning of open strings. The derivation of the alleged fingering positions for the Zalzalian notes by

On balance, it appears reasonable to attribute only the smaller shift of the middle-finger fret to Manṣūr Zalzal, restoring much greater consistency to the music of the Abbasid court around 800 CE. Its lute frets, as is presupposed or described in the early Arabic sources, notably Ibn al-Munağğim, al-Kindī in his *Risāla fī Ḥubr ta’līf al-alḥān* and the Iḥwān aṣ-Ṣafā’, would generally have been tuned in fifths and fourths throughout, resulting in the TSSS scheme with one larger semitone between two smaller, a scheme that was shared by contemporary instruments in the Far East. Starting from this traditional layout, Manṣūr Zalzal pushed the middle-finger fret slightly towards the ring-finger fret, so that the instrument would play pure thirds. The ‘Persian’ middle-finger, in turn, looks like a ‘tempered’ version, a compromise between pure thirds, on the one hand, and pure fifths and octaves, on the other. Within al-Fārābī’s musical horizon, in contrast, an equidistant middle-finger fret was also in widespread use, which gave rise to a wholly different sort of scales. Its position was much further removed from the TSSS standard than that of Zalzal’s fret. Nevertheless it became associated with his name as well, probably in an environment where the traditions met: the notion of ‘Zalzal’s middle finger’, being associated with the idea of shifting the middle-finger fret to a higher pitch, was thus transferred to any such shift.

This model remains necessarily speculative, but it incorporates all data much more smoothly than would conceivable alternatives. Not only does it attribute a plausible role to Zalzal himself, it also allows for a tradition of lutes with neutral thirds long before his time, and specifically the probably four-stringed version playing in the same register as the ‘ūd that appears to have influenced the design of the smaller late-antique lute.

At any rate, there is excellent reason to date at least the TSSS variant of a musically ‘ūd-like lute before the Sassanid period, and perhaps a cause for a neutral-third variant of it as early as the fifth century CE. Where and when was the general design invented? The Gandhāran representations in combination with four-stringed lutes in Roman-Imperial iconography caution us from generally asserting a ‘Central Asian’ origin (even though this may well be true for the variant with a pear-shaped body in particular).

More than half a century ago, R.A. Higgins and R.P. Winnington-Ingram collected pictorial and textual evidence for lutes in the ancient Greek cultural

bisection recommends itself as a simple extension of the process by which the ‘Persian’ middle fingers are obtained; no sufficiently accessible procedure would have given the other Zalzalian variant.

sphere.⁴⁷ In both types of sources they were able to trace this rarely mentioned and scarcely represented instrument back to the fourth century BCE. When scrutinizing possible instrument names, they mostly settled on variants of the stem *pandour-*, on the one hand, and *skindapsós*, on the other. With fewer strings and an especially exotic connotation, the former might rather have represented long-necked lutes, perhaps spike lutes, than anything like the instrument we are looking for. In contrast, the *skindapsós* is associated with four strings (τετράχορδος; Matron, cited in Athenaeus, *Deipnosophists* 183a) and a large size and in some way likened to the lyre (μέγας, λυροίεις; Theopompus of Colophon, cited in Athenaeus, *Deipnosophists* 183a–b). Regarding lutes of comparatively large size in the iconography, Higgins and Winnington-Ingram point to the one in the hand of a Muse on the Mantinea base (Athens, National Museum inv. 216).

This is the best representation of a ‘European’ lute before the Roman period; unlike the lyres on the same monument, it is evidently shown being played, the left hand stopping the strings at the uppermost playing position, the right hand with plectrum in the typical position for strumming or plucking. Allegedly stemming from the workshop of Praxiteles, the image inspires some confidence in its realism.

Of course we need to remain aware that musical scales ought (almost) never be inferred from iconography; even though visual artists may strive for a ‘naturalistic’ representation of important proportions and other details, such as string numbers, this cannot *a priori* be taken for granted. In contrast, it is perfectly admissible to compare representations with external evidence: where the two concur, it is likely that the former intentionally portrays certain organological aspects with reasonable accuracy.⁴⁸ Our present case falls within this category: we only need to establish whether the Mantinea lutist is compatible with what we know about possible related instruments from reliable sources.

The important distances are shown in Figure 6. The length of the open strings (d) is determined by the position of the bridge (f) and the nut (g). While the latter is represented as a band within which the precise position from where the string would vibrate cannot be guessed – is it at its lower end

47 Reynold A. Higgins and Reginald P. Winnington-Ingram, “Lute-Players in Greek Art,” *The Journal of Hellenic Studies* 85 (1965): 62–71; cf. now Vendries and Émerit, “Autour du luth d’Antinoé.”

48 Apart from the well-known fact that the bulk of Archaic and Classical Greek representations of lyres show the canonical seven strings known from literary testimonies, one finds also that represented proportions between players and instruments of various types are consistent with the latter’s inferred pitch within a quite small margin (Hagel, *Ancient Greek Music*, 88–92; 328–32).

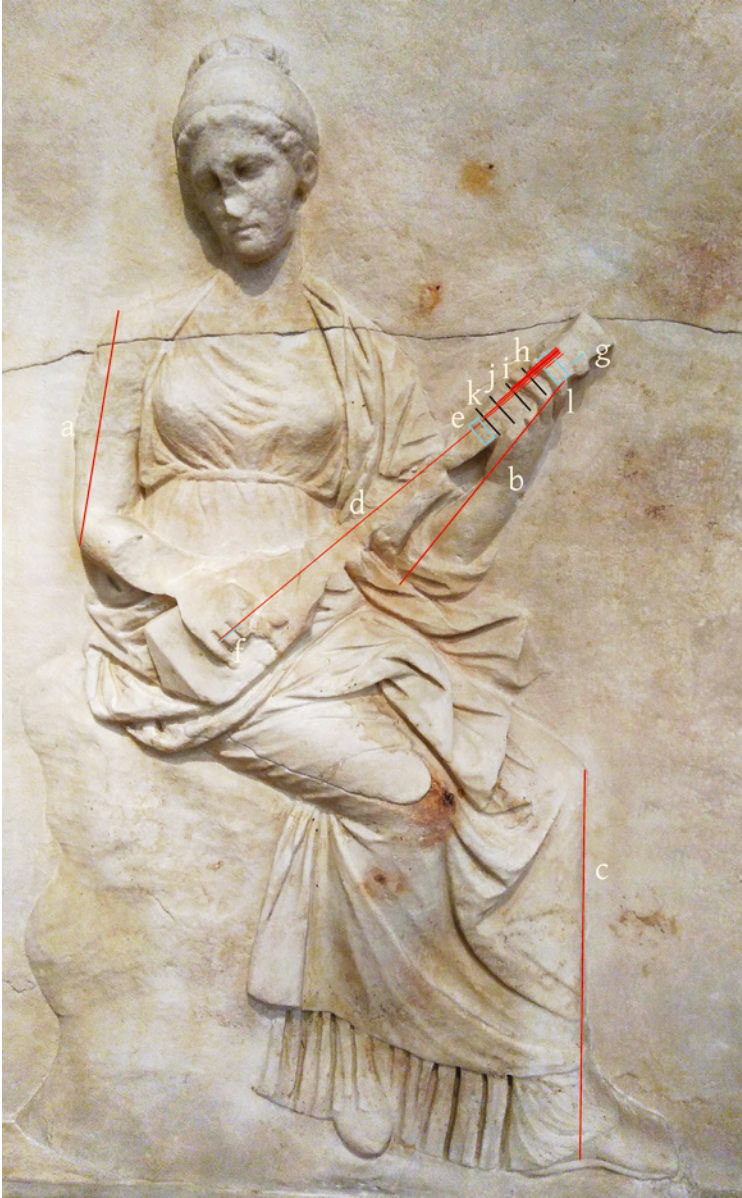


FIGURE 6 Relative lute measurements on the Mantinea base
IMAGE MIRIAM & STEFAN HAGEL

or rather in the centre? – the location of the former is concealed beneath the player's right hand. For both, we need to work from plausible ranges. The fret positions (h–k) are better determined, since they can be judged from the placement of the finger tips. In combination with the ranges for the endpoints of the strings, each fret position translates to an interval range, which is most conveniently expressed relative to the open string. In Figure 7, these ranges are compared with the traditional tuning of the Early Abbasid *ūd*. It emerges that, although that tuning mostly exploits the upper limits of the ranges, the displayed Greek lute is apparently as compatible with the later instrument as one might wish when dealing with iconography – at least as far as the relative scale is concerned.

Approximating absolute measurements is less straightforward. Here we need to judge the size of the instrument against its player, assuming a model of average ancient size. The seated goddess offers mainly three distances of reference: her upper right arm from shoulder to elbow (Figure 6, a); the cubit of her left arm (b); and her left leg from the upper end of the bent knee down to the sole (c). The last, being positioned in the foreground, may be larger in scale in comparison with the instrument, while the cubit is somewhat shortened by perspective; we would therefore expect that the upper arm, being placed only slightly behind the instrument, gives the best estimate. Since body proportions vary between individuals, I have based the following assessment on data averaged from three available females from different regions; at any rate, the variance in the relevant values remained in the range of 1% of the total body height. As expected, when comparing the ratios between the lengths, the knee-sole distance of the relief appears exaggerated, and the cubit, shortened,

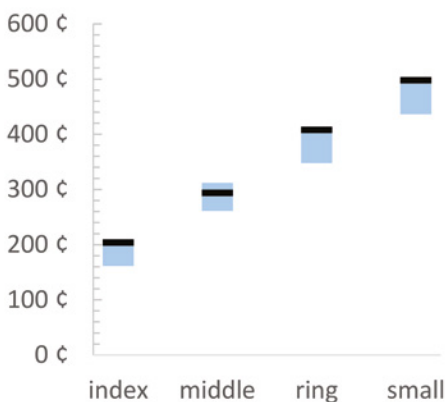


FIGURE 7 Plausible interval ranges on the Mantinea lute (blue) compared with a pantonic tuning (black)

while the upper-arm length ratio is almost identical with the average, which can therefore be safely used as a starting point. In order to translate measurements on the instrument to approximate real-life equivalents, we finally need to settle on a plausible body height for the Muse; a conventional average of 168cm has proven useful also in other musical contexts.⁴⁹ On this basis, the vibrating string length would range between 56.5cm and 61.5cm; the best fit for a TSSS tuning occurs at 58cm. The uncertainties that enter the equations should not affect the outcome by more than a few percent. Without pressing iconographic evidence too much, we can therefore state with confidence that no significant difference can be established between the Mantinea lute and the early *ʿud* regarding either absolute size or the finger positions. The same goes for the number of strings. The width of the neck below the left hand (Figure 6, e) extrapolates to about 3.4cm, above it (l), to 3.9cm, a distance that nicely accommodates four strings, as it does for instance on a modern guitar. With more than four strings, the distances would become too small for stopping individual strings, with fewer, the neck would appear unreasonably wide, needlessly encumbering access to the strings.

All this appears to shift the burden of the argument to those who would deny that the Mantinea lute and the early *ʿud* are functionally similar instruments. A competing musical interpretation of the former, if it can be found at all, would have to change certain parameters by a significant amount. It is hard to see how such a modification might remain compatible with the representation.

Conversely, if only a number of four strings is acknowledged as plausible for the Mantinea lute, for any lute of such a large size a general design of the TSSS kind would appear most natural, as we have discussed above, which would again render it functionally identical with the early *ʿud*. Would such a design fit in the context of late fourth-century BCE Greek music? First of all, if the early *ʿud* basically played the same melodic notes as did the ancient kithara, this would also be true for the Mantinea lute. If Higgins and Winnington-Ingram have correctly identified the latter as a *skindapsós*, this would lend a very specific significance to the epithet “lyre-like” (*λυρόεις*) found in Theopompus. Secondly, some of the coincidences we have observed would also gain a deeper meaning. We have already observed that the arrangement of the pitches in similarly structured fourths recalls the concept of the tetrachord. With the whole tone interval at the bottom, a single string cannot embody a structural tetrachord in the precise Aristoxenian sense, where the lowest position is always occupied by the smallest intervals, but it transpires from Aristoxenus’ own writings, which are roughly contemporary with the Mantinea base, that

49 Cf. Hagel, as in n. 48.

the term was generally employed in a much looser way.⁵⁰ Even more telling is perhaps the partially chromatic nature of the division. While the cuneiform sources transmit a system that was tailored to pure diatonic, and ancient Chinese theory contemplated the full set of twelve semitones in the octave, arrangements of merely two or three sequential semitones appear typically Greek. Two semitones plus a minor third make up a ‘chromatic tetrachord’ (*eff# a*). In combination with a diatonic tetrachord (*efg a*), one obtains three semitones plus a tone (*eff# g a*). In mathematical terms, such sequences are first found in the pseudepigraphic *Timaeus Locrus* from the late Hellenistic period,⁵¹ but a close association between diatonic and chromatic is already established in a famous passage that almost certainly predates the Mantinea monument.⁵² Their mixture, and thus the creation of pitch configurations that match the TSSS frets of the lute, must have been a hallmark of the citharodic art, where a typical modulating tuning would have started, from low pitch, *hyperypátē* (*d*), *hypátē* (*e*), *parypátē* (*f*), *chrōmatiké* (*f#*), *diátonos* (*g*).⁵³ A lute with a similar intervallic pattern would therefore fit perfectly within the musical environment of Late Classical Greece.

Furthermore, since the Greek model scale, the so-called *Perfect System*, starts with a step of a tone as well, its lower octave, expressed in diatonic-chromatic, matches that of a TSSS lute (Figure 8); since the Western note names derive from the *Perfect System*, this is also the reason why the bass note of the *ūd* is most conveniently transcribed as (relative) *A*. In the upper octave, the presence of a ‘modulating’ tetrachord (*synēmménon*) along the ‘regular’ one (*diezeugménon*) introduces a complication. Obviously the creators of the system deemed it important enough to bemuddle their neat scheme. On the lute, it is matched by tuning the second highest string a fourth above the third, even though perfect octave relations would have been assured by tuning it a fifth

50 See e.g. Aristoxenus, *Harmonics*, ed. by Rosetta da Rios (Rome: Publicae Officinae Polygraphicae, 1954), 9.16–20; cf. Hagel, *Ancient Greek Music*, 373–7.

51 For a diagrammatic rendition of its musical division of the world soul, see Hagel, *Ancient Greek Music*, 162. Diatonic and chromatic are also coupled in the numbers given by Thrasyllus, cited by Theon of Smyrna, *Expositio rerum mathematicarum ad legendum Platonem utilium*, ed. by Eduard Hiller (Leipzig: Teubner, 1878), 91–93; cf. Hagel, *Ancient Greek Music*, 159–60.

52 Papyrus Hibeh I 13.15–22, cf. e.g. Martin Litchfield West, “Analecta Musica,” *Zeitschrift für Papyrologie und Epigraphik* 92 (1992): 16–23; Guido Avezzi, “Papyrus Hibeh I, 13: Anonymi fragmentum de musica,” *Musica e Storia* 2 (1994): 109–37; Francesco Pelosi, “Against Musical Ἀτεχνία: Papyrus Hibeh I 13 and the Debate on Τέχνη in Classical Greece,” *Apeiron* 50, no. 3 (2017): 393–413.

53 Cf. e.g. Hagel, *Ancient Greek Music*, 110–11. For possible evidence of a similar tuning already in late Bronze-Age Syria, see Stefan Hagel, “Is *Nīd Qabli* Dorian? Tuning and Modality in Greek and Hurrian Music,” *Baghdader Mitteilungen* 36 (2005): 333–37.

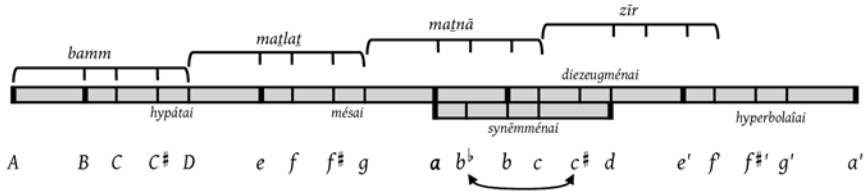


FIGURE 8 The pantonic ‘ūd and the diatonic-chromatic Perfect System

above. As a result, in the higher octave the chromatic $c\sharp$ is traded off against the diatonic and chromatic $b\flat$. The highest string, finally, stops short of completing the double octave, so that the greater part of the highest tetrachord cannot be played, which the Greeks termed the ‘excess notes’ (*hyperboláiai*). Once more, it is hard to imagine a musical context within which the traditional ‘ūd design would make more sense than in the Greek world of the late Classical period, when the chromatic and the diatonic genera were equally valued, and when the *Perfect System* had just been established.⁵⁴

As Higgins and Winnington-Ingram have shown, the lute does not seem to appear in Greek sources of any kind before the fourth century BCE, precisely the environment in which the ‘ūd-like design makes most sense. Notably this is also the period in which the monochord was introduced to harmonic science,⁵⁵ a device so similar to the lute that it would be incomprehensible why earlier theorists would have used the imprecise notion of air columns instead of dividing strings, had the lute played any notable role. If the instrument family was indeed introduced or popularized around the middle of the century, not long before the Mantinea slabs were devised, this would coincide perfectly with the new-fangled method we find in the *Division of the Canon*.

The *Perfect System* served as an abstract grid onto which all the various scales could be matched; it prescribes no absolute pitch. Above we have seen that what we know about Early Abbasid ‘ūd music echoes the melodies of the Roman period if the open *matnā* is equated with the lyre *hypátē* CC. In this way, the open *bamm* would play $\text{W}\Gamma\text{I}$, placing the underlying *Perfect System* in the Iastian key. This is all well for the Roman period, when the Iastian is frequent: for instance, it is the key of the most famous musical document, the Seikilos song. If played on the ‘ūd, its melody would start on the open *matnā*,

54 The system is presupposed both by Aristoxenus and by the *Division of the Canon*, where it is geometrically construed.

55 Cf. David E. Creese, *The Monochord in Ancient Greek Harmonic Science* (Cambridge et al.: Cambridge University Press, 2010). For a strong argument for the recency of the tool, see Stefan Hagel, review of *The monochord in ancient Greek harmonic science*, by David E. Creese, *Aestimatio*, Cambridge classical studies, 9 (2012): 337–51.

move mostly around *maṭnā* (using the ring finger fret) plus one adjacent note each from *zīr* and *maṭlat*, and drop to open *maṭlat* only on the final syllable.

However, the musical documents reveal a deep rift separating Roman-period music culture from its Hellenistic precursor, which manifests itself above all in the use of very different keys. Instead of the ‘sharp’ keys such as Iastian, earlier scores are typically notated in ‘flat’ keys such as Phrygian. What late antiquity called Iastian, for all we know, appears to have originated as a purely theoretical concept, probably invented only by Aristoxenus who baptized it ‘low Phrygian’, because it was a semitone lower than the traditional Phrygian. If there had been a Greek *trsss* lute before the transformation period (whose details we struggle to understand), its musical conceptualization would have had to change as well.

At any rate, the ‘Iastian’ analysis that has worked so well for late antiquity is out of phase with Hellenistic musical conventions, as far as we can tell from the limited evidence (Figure 9). Instead, tuning the lute a semitone higher in respect to ancient notation appears to work reasonably well (Figure 10).⁵⁶ This would take the lute’s *Perfect System* to the Phrygian key, and the open *maṭnā* would represent the Dorian *mésē* ΠD⁵⁷ – two keys that all but disappear from the record in the Roman period.

Is it significant that the plausible interpretation of an *ūd* in Hellenistic times would point to Phrygian, while the Roman-period equivalent would be Iastian, and that the latter is but a late designation for Aristoxenus’ ‘Low

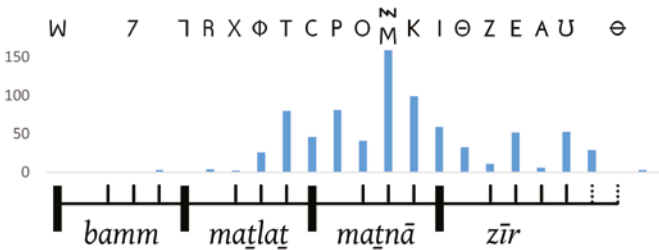


FIGURE 9 Note frequency in Hellenistic musical documents compared to an *ūd* with open *maṭnā* = CC
Data pool: notes clearly read according to Pöhlmann and West

56 The troubling pitch that would fall between the open string and the index fret on *maṭnā* is mainly represented by the ‘irregular’ note O in the second section of the First Delphic Paean (Pöhlmann and West, *Documents of Ancient Greek Music* no. 20).

57 Note that this is the functional (‘dynamic’) *mésē* of the particular key (*tónos*). Above, we have considered the absolute (‘thetic’) *mésē* of lyre tuning, which coincides with the functional Lydian *mésē* |< of ancient musical notation.

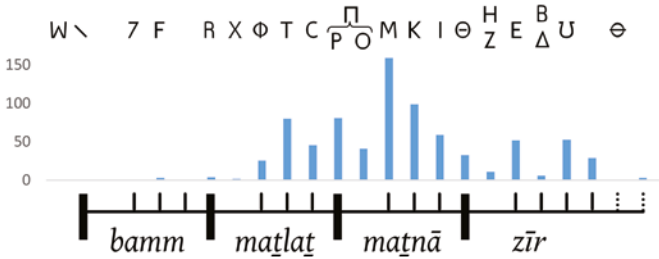


FIGURE 10 Note frequency in Hellenistic musical documents compared to an *ūd* with open bamm = Phrygian *proslambanómenos* \E
Data pool: notes clearly read according to Pöhlmann and West

Phrygian”? Does this apparent downward shift by a semitone capture some music-historical reality within the enigmatic transition between the periods? Might one even relate it to the proportions we have observed on the Mantinea monument, which might suggest a slightly smaller size compared to the *ūd*, within a scope of about a third of a tone? The shaky evidence cannot currently provide answers to such questions.

Conclusion

What insights have we gained that rest on firmer ground? There seem to be good reason to trace the precursors of the Abbasid *ūd* back to late antiquity, at least. It may have been in Central Asia that the instrument acquired its typical shape which consequently spread both eastwards and westwards to the ends of the known world. A similar design of four strings structured by frets in a sequence of a tone and three semitones may however have been older, perhaps significantly older. The first sufficiently realistic depiction that matches the required parameters as well as the approximate string length appears in late Classical Greece, in a musical environment that related exceptionally well to characteristic features of the *ūd*, such as limited chromaticism and the realization of the theoretical model scale, and which produced a literary reference to a four-stringed instrument.

It is obvious that the Greeks imported the basic concept of lute from other cultures, where long-necked types had been in use for millennia.⁵⁸ However, a

58 For instance, the term *panourg-* is associated with an old (Euphorion quoted by Athenaeus, *Deipnosophists* 4.182e) three-stringed (Pollux 4.60) instrument of more or less exotic origin (ibid.: Assyrian; Athenaeus, *Deipnosophists* 4.183f–4a: Troglodytan variant).

direct precursor of an instrument such as that on the Mantinea monument has not been identified. Is it plausible that the particular design was a Greek invention, after all? In fact, al-Kindī mentions sources that entertained precisely that possibility, rivaling a Babylonian claim.⁵⁹ Modern scholarship might be well advised not to preclude it without further argument.

Acknowledgements

The Arabist aspects of the preceding arguments are deeply indebted to Yasemin Gökpınar's kind instruction and guidance, though I acknowledge responsibility for any misjudgment. Not least in terms of this collaboration, this publication is based on research funded by the European Research Council (ERC) under the European Union's Horizon 2020 research and innovation programme (grant agreement No. 787522). The views presented here, however, reflect only those of the author; the ERCEA is not responsible for any use that may be made of the information contained.

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59 Al-Kindī, *Kitāb al-Muṣawwītāt al-watariyya min dāt al-watar al-wāhid ilā dāt al-'aṣarat al-awtār*, ed. by Yūsuf, *Mu'allafāt al-Kindī al-mūsīqīyya*, 75; cf. Neubauer, "Al-Ḥalīl ibn Aḥmad," 308 n. 171.

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