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Dossier: Was the Early Arabian ‘ūd “fretted”?

Amine Beyhom*

“I have long felt that the practical music of many Asiatic peoples, ancient and modern, must have been and must be a totally different thing from the metaphysical or mathematical music of their philosophers, which as pure speculation must always have held itself apart from practice. We have erred in reasoning from the writings of theorists among these peoples to the nature of their art itself.

[...] therefore, we should not say: the music of the Chinese, of the Indians [Hindus], of the Arabs, of the Persians etc., but: the musical system (or enigmas) of the Chinese, the Indian, Arab, Persian philosophers, of Master Chrysanthos, etc. – Maybe it was no different for Ancient Greek music…”

[Raphael Georg Kiesewetter, Über die Musik der neueren Griechen]¹

“In the best cases, the theory [of music] inspires or enlightens the [musical] practice, […] . On the contrary, in the worst cases, theory comes to the aid of ideology to impose one [particular] system and erase subtle nuances”

[Jean During, “Introduction au Volume 71 1/2 de la Revue de Musicologie”]²

“Al-Kindi oversaw one of the two main groups of translators in the ninth century (the other group was led by Hunayn ibn Ishaq). The ‘Kindi circle’ […] translated numerous works of philosophy and science from Greek into Arabic. […] Al-Kindi seems to have been a mediator between the patrons of these translators and the scholars who actually did the translating, many of whom were Syrian Christians or of Syrian extraction. His own writings might be thought of as a sustained public relations campaign intended to display and advertise the value of Greek thought for a contemporary ninth-century Muslim audience”

[Peter Adamson, “Al-Kindi”]³

INTRODUCTION

This dossier is a complement to the dossier on Hellenistic Orientalism published in 2016 in NEMO-Online⁴, in which I explained the main process of Orientalism in musicology and how it was based on Music theories beginning with Greek Neo-Pythagorean theories and ending with the so-called “Resonance” theory.

I also explained the need for most Orientalists to confine Early Arabian theories of the scale to the Pythagorean tonal model based on the division of the (Just) fourth in two whole-tones and one leimma. This division – that I name “ditonic” to differentiate it from other “diatonic” divisions of the tetrachord⁵ (see Fig. 3:118)⁶ – translates in the equal-tempered 2 whole-tones and one half-tone commonly used today. Apart from the use of biased, unfit for the analysis of Arabian music, theories and notation(s) as explained earlier⁷, and besides the fact that the Pythagorean theory – and other theories – of the scale fail at explaining the formation of the heptatonic

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² [During, 1985, p. 7]. My heartfelt thanks to Jean During and Richard Dumbrill who reviewed this dossier and proposed numerous improvements.
³ [Adamson, 2011].
⁴ [Beyhom, 2016], more specifically the section on “Musicological Orientalism” p. 158-163.
⁵ I use the terms “ditonic” and “ditonism” to differentiate the western exclusive concept of “diatonism” (or “tense diatonic” which corresponds to the Pythagorean two whole-tones + leimma division of the tetrachord – or to the equal-tempered two tones + one half-tone division) from generalized diatonism (or “zalzalism”), examples of which are provided in Fig. 3:118. (See also [Beyhom, 2016, Chapter 1] for a discussion of these concepts.)
⁶ The second number for the figure is the page number.
⁷ See aforementioned [Beyhom, 2016], and [Beyhom, 2018].
scale, orientalist musicologists – beginning with Henry George Farmer and (not) ending with Eckhard Neubauer – promoted with great diligence the hypothesis of the fretting of the Early Arabian ʿūd, to the point that most musicological publications dealing today with Early Arabian music consider this “fretting” as an established fact.

Thus, in the Encyclopedia of Islam:

“Unlike the mediaeval lute, the modern lute is not fretted”,
or further widened such as in Poché’s assertion in the New Grove:

“The neck [of the ʿūd] rarely has frets (dasātīn), but some are found on the Tunisian ʿūd of Khumayyis Tarnān”,

which is all that Christian Poché had to say on the matter, while we can read in the same dictionary:

“The ʿūd still survives over all the Arab world, where it is used as a solo instrument and for accompanying song, though it no longer has frets”.

While this myth has already been invalidated elsewhere and is further invalidated here, very few contemporary researchers have put in doubt this common-place belief. To understand fully the reasons of the persistence of this fabrication against all indications of its invalidity, there needs only to remember that the music of the Early Arabs, in the eyes of Occidental musicologists, may explain the European music of the Middle Ages and its (later) crystallization in the ditonic paradigm. Thus the Arabs would have – according to orientalist musicologists – merely copied their theory from their predecessors, and their music would have further “regressed” being influenced by Persian (or other) music(s), i.e. musics supposedly outside the realm of restricted Hellenism. In the meantime, European (musical) culture retrieved its legitimate Greek legacy in its “purest” (ditonic) form, from which we can conclude that Europe and the Occident became effectively the only “legitimate heir” of Greek culture and civilization.

In parallel to this demonstration – or “fairy tale” – and as I show further, all indications in the Early Arabian treatises on praxis at that time are deemed insignificant or simply avoided – as with Neubauer for the latter process –, the role of ditonism is amplified and Zalzalian praxis minimized while archeological evidence is ignored for the sake of “continuity” and, when the evidence becomes too insistent, Arabian music becomes promoted as formulaic music with the scale playing a secondary role in its structure.

As with the “ditonism of the origins” of Byzantine chant – which ended up being a major fabrication of Western Byzantinologists – but for opposite purposes, the alleged fretting of the ʿūd served as the main vector of the historical forgery of music history, mostly in the 19th and – mainly the first half.

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8 [Beyhom, 2016] and [Beyhom, 2003; 2004; 2010a; Beyhom, 2017].
9 [Chabrier et al., 2000], entry “ʿūd” (to which Farmer contributed originally).
10 [Poché, 2001, p. 27], entry “ʿūd”: as explained in [Beyhom, 2016], all Tunisian colleagues and musicians that I could consult on the matter confirm that they never saw – or heard of – “frets” on the ʿūd of Khumayyis Tarnān.
I suspect that Poché deliberately avoided a subject he knew was very controversial, precisely because of Farmer’s (posthumous, enduring) influence on the musicology of Arabian music.
12 This is a very strange statement which restricts greatly the use of the ʿūd today as it is included in both large ensembles and other (sometimes few lutes playing together) in the Arab world – as well as in Europe – and frequently today in jazz ensembles (for fusion music).
13 [Wachsmann et al., 2007]; entry “Lute”. (Bold type mine.)
15 See for instance [Parisot, 1898, p. 10].
16 With regard to the scale and intervals used by performers.
17 “Zalzalian”: non-tempered music, not based on semi-tonal scales, and mainly relating to maqām music. The terms Zalzalian and zalzal are used after Manṣūr Zal zal a-dārīh, an 8th-9th centuries ʿūd player who was (supposedly) the first to introduce the fingerings of the mujannab(s) – that is the so-called “neutral” seconds and thirds – on the fingerboard of the ʿūd. It refers more generally to intervals (or musical systems which use them) using subdivisions other than the semi- (or “half”) tone, noticeably all the varieties of mujannab seconds spreading from the (exact or Pythagorean) half-tone to the disjunctive (Pythagorean, or whole) tone. The same applies to intermediate intervals between the (exact or Pythagorean) tone and the one-and-half-tone interval (either equal-tempered or Pythagorean “augmented” second), etc.
18 See the “Appendix On the Origins and alleged ‘Diatonism’ of Byzantine Chant” in [Beyhom, 2015, p. 429–478], and Chapter 4 in [Beyhom, 2016].
19 Excluding maqām music from the evolutionary scheme, and including Byzantine chant in the European identity.
of the – 20th centuries, the sole purpose of which was the establishment of an evolutionary process of musicculminating with the Western Classical music of the common-practice period.

“Why?”, could – still not convinced – benevolent musicologists ask, “what has the West to gain in defending the Pythagorean or ‘ditonic’ thesis”, “why do they wish to retain their simplistic scale whenever this affects their music – and its perception – rather negatively?”, would they sustain?

As explained above, the answer is simple: as the Ancient Greek legacy came to Europe mainly – at least in the first centuries of the Islamic civilization – from Arabian sources, Arabian music of the Early Islamic times (7th-9th centuries) was considered by European musicologists in the 18th and the (first half of the) 19th centuries to be the missing link between Ancient Greek music and the European music in the (European) Middle Ages. As European music was allegedly a relic of the Early European music, it could only be ditonic in its essence, as with European music in the common-practice period.

Furthermore, prominent researchers on Arabian music such as Henry George Farmer promoted the existence of an embryonic form of polyphony – on a ditonic basis, evidently – in Early Arabian music which confirmed – in their opinion – the role of the latter music as the missing link with Ancient Greek music.

Let us remember that the early theory of Western music was heavily influenced by Boethius’ (see Fig. 1) De institutione musica – which was rediscovered in the Carolingian Era (9th century – See Fig. 2.) and abundantly copied since – purely on Pythagorean ground.

While trying to prove that European music is the heir of (the music of) Ancient Greece, musicologists were compelled to consider the missing link, which is Arabian writings on music (theory). Therefore, Early Arabian music must have been ditonic (as Ancient Greek music was mainly supposed to be), and transmitted to the West on this ground.

As I already wrote in “The ‘frett ing’ of the Arabian ‘ūd – or Sequencing Musicological Orientalism”, as long as the main threat comes from the theories of the scale, and while early Arabian writings about music theory base the scale theory on the ‘ūd, this instrument had to be fretted because if it were not, this would leave open perspectives for all non-tempered musics to be performed on it, which would directly contradict the evolutionary thesis based on the ditonic dogma.

20 This procedure is explained in detail in [Beyhom, 2016], more particularly in the “Preliminary Synthesis” [Beyhom, 2016, p. 175–176], the reading of which is recommended for a better understanding of how the Orientalist scheme led to the necessity of the “frett ing” of the ‘ūd.

21 The terminology is borrowed from Ruth Solie’s “Melody and the Historiography of Music” [1982, p. 297].

22 These points were effectively questioned by Jean During in a private and virtual discussion about this dossier on September 19th 2020.

23 This time-period corresponded to the Golden Era of Islamic civilization.

24 Byzantine Chant could have been a parallel link to Ancient Greece, but its “Oriental” nature deeply disturbed European specialists who followed a similar scheme, however not to exclude but to integrate Early Byzantine Chant in (Western) Europe.

25 See [Boethius, 2004, p. 1]. See also [Wikipedia Contributors, 2020] and the preface of the more academic [Bower, 1989, p. xiii] (written by Palsca), notably: “Beginning around the ninth century, De institutione musica became established as the foundation of Western music theory, and throughout the Middle Ages Boethius remained the authority most revered for music-theoretic matters.”

26 Retrieved from [Dall’Orto, 2009]: Boethius was a “martyr” of the Catholic cause.

27 [Beyhom, 2016, p. 159–162].

28 And until at least the 14th-15th centuries.
The procedure followed by Orientalist musicologists was therefore to change the Zalzalian aspect of theories using this instrument, namely:

- Firstly, and from one, single (theoretical) description by the first major Arabian theoretician, Yaʿqūb Ibn Iṣḥāq al-Ḵūnāḵī ("The Philosopher of the Arabs"), and by neglecting all indications about praxis given by the author, the “Early Arabian ‘ūd” (of the “Middle Ages”) is proclaimed “fretted” ditonically, thus:
  - Early Arabian music was ditonic and tempered.

- Secondly, from this first example, it is taken that all Arabian ‘ūd(s) were “fretted”, not only in theory but also in praxis, not only at the time of Kindī, but from the very beginnings of this music until the post-Ṣafīyya period (post-13th-Century), “forgetting” that:
  - Kindī was the first Pythagorean philosopher influenced by Plato who took over Ancient Greek theories for the purpose of theorizing the yet un-theorized Arabian music of his time, and that it was tempting to materialize the Pythagorean division of the octave directly on the neck of the ‘ūd – the primary instrument of Arabian music at that time and up to the present.
  - Kindī’s epistle Risāla fi-l-Luḥūn wa-r-Naghām – in which the description of the “frets” is given – was dedicated the son of Caliph al-Mu’tasim (833-842), Aḥmad ibn al-Mu’tasim – an amateur musician – and was meant as an informative treatise as well as a teaching method for the instrument.
  - In the only instance where Kindī describes the ‘ūd playing techniques and strings stopping, his explanations are at some point inconsistent and incompatible with an effective fretting of the instrument.
  - Kindī further described notes “used by singers” from which it can be deduced that the effective division of the scale was the seventeen (unequal, Zalzalian) intervals division explicitly given by his famous successors Fārābī (the “Second Master” – by reference to the “First Master”, Aristotelēs) and Sinā.20
  - All subsequent authors who mention “ligatures” on the neck of the ‘ūd explain that the string must be stopped at exactly the position of the “tie-fret”31, (which is incoherent with the “ties” having the function of effective frets – as shown in Appendix B), and that most of them mention the possibility of stopping the strings between the ligatures, or to use hand shifts (towards the bridge) for higher notes, to positions where there are no ligatures (or marks).
  - The second proven description of an effective “fretting” of the ‘ūd32 is found in Muhammad ibn al-Ḥasan ibn a-ṭ-Taḥḥān’s treatise. He was a Fatimid musician, singer and teacher who explained that a particular type of fretting was used for beginners.
  - All subsequent authors mentioning ligatures (dasātīn) on the neck of the ‘ūd either do not mention any material for those, or say that they are marks33 on the surface of the neck indicating stopping positions of the strings.

All these facts are ignored – or brushed aside when mentioned – by Orientalists and hence, despite very few contradicting views, the myth of the fretting of the early ‘ūd promoted by a series of more dasātīn (pl. dasātīn) used in the Arabic literature about music theory which avoids the recourse to the term “fret” – which is misleading. The dasātīn (from the Persian “dast”, “hand”) were generally, as I show further, marks on the neck of the instrument.

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20 Source: https://3.bp.blogspot.com/-tn4kVZWyDXos/Ultiqyedi_wL/AAAAAAAAAlY/W29gY0Powto/w1200-h630-p-k-no-nu/Carolinian-Dynasty.gif

21 As explained in [Beyhom, 2010b, v. 1, p. 182-276 (Chapter II)].

31 I use the term “tie-fret” for frets made of gut or other material which are wound around the neck of the ‘ūd and knotted on the back side. “Ligature” is a more reliable translation of the term.

32 Probably inspired by Kindī’s description.

33 Or possibly threads as explained further.
or less renowned authors including Lachmann, Farmer, Manik, and finally Neubauer, is still taught in maqām musicology\textsuperscript{34} against all factual data\textsuperscript{35}.

The main aim of this dossier is to assemble all possible data about this alleged fretting of the instrument, in order to draw worthwhile conclusions, set on a firm ground.

**Prefatory Remarks**

This dossier is composed of three main parts and accompanied by two videos:

- Part I features explanations about (al-) Kindī’s\textsuperscript{36} division(s) of the fingerboard of the ‘ād. It then explains the partitioning of the tetrachord in seven divisions (and of the tone in three divisions) which ends with the partitioning of the octave in 17 unequal intervals (in this case with Zalzalian intervals, or generalized diatonism\textsuperscript{37}). This division is present in Arabian specialized literature from the very beginnings,\textsuperscript{38} and is rooted in music practice since the Forerunners\textsuperscript{39}. It was the main representation of the scale in the Golden Age of the Arabian Civilization from (al-) Fārābī (9\textsuperscript{th} Century) to (al-) Urmawī (13\textsuperscript{th} Century).

- Part II is a reflection about the theoretical use of the Arabian ‘ād, and how this instrument was erroneously fretted by (some) Western musicologists – including Eckhard Neubauer’s attempts at reviving the thesis of the fretting of the (early) Arabian ‘ād in his article “Der Bau der Laute und ihre Besaitung nach arabischen, persischen und türkischen Quellen des 9. bis 15. Jahrhunderts”\textsuperscript{40} – then by autochthonous re-orientalists. It exemplifies the – willful or unconscious – blindness of some (modern and contemporary) Orientalists when it comes to the ditonic (or “tense diatonic”) dogma of Western musicology.

- The third part consists in a series of four appendices:
  - Appendix A (“The ‘ād, its components and its proportions”) is a reminder about the proportions of the ‘ād and its components in the early period – and nowadays for its proportions.
  - Appendix B (“Organological clarifications”) lists the organological problems raised by the fretting of the ‘ād.
  - Appendix C reviews the contents of *The Risāla fi l-Māsiqā* by (al-) Munajjim (856-912) and shows that the Pythagorean division attributed to this author cannot be sustained.

\textsuperscript{34}I recently had to warn a colleague from publishing in an article that the Early ‘ād was fretted, despite his protests that this “fretting” was “an established fact”.

\textsuperscript{35}In fact, a converging array of evidence contradicting the thesis of the “fretted” ‘ād.

\textsuperscript{36}The “Philosopher of the Arabs” and the first author whose works on Arabian music theory are (partly) extant.

\textsuperscript{37}The term “generalized diatonism” is used to oppose the general concept of diatonism in Ancient Greek theories to the particular tense (Western) diatonism. (See Fig. 3:118.)

\textsuperscript{38}Although not explicitly in the case of Kindī.

\textsuperscript{39}The term comes from my proposed (in Beyhom, 2010b) division of the history of maqām music (theory): 1. The Forerunners: mostly (al-) Kindī (9\textsuperscript{th} century) and (al-) Munajjim (9\textsuperscript{th} and beginning of the 10\textsuperscript{th} centuries); 2. The Golden Age: from (al-) Fārābī (Latinized “Alfarabius” – 10\textsuperscript{th} century) to ibn Zayla (d. 1048), not forgetting the mentor of the latter, ibn Sinā – or Avicenna – (980-1037); 3. The Systematists: beginning with (al-) Urmawī (13\textsuperscript{th} century), with followers such as (al-) Lādhiqī or (al-) Marāghī; 4. The Intermediate Period: with writings such as the Anonymous *Aḥ-Shajara dhūt al-Akmām* ‘published as [Anonyme, 1983]), or from [Ṣaydāwī (a-ṣ), XV siècle] (translated to French in [Ṣaydāwī (a-ṣ) and Antar, 2001]) or the pseudo Ṣafādī published as [(Ṣafādī (a-ṣ)), 1991]; 5. The Moderns: beginning with Mashāq (19\textsuperscript{th} century) and his mentor Farīd-a-d-Dīn al-Attār and ending with the 1960s (not forgetting [Khulīrī (al-), 1904]); 6. The Contemporary Period: roughly since the 1970s and the predominance of the Conservatories in the teaching of Arabian music. (Note that periods 3 and 4 may overlap.) As for Arabian music per se, [Jargy and Chottin, 2001, p.527] identifies (for example – Guettat has another division still, as seen in Chapter V of [Beyhom, 2016]) five time periods (which correspond only partly to the aforementioned six, and disregard the post-Congrès du Caire period), namely: “1) Bedouin period, from the Jūhilīyya (‘the time of ignorance’) till Early Islam (death of ‘Ali, 661); 2) Assimilation period, from the Umayyad dynasty till the First Abbasid cycle (circa 830); 3) Period of Fulfillment and Dispersion, with the second Abbasid cycle and the establishment of the Umayyad in Spain; 4) Period of Decline, from the taking of Granada [note here that Jargy does not term this as ‘the Fall’ of Granada] (1492) till the end of the 18\textsuperscript{th} century; 5) Renaissance: from the Nahyå (hence the term “Renaissance”) in the 19\textsuperscript{th} century, beginning with the expedition of Bonaparte in Egypt end of the 18\textsuperscript{th} century, until the Congrès du Caire (1932).”

\textsuperscript{40}[Neubauer, 1993], which is, as a matter of fact, a dossier of nearly 80 pages.
Ancient Greek tetrachords with equivalents in the writings of (al-) Fārābī (9th-10th centuries – see [Wright, 2001a]) and (ibn) Sinā (10th-11th centuries – see [Wright, 2001b]), the two major Arabian music theoreticians of the Golden Age. Arabian tetrachords are taken from [Fārābī (al-), 1930; Fārābī (al- et al., 1935; Yūsuf, 1956; أبو نصر محمد بن محمد بن ترخان الفارابي, 1967 الفارابي, 1998]; Greek tetra-
chords from [Mathiesen, 1999]; the enharmonic tetrachord in its 2nd form in the lower table (Ptolemaeos – last column to the right) is taken from the Appendix of [Erlanger, 1930]. First published (in French) in [Beyhom, 2010b].

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Fig. 3 Ancient Greek tetrachords with equivalents in the writings of (al-) Fārābī (9th-10th centuries – see [Wright, 2001a]) and (ibn) Sinā (10th-11th centuries – see [Wright, 2001b]), the two major Arabian music theoreticians of the Golden Age. Arabian tetrachords are taken from [Fārābī (al-), 1930; Fārābī (al- et al., 1935; Yūsuf, 1956; أبو نصر محمد بن محمد بن ترخان الفارابي, 1967 الفارابي, 1998]; Greek tetra-
chords from [Mathiesen, 1999]; the enharmonic tetrachord in its 2nd form in the lower table (Ptolemaeos – last column to the right) is taken from the Appendix of [Erlanger, 1930]. First published (in French) in [Beyhom, 2010b].

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Fig. 4 Urmawi's two divisions of the tone (L.C and alternative L'C L") – from right to left, top to bottom, in the figure) in the Kitāb al-
Adwar [Urmawi (d. 1294), 2001] and corresponding ratios and intervals in cents.
Appendix D ("Original texts") is a collection of the original texts the translation of which is proposed in the main text.\footnote{This is for clarity of the main text, while philological differences impose the reproduction of the original texts for verification purposes.}

The two complementary videos were published with the article on the ‘ūd – in French – by the author with Hamdi Makhloff\footnote{[Beyhom and Makhloff, 2009].}, with subtitles by Beyhom:

- The first video is entitled *Fretting of the ‘ūd according to (al->(); Kindī,\footnote{Available at https://youtu.be/d7TTInh_pKM.} and shows the stringing and positioning of the frets as explained by (al-()); Kindī, for both a “Harmonic” and a Pythagorean tunings.

- The second video is entitled *Fretting of the ‘ūd according to Ibn a-t-(); Ṭahbān\footnote{Available at https://youtu.be/denT-hpcXlS.} and shows the same procedure but with one set of strings described by (ibn a-t-()); Ṭahbān.

While most of the material proposed to the reader is based on my first book (in French) about Arabian music theory and praxis to the 13\textsuperscript{th} century and on the article published with Hamdi Makhloff\footnote{[Beyhom, 2010b] and aforementioned Beyhom and Makhloff, 2009.}, new data is provided in this dossier which complements my earlier writings on the subject.\footnote{Note that some of the material included in [Beyhom, 2016], mostly from the last section of Chapter I entitled “Greek theories in Arabian writings”, may be of use for the reader and is cited where deemed necessary.}

\section*{A CONCLUSION AS FOREWORD\footnote{This section was originally the “Synthesis” of the first chapter of [Beyhom, 2010b] regarding the theories of the Forerunners, which seemed to me best suited as a foreword to this dossier.}}

Between the 7\textsuperscript{th} and the 9\textsuperscript{th} centuries, the expansion of Islam\footnote{Both religion and civilization.} resulted in an Arabic-speaking empire extending from Persia to Spain, including North Africa and parts of Central Asia. The major confrontation of this Arabian-based empire was, at that time, not with the West but with the Byzantine Empire which predominated on its North-Western front. The music of the kingdoms of the Arabian Peninsula could compete with difficulty with the music of some of the conquered peoples, as with the music of Bilād a-sh-Shām\footnote{Syria and Lebanon and, by extension, Jordan and Palestine.} being part of the former Roman Empire,\footnote{Then of the Byzantine Empire (or the Eastern Roman Empire).} and with the music of Persia. Claiming a purity of the Arabian (“Bedouin”) musical art would be, with such facts at hand, an aberration.

The process of acculturation of the Bedouin Arabs, which became the rulers of an empire extending far beyond their original habitat, is unfortunately not documented for their music.\footnote{The process of acculturation was not one-sided: Arabian culture (poetry, language, rhythms, music) influenced also the conquered peoples, whatever influence the culture of the latter had on the Arabian rulers.} All the writings on music of the period, anterior to (al-()); Kindī’s, have been lost. Later chroniclers such as Masʿūdī and (ibn) Salma\footnote{See [Masʿūdī, 1987; Salma (a-n-Nahawi al-Lughawi), 1984], and [Khalidi and Masʿūdī, 1974] for the importance of Masʿūdī as a historian.} have tried to retrace the evolution of the Arabian society towards a Pan-Islamic society, starting with the small kingdoms of the Arabian Peninsula and ending with the Abbasid caliphate, and recreated thus the illusion of a continuity of the original “purity”, an ongoing and exclusive filiation of the Arabian Empire.

It is, however, self-evident that Arabian music in the 9\textsuperscript{th} century could only be the hybrid result of the Islamic melting pot, with influences as diverse as Persian, Byzantine, Mediterranean music and music from Central Asia (Fig. 5).\footnote{Two short (and available) references on, respectively, the conquest of Egypt and the conquest of Central Asia are [Butler, 1902] and [Gibb, 1970].}
More than two centuries after the beginning of the expansion of Islam\textsuperscript{56}, Arabian scholars and philosophers had to get on with the heavy task of characterizing this music and to establish a unified presentation of it intended, above all, for the Abbasid Caliphs and for other, lesser, contemporary potentates.

This procedure took place concurrently with the assimilation of the vast scientific and cultural corpus of Ancient Greece from which these scholars quickly tried to establish an “Arabian”\textsuperscript{55} music theory with pretense to universality. (Examples of the appropriation of Ancient Greek music theories by Arabian theoreticians are proposed in Fig. 3:118 and Fig. 4:118.)

It is important to remember that the first "theoreticians" of the Arabian Empire\textsuperscript{54} were neither simple musicians trying to codify and transmit their art, nor "musicologists" in the contemporary sense of the word – meaning by that Music historians or analysts. Music “science” was therefore originally confined, through the influence of Pythagoreanism and neo-Pythagoreanism, to the mathematical and cosmogonic domains, as the near totality of Early (and extant) works shows. Adding to this fact that the Arabian concept of plagiarism was (and still is today) very different from the modern Western concept,\textsuperscript{57} and that this procedure was concurrently transposed to translations from Greek Masters, it becomes less surprising that many of the most early writings on Arabian music are much alike, and use mainly Pythagorean ditonism as the basis of their theoretical explanations.

This theoretical handling, although already breached in Kindī’s epistle (“"Risāla” fī-l-Lūḥān wa-n-Nagḥam), changes radically with (al-) Fārābī\textsuperscript{58} in his Great Book of Music in which we find, finally(!), the expression of a powerful (and critical) mind exploring music and music theory of his time. This theoretician’s approach is respectful of “The Masters of the Art” – Ahl aṣ-Ṣīnā‘a to which he refers when practical details are needed – and of practical music, which ended up in him being the first to explicitly include Zalzalism in his theoretical descriptions of the Arabian scale.

It is worthwhile, even at this early stage in this dossier, wondering about the social and intellectual contexts which resulted in the exclusion – for many decades – of an already existing, even characteristic phenomenon as Zalzalism (or non-temporalism), from the theorization of Arabian (maqām) music; this context is explicitly scrutinized in the following pages.

Let us note that the already signaled (al-) Kindī\textsuperscript{59} – surnamed the “Philosopher of the Arabs” – seems to have well earned his surname in music theory\textsuperscript{60} as he was the first to include the ditonic division of the (Neo) Pythagoreans in his theoretical reasoning.

We should however also note from the outset that the principal aim of this philosopher was to incorporate Greek “science” in Arabian nascent philosophy – to “advertise” it as Adamson writes in the epigraph. In such a context, the concordance between Greek theories and Arabian (or even “Greek”) musical praxis becomes of for manuscripts in the libraries of Egypt, Morocco, Russia, Tunisia and others seem to be also available (as noted in “Seminararbeit von Silja Geisler-Baum, Sommersemester 2004, Betreuung: Prof. Dr. Ursula Georgy”).

Unlikely Aristoxenos – who, as reminded in [Beyhom, 2016] and even though he was also a philosopher, approached nevertheless music from a practical point of view – Pythagoreans and Neo-Pythagoreans had a strictly philosophical, if not dogmatic approach to music.

\textsuperscript{54} The civilization, here differentiated from the religion.

\textsuperscript{55} I use “Arabian” for Arabian-Persian-Turkic – and later Ottoman – music.

\textsuperscript{56} The fact that the Caliphate was an empire exonerates me from specifying whether the authors were Arabs, Persian or Turkic (or Armenian, Jew and other nationalities – or religions).

\textsuperscript{57} See [Grunebaum, 1944].

\textsuperscript{58} The “Second Master” (to Aristotle).

\textsuperscript{59} For a comprehensive reviews of Arabian sources, see [Farmer, 1965; Shiloah, 1979] – a second volume of RISM by Shiloah, 2003,
secondary importance.\textsuperscript{61} Let us also note that Kindī was more of a translator than a “transmitter” of Ancient Greek tradition.\textsuperscript{62} He was however the first to describe the Arabian musical system through the division of the fingerboard of the ‘\textit{ēd}, even if we do not know for certain if his use of the ditonic division of the fourth corresponds at all to praxis\textsuperscript{63} at that time. The ditonic division, which is probably justified by Kindī’s pretense in his epistle \textit{fī-L-Luhūn wa-n-Nagham}\textsuperscript{64} to a “simplicity” of music – as a “science” and inherited from Platonic interpretations – contradicts somewhat the description of the \textit{genē} in his epistle \textit{fī Khubr Ṣinā’at a-t-Taʿīf} which includes, notably, an enharmonic \textit{genos} with two quarter-tones.\textsuperscript{65}

Whenever the question of the adequacy of the simplicistic ditonic division with the music of that time is clearly raised by Kindī’s description of praxis (singing – \textit{ghināʾ} – as opposed to “musical science”) in the \textit{Risāla fī-L-Luhūn wa-n-Nagham}, his interest in the “science” of music is undeniable, as testify the numerous epistles he devoted to the subject.

In a very Arabian-like approach about the transmission of knowledge,\textsuperscript{66} several of Kindī’s successors – such as Ikhwān a-ṣ-Ṣafā’ and (al-) Khawārizmi – adopted the Pythagorean premises of this philosopher, forgetting however about his mentions of praxis which stand far from intervallic mensuration and from arithmetical handlings. The latter – practical – approach, which would have probably been welcomed by the musicians of his time, was unfortunately an exception.

Mentions of practice are rare – if not inexistent – in the literature until the advent of Fārābī, and while the latter tried to reform music theory he had, however reluctantly, to contend with earlier writings whatever lacunae he may have found in them. Whenever Kindī avoided\textsuperscript{67} introducing new ratios to describe the Zalzalian intervals used in praxis, (al-) Fārābī and later (ibn) Sinā and (al-) Urmawi\textsuperscript{68}, while keeping the ditonic norm imposed by their predecessor(s),\textsuperscript{69} integrated new and old divisions based on string-length equal-divisions, or recalling non-ditonic ratios used by these predecessors.\textsuperscript{70}

More generally, the question that is raised concerns the adequacy of the theoretical systems which were described by Arabian theoreticians, with praxis.\textsuperscript{71}

\textsuperscript{61} Plausibly, the same phenomenon took place in Western theory of music beginning with the so-called “Middle-Ages”.

\textsuperscript{62} Notably for ethos theory and numerical correspondences with the four elements, nature, etc. To “transmit” is here used in the sense of a living tradition which is handed down – modified and augmented but still traditional – to others (see [During, 1994]).

\textsuperscript{63} Or to the extent of this practice.

\textsuperscript{64} Reviewed further.

\textsuperscript{65} Knowing that the translation of Ancient Greek sources was an ongoing process in the time of Kindī, it is very possible that his successive epistles on music – for which we do not have a precise chronology – were based on different translations from different, and more or less complete, Ancient Greek sources.

\textsuperscript{66} See footnote no. 57:120 above.

\textsuperscript{67} Maybe because of the lack of intellectual audacity, or capacity to conceive them: Arabian music “science” was still to be founded at his time and, while Kindī was a pioneer at introducing Ancient Greek theories to the Arabs, he would reluctantly “alter” them (or the part of it he had access to). In his \textit{Risāla fī-L-Luhūn wa-n-Nagham}, intended as a manual for the son of the Caliph (see further), Kindī had to resolve the obvious discrepancies between (Greek) theory and (Arabian) praxis, which he did by signaling approximate positions for Zalzalian (Arabian) notes between the notes of the Canonical (ditonic, Pythagorean) division – as is explained further.

\textsuperscript{68} Although Safiyy-a-d-Din al-Urmawi used a refined Pythagorean adaptation of zalzalism in his Early \textit{Book of Cycles} [Urmawi (d. 1294), 1984; 2001] (see explanations and comments in [Wright, 1969], [Beyhom, 2010a; Beyhom, 2018], and Fig. 4:118), he was compelled to modify it by introducing explicit zalzalism in his second major (and comprehensive) work, the \textit{Risāla a-sh-Sharafjyya} [Urmawi (d. 1294) and [Jurjānī (al-)], 1938].

\textsuperscript{69} This includes Ancient Greek theoreticians that Fārābī would reluctantly criticize, while preferring (see [Beyhom, 2016], p. 79, fn. 197) to ascribe their imperfections to the translators of their works (notably Kindī and his group of translators).

\textsuperscript{70} See for example Appendix 3 in [Beyhom, 2016] and Fig. 3:118 as well as Fig. 4:118.

\textsuperscript{71} This topic is seldom addressed for example by Sawa in his article [Sawa, 1981] or in his book [Sawa, 1989], although the author insists on the practical aspect of the music he researches, as in [Sawa, 1981, p. 85–86]: “Obviously, even for ethnomusicologists interested in modern musical practices and musical life, historical ethnomusicology can be a lively and extremely useful subject of research in at least two ways. First, it can clarify the reasons behind many modern concepts and practices. Second, ethnomusicologists with an intimate knowledge of modern practices can clarify ambiguities in the historical sources. Finally, for present-day native Middle Eastern musicians, the study of the past offers the necessary methods and terminology for the study of their own music. This is a much more suitable and fruitful procedure than borrowing irrelevant, if not damaging, concepts from 18th- and 19th-century European art music”. While I agree with the conclusion of Sawa, I could not help but note that the author’s descriptions of the Early Arabian theoretical systems are but a little too… theoretical, as he does not even address Kindī’s writings and neglects comparisons with praxis with (al-) Fārābī and others, a steady attitude with re-orientalizing musicologists of the \textit{maqām} (as explained in Chapter V of [Beyhom, 2016]).
Other questions remain unanswered, concerning notably the relation of Arabian music praxis at the time – ascribed to the court of the Caliph and to the high society and characterized by the use of seven subdivisions within the tetrachord (just fourth) – with the music of the peoples of this vast empire.

Is it possible that Court music followed the same rules and system as with shepherds, artisans, farmers, city riffians and prostitutes of both sexes scattered in such disparate regions as the Arabian Rab‘ al-Khâli, Post-Byzantine Syria, Egypt, Iraq, Central Asia and Persia, not to mention North-Africa and Spain?

Maybe not, and maybe yes, as popular musics today, in the Arab world, follow the same principles as with Art music, while the main question can still not be answered definitely as sources on the subject are unavailable, or maybe never existed.

The second question which is (inevitably) raised concerns the adequacy of the Pythagorean ditonic model with Court music per se: does the Pythagorean substrate, which is contradicted by Zalzalian inclusions, coincide even loosely with the praxis of Art music at the time?

Here again the lack of sources compels us to delay the answer to this question. What is today clear is that the 7-intervals per just fourth division, extended to the 17-intervals division of the octave (both in unequal intervals) is a constant feature of these theories, beginning with Kindi and extending to the late Systematists.

**Part I. First Theoretical and Practical Descriptions**

The theoretical treatment of the scale in the period of the Forerunners is characterized by the recourse to Pythagorean ditonism. It must be remembered that, during Kindi’s time, the large-scale translation of Ancient Greek texts was still in its infancy. Arabian philosophers hurried to use these texts and adapt them to Arabian music, whatever differences with praxis.

The first theoretical procedure of which we are aware with Arabian theoreticians about the modeling of the melodic vertical space is the division of the strings on the neck of the ‘ād, mostly limited for each string to its first acoustical characteristic interval, the fourth. While music was assimilated by these philosophers to a theoretical science, and whenever the ‘ād was the main (and very versatile) instrument for performance, it Kindi died in 866. The latter wrote numerous epistles on music that we are unable to date precisely. Note also that, contrarily to previous assimilation of Arabian music theory in this period, which begins with (al-) Munajjim’s extant epistle on the subject, I begin in my book (and in this dossier) this review with Kindi. This is justified by the simple reason that Munajjim was born in 856 (and died in 912 according to Farmer). (Note that Munajjim’s epistle includes a few references to Ashafānī – a music chronicler who gives no indications about the composition of the Arabian scale – and to Iṣḥāq al-Mawsili – a well-known singer of the Abbasid period from which we have no extant works although some of his scattered quotes can be found in later works –, cf. [Farmer, 1966a, p.1146]. [Farmer, 1966b, p.99]. [Maalouf, 2002 (Chapter 2); Manik, 1969, p.22]. Shiloah, 1981, p.29; Wright, Poché, and Shiloah, 2001, p.800 (iv) Early theory – written by Wright.)

A review of the main divisions of the fingerboard of the ‘ād is proposed in [Beyhom, 2016, p.79-80], in the section entitled “The ‘ād as the ‘Monochord’ of the Arabs.”

Some descriptions – as expounded later – include hand-shifts beyond the (just) fourth, sometimes for theoretical purposes (such as complementing the second octave of the scale). (See also footnote no. 418:184.)

And “singing” (ghinā’) being ascribed to music practice – see for example [Farmer, 2011].

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72 This has been determined for Arabian music in [Beyhom, 2010b], beginning with the first Arabian Philosopher (and theoretician), al-Kindi, and is expounded in Part I of this dossier.
73 Till the Modern period and excluding school syllabuses.
74 Extant sources deal only with caliphal – or Art – music, with few exceptions (such as Fārābī’s and Kātīb’s descriptions of the ṣambūr Baghdādī – see [Beyhom, 2010b, v.1, p.311, 320]) – which are not conclusive.
75 Sources are scarce or unavailable for the period before Kindi, and the research on Arabian scale theory must begin with works dating two centuries after the advent of Islam (the religion) – in the Abbasid period – with Arabian theoreticians finally addressing Ancient Greek theories and some of them trying to adapt these theories to the music practiced in the vast countries dominated by the Caliphs. The craze for these theories (which reminds of the Philhellenic trend in Europe in the 18th-19th centuries) has perhaps determined a de facto inclusion of Pythagorean ditonism in music practice at the court of the Caliphat in Baghdad and, by extension and impregnation, in other population segments and other regions of the Arabian empire. (Richard Dumbrill reminds here – personal communication – that ditonism seems to have been known since the middle of the first millennium BCE, as is shown in the tablet CBS 1766 dating from the Neo-Babylonian Period historically known as the Chaldean Empire (626-539 BCE).)
76 Bayt al-Ḥikma (“The House of Wisdom”), in which this large-scale operation started, was founded by Caliph al-Ma’mūn in 830, when
was only natural that this instrument became the preferred tool for theoretical explanations.

It is worth noting that even Kindī – the philosopher who was probably the most influenced by Plato\(^ {80} \) – could not contend himself with the precise, but nevertheless arbitrary explanations of the Pythagoreans and neo-Pythagoreans, and was compelled to include additional positions on the fingerboard of the instrument to reflect effective (Zalzalian) praxis.

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**A. First description of the ‘ūd and of the division of the fingerboard by (al-) Kindī (c. 802-c. 866)\(^ {82} \)**

Yūsuf Abū Yūsuf Ya'qūb ibn Ishaq ibn a-Ṣabbāḥ ibn Ismā'īl ibn al-Asḥath ibn Qays al-Kindī, whose father Ishaq was the Governor of Kūfā\(^ {83} \) under the reign of Abbasid Caliphs al-Mahdi (775-785) and a-r-Rashid (786-809), stemmed from the South-Arabian tribe of Kindā (hence the origin of his second surname).\(^ {84} \)

On the Philosophical and religious front Kindī was an adept of mu'tazilism,\(^ {85} \) a theological school (and political party) which contributed notably in introducing Greek elements into Islamic thought. He was the protégé in Baghdād of al-Ma’mūn\(^ {86} \) and of al-Mu’taṣīm\(^ {87} \) then fell in disgrace in 848\(^ {88} \). His library was then confiscated but was given back to him sometime before his death. Ehwany underlines one aspect of Kindī’s works which reconciles Hellenistic legacy with Islam:

“It was due to al-Kindī (Kindī) that philosophy came to be acknowledged as a part of Islamic culture. The early Arab historians called him ‘the Philosopher of the Arabs’ for this reason. It is true that he borrowed his ideas from Neo-Platonic Aristotelianism, but it is also true that he put those ideas in a new context. By conciliating Hellenistic heritage with Islam he laid the foundations of a new philosophy. Indeed, this conciliation remained for a long time the chief feature of this philosophy. Furthermore, al-Kindī, specializing in all the sciences known at his time – of which his writings give sufficient evidence – made philosophy a comprehensive study embracing all sciences […]. Ibn Nabata, quoting […] al-Kindī, mentions […] the theoretical divisions. The philosophical sciences are of three kinds: the first in teaching (ta’līm) is mathematics which is intermediate in nature; the second is physics, which is the last in nature; the third is theology which is the highest in nature. The priority of mathematics goes back to Aristotelianism but the final sequence of the three sciences beginning with physics came from the later

the birth in Basra as one possibility, concurrently with Kūfā. Kindī was also an algebraist in line with Muhammad ibn Mūsā al-Khwārizmī (c. 780 – c. 850). The latter, whose name was Latinized as Algorīmi – from which comes “Algorithm” –, was a mathematician, an astronomer, and a geographer during the Abbasid Caliphate, also a scholar in the House of Wisdom in Baghdad. (See also [Wikipedia Contributors, 2017a] and, more generally on Arabian mathematics and astronomy, [Sīdīqī, 1966] – a domain which, however and according to [Colebrooke, 1817, p. lxix–lxx] and [Rosen, 1831, p. ix–x], owes more to Indian than to Greek science. One of the questions which is also (and still) raised today concerns the relation between Indian and Arabic musics at that time (and after), and cross-influence.)

See also the re-evaluation of Kindī’s connection with the Mutazilites (adepts of a school of Islamic theology) in [Ivry, 1976], but also [Walser, 1957, p. 15 sq.].

82 Abbasid Caliph (813-833).

83 Abbasid Caliph (833-842).

84 Under the reign of al-Mutawakkil (847-861) because of a conspiracy due to the jealousy of two of the Banū Mūsā, the brothers Ahmad and Muhammad – according to [Ehwany (El-), 1966, p. 422] citing (ibn abi) Usayyi’a (Tābqāṭ al-ʿāthībāʾ, Cairo, Vol. 1, p. 207 – in fact Uyūn al-anbāʾ fī taḥqīqa at-ʿāthība’ī, with numerous editions of which [Usayyi’a (ibn abi), 1882]). (For Muhammad ibn Mūsā, see [Hassan, 2004].)
Peripatetics. Most probably al-Kindī was following Ptolemy, who gave a division of sciences in the beginning of Almagest [...]. Mathematics was known to the Arabs from that time as the ‘first study’

It is to be noted, most interestingly, that Kindī was also a translator and a propagator of Ancient Greek writings from Syriac (and perhaps from Ancient Greek) language(s). Furthermore, he was a theoretician of music and possibly a(n amateur) musician.

Most importantly for us, he wrote a few epistles on music – of which four are extant – which greatly influenced his successors.

For different reasons – maybe because of his practical discourse on music – his epistles are almost systematically seen as a kind of auxiliary, a later additional documentation to the epistle of (al-) Munajjim (856-912 – See Appendix C for the epistle of this author).

However, mere chronology shows that the last assertion is false. Let us note that Kindī is the first who:

- wrote a series of epistles and treatises on music,
- integrated some theoretical procedures from Ancient Greeks (while also integrating other aspects such as cosmology, numerology, Ethos theory and a description of the rhythmic system),
- clearly and explicitly described the tuning of the strings of the ‘ūd in successive fourths,
- mentioned some points regarding music practice,
- explained where what the ties used on the neck of the ‘ūd,
- gave a (nearly) complete organological description of the latter instrument, including a detailed description of the material and precise proportions for the strings,
- introduced the fifth (theoretical) string of the ‘ūd,
- considered a sixth hypothetical string while explaining the acoustical and organological reasons conflicting with this addition,
- and, finally, described a practical system for the mounting of the ties when applying them onto the neck of the ‘ūd, with an alternative system to ditonic Pythagoreanism coupled with indirect mentions of Zalzalian inclusions (cf. infra) to reflect musical practice.

89 [Ehwany (El-), 1966, p. 424].
90 [Ehwany (El-), 1966, p. 421].
91 [Ehwany (El-), 1966, p. 421] mentions an anecdote in (al-) Qifti’s “Ṭürkī [sic] al-Ḥukmā, Cairo edition, p. 241”, (the corresponding – and correct – citation would be Ṭürkī al-Ḥukmā [Qifti (Ibn al-), Müller, and Lippert, 1903, p. 376–377]) relating the healing, by Kindī and through music, of a paralyzed boy. A-t-Tīfāshī – a 12th–13th-Centuries author who wrote on music – describes, in the Fī al-khätāṭ fī madārik al-bawāsī al-khams li-tul al-abūb (Manuscript 118-06 Emnajma Ezzaehra – Chapter 6; a printed edition [Tīfāshī, 2019] is also – recently – available) the hypothetical use by Kindī of music to cure otherwise terminal diseases with patients, while Fārābī would have used a musical instrument to make people laugh, cry or sleep at will. Such anecdotes can be traced back to the Ancient Greek sources as found notably in [Grame, 1972, p. 26]: “Plato […] was described as a brilliant performer who was able, by playing appropriate music, to affect his auditors so strongly that he could first calm them, then put them to sleep, and finally to awaken them. They tell us further that Aristotle, who attempted to emulate Plato in this respect, was able to send his listeners to sleep, but unable to awaken them! For this reason, according to the tale, he became the disciple of Plato.” See also in Shiloah’s translation [Kātib (al-), 1972, p. 45–46] (here translated from this French language annotated version): “It is also well known that Terpander [Terpandros] and Arion the musicians delivered the people of Lesbos and Antissa (?) from a plague that fell upon them, with melodies that they devised which relieved [the sick] from this pestilence.” (Note that there is generally much confusion in Greek names in the Early Arabic writings (at least those which I have consulted in my research) with – for example and in the Arabic language version published by Ḥifnī and Khusabā in Egypt [Kātib (al-), 1975, p. 23] – Terpander and Arion becoming “Therpidoros” (?) and “Odeon”, while Lesbos and Antissa (which Shiloah corrected from “Anusa” or “Anissa” – pleading for Terpander to be born in the previous) become “Laris” (to understand as “Larissa”?) and “Anusa” (possibly “Anissa” – today on the site of Kulêpete in Turkey). (I couldn’t get a hold on the original manuscript – copy? – of Kātib’s Kamāl Adab al-Ghānî which is supposed to be in Dār al-Kutub in Cairo.) Finally, note in [Kātib, 1973, p. 112] – which is Zakariyyâ Yūsûf’s edition – Therpídoros (?) and “Artōn” in “Larīs” and “Anusta” (with question marks by the editor.)
92 From a total of about 270 writings which are ascribed to him [Ehwany (El-), 1966, p. 422]. There exist differing opinions about the number of his extant works on music (possibly 13), a discussion which exceeds the needs of the current exposé, but which is detailed in fn. 403 in [Beyhom, 2010b, v. 1, p. 122].
93 Which are of lesser importance for our purpose.
95 Which interest us in particular as for their incidence on the scale.
96 See [Beyhom, 2010b].
97 See Appendix A, notably FHT 2:158.
98 The ḥād (a denomination which was adopted by his successors), which he also named “second zîr” or “lower zîr”.
99 cf. infra the Risāla fi-l-Lughāt wa-Nahāram.
100 This last point alone explains why early commentators such as Farmer ignored this author, since his division could jeopardize the admirable structure elaborated around the “linear” evolution of the Arabian scale, originally devoid of Zalzalism – which allegedly came later to Arabian music. A second reason could be that Kindī's
To conclude on Munajjim’s “precedence” in Arabian music: while Munajjim is presented as “reveling” the theory of Ishāq al-Mawsili (767-850)\(^\text{101}\) and considered to be the First Arabian theoretician of music, this persistent “mistrating” of Kindī the Philosopher\(^\text{102}\) (which Munajjim was not)\(^\text{103}\) is totally unjustified and chronological exposés on Arabian music theory should clearly give precedence to Kindī.

The four epistles which were undoubtedly written by this author are, chronologically\(^\text{104}\) and followed by the name of their dedicatees:


2. *Risāla fi-l-Luḥūn wa-n-Naghām* to Ahmad ibn al-Muṭaṣim (son of al-Muṭaṣim).\(^\text{106}\)

3. *Risāla fi Ajzāʾ Khubariyya fi-l-Mūsāqāt* as above.\(^\text{107}\)

4. *Risāla fi Khubr [knowledge] Sināʾat al-t-Taʿlīf* dedicated to one of Kindī’s late students.\(^\text{108}\)

Out of these, two, the *Kitāb al-Muṣawwītāt* … and the *Risāla fi Ajzāʾ Khubariyya fi-l-Mūsāqāt* do not relate directly to the scale of Arabian music. The two other epistles, the *Risāla fi Khubr Sināʾat al-t-Taʿlīf* and the *Risāla fi-l-Luḥūn wa-n-Naghām*, are analyzed below.

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\(^{101}\) Ishāq al-Mawsili was the most famous singer of the Abbasid era. His conflicting relation with his nemesis Ibrāhīm al-Mahdī is expounded in [Neubauer, 2001b; Meynard, 1869], with Neubauer explaining that Ishāq was “a court musician and companion (nakīm) under every caliph from Hārūn al-Rashīd (786-809) to al-Mu’tawakkil (847-861). As an upholder of the classical Arabic music style, he stood in opposition to the innovator Ibrāhīm ibn al-Mahdī and his followers”. See also the *New Grove* [Wright, Poché, and Shi-loah, 2001, p.800] in which Wright comments the relation between “Traditionalists” and “Modernists” at that time, notably: “[T]he extent to which variation might be either cultivated or avoided was also coloured by attitudes to tradition, and in parallel with the literary debate on the respective merits of the ancients and moderns, we find advocates of faithful musical transmission opposed to innovators. Chief among the latter was Ishāq al-Mawsili’s great rival, the princely amateur Ibrāhīm ibn al-Mahdī (779-839). Renowned for the quality and reputed four-octave range of his voice, he was portrayed as a champion of greater freedom of expression. The innovations espoused appear to have involved a further injection of Persian elements, but exactly what these might have been is by no means clear, for again we encounter curt indications of stylistic contrast rather than analysis. When used in relation to Umayyad musicians, the distinction between ‘heavy’ (thaqīf) and ‘light’ (kaqīf) appears to have implied a contrast between a more complex and serious style and a simpler, gayer one, the former commanding more prestige, the latter greater popularity. In its Abbasid manifestation, however, it appears that the lighter, more Persian style involved an association of freedom of interpretation with greater melodic elaboration, in contrast to the sobriety of the traditionalists”. (Note here that while the relations between the Persian and Arabian musics have been argued by many commentators, but with no conclusive indications about which one consisted in what exactly, Jean During adds to this discussion – in a private conversation on the 9th of September 2020 – the following details which only confirm the “Oriental melting pot” at that time: “Ishāq al-Mawṣili’s (Persian) style would have been sober, in contrast to his nemesis Ibrāhīm al-Mahdī the (Arabian) style of which would have been exuberant. According to Mashhun (as retrieved in the *Tārikhe musiq-e īran*, vol 1. 1994, p. 119-121), Ibrāhīm al-Maṣwīlī [the father of Ishāq], son of Mahān son of Bahman son of Pashank originated from the Fars [Persia] and emigrated to Kūfā [in today’s Iraq]. He worked out music in Mosul [Iraq] for one year – hence his surname – then went to Ray [in Iran] to work with Jāvānīyeh, a zoroastrian originating from Abū ’All [a harbour situated in the Western part of the Persian Gulf – today in Saudi Arabia], Ibrāhīm marries Shāhak, an Iranian, and moves to Baghdad where he becomes the recognized entertainer known to us through literature on music of that time. Ishāq was born in Ray, learned the music trade from his father then afterwards with Zalzal (who – according to Mashhun was also of Persian origin),”. In conclusion: knowing that the “Persian waṣṭ” (Persian third) of the Early Arabian theoreticians was Pythagorean, and that Zalzal was supposedly the first to have introduced the “Zalzalian” (i.e. “Arabian”, i.e. non-Pythagorean) positions on the fingerboard, it seems impossible – at least today and especially as long as the trend in Oriental musicology is to incorporate all known characters of music in the nationalistic struggle between Arabs and Persians – to disentangle the knot of the relations between Arabian and Persian music(s) at that time.)

\(^{102}\) See footnote no. 76:122. Note however that Owen Wright, although he begins his explanations, in the second edition of the *New Grove* and for the aforementioned entry [Wright, Poché, and Shi-loah, 2001, p.800] (article “Arab Music”), with the Tonal system of Munajjim, specifies a little further: “Of particular importance are several short treatises of the philosopher al-Kindī (c801-c866), the first major theorist whose works are extant “.

\(^{103}\) And neither was he a musician.

\(^{104}\) According to Shawqi in [Kindī (al-), 1996, p.231].

\(^{105}\) This is the second epistle in the compendium [Kindī (al-), 1962a], published by Zakariyyā Yūsuf.

\(^{106}\) This is the fifth epistle out of five (of which one – the fourth, probably a translated excerpt from Euclid’s writings – is incorrectly attributed to him) in the compendium [Kindī (al-), 1962a], published by Zakariyyā Yūsuf, also published as a standalone booklet [Kindī (al-), 1965]. Another version was published by Yūsuf Shawqi in 1996. (See footnote no. 104.)

\(^{107}\) This is the third epistle in the compendium [Kindī (al-), 1962a], published by Zakariyyā Yūsuf.

\(^{108}\) This is the first epistle in the compendium [Kindī (al-), 1962a], published by Zakariyyā Yūsuf. It should be entitled, following the MS. British Library Or. 2361, f.168 (see [Wright, 2006, p. 1, fn. 3]), *Risāla fi Khubr Taʿlīf al-Alḥān*. **Amine Beyhom**

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**Was the Early Arabian ‘ūd “fretted”?**


4. *Risāla fi Khubr [knowledge] Sināʾat al-t-Taʿlīf* dedicated to one of Kindī’s late students.

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THE RISĀLA FĪ KHUBR ṢINĀʿAT A-T-TAʿLĪF109

This epistle is the “typical” of Kindī, not because of its informative value, but because a copy existed relatively early in Europe at the British Museum under the reference Or. 2361 (Fig. 7). Its subject is doubtless about scale theory and melodic composition [taʿlīf], a theoretical writing par excellence.

The manuscript, a copy dated 1622, is incomplete and fraught with errors.110 The description of the positioning of the fingers on the fingerboard of the īd is also incomplete. However, it allows for the reproduction of the possible division(s) as shown in Fig. 8:127.

Evidently, different commentators propose different choices among the partitions shown on Fig. 8, where each may be disputable, but possible. In the Risāla fī-l-Luḥūn wa-n-Nagham, Kindī brings a division resulting from equal-divisions of the string in opposition, immediately followed, however, by a theoretical Pythagorean partition as detailed in the next section.

B. Praxis – or Zalzal versus Pythagoras

The first descriptions of the theoretical system(s?) of Arabian music seem strangely familiar to researchers in the field of Greek music (or of “some” Greek music – especially with Pythagorean arithmetical speculations).

I base myself for the following on [Kindī (al-), 1962a] and [Kindī (al-) and Shawqī, 1996] to which must be added [Wright, 2006] with a critical evaluation of some of the aspects of the epistle.

According to the copyist (as reported in [Kindī (al-), 1962a, p. 66]), who notes that he copied from a version which is “defective and unauthenticated” [saqīma wa ghayr muʿtamada].

I do not give here details of the multiple, sometimes contradicting interpretations of this division which are explained in [Beyhom, 2010b].

Because the choice of some positions and not others will remain arbitrary as long as another, complete copy, is not discovered (if ever).

Very few other theoretical descriptions are extant, for example from Khawārizmī, the Ikhwān aṣ-Ṣafāʾ, Naṣīr a-d-Dīn a-t-Tūsī, but these are mainly copies of Kindī’s or Munajjim’s divisions. None of these later writers – as far as we know – was a musician.

Note that Așfahānī mentions rhythms, and “modes” (qawāṭ – sing. ɡawt) which correspond to “courses” (as with Munajjim – See...
Knowing that later authors such as Fārābī and Sīnā, who wrote voluminous books (or book chapters) on this subject and who had a more respectful attitude towards the “people of the Art” (Ahl aṣ-Ṣīnāʿ in Arabic), included explicit Zalzalism in their theoretical description, one cannot help but wonder at the fact that, as Wright wrote:

“Al-Munajjim’s neat 2 x 4 scheme probably also tidies up a more complex reality. One evident anomaly is that it takes no account of the neutral 3rd fret said to have been introduced by Zalzal (d after 842), the ‘ūd teacher of Isḥāq al-Mawṣūlī himself, and named after him (wustā zdalal)”.118

While these descriptions are accepted by most researchers, the reader may imagine my astonishment when I found mentions of practice in the very heart of Early Arabian Pythagoreanism, in the Risāla fī-l-Luḥūn wa-n-Nagḥam by Kindī which I examine below.

Appendix C). He also frequently mentions the wustā Zalzal, the so-called “3rd fret” in the quote from Wright below in the text.116 Which belong to the second period, the “Golden Age”.

115 See Appendix C – This division could be similar to the one by Kindī reproduced in Fig. 8:127, but more simple.
116 See Appendix C – This division could be similar to the one by Kindī reproduced in Fig. 8:127, but more simple.
117 And also his uncle: see [Farmer, 1929, p. 124].
118 Wright in [Wright, Poché, and Shiloah, 2001, p. 802].
The reader may also wonder, as I wondered for some years after this discovery, how and why these indications by the leading theoretician at that time had been dismissed by successive generations of Orientalist musicologists, and this for more than two centuries.

As for local musicians (or musicologists), the reason for not questioning Orientalist writings is evident: the grand names of the “science” of musicology (Western and local) having spoken, it becomes difficult to bring their “findings” to the test...

**The Risāla fi-l-Luhūn wa-n-Nagham by Kindī**

The contents of the epistle (Risāla) fi-l-Luhūn wa-n-Nagham are described in details in Appendix A.3 of my (first) book on Arabian music. The description of the proportions of the ‘ūd, the first one known to us, is reproduced in Appendix A in the current dossier, while the description of the “tie-frets” on the neck is included in Part II.

The epistle, which is written as a teaching manual for the ‘ūd, has many useful indications on the practical aspects of the fabrication of the ‘ūd and performance. When compared to the Risāla fi Khubr Śināṣ at-ta-t-Ta’lif reviewed above, it has a decisive advantage as it is complete, well written and is vocalized which helps understanding words or phrases that would be otherwise unclear. Its importance is crucial for our research as it contains the first description of actual “tie-frets” on the neck of the ‘ūd, with precise and detailed explanations about their mounting and proportions.

Note that Kindī mentions three different tunings for the strings, the first (and most used) being successive just fourths, while the two other tunings are variations with different resulting notes for the (unstopped) lower (acoustically) string (the bamrit) in order to underline particular tonic notes.

**“Harmonic” and Pythagorean divisions**

As mentioned in Appendix A, in this epistle Kindī provides the dimensions of the ‘ūd in “full fingers” (ff) from this point on, a unit roughly corresponding to 2 cm (today). The vibrating string is 30 ff long with 10 ff (which is the third of the total vibrating length – see Fig. 9:131) over the fingerboard until the junction of the neck with the soundboard and the body. Tie-frets must not be mounted further as the fourth of the total speaking length (from the nut) and are placed at the successive distances of 3 ff, 2 ff, 1 ff and 1½ ff, forming (with the strings) a “harmonic” division of the fingerboard (cf. Fig. 9). The reason for this positioning, which is a little far from the simple Pythagorean ditonic positioning, is given as practical, the author justifying his point by the necessity to use superparticular ratios (in the form [n+1]/n) beginning with the “tenth of the string” and ending with its “half.”

The actual, physical ties must be “firmly tied at the back of the neck to avoid the possibility, due to their tension, of lateral displacement.” While this is an indication of Kindī’s practical concerns, tying the “frets” firmly is, however, premature, as further equivalences

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119 And by their Arab (Persian, Turkic, etc.) students: these and their masters are so many that I do not bother mentioning them, although their writings are expounded in [Beyhom, 2010b].

120 The problem with local musicologists is clearly a re-Orientalist matter: if they have recourse to Western musicological “science”, they are compelled to learn under the supervision of Western musicologists and as a result of these studies use the same biased tools Orientalist musicologists use for their descriptions of Arabian music; mostly, however, they are so overwhelmed by this “science” that they take the statements of their mentors for granted.

121 [Beyhom, 2010b]: other organological aspects, such as the thickness and material of the strings, are detailed in this reference, with the corresponding texts reproduced (in Arabic) in Appendix D.

122 And the only one, if not for at-ta-Tahlīn’s description explained below.

123 [Kindī (al.), 1965, p. 16–17]: this is also the tuning used for theoretical descriptions (scale system).

124 [Kindī (al.), 1965, p. 17–18]. In today’s practice, and depending on which mode is used, the bamrit can also be tuned differently to suit the needs of the performer. (See next footnote.)

125 There is a contemporary example with maqām Sīkā where the acoustically lowest string is frequently retuned to the note Sīkā (e’).

126 This is a conventional reduction of the literal translation of (as’āb Mutnaṣtīdun): “full fingers with good flesh”.

127 [Kindī (al.-), 1965, p. 11].

128 The half of 1 ff, which the author seems to consider as a lower limit in this measuring method, prevents him from using some ratios such as the 1/9 of the string ([30 ff]/9 = 3,3333... ff), the eighth ([30 ff]/8 = 3,75 ff) and the seventh ([30 ff]/7 = 4,2857... ff), while the sixth (5 ff – position of the wusāt), the fifth (6 ff – position bīnsīr), the fourth (7½ ff – position of the khūnsūr), the third (when extrapolating, to get the fifth – 10 ff, which equates to the vibrating length over the fingerboard), including the half (octave at 15 ff) of the string are all compatible with this method (this line of reasoning is deduced from [Kindī (al.-), 1965, p. 13]).

129 [Kindī (al.), 1965, p. 12].
between octaves and fifths mentioned by the author compel to reconsider this initial division.\textsuperscript{130}

Equivalences of octaves mentioned by the author result in a modified placement of the tie-frets, shown on Fig. 10:131. The modifications make the first measurement procedure obsolete, as the new positions do not comply with a superparticular division of the string.

The result of further equivalences between notes a fifth apart (Fig. 11:132) is similar and implies a Pythagorean division of the fingerboard (practically)\textsuperscript{131} equivalent to the division expounded in the \textit{Risāla fī Khubr Ṣināʿat a-t-Taʿlīf} reviewed above (Fig. 8:127).

This result is not compatible with the initial (“Harmonic”) description, although it could be hypothesized that the differences of one comma between different positions of the ligatures would be considered as insignificant by Kindī.\textsuperscript{132}

However, the mere fact that Kindī explores octave and fifth correspondences compels us to consider both divisions, “Harmonic” and Pythagorean, as possible. Consequently, the placement of the “additional notes for singers” explained below is undertaken for both divisions.

\textbf{Additional notes used by singers}

At some point in his epistle after the description of the division of the fingerboard of the ‘ād, Kindī adds some explanations about praxis, with regard notably the accompaniment of singers, and provides in the last part an exercise in form of tablature.\textsuperscript{133} While explanations about singing practice are given, seemingly, with reluctance, the information about the “additional notes [used by singers] outside the tie-frets [dasātīn]” stands:

“It may be that singers use also a note [naghma] which lies outside of all the ligatures, that they name maḥṣūra [“compressed, limited”]. It lies outside of the ligature [dasātīn] of the khinṣir by extending the auricular [khinṣir], and behind this one also – at the same distance as the ligature of the khinṣir – except that they move the wusāba [index] to the ligature of the wasṭa [middle finger] or of the binṣir [annular]”.\textsuperscript{134}

A thorough review of this quote shows that the author gives in fact indications for \textit{three new ligatures}, or series of notes a fourth apart, the placement of which can be deduced in two steps.

1\textsuperscript{st} additional ligature (series of notes): “It may be that singers use also a note [naghma] which lies outside of all the ligatures, that they name maḥṣūra [“compressed, limited”]. It lies outside of the ligature [dasātīn] of the khinṣir by extending the auricular [khinṣir]”.\textsuperscript{135}

Kindī mentions no string for the maḥṣūra: he considers hence, by default, that it applies to the four strings of the ‘ād: this is indeed an additional ligature.\textsuperscript{136} As for its positioning on the fingerboard, and knowing that the author does not mention a hand-shift for it – neither

\textsuperscript{130} If we follow the author’s indications, “frets” will have to be tied and untied repeatedly, which is impractical.

\textsuperscript{131} The division in the \textit{Risāla fī Khubr Ṣināʿat a-t-Taʿlīf} can be interpreted in multiple ways as explained in Part A.

\textsuperscript{132} This would be plausible knowing the general propensity of the author to mimic Plato by despising “mixtures” of notes. Thus, in [Kindī (al-), 1965, p. 19] the philosopher “cites” (pseudo)-Plato who would have complained about the “aimless and endless tarākīb [combinations] of mixed notes”. Compare to: “Then, I said, if these [Dorian and Phrygian harmonies] and these only are to be used in our songs and melodies, we shall not want multiplicity of notes or a panharmonic scale? / I suppose not. / Then we shall not maintain the artificers of lyres with three corners and complex scales, or the makers of any other many-stringed curiously harmonised instruments? / Certainly not” – in [Plato, 1908, p. 399 C-D (Book III)]. While Kindī chooses here austerity (some would write “simplicity”) in music and endorses Plato’s complaints about praxis, the realities of music both in Ancient Greece and in the countries of the Arabian Empire at his time seem to be far different from the (too) simple Pythagorean scheme he adopts in theory.

\textsuperscript{133} Besides being the first known literal (using intersections of strings and tie-frets – or tablature) notation of Arabian music, this musical exercise features two simultaneous and differentiated melodic lines.

\textsuperscript{134} [Kindī (al-), 1965, p. 19]. These indications are remarkable as they underline a crucial difference between the practical modal system (by singers) and the theoretical system inspired by Ancient Greek theories. It suffices to remind the reader that Kindī considered music, as the Pythagoreans did, as a science: “The soul has an affinity with music – That is [the science of] the composition of melodies”, which is a quote from Plato in [Kindī (al-), 1965, p. 19]: “النفس تنكفي مع الموسيقى – أي تأليف الألحان”. This is possibly the first differentiation between ghinā (“singing”) and mūṣāq (“music”), the criteria differentiating praxis (“singing”) and theory (“composition on the instrument”) being in this epistle clearly stated.

\textsuperscript{135} Excerpt from the previous quote from Kindī.

\textsuperscript{136} Virtual, evidently and for many reasons which will become clear in Part II (where the process of the mounting of the ties in the \textit{Risāla fī Khubr wa-t-Naghma} is reviewed). Let us note for the time being that these additional “ties” would create, if they were to be materialized as “frets”, incommensurable problems within this process, which is already very debatable. Further, and while Kindī wishes in no way to step out of the framework of Pythagoreanism in his theoretical expounding of the “Arabian” system, this is another reason for him not to mention an exact position for the maḥṣūra, a position that he cannot quantify by giving a Pythagorean ratio for its interval, or that he simply did not bother to examine more thoroughly (as this is praxis, not theory). Only with Fārābī and (ibn) Sinā’i would
does he give its precise position – it should reasonably be situated somewhere between the just fourth (khinṣir) and the just fifth, which could complement octave equivalences missing in his division (see Fig. 12:132).137

However, the use of the term maḥṣūra ("compressed, limited") by the author compels us to consider other options that will become clear when we place the remaining “additional notes”.

As for the other two positions, we shall note that moving the sabbāba (the finger) towards the position of the wūṣṭā or of the binṣir (the ligatures) corresponds to a hand-shift, or lateral displacement of the (left, for right-handed performers) hand towards the bridge in order to reach locations for the fingers which cannot be reached using the traditional hand position (Fig. 13:134).138

The reason for this positioning outside the range of the ligatures (of the fourth) is that while the description of their mounting shows that they are material ties made of gut, positioning the finger between two (consecutive) tie-frets is unfunctional139. In order to maintain the consistency of his demonstration, Kindī had to postion these additional notes outside of the fretted zone, after the khinṣir (and towards the bridge).

As for the remaining (two) series of notes:

2nd and 3rd additional ligatures (series of notes): “and behind this one also – at the same distance as the tie-fret of the khinṣir – except that they move the sabbāba [index] to the tie-fret of the wūṣṭā [middle finger] or of the binṣir [annular]”.

If we sequence Kindī’s proposals, we can determine that these two series of notes can be found:

1. After the maḥṣūra,
2. at a distance which is equivalent to the distance between the sabbāba and the khinṣir,
3. with this distance being measured
   - from the wūṣṭā,
   - or from the binṣir.

The first term of the sequence above is clear, showing that two additional series of notes are to be placed between the maḥṣūra and the bridge (Fig. 12:132).

The second term must be understood as a distance, because if it must be the interval between the sabbāba and the khinṣir, a Pythagorean “augmented second”, such “new” notes could be found on the lower string either on the estimated position of the maḥṣūra (if the initial starting point is the wūṣṭā), or on the sabbāba (if the initial starting point is the binṣir – Fig. 12:132). Assuming Kindī had in mind octave correspondences, the second series of notes would be superfluous, because it would already be delimited by an existing tie-fret. We are dealing with distances with this second term.

these “additional” positions be given “rational” quantification. (For the latter authors, please refer to Chapter II in [Beyhom, 2010b] for a complete review.) As we shall see in Part II, this mounting procedure is adapted only for the final aim of this epistle, teaching the rudiments of the technique on the ‘ād. 137 The position of the maḥṣūra cannot exceed the fifth as Kindī explains that one of the other additional notes is positioned behind the maḥṣūra (further towards the bridge), and before the fifth.

138 Note that hand shifting is – relatively – seldom mentioned in early Arabian writings, whenever today this has become a standard procedure in ‘ād technique as it has been for centuries for the European lute. Note also in [Ṣinā (Ibn) or Avicenna (980?-1037), 1956, p. 47-48]: “When it came to the insertion of melodic intervals […] only three were inserted within the fourth […]. The reason is the absolute necessity to appreciate the location of the fingers for the stopping of the strings on the ligatures [with Šinā these are vertical markers as shown in Part II]. There was a difficulty for moving the hand at the same time as moving the fingers. It was then agreed to keep the hand in a fixed position and to move the fingers only. The optimal position allowing for this movement was reached within the fourth of the string, on which was mounted the khinṣir. With the thumb holding the instrument, the four [other] fingers could move within this fourth [of the string]”. See for example [Spencer, 1975, p. 352], where images 2 and 4 show the left hand position described by (Ibn) Šinā, while images 1 and 3 show the left hand in shift position. Ligatures a and b are reached by moving the sabbāba (the – index – fingers) towards the position of the wūṣṭā or of the binṣir (the ties), which corresponds to a hand-shift, or lateral displacement of the (left, for right-handed performers) hand towards the bridge in order to reach locations for the fingers which cannot be reached using the traditional hand position. (Reminder and complement:) Hand shifting means moving the thumb towards the wūṣṭā or further, in which way further positions for stopping the strings (and further towards the bridge) can be reached by the other fingers, mostly the auricular for the further positions towards the bridge – see also http://www.lutesociety.org/pages/beginners-lesson-3, notably:

“The easiest and most efficient way to achieve [hand-shifts] is to simply pull the whole hand and forearm towards you to shift up (towards the bridge), and to push the hand and forearm away from you to shift down (towards the nut). Be careful not to twist the hand during shifts; common faults include moving the fingers but leaving the thumb behind, leaving the wrist sticking out awkwardly after the shift, and making excessive movements of the upper arm which leave the elbow sticking out”. (See also Fig. 13:134.)

139 This is further explained in Part II.C.
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Division of the fingerboard of the ‘ūd in Kindī’s epistle (Risāla fi-l-Luḥūn wa-n-Nagham, in “full fingers” (= “ff” in the figure); the note corresponding to the non-stopped mathnā (g₂ in the figure) is called the yatīma ¹⁴⁰. In the literal notation in the figure the g₂ is taken as the central note; the diesis “#” raises the note by one approximate apotome while the “♭” lowers the note by the same amount; “+” and “−” signs are “corrections” with approximate value equal to one comma (or 1/8th to 1/9th of the tone) respectively higher or lower. Note that the ḥād string is hypothetical: Kindī further considers (see [Kindī (al-), 1965, p. 21]) adding one string still below the ḥād for the sake of demonstration of octave equivalences. (“Vibrating string” in the figure = speaking length of the string.)

Octave equivalences (in double-arrowed curves) as expounded in Kindī’s Risāla fi-l-Luḥūn wa-n-Nagham, with sequential numbering (Arabic numbers) and consequent modifications (Roman numbers) of the positions of the tie-frets. The resulting system is Pythagorean ascending (two whole-tones and one half-tone from the nut to the just fourth) then descending one tone (from the Khinsir to the Wusta).

¹⁴⁰ The (she) “orphan”: so called because it does not have in practice a corresponding (higher or lower) octave, except for the approximate g₃ on the hypothetical ḥād string (Fig. 9 and Fig. 10).
Fig. 11 Correspondences of fifths in the *Risāla fī-l-Lūḥān wa-n-Naghām* by Kindī — as above.

Fig. 12 Estimated inclusion of the maḥṣūra on the fingerboard, and its placement within the Pythagorean division of the fingerboard of the 'ūd in Kindī’s *Risāla fī-l-Lūḥān wa-n-Naghām*.\(^{141}\)

Let’s call the distance between sabbāba and khünṣir \(L_{sab}\). It is equal to the fourth of the (total) speaking length of the string (from the nut to the khünṣir – see Fig. 14:134) minus one ninth of the (total speaking length of the) string (which is the distance between the nut and the sabbāba) with:

\[
L_{sab} = L_0(1/4-1/9) = L_0(9-4)/36 = 5L_0/36
\]

(with \(L_{sab}\) = distance, or string part, between sabbāba and khünṣir, and \(L_0\) = distance between nut and bridge, meaning the total speaking length of the string).

\(^{141}\) The maḥṣūra is reached by extending the auricular finger towards the bridge.
This distance $L_{ab}$ is to be measured towards the bridge from the wustā and the binšir (Fig. 14:134). If we measure it from the wustā, the distance $L_{ab}$ should be subtracted from the length of the string between the wustā and the bridge to calculate the resulting distance (let us name it $L_{a}$) from the bridge to the new tie (from this point on ligature “a”). While the distance between wustā and bridge is equal to the corresponding interval ratio multiplied by the string length ($27L_q/32$ – See figure), we can calculate

$$L_{e-a} = L_q(27/32-5/36)$$
$$= L_q[(27x36) - (5x32)]/(32x36)$$
$$= L_q(972-160)/1152$$
$$= L_q(812/1152)$$
or, by reduction,

$$L_{e-a} = 203L_q/288 \approx 0.7049L_q.$$ 

This first ratio corresponds to an interval with the value of 605.51 cents from the nut, rounded to 606 cents. When positioning the series of notes from the binšir (Fig. 15:135), the same distance $d$ must be subtracted from the string length between the binšir and the bridge in order to find the resulting distance, (which we name $L_{e-a}$) between the bridge and the (second) new tie (“b”), the result of which, with calculations similar to the ones performed for ligature b, is an interval with a value $\approx 743$ cents, with the (virtual) tie-fret $b$ on the soundboard, near the junction with the fingerboard.

The maḥṣūra, the precise position of which remains however undefined, is “surrounded” by the khinšir and ligature a (Fig. 14:134), which confirms its name.

Fitting these three new (and virtual) tie-frets within the Pythagorean division on the fingerboard (Fig. 15:135), we can see that the effective, resulting configuration that Kindi describes is in fact more complex than the “neat [Pythagorean] 2 x 4 scheme” and allows for Zalzalian intervals as well as for ditonic ones.

We shall also note that this is the first occurrence, in the Early period, of the division which would become the common denominator between all subsequent descriptions by major theoreticians of the Golden Age and the Systematists’ periods, the 3-intervals per one whole-tone division, 7-intervals per fourth and, adding one fourth and one whole-tone to complete the octave, the 17-intervals division of the octaves of maqâm music.

The resulting “Harmonic” division of Kindi (see Fig. 16:135) has the same numbers of intervals in the whole-tone, the fourth and the octave, with however different values for the composing intervals than in the Pythagorean division. In this case the maḥṣūra justifies also its name as, while its precise position is still undefined, it is delimited by the khinšir and ligature a, or – after fitting it within the Harmonic division – by the nut and ligature $a^*$. Remains the most important question: was the Early ʿud effectively fretted?

If we rely on Kindi’s description in this epistle, we may conclude as most our forbearers that “yes”, the Early ʿud was fretted. However, knowing that this is the only mention of material frets by Kindi, and that one single other description imitates him in the whole extant literature, we shall withhold our conclusion as many aspects of Kindi’s epistle must still be explained, as well as other descriptions which fully contradict the “fretting” thesis.

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142 The distance between the binšir and the bridge being equal to $64L_q/81$ (see Fig. 14), we can calculate $L_{ab} = L_q(64/81 - 5/36) = L_q(64 \times 36) - (5 \times 81))/(81 \times 36) = L_q(2304 - 405)/2916 = L_q(1899/2916) or L_{ab} = 211L_q/324 \approx 0.6512L_q$. This corresponds to an interval value of 742,501 cents from the nut, rounded up to 743 cents.

143 Similar reasoning applied to the first (“Harmonic”) division would give, for the ligature a, an interval with value 659 cents and, for the ligature b, an interval with value 746 cents. Essentially, the two possibilities lead to the same conclusions expounded further in the text.

144 As quoted from Wright at the beginning of Section B.

145 The maḥṣūra could also correspond to the missing octave equivalences on wustā and the binšir, which would complement the division of the fingerboard.
Fig. 13 Positioning of the left hand on contemporary ‘ūd(s) as shown in the opening pages of [Rūḥānā and Ṣalāḥ, 2001]. From top left to right then bottom left to bottom right: 1st position, 2nd position, 1st “half” position and 4th position. The two positions to the left are for traditional performance. The two positions to the right correspond to hand-shifts.

Fig. 14 Calculating the position of ligature a and including (then fitting) it in Kindī’s Pythagorean division in the Risāla fi-l-Luhān wa-n-Nagham.146 (“Tie” in the figure = “ligature”.)

146 The calculation of the distance between a and the nut was made by calculating the length of the string part which results from the addition of the equivalent of a fourth to section $L_{ca} = 203L_a/288$ (by subtracting a fourth from the interval delineated by ligature a); it suffices then to multiply $203L_a/288$ by 4/3 (being $812L_a/864$), and to simplify the result by dividing both numerator and denominator by 4, which gives $203L_a/216$. 

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Fig. 15 Positioning ligature $b$ with inclusion of the three new “tie-frets” ($a'$, $b'$ and mahṣūra) within the Pythagorean division of Kindī in the Risāla fī-l-Lūhūn wa-n-Nagham. (“Tie” in the figure = “ligature”.)

Fig. 16 “Harmonic” division of the fingerboard of the ‘ūd with Kindī’s indications on the “supplementary notes”, an alternative (based on praxis) division described by Kindī and totally overlooked by Orientalist (and re-Orientalist) musicologists – ʿiba’ (pl. ʿasābi’, dual ʿiba’-ayn) means “finger(s)”, here the “full fingers” (“ff”) of Kindī.
PART II. **ON “FRETS” AND “TIES” ON THE NECK OF THE ‘ŪD**

In this second part we shall examine one of the most debated questions in the history of (Arabian) music, the alleged fretting of the Early ‘ūd.\(^{147}\) Opinions have been historically far apart on this subject, and changing. We have also seen in the first part that theoretical divisions of the fingerboard, although described as “purely” Pythagorean in the literature are, when it comes to facts (to praxis), approximate and Zalzalian. The problem that arises is that, given material “frets” as those advocated by Farmer and others, Zalzalian (maqām) music as described in the *Kitāb al-Aghānī*\(^{148}\) and many other sources would be impossible: how can then this contradiction be resolved?

I provide here a foretaste of the final answer proposed in this dossier: there is no solution to this problem, unless early ‘ūd(s) were never fretted – except for teaching or theoretical purposes.

\(^{147}\) For the influence of the ‘ūd on Arabian music theory and praxis, see the entry for the instrument [Chabrier, 1982] in the *Larousse de la musique*, notably: “With the Abbasid Caliphs in Iraq, the ‘ūd becomes the conceptor of genē and modes of Meso-Islamic musics and the creator of melodies, a role maintained till today in both Arabian Popular and Art Musics”.

\(^{148}\) See footnotes nos. 424 and 425:184.

**A. Different opinions about the “fretting” of the ‘ūd**

Although many Western “specialists” in Arabian music state(d) that the Early Arabian ‘ūd was fretted, this question was never really settled.\(^{149}\) In 1969, Liberty Manik reviewed the arguments brought forward against this thesis:

> “With regard the tie-frets\(^{150}\) of the ‘ūd, which theoreticians of the Middle Ages\(^{151}\) have described in fine details to explain their [musical] system, Berner actually argues that these tie-frets never existed as this is, as he literally says, ‘pure fiction’.\(^{152}\) Berner refers for this to Geiringer who, after having determined that a lute with ties was not to be found in the iconographical context at that time, came to the conclusion that tie-frets were only used with the aim of measurement and research, and that these tie-frets could have no significance at all in [musical] practice.\(^{153}\) Before that, Curt Sachs came to a similar conclusion”.\(^{154}\)

Manik takes sides against these opinions by arguing that a lack of proof (corroborating the mounting of tie-frets on the neck of the ‘ūd) is not a proof of the absence of tie-frets because (1) an image (or a sketch) is not a photography and (2) lack of proof *per se* is not enough.\(^{155}\)

To defend his thesis, Manik cites in a footnote Farmer’s article “Was the Arabian Lute fretted?\(^{156}\) together with Lachmann’s\(^{157}\) and settles for the authority of these authors to conclude that “frets” were indeed mounted on ‘ūd(s) during the Golden Age\(^{158}\) (the Western Middle Ages according to Manik).

\(^{147}\) [Manik, 1969, p. 12]. Note that Manik’s reference for the last assertion corresponds to [Sachs, 1940, p. 254]: “Lutes seem to have no frets, either in older times or today, in spite of the constant use by the theorists of the word *dāsatīn* [sic – ‘*dāsātīn*’], plural of Persian *dast* or ‘band’, which is used to indicate frets. And it would have been difficult to string them securely around the sloping end of a pear-shaped lute [see Appendix B: Organological Clarification]. Very probably, the frets existed only theoretically to symbolize the positions of the stopping fingers”.

\(^{149}\) [Farmer, 1937, p. 458].

\(^{150}\) Reference to Lachmann, Robert, 1934, “Die Vinā und das indische Tonsystem bei Bharata”, *Zeitschrift für vergleichende Musikwissenschaft, II*, s. 64 (which I could not find).

\(^{151}\) [Manik, 1969, p. 12]. Note that Manik’s reference for the last assertion corresponds to [Sachs, 1940, p. 254]: “Lutes seem to have no frets, either in older times or today, in spite of the constant use by the theorists of the word *dāsatīn* [sic – ‘*dāsātīn*’], plural of Persian *dast* or ‘band’, which is used to indicate frets. And it would have been difficult to string them securely around the sloping end of a pear-shaped lute [see Appendix B: Organological Clarification]. Very probably, the frets existed only theoretically to symbolize the positions of the stopping fingers”.

\(^{152}\) Such arguments are totally acceptable *per se*, but the proof of the contrary was not provided either, as I explain further.


\(^{154}\) Reference to Lachmann, Robert, 1934, “Die Vinā und das indische Tonsystem bei Bharata”, *Zeitschrift für vergleichende Musikwissenschaft, II*, s. 64 (which I could not find).

\(^{155}\) Manik’s argumentation is reduced to showing the inexistence of proofs for the presence of tie-frets on the ‘ūd, stating that the lack of evidence in the iconography does not confirm their absence, which he uses as an argument in favour of the “fretting” thesis. This is an arbitrary procedure as it is in every science. Furthermore, he...
The thesis of the “fretting” of the ‘ūḍ is, consequently, based on already “old” (at the time of Manik) arguments from Farmer, Lachmann having simply followed Farmer in his argumentation as explained next. However, and due to the fact that Farmer’s writings remain an easily accessible reference for researchers, this interpretation resurfaces regularly in the musicological literature as explained in the introduction to this dossier for the *New Grove* and the *Encyclopedia of Islam*, to which should be added this statement by Farmer in his *History of Arabian Music*…:

“The ‘ūḍ qadīm or classical lute of four strings still continued to be favored, in spite of the introduction of the ‘ūḍ kāmil or perfect lute of five strings, which was fretted according to the ‘systematist’ scale”.

In his book, as in the *Encyclopedia of Islam* to which he contributed, Farmer considered the fretting of early – and less early – ‘ūḍ(s) as fact. However, there are many indications which contradict Farmer and other proponents of the “fretting” thesis and confirm Sachs’, Berner’s and Geiringer’s opinion, especially for the “Systematist” scale as Farmer wrote.

**B. Historical clarification**

**Farmer’s “Was the Arabian Lute Fretted?” revisited**

We saw that Liberty Manik, the 1969 author of a concise treatise on the theories of the scale of Early Arab, supports the thesis of the “fretting” of the ‘ūḍ at that time, referring in so doing to Farmer. Returning to Farmer’s article, we find from the outset Manik’s problematic stated in the introduction, in which Farmer cites an encounter with Lachman who (according to Farmer), was influenced by Geiringer’s opinion about the absence of frets on the early ‘ūḍ(s), and asked Farmer if proofs of such fretting(s) existed. A few lines further down Farmer cites Curt Sachs and his standpoint against the fretting thesis, while revealing concurrently Arabian musicologists’ dependence on Western musicological science:

“In 1932, whilst I was at Cairo at the Congress of Arabian Music, the question arose officially. At the plenary session of the Commission of Musical Instruments the well-known Egyptian musicologist Ahmad Amin al-Dik Efendi […] suggested that frets should be adopted on the modern Egyptian lute (‘ūḍ) as in days of old. Dr. Curt Sachs, […], who was President of the Commission, replied that the Arabian lute in days of old was not fretted. Several Egyptian savants and musicians questioned me privately at the time about Dr. Sachs’s statement. […] I promised that I would deal with the question at length not only for its own sake, but in defence of my own thesis that Europe was influenced by the introduction of musical instruments with frets during the early Arabian culture contact.”

Having stressed, at the end of his introduction, his own intention to prove the existence of frets, and having explained the issue and his own agenda, Farmer refers to Farmer and Lachmann without quoting them, and concludes in favour of the “fretting” thesis which is, to say the least, a flawed argumentation. The reader may compare this argumentation to Roasted’s conclusion on the ditonicity of the Byzantine chant “of the origins” in the section entitled *The unambiguous supporting testimony for the ditonicity of “Medieval” Byzantine chant* in [Beyhom, 2016, p. 235–236].

159 Farmer contributed to many articles, for example, in the *Encyclopedia of Islam*.

160 For example Bouterse’s article, entitled “Reconstructing the Medieval Arabic Lute: A Reconsideration of Farmer’s ‘Structure of the Arabic and Persian Lute’” [Bouterse, 1979], and his critique of Farmer’s description of Early ‘ūḍ(s). In spite of his critical attitude towards Farmer, Bouterse adopts the latter’s opinion: “As Sachs has pointed out, (citing [Sachs, 1940, p. 254]) frets would have been difficult to tie on the sloping neck, but […] Farmer has conclusively proved that the Arabs did use frets on their lutes in the Middle Ages (citing ‘Was the Arabian and Persian Lute Fretted?’ examined further)” – [Bouterse, 1979, p. 2–3]. More recently, the advocates of the “fretting” had the strong support of Eckhard Neubauer in his article “Der Bau der Laute und Ihre Besaitung…” [Neubauer, 1993] which is examined further.

161 Farmer states here in a footnote: “It was still in use in the 15th century. Bodleian MS., Marsh, 282, fol. 77”.

162 [Farmer, 1929, p. 208–209].

163 [Farmer, 1937].

164 Cited by Farmer in the same page mentioned by Manik.

165 [Farmer, 1937, p. 453]: later, Lachman changed his mind (according to Farmer) and distanced himself from Geiringer on this matter.

166 [Farmer, 1937, p. 453–454].

167 To defend his thesis about the introduction of fretted lutes in Europe at the time of the first interactions with the Arabs as quoted above. The purpose of this demonstration was the justification of a wider thesis by Farmer on the influence of Arabian music on European music, advocated in [Farmer, 1930] with, notably in pages 104, 108, 112 and 363–364, the claim that Arabian music introduced harmony in Europe. The “fretting” thesis allows for steady
starts\textsuperscript{168} by analyzing the term dasātīn used in the treatises for the “tie-frets”. He first quotes (al-) Khawārizmi\textsuperscript{169} in his Mafāṭīb al-ʿUlim:\textsuperscript{170}

\textit{Quote 1:} “dasātīn\textsuperscript{171} are the tied places (ribāṭūr) upon which the fingers are placed”\textsuperscript{172}

Farmer immediately concludes:

“This definition is in itself quite sufficient to settle the question at issue. These ‘tied places’ were made by means of gut or string tied around the neck of the instrument”.

Many questions arise here. Firstly, why would these “tied places”\textsuperscript{173}, if these are tie-frets, need to be made “by means of” gut or string? Why are these tie-frets not simply “made of” any material, be it gut or anything else? Would Farmer have only given a reference for this material from which the tie-frets were (allegedly) made, then we would not have to ask the question. By returning to the original source,\textsuperscript{174} we find that there is no single reference by Khawārizmi to the material from which the dasātīn (“ligatures”) were made, and that the page cited\textsuperscript{175} by Farmer contains only the description of the tuning of the ‘ād and the positions of the dasātīn.

The second main question which comes is Khawārizmi’s mention of the stopping of the string on the “tied places” which, as I show further, is incompatible with physical frets.\textsuperscript{176}

In the second part of his article,\textsuperscript{177} Farmer informed the reader that “Frets (dasātīn) are frequently mentioned in the Kitāb al-Aghārūn” by Asfahānī,\textsuperscript{178} and further refers to “the Arabic theorists”:

“their treatises prove conclusively that the lute (ʿād) as well as the pandore (tunbūr) had these frets or dasātīn tied around the neck of the instrument”.\textsuperscript{179}

He also adds that Kindī, speaking of the dasātīn of the ʿād in one of his epistles on music,\textsuperscript{180} “shows […] that they must have been frets”.\textsuperscript{181}

We must note here, firstly, that the tunbūr and the ʿād are different instruments,\textsuperscript{182} this difference lying mainly in the (relative) length\textsuperscript{183} of the neck\textsuperscript{184} but also in the playing techniques which, frequently, stem from the fretting, or from the non-fretting of these instruments.\textsuperscript{185} Secondly, I have shown elsewhere\textsuperscript{186} – and explain further in the following pages – that the tunbūr

intervals on the ‘ād which is in favour of polyphony (in Western mainstream thought); the ditonic thesis allows further for harmony in the Arabian Empire as early as Kindī (his “exercise for the ‘ād” in the Rūdāla β-l-Luḥān wa-n-Naghām is explained by Farmer in p. 104 of the aforementioned reference).

\textsuperscript{168} [Farmer, 1937, p. 454].


\textsuperscript{170} Further quotes of Arabian sources by Farmer and other authors are numbered from this point on.

\textsuperscript{171} (Reminder:) Plural of dasātīn.


\textsuperscript{173} This is effectively the first question as the terms “tied places” are a circumvolition for the word “ligature” (in French also “ligature”, in German “Bund”) which is the correct translation of the Arabic ribāṭūr (sing. of ribāṭūr).

\textsuperscript{174} [Khawārizmi (al-), 1991, p. 207–214].

\textsuperscript{175} [p. 210] in [Khawārizmi (al-), 1991].

\textsuperscript{176} Unless these “frets” are so thin (for example made of one or few silk strands the sole purpose of which being to materialize the positioning of the fingers, which means their purpose is indicative (showing the stopping points) and not effective (stopping the strings)). While this problematic is explained further, it is worth mentioning that these tied threads would hardly hold on to the neck of the ‘ād (even less than ties made of gut, as explained in Appendix B).
(here “of Baghdad”) might as well be considered as having no frets at all.

Further: when returning to Kindī’s manuscript at the page cited by Farmer (F 165v), we find absolutely no indication that the dasātīn may have been “frets” (or tie-frets). Kindī discusses in fact, in this folio (recto-verso), the positioning and the locations of the anghām (notes) on the fingerboard of the ‘ūd, and mentions three times a dasātīn which coincides with one or another of these locations, while failing to inform us if these dasātīn, that he had not previously defined, do exist physically.

Farmer continues his argumentation citing Munajjim who explains:

**Quote 2:** “the place of every note (nahma) upon every fret (dasātīn)”.

then Fārābī who, while describing the ‘ūd, would have written:

**Quote 3:** “that the dasātīn (frets) were tied (shadda) on the neck (mimusūla‘a) of the instrument, and that they were fixed parallel with the bridge-tailpiece”,

which corresponds to the original.

It seems here that, for the first time, Farmer’s assertions may come true. Still, we do not know what was the material used for the making of these “frets”... except for Farmer’s unsubstantiated statement at the beginning of his article.

Farmer further quotes (incompletely) Masʿūdī:

**Quote 4:** “the dasātīn next to the nut (anyf) was to be placed (mawḍūʿ) on the fingerboard at one-ninth of the vibrating string-length”.

Masʿūdī, however, wrote in the Arabic version:

**Quote 5:** “wa-d-dastabān al-ladhi yali al-anyf mawḍūʿ ‘alā khatt a-t-tasu’ min jurjat al-watar”,

which can be translated as:

**Quote 6:** “the dasātīn which (immediately) follows the nut is positioned on the line of the ninth of the whole string”.

While still no material for the “frets” is mentioned by any of the authors quoted or mentioned by Farmer, he asserts further, without providing references to the reader, that the Ikhwān a-Š-Safā’, (ibn) Sinā, (ibn) Zayla and Šafiyy-a-d-Dīn al-Urmawi and others,

**Quote 7:** “all confirm the view that dasātīn were gut or string frets tied on the neck of the lute”,

which is absolutely unsubstantiated, as we shall see, and while still no precise references are provided describing the material (except for Farmer’s own assertions) and no indications about this material can be found in his article until this point.

As there is no other way to be sure of the material existence of “frets” on the neck of the ‘ūd, we must therefore try to find them in the works of the four authors mentioned by Farmer, but not referenced by him. The “Brethren of Purity” (Ikhwān a-Š-Safā’) do mention, in their fifth epistle entitled On Music (Fi- al-Mīṣiqā), dasātīn which would be tied (tushadd) on the neck of the ‘ūd although they do not mention the

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187 B mentions at least of the words mawḍūʿ (“location”) or mawḍūʿī (plural of mawḍūʿ).
188 It is noteworthy that the first sheets of this manuscript were (and still are) missing in the copy cited by Farmer. These will be addressed further.
189 While Farmer’s argumentation seems already, at this point, heavily flawed, intellectual integrity compels us to go along with his reasoning.
190 “British Museum MS. Or. 2361, F 236v”, see [Munajjim (al-), 1976, p. 189–209].
191 [Farmer, 1937, p. 456]: note that these are still indications about the locations of the notes on the dasātīn; note also that Farmer insists heavily on the word “fret” in his quotes. In the original [Munajjim (al-), 1976, p. 189] we find “mawḍūʿ kull naghma min kull dasātīn”.
192 So far in this discussion (and in his article), all of Farmer’s assertions turned out to be imprecise or, worse, flawed. Therefore, I am compelled to use the conditional mood.
193 [Farmer, 1937, p. 457].
194 [Fārābī (al-), 1967, p. 498–499]:
material from which these are made. (Ibn) Sinā does mention,\(^{201}\) in the second part\(^{202}\) of his last discourse\(^{203}\) that the dasātīn must be tied (shadda), but nowhere in his whole book-chapter on music is there a mention of the material of those dasātīn to be found. As for his student (ibn) Zayla, he also says that the dasātīn must be tied (shadda)\(^{204}\) on the fingerboard, but, although he, as did (ibn) Sinā,\(^{205}\) explains that in order to complete the second octave musicians must perform a hand-shift,\(^{206}\) he still does not mention the material from which the dasātīn were made.

As for Şafiyy-a-d-Din al-Urmawi, and while not knowing\(^{207}\) which of his two treatises was read by Farmer, I read both the Kitāb al-Adwâr and the Sharafyya looking for the dasātīn. At the very beginning of the 2nd chapter of the Kitāb al-Adwâr, Urmawi explains:

**Quote 8:** “The dasātīn are marks which are put on the neck of stringed instruments following precise proportions to serve as locators for the emission of notes from parts of the string”\(^{208}\)

As for the Sharafyya, in the fourth discourse (in which the division of the fingerboard of the ‘ud is explained), Urmawi likewise writes:

**Quote 9:** “[…] and the dasātīn are marks put on the necks of stringed instruments to localize the positions dedicated to determined notes, and they are used for the appropriate composition (of music)”\(^{209}\)

Note also here two (later) indications by Shirwānī:\(^{210}\)

**Quote 10:** “and [the dasātīn] are marks put on the necks of stringed instruments to localize the positions dedicated to the sounding of specific string-parts”,\(^{211}\) and Lādhiqi:\(^{212}\)

**Quote 11:** “[there are] dasātīn in some instruments and these are marks which are put on the neck of stringed instruments to localize the positions dedicated to the sounding of specific notes in the course of melodies”,\(^{213}\) which confirm, with practically the same words, Urmawi’s descriptions.

As a consequence of the last references it can be concluded, at this point, that the dasātīn do not compel the musician to play the notes at their exact position (they do not constitute a compelling temperament), but that their main function is indicative: they simply show the locations of the “ideal” (theoretical) notes which compose the melodies.

While these references show that Farmer’s argumentation, in this article, is at least unconventional, if not

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201 In a-sh-Shifā’, an encyclopedic work the 13th chapter of which is dedicated to music and was translated in French by Rodolphe d’Erranger, cf. [Farābī (al-) and Sinā (Ibn) or Avicenna (9807-1037), 2001, v. 2, p. 234–235] and Chapter II in [Beyhom, 2010b].

202 Dedicated to musical instruments.

203 (Sinā (Ibn) or Avicenna (9807-1037), 1956, p. 144–145).

204 [Zayla (Ibn), 1964, p. 74–75]; note also [p. 73] – “among the instruments: those with strings and dasātīn which are tied (washidā) at the locations of the notes, such as the ‘ud and the ṭunḥār’:

’mīnā: Dost Awtar and Dasatīn Maṣudda, Muwaṣṣat al-sīnāt, al-ṭawārīkh, al-ulama’ bi al-’arabī, al-falāsi’.’

205 [Sinā (Ibn) or Avicenna (9807-1037), 1956, p. 144].

206 In the description of the two authors, the musician must perform a hand shift on the úr (see for example Fig. 15:135) to reach the two notes g and a, these have correspondences on the theoretical string ḍud, but Sinā and Zayla are describing here the praxis – which means that, at least for the ā, the location of the “tie-free” must be on the soundboard, which is incompatible with the “tying” of the dasātīn. In other words, the dasātīn either does not exist physically (its location can be simply marked on the soundboard) or the ligature is effectively a fret which is inserted on the soundboard. No such fret is however described by either of the two authors. Another possibility is that the ‘ud have a slender body at the junction with the neck, which is unlikely because Kindī’s and Tahārīn’s descriptions of the ‘ud (see Appendix A and [Beyhom, 2010b]) do not confirm such a shape.

207 Which also applies to Lādhiqi (al-) and (Ibn) Zayla but, for these authors, I could find corresponding editions in Arabic; as for Urmawi, here is the reference provided by Farmer: “British Museum MS. Or. 136, P. 235v”.

208 [Urmawi (d. 1294), 1986, p. 93]:

210 Note also here two (later) indications by Shirwānī:

211 [Shirwānī (al-) devoted to musical instruments, 1939, v. 4, p. 70]

212 [Shirwānī (al-), 1986, p. 70] (French version available in [Shirwānī (al-) and Lādhiqi (al-) (al-), 1939, v. 4, p. 70]).

213 [Lādhiqi (al-), 1986a, p. 59] (French version available in [Shirwānī (al-) and Lādhiqi (al-) (al-), 2001, v. 4, p. 292]):

214 See [Wright, 2001]e for more details on this author.

215 See [Wright, 2001f] for more details on this author.

216 [Lādhiqi (al-) and  (al-), 1939, v. 4, p. 70]).
flawed, his next argument seems to be more consistent:

**Quote 12:** “If further proof were necessary one might quote from the *Ḥ[a]wār al-funūn wa salwat al-maḥṣūn* of Abū'l-'H[usayn] Muhammad ibn al-Ḥasan, better known as Ibn al-Tāb[h]ījān, (fourteenth century?) the only copy of which is in the Dār al-kutub at Cairo, himself a musician, recommends the use of a pair of compasses when fixing the places of the *dasātīn* on the neck of the lute. He tells us, however, that he did not need *dasātīn* on his lute because he knew the place of every note on the fingerboard without *dasātīn*. He says, further, that four rolls of gut string were required to ‘fret’ a lute, and he recommends that several thicknesses ought to be used.”

Finally we have here a substantial indication by Farmer of the material existence of frets “made of gut strings”. Let us note, for future reference, that the provided pieces of information in the last quote are numerous and can be sequenced thus:

1. Locations of ligatures are marked, then these are mounted (it remains unclear however how) on the neck of the āḍ.
2. Theses ligatures are not of common usage, as (ibn a-t-) Tāb[hān] does not use them.

3. Ligatures are not necessary when the locations of notes are known to the performer.
4. If physical tie-frets are needed, gut strings can be used for this purpose.

From which it is easy to deduce that:

1. Mounting physical tie-frets is superfluous for confirmed musicians.
2. As a consequence of the previous point, ligatures were used only for beginners.

While remembering earlier quotes from Urmawi and other early authors, we may add two supplementary inferences:

1. Ligatures, wether physical (material) or not (for example markers on the upper side of the neck – which are still in use nowadays), serve primarily as locators of notes.
2. Ligatures are mainly used, in theoretical writings, to mark these positions.

Before going any further in our reasoning, it is time to examine more thoroughly the particular case of the ligatures on the *funbūr* and the iconography of the āḍ (First and Second Interlude thereafter).

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214 [Farmer, 1937, p. 457]; this description reminds of Kindī’s description in the *Risāla fil-Lahbīn wa-r-Naghīm*, reviewed further for the mounting of the *dasātīn*.

215 “Tāb[hān]” means “miller” (see [Beg, 2000]); see also [Wright, 2001] about Abū-l-'Husayn Muhammad ibn al-Ḥasan ibn a-t-Ṭab[hān] al-Muṣīqī, and more of his and Kātib’s books (mentioned in the following quote) in [Wright, 1999, p. 545], notably: “Together with the *kanūl adab al-ḥīma* (by (al-) Kātib, available in French as [Kātib (al.), 1972] and in Arabic as [Kātib (al.), 1973; 1975] – also examined in [Beyhom, 2010]) Ibn al-Tāb[hān]’s work provides an invaluable insight into the conceptual and analytical categories familiar to practising musicians in the major cultural centres in both Egypt and the Fertile Crescent during the first half of the period between the great theoretical syntheses of al-Fārābī in the tenth century and Sa’d al-Dīn al-Urmawi in the thirteenth. Less systematic and more eclectic, with a greater interest in human behaviour and wit than mathematical abstraction, they embody a major strand in sophisticated urban culture, happily combining the presentation of specialist knowledge with a participation in the more general world of ideas by drawing upon and prolonging an already well-established literary tradition concerned with musical origins and the achievements of outstanding performers”.

216 This is one additional example of Farmer’s hasty assertions as, in the article entitled “The structure of the Arabian and Persian Lute in the Middle Ages”, he confirms [Farmer, 1939b, p. 46–47] this information about (ibn a-t-) Tāb[hān] living in the 14th century, while it is here tempered by a question mark. All of a-r-Raŷî (cited in Yūsuf’s edition of Tāb[hān]’s *Ḥāwī al-Funūn wa Salwat al-Maḥṣūn* [Ṭab[hān] (ibn a-t- al-Muṣīqī), 1976, p. 2, fn. 5]), Neubauer (in both his edition of the same [Ṭab[hān] (ibn a-t- al-Muṣīqī), 1990, p. iii] and in his article [Neubauer, 1993, p. 285]) and [Wright, 2001] place Tāb[hān]’s active period in the 11th century. As a further indication about the persistent influence of Farmer’s erroneous assertions on contemporary musicology of the *maṣqām*, Poché, in the entry ‘āḍ of the *New Grove* [Poché, 2001, p. 27], mentions Tāb[hān] as active in the 14th century and refers for that to another of Farmer’s articles in *Studies in Oriental Musical Instruments* [Farmer, 1939a, p. 30], while concurrently citing Neubauer’s article of 1993 in which the latter corrected Farmer(!). (See also next footnote.)

217 There currently exists (October 2017) three different copies of Tāb[hān]’s *Ḥāwī al-Funūn wa Salwat al-Maḥṣūn* in Dār al-Kutub at Cairo: (1) Funūn Jamila 32, and (2) Ṭal‘at 84 while the Funūn Jamila 539 published by Neubauer is seemingly lost. According to Rosy Beyhom (personal communication) another version, (3) the M 1362, is certainly a photographed copy of the Funūn Jamila 539.

218 Farmer’s repeated errors with Arabic (and Persian) names and words may be an indication of his insufficient knowledge of the Arabic language. Bouterse’s article [Bouterse, 1979] explains some of the deficiencies in his translations (see also [Beyhom, 2011]).

219 With the help of which marks can be made (lines, or segments of circles).

220 See [Ṭab[hān] (ibn a-t- al-Muṣīqī), 1990, p. 175-176 (89–90)]: Arabic original in Appendix D; additional explanations provided in [Beyhom, 2010b], notably in p. 520-521.
FIRST INTERLUDE: LIGATURES ON THE ṬUNBŪR IN EARLY ARABIAN DESCRIPTIONS

Farmer pretends that all the treatises of (some mentioned by him) early Arabian theoreticians “prove conclusively that the lute (ʿūd) as well as the pandore (ṭunbūr) had these frets or ḍasāṭīn tied around the neck of the instrument”\(^ {221}\).

The only extant early (till the 12th century) descriptions of the ṭunbūr, to my knowledge, are by Fārābī (9th century) and by Kātib (probably end of the 10th/beginning of the 11th centuries). None of the authors mentions any material for the ligatures or mentions that ligatures have a physical existence,\(^ {222}\) either for the ṭunbūr or for the ʿūd, while Fārābī specifies:

“It is possible that an uneven placement of the ḍasāṭīn on the ṭunbūr of Baghdād alters the consonance of notes, in which case it is necessary, in the course of performance, to use evenly disposed places between the existing ligatures, as described above for the ʿūd.”\(^ {223}\)

Using intermediate positions, which change the pitch of the produced sound, is equivalent to say that the ligatures have no physical existence or that they are so thin that they do not have the function of tie-frets, but are markers for the positions of the fingers. A little further in his treatise, Fārābī explains (see Fig. 17:143)\(^ {225}\):

“In our days, most Arabian users of the [ṭunbūr of Baghdād] neglect the ḍasāṭīn of the ‘Pagan times’\(^ {226}\). They use the part of the fingerboard below ḍasāṭīn S–A and make of it the [new] sabbāba [index]. They put the binṣīr [annular] below it in the direction of J, and follow up with the khinṣīr [auricular]. They place their khanāṣīr [pl. of khinṣīr = auricular] farthest just above the fourth of the length of the total string. As for the ṭunbūr, for example, (pl. of ṭunbūr = middle finger), they make them between S–A and the locations of their banṣīr [pl. of binṣīr = annular]. Most of them make the distances between their fingers equal, or close to the distances between the ḍasāṭīn except for the sabbāba, for which they use the last ḍasāṭīn of the Jāhiliyya which is ḍasāṭīn S–A.”\(^ {227}\)

Therefore, and according to the greatest theoretician of the Arabian Golden Age, the ʿūd and the ṭunbūr had ḍasāṭīn (“ligatures”). However, these ḍasāṭīn did not prevent performers to play between the ligatures, above them or below them, in which case the sounded pitches are modified.

Which makes me wonder if Farmer really read the authors he cites, or if he even wished to understand what they wrote.\(^ {228}\)

SECOND INTERLUDE: ICONOGRAPHICAL ARGUMENTS

One of the major arguments against the thesis of the “fretting” of the ʿūd was the lack of iconographical evidence. Farmer himself acknowledges this fact\(^ {229}\) and mentions “hundreds of illustrations of the lute which reveal no trace of frets”, while reproducing\(^ {230}\), as a contribution to his thesis, an illustration credited to Riz[ḍ]ā ʿAbbāši and dated from the 1630s.

\(^ {221}\) Italics in the quote are mine.

\(^ {222}\) See the description of the ḍasāṭīn in [Kātib (al-), 1972, p. 89–91] and [Kātib (al-), 1975, p. 54].

\(^ {223}\) See Quote 13:148.

\(^ {224}\) [Fārābī (al-), 1967, p. 655]. The French version [Fārābī (al-), 1930, v. 1, p. 224] is different from my translation, but does not contradict it.

\(^ {225}\) See also [Hassan, 1982, p. 10 sq.] for contemporary Iraqi ṭunbūr(s) with different divisions of the fingerboards.

\(^ {226}\) Reminder (see footnote no. 45:119): Jāhiliyya (“Age of ignorance”) in Arabic.

\(^ {227}\) [Fārābī (al-), 1967, p. 663–664]. The French version [Fārābī (al-), 1930, v. 1, p. 227] is (also) different from my translation, but does not contradict it.

\(^ {228}\) Note that Urmawi does not even mention the ṭunbūr in his Risāla ašš-Sharáfīyya but mentions, in a very concise paragraph [Urmawi (d. 1294) and [Jurjānī (al-), 1938, v. 3, p. 110] “two-stringed instruments” and refers to his Kitāb al-Advār ((Urmawi (d. 1294), 1984, p. 44–45) or [Urmawi (d. 1294), 1986, p. 229–230]) in which Chapter 7 (in fact a long paragraph) is dedicated to stringed instruments, and where “ligatures” (ḍasāṭīn) are mentioned but not described. Likewise the “Brethren of Purity” mention [Ikhwān a-ṣ-Ṣāfi, 1983, v. 1, p. 202] the ṭunbūr among a dozen other instruments but restrict themselves, in the following pages, to a description of the ʿūd and of its tuning.

\(^ {229}\) [Farmer, 1937, p. 457–458]: “Although it is quite clear from literary sources that the lute of the Arabs and Persians was fretted in the early Middle Ages, it has to be admitted that our iconographical sources do not support this”, adding [p. 459]: “Clearly, iconography is an uncertain guide”.

\(^ {230}\) Insert (Plate I) between [Farmer, 1937, p. 452–453], with the following acknowledgment: “(Reproduced by the courtesy of Messrs. Bernard Quaritch, Ltd.)”.

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Amine Beyhom
Was the Early Arabian ‘ūd “fretted”?

The system of the ṭunbūr of Baghdād as explained by Fārābī.

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Fig. 17 The system of the ṭunbūr of Baghdād as explained by Fārābī.
It shows a lute-type instrument the fingerboard of which clearly bears marks perpendicular to the strings (Fig. 18:144). The drawing allows, however, no identification of the type of “tie-frets” (or to know if they have any physical consistency).\(^{231}\)

Farmer was, there is no doubt about this, one of the best-placed Orientalists to dissert on the iconography of the ʿūd, and he was notably the editor, in 1966, of a compendium of illustrations on “Islamic music.”\(^{233}\) The mere fact that these illustrations were not used as potential “proofs” for Farmer’s thesis is somewhat disturbing.

On the other hand Liberty Manik, who cites no less than 9 of Farmer’s works along with at least 15 other references in French (including *La musique arabe* by Erlanger\(^{234}\) ), did not bother to consult Farmer’s aforementioned book\(^{235}\) published in Germany three years before his thesis, as well as he did not bother consulting Erlanger’s book to verify if his thesis could be confirmed or infirmed.

This is even more disturbing when we know that Manik’s understanding of Arabian sources could have helped him substantiate his thesis, as the *Risāla fi-l-Luhūn wa-Nagham* of Kindī, reviewed above for the description of the tie-frets, was published seven, then four years before the publication of his book.\(^{236}\)

However, before reviewing this description, Fig. 19 is a remarkable example of “chimerical forms”\(^{237}\) for music instruments in the literature on Arabian music.

![Sketch of a ʿūd (duplicate from the original) from a Turkish manuscript from the Bibliothèque Nationale de France (BNF).](image)

Few other representations of the instrument are proposed in Fig. 20 to Fig. 24.

\(^{231}\) And, this is no early ʿūd.

\(^{232}\) [Farmer, 1937, Plate facing p. 453].

\(^{233}\) Farmer has published no less than 821 books, articles and Encyclopedia entries, of which 334 are dedicated to Arabian music and musicians; 121 additional works were still unpublished in 1999 (according to [Cowl and Craik, 1999]).

\(^{234}\) [Erlanger, 1930]. (The six volumes were published between 1930 and 1959).

\(^{235}\) [Farmer et al., 1966]. (Either Manik knew about this book and did not want to cite it, or he simply did not do a thorough research for the relevant literature.)

\(^{236}\) [Kindī (al-), 1962a; 1965].

\(^{237}\) As Farmer himself describes them in [Farmer, 1937, p. 460].

\(^{238}\) From [Shiloah, 2002, p. 207]: this sketch is made by Rosy Azar Beyhom.
“In short”, I agree with Farmer that:

“ whilst iconography has an undoubted value in recording the existence of classes of musical instruments of which no literary evidence has come down to us, we must always be critical before accepting the forms and details of such instruments”.  

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239 Between 320 and 480 CE.

240 Carbon copy by Rosy Azar Beyhom, from [Subramanian, 1985, p. 12, Fig. 8]. (This figure was previously published in [Beyhom, 2010b].)

241 As above, from [Subramanian, 1985, p. 12, Fig. 9].

242 This is to this day the oldest representation of a ‘ūd-type lute that I could identify, taken from the booklet of [Zakir Hussain and Brij Narayan, 1990], and kindly provided by François Picard. (This figure was previously published in [Beyhom, 2010b].)

243 [Farmer, 1937, p. 460].

244 From [Liu et al., 1988, ill. II-86], kindly provided by François Picard. (This figure was previously published in [Beyhom, 2010b].)

245 (These sketches were drawn by Rosy Azar Beyhom, and were previously published in [Beyhom, 2010b] and [Beyhom, 2016]).
The tie-frets (dasātīn) in Kindī’s Risāla fī-l-Luhūn wa-n-Naghām

In the Risāla fī-l-Luhūn wa-n-Naghām, unlike in other references cited by Farmer, the author (Kindī) thoroughly describes the material(s) used for the tie-frets, as well as their thickness proportions. Furthermore, it seems that Farmer had access to a copy of this epistle which, as he writes in a later article, he had consulted in 1926, and mentioned that the first folios were missing.

The missing folios happen to be those where Kindī describes the tie-frets. The total speaking length of the strings is 30 “full fingers” (“ff”), which roughly equates to 60 cm. The first tie-fret, the sabbāba (index), is positioned (see Fig. 9:131) at a distance of 3 ff from the nut, and is made of a bamm string (the thickest and, acoustically, the lowest string) winded twice around the neck (Fig. 25). It is firmly tied to avoid lateral displacements.

The bamm string is made of four strands of homogeneous gut of constant cross section thoroughly twisted together (Fig. 26 and Fig. 27). The second tie-fret, the wustā (middle finger), is made of mathlath string, and mounted 2 ff away from the sabbāba. The mathlath string is made of three strands of twisted gut. The third tie-fret is winded 1 ff apart from the wustā, with a mathnā string made of twisted silk strands (Fig. 27) the section of which is equal to the section of two gut strands.

The fourth tie-fret is mounted with a zīr string 1½ ff after the third tie-fret. The zīr string is made of twisted silk strands the section of which corresponds to the section of one gut strand.

The total sketch (above Fig. 84 in Farmer et al., 1966) — taken from Kura, al-Ṭūḥa, unknown author, Iran, mid-14th-century, British Museum MS. Or. 2361, f° 260v, below Fig. 81 in Farmer et al., 1966 — from the Kitāb al-Adwār by Saḥḥīy-a-d-Dīn al-Urmawī, Bodleian Library Oxford, MS. Marsh 521, f° 157v, 1333-1334 served as “proof” that ‘īd(s) from the Early Islamic Era were, like Odenotial lutes in the Baroque and Renaissance periods, “fretted”.

Except for (īb a-t-) Ṭabḥān.

Which probably corresponds to the Berlin MS. Ahlwart, 5530, f° 254r – 31r, published as the fifth epistle in Kindī (al-), 1962a.

Farmer, 1939b.

Farmer, 1939b, p. 43, fn. 2.

The missing folios correspond to pages 9–14 in Kindī (al-), 1965, and the incomplete manuscript consulted by Farmer begins at the end of the first line of page 14.

This contradicts Kindī’s further indications for octaves and fifths correspondences as the knots would have to be undone and done repeatedly.

[Kindī (al-), 1965, p. 12]: the other tie-frets are described on this page and the following.

[Kindī (al-), 1965] [p. 15]: descriptions for the material of other strings are given on this page.

The reasons invoked by Kindī [p. 16] for this change of material are firstly that the sound of silk strings is “purier” for higher notes such as on the zīr, and secondly that the mathnā and the zīr need to be tensioned to such an extent as to possibly rupture were they made of (one or two) gut strands, whenever silk strings would not. The complete original quote for Kindī (al-), 1965, p. 12–16] is available in Appendix D.

Such sketches (above Fig. 84 in Farmer et al., 1966) — taken from Kura, al-Ṭūḥa, unknown author, Iran, mid-14th-century, British Museum MS. Or. 2361, f° 260v, below Fig. 81 in Farmer et al., 1966 — from the Kitāb al-Adwār by Saḥḥīy-a-d-Dīn al-Urmawī, Bodleian Library Oxford, MS. Marsh 521, f° 157v, 1333-1334 served as “proof” that ‘īd(s) from the Early Islamic Era were, like Odenotial lutes in the Baroque and Renaissance periods, “fretted”.

Fig. 25. The first (sabbāba) tie-fret (“tie” in the figure) described by Kindī and tangency point (“Bend”) with the bamm string. This is a side view (length section) in which d is the diameter of the bamm string, Δd is (twice) the undetermined error estimation – due to the elasticity of the composing gut-material – between the theoretical position of the tie-fret and the effective contact point of the mounted (and stopped) bamm string. The tie-fret, which is also made of a bamm string, is winded twice around the neck.

All these explanations by Kindī are clear and consistent, and show that, at least for this author, tie-frets made of strings were effectively mounted on the neck of the ‘īd, contradicting thus Urmawī’s indications (Quote 8:140 and Quote 9:140) while confirming (a priori) the description of Ṭabḥān (Quote 12:141).

One undeniable contradiction is however raised by Kindī himself as he mentions in the same epistle notes performed outside the tie-frets, between the
tie-fret of the *khinsir* (auricular) and the bridge, maybe even on the soundboard of the instrument.²⁵⁵

![Diagram of gut strands](image)

Fig. 26 Result of the (thorough) twisting of the 4 gut strands to make the *bamm* string on the ‘ūd (the figure shows cross sections of the gut strands). If the gut is 1 mm wide (diameter = 1 mm), the resulting string will have a diameter D of approx. 2 mm.²⁵⁶

We need therefore additional information in order to be able to conclude on this subject, which we shall seek evidently in Kindī’s works, but first in other author’s works.

²⁵⁵ As seen in Part LB of this dossier.

²⁵⁶ Given *d₁* as the diameter of one gut strand (assuming it was already treated as to have a homogeneous density), the cross-section of one strand is $π (d₁)^2$. A good twisting – depending also if the gut is wet or dry – discards the empty spaces between strands in such a way as to form one gut string of circular cross-section the diameter of which we name *d₂*. The cross-section of the *resulting string* is equal to the cross-section of the 4 strands of gut twisted together to form the string, i.e. $11 (d₂)^2 = 4 \times π (d₁)^2$ which, after simplification and reduction, gives $d₂ = 2 \times d₁$. Four considerations are important for this reasoning: firstly, in the case of not sufficient twisting, there will remain tiny empty spaces between the strands, which results in a slightly greater diameter of the string. Secondly, while a gut strand is initially hollow (tubular), and while Kindī does not mention a prior twisting of the gut strands, we can assume that *d₂* will be smaller than $2 \times d₁$. The same applies for the third consideration, which is that the process of twisting will elongate the gut (but reduce the total length of the resulting string), reducing in so doing the diameters *d₁* of the strands, in which case, it is better to assume that the final cross-section will be less than $2 \times d₁$. However, the material (the gut) plays a major role and makes the final result more complicated, as Richard Dumbrill explains (private communication): “You must consider the nature of the gut (collagen) and depending on many factors, such as (a) the animal from which the gut comes; (b) the age of the animal when it was ‘gutted’; (c) the time between the slaughtering of the animal and when the guts were used (never longer than 30 hours); (d) were the guts salted as soon as extracted from the animal and then thorough washed before twisting; e) was garlic/alum used as an anti-septic prior to twisting, as this would change the structure of the collagen; f) how many twists per cm; g) what was the tension of the guts during the twisting process; h) were the guts split prior to twisting. Many other factors such as hygroscopy at the time of the twisting must also be taken in consideration: in practice, I would expect that the consideration of the few parameters I gave you would lead to a + or - 25% either way. The only way to set a proper formulation would be empirically to emulate ancient methods, and with proper microscopic examination”. Other considerations must be taken into account (such as the angle of the twisting, the polishing of the string) – see [Abbott and Segerman, 1976; Bonta, 1999] for more details.

²⁵⁷ Note that silk strings are not made as with gut strings. To make a silk string the silk threads must be twisted over double the length required and then folded in two (and knotted again at both ends) to make one string where the strands will not unwind. Further: “an old cloth of linen is [soaked in glue], and silk strings should be rubbed with it until they are infiltrated thoroughly with the ingredient” – in [Tsuge, 2013, p. 178]. (See also the complete description of the “making of” gut and silk strings in Appendix A.)

²⁵⁸ See for example Carra de Vaux’s appreciation of Fārābī’s work in the foreword to Erlanger’s translation of [Fārābī (al-), 1930, v. 1, p. vii].

²⁵⁹ Respectively in 1930 and 1935 – see previous footnote and [Fārābī (al-) and Sinā (Ibn) or Avicenna (980?-1037), 1935].
original version) the phrase “these dasātān play the role of bridges” that Farmer omitted, although it could have helped him defend his thesis.

Whenever this indication remains inconclusive for our purpose, other indications in Fārābī’s book may help us better understand the role of the ties for the performer:

Quote 13: “The leimma is close to a quarter-tone, which is the reason why its consonance may be found close to the consonance of the quarter-tone. The reason is that the finger does not always reach the exact location of the intended note and may (stop the string) a little further or closer. If the quarter-tone was intended and the finger went a small amount further, it becomes a leimma which is not originally consonant. If the interval of leimma was intended and (the finger) went a small amount closer, then the leimma becomes closer to a quarter-tone. […] This is why it is difficult to conclude on the consonance of the leimma performed on the ‘ūd’.  

While this completely contradicts Kindī’s “solid” ties (and Farmer’s assertions), the following excerpt from Fārābī’s book is even more explicit on the subject:

Quote 14: “It is however useless to multiply the dasātān. Many musicians [“persons”] use other notes than these [the ones located by ligatures] which have no predetermined locations, depending on the needs of the composition of their melodies. Some of these notes are sounded from between the ligatures (dasātān) and others below the ligature of the khrāṣ [auricular] while others [still] are found over the ligature of the sabba (index). These notes are used to enrich the melody. If somebody wishes to determine these notes, he must search for the corresponding location on the dasātān or between them”.

As for (ibn) Sinā, the following explanations can be found in the book-chapter dedicated to music in his Kitāb a-sh-Shīfā, in the section concerning the tuning of the ‘ūd and the division of the fingerboard:

Quote 15: “Concerning the tawsīṭān [pl. of tawsīṭa – “link, connection”] these are of the same type as the ‘mixtures’, or close to them. They consist in plucking the string stopped at the location of one ligature and moving then the finger to another ligature located above or below it, with no disruption [on the string]. The aim is to modify the sound continuously from low to high or from high to low”.

While for the two major authors of the Golden Age of Arabian music the “tie-frets” on the neck (fingerboard) of the ‘ūd are just visual markers for the notes, their explanations seem to contradict fully the indications of Kindī and Ṭaḥhān.

As all indications in the literature and the iconography about the organology of the instrument seem to converge towards the use of fretless ‘ūd(s) in the Golden Age of the Arabian Empire, it may be concluded that either (1) Kindī did not know much about the matter (and Ṭaḥhān copied him without experimenting with tie-frets on the neck of the instrument) or that, effectively, (2) tie-frets had existed historically over a short time period (around the 9th century) but were limited in number on the fingerboard and were used for teaching or theoretical purposes exclusively.

However, Kindī’s descriptions of the proportions of the ‘ūd and of the tie-frets being very precise in comparison to other authors, it is possible that further explorations of his and other writings may reveal other, complementary details. Eckhard Neubauer's 1993 article on the ‘ūd is such an attempt which is typical in its Orientalist handling of the sources.

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NEUBAUER’S “BAU DER LAUTE…”

In “Der Bau der Lauten und ihre Besaitung nach arabischen, persischen und türkischen Quellen des 9. bis 15. Jahrhunderts” Neubauer examines the problematic of the “Bünde” (“frets”) on the fingerboard of the ‘ūd

260 Because “ligatures” can still play the role of “intermediate” bridges if they are simply marks on the fingerboards as quoted for Urmawi (Quote 9: 140).


262 Between the ligature of the auricular and the bridge.

263 Between the ligature of the index and the nut.


265 Otherwise called “portamentos”.

266 [Sinā (Ibn) or Avicenna (9807-1037), 1956, p. 140], and [Fārābī (al-) and Sinā (Ibn) or Avicenna (9807-1037), 1935, v. 2, p. 231] for the French translation.
within four pages supported by various quotes in the second part of his article. He states from the outset that Farmer’s 1937 article – published fifty-six years before his own article – is “clear” on this question despite of the increasing skepticism which, according to him, reached the “secondary literature”, and endeavors to “correct” the “erroneous opinion” of authors who do not believe that Early Arabian ‘ūd(s) were fretted.

In order to support his thesis, he relies on a series of quotes, either already known to the reader – from Farmer’s 1937 aforementioned article – or “new”, from sources that he read.

**Neubauer’s references to Lādhiqī, Fārābī and other authors**

Neubauer’s first quote “in favour” of the fretting thesis is from Lādhiqī (the first phrase in bold type, in the original and which Neubauer leaves out, is added to explain the context):

*Quote 16:* “Some modern performers mount a sixth string on this instrument and call it the ‘ūd akmal [even “more complete” (than the “complete” ‘ūd with 5 strings)]”\(^{274}\), and markings are put on the neck of these instruments to show the [places] for the emission of the notes of the melodies (madār al-albān) from the neck, and these markings are called dasātīn, be they from tied strings, marked lines or others [still]."\(^{275}\)

This excerpt comes late in Lādhiqī’s work and complements Quote 11:140\(^{276}\), while restricted to either “modern performers” or to the ‘ūd al-akmal. Knowing that in previous two pages Lādhiqī’s discourse relates to the differences between the ‘ūd qadīm (“the Old ‘ūd”) – with four strings – and the two others, later ‘ūd(s), and knowing that in his first indication (Quote 11) he mentions only marks on the fingerboard to be used as dasātīn, it is difficult, in this case, to be sure about which instrument or epoch this (new) indication (Quote 16) is.

We cannot decide either if the multiplication of the strings created specific constraints (for example for octave and fifth correspondences) which compelled some “modern performers” to add marks or ligatures (dasātīn) to show the new positionings for some notes, and neither can we conclude if Lādhiqī, in this excerpt (Quote 16:149) simply retells the history of the dasātīn by implicitly quoting Kindī – a sort of a tribute to his predecessor – on the matter. Let us simply note that, according to this quote, the dasātīn can either be tie-frets (made of gut or of another material) or marks (lines) drawn on the neck.

Next, Neubauer mentions *Kanz a-t-Tuhaf*:

*Quote 17:* “The dasātīn consist in a series of marks (nešāni ye čand)\(^{278}\) affixed (wad karde) on the necks (sawāʿed)\(^{279}\) of stringed instruments (ālāt-e dowlāte-otūtā) for a firm and precise positioning (tasaddod) of the fingers on the string and for the production of the notes (estefrāeq-e naghamāt) on it”\(^{280}\)

In itself, this quote confirms that the dasātīn were marks\(^{281}\) “affixed”\(^{282}\) on the fingerboard of the ‘ūd or other stringed (and probably lute-like) instruments.

After quoting Khawārizmī at the beginning of the next page of his article,\(^{283}\) Neubauer, while asserting that the “usual material for the frets [was], according to Ancient sources, pieces of string”\(^{284}\) quotes then (directly) Fārābī (corresponding to Quote 3:139)\(^{285}\) and

\(^{269}\) [Neubauer, 1993, p. 328-331].

\(^{270}\) [Neubauer, 1993, p. 328].

\(^{271}\) The aforementioned [Farmer, 1937], which Neubauer erroneously dates from “1939”.

\(^{272}\) “Fehlmeinung”.

\(^{273}\) This is one further indication, if needed, that Neubauer picks out in the literature what comforts his thesis specifically, and discards whatever information or facts that can put it in doubt.

\(^{274}\) Expounded in [Lādhiqī (al-), 1986b, p. 178].

\(^{275}\) Translated from the Arabic version [Lādhiqī (al-), 1986b, p. 179].

\(^{276}\) “[There are] dasātīn in some instruments to localize the positions dedicated to the sounding of specific notes in the course of melodies” – [Lādhiqī (al-), 1986b, p. 59].

\(^{277}\) Which I could not find (and I have no knowledge of Persian).

\(^{278}\) All transliterated Persian terms in this quote are in Bold type.

\(^{279}\) “Sawāʿid” in Arabic transliteration.

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280 Translated from [Neubauer, 1993, p. 328]: the German original quote, as for all quotes from Neubauer, is reproduced in Appendix D.

281 “Zeichen” in the original German.

282 *die man auf den Halsen […] anzubringten pflegt* in the original German. “Anbringen” can be translated as either “affixed” or “mounted” (or other possibilities), which does not help in determining the material from which these “marks” are made.

283 Translated from [Neubauer, 1993, p. 329] – Neubauer’s quote corresponds to Quote 1:138: “dasātīn are the tied places (ribātūt) upon which the fingers are placed”.

284 Which, as we have seen, is false as the majority of references provided in this dossier concern markers on the fingerboard. Note that in Neubauer’s article the only mention of “pieces of string” till this point is in Lādhiqī’s reference, which is far from being all the “Ancient sources”, and even further from being the “usual material” for the ties.

285 Translated from [Fārābī (al-), 1967, p. 498-499], in which I re-instate here [between brackets] the phrase at the beginning: “[And this instrument is one in which the notes are emitted according to
then indirectly (and with no reference to a page number):

“Elsewhere he [Fārābī] says that notes which are positioned above the ties can be played without additional ties only by Masters of the corporation [of musicians].”

Searching for this unreferenced (and indirect) quote in Fārābī’s *Great Book of Music*, the only corresponding quote to be found is the aforementioned Quote 14:148 in which, however, Fārābī does not mention “Virtuoso performers” (or “Masters of the corporation”) but “many persons” who, furthermore, can play *between the ligatures, over them or below them*, a fact that Neubauer (very) lightly overlooks().

Immediately after, Neubauer quotes Fārābī (both indirectly and directly) a second time:

“In one equivalence of fifth, the fifths can be for example only produced ‘if a fret stands there, otherwise not. Unless [the performer] succeeds in positioning the finger [correctly]”.

Here is the complete translation of the excerpt:

**Quote 18:** “In this tuning [to the fifth between the *bārm* and the following string], the notes produced by the three strings below the first string [the *bārm*] are displaced when compared to the same notes in the usual tuning [in integral successive fourths] one whole tone above [towards the lower tones]. If a *dastān* happens to be there, they will be produced, if not they will not, or it may happen that the finger stops [the string] on the corresponding location of the *dastān*."

Fārābī clearly says in the Arabic original that the notes, if they are not found on one of the *dastān* (pl. of *dastān*) of the previous tuning, could still be performed if the finger stops the string on the corresponding position, although it may not be marked by a *dastān*. In other terms, notes on the ‘ād that he describes can be produced whether there are ligatures or marks (*dastān*) affixed to the neck, or not.

Neubauer’s does not stop, however, at these truncated or tampered quotes, but quotes as well Kindī in the *Risāla fi-l-Luhūn wa-n-Nagham* and (ibn a-t) Ṭāḥhān in his Ḥāwī-l-Fumān wa Salwat al-Maḥāzin.

**Neubauer’s interpretation of Kindī’s *Risāla fi-l-Luhūn wa-n-Nagham***

Further quotes from Kindī’s *Risāla fi-l-Luhūn wa-n-Nagham* are provided in Neubauer’s article, explaining the tuning, and the mounting and tying of the frets, while concluding (see FHT 9:166):

“According to the indications [of Kindī] the proportions of the strings from the *zār* to the *bārm* strings are 1:2:3:4. In an analogous way, the sizes of the frets, from the fret of the index to the tie of the auricular, should diminish in the proportion 4:3:2:1. Both are unrealistic.”

Let us firstly note that these proportions are not necessarily unrealistic as similar increasing thicknesses of ties – but not necessarily similar dimensions – were used in European lutes and, secondly, that this quote suggests that Kindī may have given, in Neubauer’s opinion, false indications for these proportions which would in turn make him unreliable as regards the organology of the ‘ād.

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286 Translated from [Neubauer, 1993, p. 329].
287 [Fārābī (al-), 1967, p. 516], reproduced here for convenience: “It is however useless to multiply the *dastān*. Many musicians [‘persons’] use other notes than these [the ones already located by ligatures] depending on the needs of the composition of their melodies, which have no predetermined locations. Some of these notes are sounded from between the ligatures (*dastān*) and others below the ligature of the *khīṣūr* (auricular) while others [still] are found over the ligature of the *sabbāḥa* (index). These notes are used to enrich the melody. If somebody wishes to determine these notes, he must search for the corresponding location on the *dastān* or between them”.

288 This indirect quote by Neubauer is clearly biased in order to influence the reader in favour of his thesis as the direct quote clearly mentions performance between the ties, which is the most probable reason why Neubauer avoided quoting Fārābī directly.
However, in the second part 298 of his article Neubauer dedicates eight full pages299 to Kindī’s epistle while explaining in Section 20 of his article entitled “Die Stellung der Finger auf den Bünden beim Greifen der Saiten”300 Kindī’s description of the position of the fingers on the neck.301

The description (see FHT 17:172) is compatible with gut tie-frets as he already described them, and the position of the finger must not change, in either direction (nut or bridge) otherwise the sound will be muffled (Taubheit) (if the position changes towards of the bridge) or will be accompanied with “chirping[?]” (Zirpen)302 when the finger stops the strings between two ties (see FHT 18:172). Neubauer then concludes:

“[T]he description of the correct position of the fingers of the left hand still applies today and is a remarkable testimony for Kindī’s precise observation and formulation. Thus the last doubt on the practical use of frets must be here dismissed”.303

Neubauer has no more doubts here, whatsoever, about Kindī’s reliability for organological matters, in an assertion which totally contradicts his opinion in the previous quote about the “unrealistic” description of the proportions of Kindī’s tie-frets.

Let us note, for the record, that the whole “Section 20” is dedicated to this description, and that all the other authors mentioning the precise stopping of the strings on the ties or that the dasātīn are marks affixed to the fingerboard of the ‘ūd are disregarded. Let us also note that Kindī advises against stopping the strings between the ties, and against reaching farther than (just before) the needed tie-fret in direction of the bridge, to preserve sound quality (see FHT 16 and FHT 17:172).

Neubauer’s interpretation of (ibn a-t) Tahhān’s Ḥāwī-l-
Fuṭūḥ wa Salwat al-Mahṣūn

Further, in the 19th section of Neubauer’s article, in which the “frets” are explained, the author mentions the description of the tie-frets by (ibn a-t) Tahhān (FHT 11:167) which follow similar proportions to Kindī’s (degressive from the nut).

The author concludes this section by a further quote of Ṭahhān and commentary:

“... 'There is still a fret which lies between the *ring finger* and the *auricular* frets, [but] it is also [normally] not used. This [?] are frets, which fall out of the original number [6]. They were used by the Persians for their modes. I use them also and reach their [correct] places [on the fingerboard], because I know them, also without [additional] frets. For students this is however difficult. To leave them ([Sie fortzulassen]) is [therefore] better and more appropriate (richtiger).304 From this follows that an Egyptian Court musician of the 5th/11th century performed also Persian music and that he played it on his local lute with or without additional frets. The fact that he avoided the additional frets and with that, the Persian repertoire for beginners is understandable.”.305

Neubauer’s translation above would have been accurate were it not for the terms in bold type (by me) in the quote. The “also” is added by the author in the translation, while the second expression “To leave them (the ligatures or tie-frets) is better” (in Arabic “فتركه أولى وأحق” or “to leave it”) should have been “to leave it to [or for] them is better”306 (in Arabic “فتركه ليوم أول و أحق”). Fig. 28:152 shows an excerpt from Tahhān’s manuscript edited and published by Neubauer in 1990 with a frame (line below) encompassing the phrase in Arabic “فتركه ليوم أول وأحق”.

298 Dedicated to translations of Early authors.
300 "The position of the finger on the frets when stopping the strings".
301 The complete text of Section 20 [Neubauer, 1993, p. 331–332], is reproduced in Appendix D. The finger stops the string near the tie-fret, immediately behind it as shown in FHT 16:172 (2nd position – in dotted lines).
302 مصارع (in Arabic, which is different from “chirpen” (or the German “Zirpen”) and should be translated as “squeak”).
303 Translated from [Neubauer, 1993, p. 331–332].
304 I use the following three levels for quotes and sub-quotes (namely stars inside simple quotes inside double quotes): “a *b* c a”.
305 The words between brackets were added by Neubauer.
306 The original Arabic version from the manuscript of Tahhān published by Neubauer [Ṭahḥān (ibn a-t– al-Mūṣīqī), 1990, p. 175] is reproduced in Appendix D.
307 Translated from [Neubauer, 1993, p. 331].
308 My translation converges towards Farmer’s narration of Tahhān’s manuscript in [Farmer, 1937, p. 457], notably: “Ibn al-Ṭahḥān […] tells us, however, that he did not need dasātīn on his lute because he knew the place of every note on the fingerboard without dasātīn. He says, further, that four rolls of gut string were required to ‘fret’ a lute, and he recommends that several thicknesses ought to be used”.

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Amine Beyhom Was the Early Arabian ‘ūd “fretted”?
The excerpt clearly proves that Neubauer ignored the word “َاذَن” which means “to them”, or “for them”, excluding thus the possibility for beginners to make a choice between keeping the dasāṭīn, or performing Persian music without them. The elision of one single word by a competent philologist allows for the reversal of the meaning of the phrase, imposing thus no other choice as special tie-frets “for beginners” to perform “Foreign” music.

Neubauer concludes that Ṭaḥḥān “avoided the additional tie-frets and with that, the Persian repertoire for beginners”, which is contradicted by the fact that the latter simply states that he “uses” two supplementary ligatures (dasāṭīn) without “marking” or tying them on the neck, which is a clear indication that dasāṭīn did not prevent the performance between the ligatures.

Let us also note that, while according to Neubauer Ṭaḥḥān does not use supplementary ligatures for special notes, he would need them even less for usual, much better known to him places for the dasāṭīn.

These contradictions do not stop Neubauer from concluding:

“However, the argument that is today to hear, that it was generally not possible to play intermediate notes on a lute with frets, and that this was the reason why frets were, with time, removed is in this exclusiveness (Ausschließlichkeit) not accurate. Similarly, the persisting representation that frets be in the Arabian-Islamic music history solely used for theoretical purpose[s] but not in praxis must henceforth belong to the past.”

Strangely enough, Neubauer’s argumentation is that this excerpt from Ṭaḥḥān shows that it was possible to play notes between the tie-frets, and he uses this possibility of playing between the “frets” as a further argument for his thesis – which is even more astonishing as, in accordance with Kindī’s explanations mentioned by Neubauer one page after, stopping the strings on a different position than the one shown in FHT 17:172 would cause the sound to become “muted” (“muffled”) and the string to sound “squeaks”.

Unless Neubauer, through his negative appreciation of Kindī’s string proportions above, considers that the “frets” were so thin that they would not hinder the performance between “frets”.

However, this would mean that these dasāṭīn did not have the role of frets, which would contradict once again his praise of Kindī’s “precise observation and formulation” of the position of the stopping finger immediately behind the (physical) tie-fret.

Whichever way we may try to understand Neubauer’s astounding statement, its inconsistency remains obvious.

Conclusions on Neubauer's “new facts” on the fretting of the Early Arabian ʿūd

In Neubauer’s argumentation on the “fretting” of the Arabian ʿūd we can single-out one quote from Lādhiqī which gives alternative possibilities for the material of the ties on the neck of the ʿūd – including simple markings – that may apply, with the latter author, restrictively to some musicians or to one particular type of ʿūd, the “ʿūd akmal”. The ʿūd akmal holds, according to Lādhiqī, 6 strings tuned in successive (just) fourths, a fact which complicates the identification of the stopping

309 Did he ignore it or forget it in his translation? In both cases, the meaning was changed in favour of the thesis of the fretting of the ʿūd. 310 The author inserts here a footnote (no. 119): “as still with Theodore Grame, The Symbolism of the ʿūd, in: Asian Music (New York), Bd. 3,1 (1972), S. 25-34, hier S. 32”. Neubauer is probably reacting to the following passage [Grame, 1972, p.32]: “As to whether the medieval ʿūd was fretted, there has been much controversy. Most scholars, who have relied on iconographical evidence, have concluded that the lute was not fretted, for there is no known delineation of a fretted ʿūd, though many illustrations are extant. Farmer, however, adamantly maintained that the instrument was fretted. [citation here of ‘H. Farmer, Studies in Oriental Musical Instruments II, 59-68’] He relied for this conclusion on the frequent use in the sources of the Persian word dasāṭīn [dasāṭīn] (bands; frets); further, it seems unreasonable to suppose that the lute when used for acoustical experiments would have been unfretted. Whatever may be the truth of his thesis—and it is possible to suppose that the ʿūd, like the viola da gamba, was played both with and without frets—the evidence is quite incontrovertible that the present-day traditional ʿūd is not fretted. Perhaps, as we have suggested, frets were used for investigations into the physics of sound, but were abandoned when virtuoso musicians performed”.
points on the strings for the performer especially for note correspondences from one octave to another.

The persisting inconsistency in Neubauer’s arguments, who dismisses organological facts whenever they contradict his thesis, then uses the same facts to reinforce his thesis, is obvious in this review.

As a result, no consistent additional proof for solid tie-frets used in performance by trained musicians is provided by the author, on the contrary as we can infer from both Kindī’s and Ṭahhān’s descriptions that tie-frets were used, if any, for beginners only.

Moreover, Neubauer provides solely (and mostly failed) arguments in favour of the “fretting” thesis and deliberately disregards the substantial, precise and even detailed arguments against this thesis.

Thus, Neubauer’s “New-Orientalist” approach becomes clear in its endeavor to impose forcibly the “fretting thesis” in maqām musicology. This, in turn, allows for the final conclusions on the “fretting” of the ‘ūd which follow.

Conclusion of Part II

**Tie-frets, if they ever existed, were solely used for beginners or for theoretical purposes**

Whenever all other authors state or explain that ligatures on the neck of the ‘ūd are equivalent to visual locators of notes used in the composition of songs and melodies,312 two authors, Kindī and Ṭahhān describe explicitly the mounting of tie-frets on the neck of the instrument.

The principal explanation for this (monumental) discrepancy lies firstly in the nature of Kindī’s Risdā fi-l-Luṭṭān wa-n-Nagḥam which, opposed to the voluminous treatises written by Fārābī, (ibn) Sinā and Urmawi, is an epistle dedicated to the ‘ūd and to its apprenticeship.

In his introduction, Kindī explains to the reader that his aim is:

> “to sketch [raʾīn] a summary of the instrument of the Wise Men fitted with four strings and called [the] ‘ūd, allowing for one to be aware of its structure and compose on it, and all that is needed to know about it”.313

This epistle is then, above all, written as a method for the ‘ūd with a preliminary description of the structure of the instrument [p. 11-12], of the mounting of the tie-frets [p. 12-13], and a justification for the proportions used in this description [p. 14].

In the second part of his epistle Kindī thoroughly describes the material of which the strings are made and their specifications (homogeneity, constant cross-section, etc.), then explains the tuning of the instrument and lists the consecutive notes and their matches at the octave, with an exercise consisting in humming the successive notes while playing them on the ‘ūd.314

He proceeds then, after a digression on the relation between the instrument and the celestial bodies, with a second exercise for which he describes note after note the fingering (tablature) to be used, with detailed indications (on three successive pages)315 on the pace of performance and on the fingers of the right hand used to pluck each string. He concludes this part by advising the reader (the apprentice) to repeat the exercise while gradually accelerating the pace, which will help him master the instrument.

As a conclusion to his epistle Kindī explains finally that there existed at his time many schools for the performance of the ‘ūd including the Arabian, the Persian and the Byzantine [rīmiyya] schools, and apologizes to the reader not to be able to expound them all due to the volume of explanations this would require, and because these explanations would be understood in writing only by the “Wisest and the Most Open” of people, whilst these “arts of teaching” can be transmitted, better and faster than in a book, directly by the professional musicians (Ahl aṣ-Ṣināʾa).316

While this epistle is clearly a method for beginners, tie-frets on the neck of the ‘ūd are also intended for them,317 which resolves the contradiction between

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312 Or mention the dasātīn without specifying the material of which they are assumed to be made of.

313 [Kindī (al-), 1965, p. 9] – As a reminder, the complete text of the epistle is available in [Beyhom, 2010b, v. 1, p. 496–504].

314 [Kindī (al-), 1965, p. 15–22].

315 [Kindī (al-), 1965, p. 27–29].

316 [Kindī (al-), 1965, p. 29–30].

317 The most acute problem in the apprenticeship of fretless lutes such as the ‘ūd, the violin, etc. is the constant sounding of false notes in the first years of the apprenticeship. It is therefore totally acceptable to think about either fretting the fingerboard or marking the positions of the main notes for beginners. Knowing, however, that the technique of the ‘ūd relies on the possibility of constant modulation and interval modifications, no professional musician, were it
Kindi’s (and Ṭahhān’s)\(^\text{318}\) explanations and the explanations in Fārābī’s Kitāb al-Mūsīqī al-Kabīr and (ibn) Sīnā’s Kitāb aš-Shīfā\(^\text{319}\) as well as in the later works of Urmawi, Shirwānī and Lādhīqī, as the latter described techniques and divisions which had a wider, theoretical and practical, scope.

Furthermore, with no indication in the extant literature for Kindi being a professional musician or a music teacher, he would have had the usual difficulties in identifying the correct notes to play on the fretless ‘ūd (and to explain their locations to his patron), and may have experimented these tie-frets as an original way to teach how to play correctly the instrument.

Kindi’s fretting and his location of pitches outside the fretting zone also become coherent as, knowing that the practical system of Arabian music was more complex than the simple Pythagorean division that he explained, he was compelled, out of intellectual honesty, to show practical ways for their sounding.

While this problematic is further examined in Appendix B about the organological particularities of the instrument, we can conclude that the use of the dasātīn by early theoreticians and performers amounted to materializing visual markings\(^\text{319}\) on the fingerboard, to ensure a correct pitch for the most frequent notes on the ‘ūd\(^\text{320}\) improving the precision of the performance and of the composition. Physical tie-frets may have been used for beginners, or even with (beginner) theoreticians wishing to experiment on their own the adequacy of their descriptions – but lacking the ability to do so correctly without tie-frets.

Farmer’s initial assertions about the fretting of the ‘ūd are not only unjustified, but clearly wrong for most of them. To the very few sources stating the use of physical tie-frets (all in all Kindi and Ṭahhān) we can oppose multiple assessments by the same, or other authors, clearly showing that the dasātīn in question are but – musically speaking – vertical markers on the fingerboard of the ‘ūd.

Even the pretense to the existence of “tie-frets” for beginners is doubtful as Kindi was such an unconditional admirer of the Pythagorean “science” that he could well have invented these tie-frets for beginners (and Ṭahhān would have espoused this statement), or used them for himself for learning how to play, while he and other theoreticians may have also used ligatures, made of solid material or not, to materialize the stopping points of the strings on the fingerboard of the instrument.

Adding to this that the organology of the ‘ūd creates specific problems for these alleged frettings (as shown in Appendix B), no doubt remains possible about the fact that the ‘ūd was never fretted for performance purposes – or that we have no indications ever mentioning such a use of tie-frets.

All in all, Sachs, Berner and Geringer were right in their opposition to the “fretting thesis”. However, biases – as with the “Byzantine Church organ”\(^\text{321}\) – die hard\(^\text{322}\) and myths will not be forgotten but are ever renewed because of the reputation of their authors, and because of the wide distribution of their works.

Researchers in musicology have generally had, notably in maqām musicology, a simple pattern which was the uncritical use of past research concurrently with the conscious or unconscious need to preserve these myths in order to ensure the supremacy of Western music over other musics.

It is evident that the silence of today’s musicology of the maqām on this subject, and the perpetuation of the myth of the fretting of the ‘ūd is in the interest of Western music. While this is perfectly understandable – but not acceptable – politically and socially, mere intellectual honesty compels to dismantle these myths in such a way as to avoid their further utilization.

\(^{318}\) With both authors, tie-frets are intended for beginners, explicitly with Ṭahhān and implicitly with Kindi. Note that Ṭahhān has probably his source of inspiration from Kindi’s – and other writers of which probably the Ikhwān a-s-Safā’ and maybe a-s-Sarākhīs – whose works are today lost but which Ṭahhān copied at least indirectly from al-Ḥasan al-Kātib.

\(^{319}\) Lines drawn on the fingerboard, thin threads of silk or other materials – which do not intervene in the performance as they do not help stopping the strings, but only show the positions for finger-stopping them, etc.

\(^{320}\) As frequently observed on the marquetry of modern and contemporary ‘ūd(s).

\(^{321}\) Rosy Beyhom, in a private conversation, brings to my attention that (a-t) Tīfāshī mentions the “organ” in his 34th chapter of Muʿāṭ al-Asmāʾ… [Tīfāshī, 2019, p. 197-200] and mentions its use by the Rūm (Byzantines) for big ceremonies and during prayer; this should be further investigated hopefully in an upcoming publication.

\(^{322}\) Since this problematic often resurfaces in discussions among (or with) musicologists, were they Western or local, influenced by Farmer’s (or Manik’s and, today, Neubauer’s) thesis on the subject.
GENERAL CONCLUSIONS

Among all the instruments of the Arabian instrumentarium, the 'ūd is the one which provoked the most controversy, because of its origins, its proportions, its tuning or its “fretting”, or concerning its part in Arabian music⁴²³ and, by extension, its influence on European music:

“Scholarship has tended to concentrate on the nature and extent of Arab musical influences on Europe, an area where paucity of evidence allows conflicting interpretations. But one thing is clear: European interest in the Arab intellectual heritage did not extend to music theory, and none of the major texts was translated. Turning to practice, however, a very different picture emerges. There is abundant lexical and iconographic evidence for the European acquisition of a wide range of instruments, the lute (‘ūd), rebec (rabāb) and nakar (naqqūn) being only the most obvious. [...] In short, although the music of the Arab courts must have provided a cultural model to be emulated, musical influences were probably not unidirectional”⁴²⁴

Arabian music being the possible “missing link” between Ancient Greek music and European music, musicologists such as Farmer endeavored to prove that the Early ‘ūd was fretted, relying on a causal link between the fretting of the instrument and the establishment of its “Pythagorean temperament” which would have been then transmitted, through multiple contacts in Southern France and Spain,⁴²⁵ to Europe and justifying thus the use of ditonism – if not of harmony with Farmer – in their music.

As has been shown in this dossier, neither the fretting of the ‘ūd nor the Pythagorean division of Kindī and other Early philosophers apply for performance practice. Tie-frets may have been used for beginners (Kindī, Ṭaḥhān), or for theoretical purposes. The Pythagorean division was inherited from the Greeks, and was the only template the Arabs had to test their Early theoretical representations in string-length ratios. Kindī, the first Arabian theoretician on music whose writings are extant, describes however “notes performed by singers” which testify that, already in the Early phases of the Arabian Civilization, praxis departed from this simplistic model.

Further descriptions by Fārābī and (ibn) Ṣīnā, the two greatest theoreticians of the Golden Age of this civilization, confirm the Zalzalian model which is still in use today, and for which the ‘ūd, with its melodic versatility and multiplicity of techniques, is (still) a perfect receptacle as well as an inspiring theoretical tool for this music.

Such writers as Farmer and his gigantic ‘ūd(s) which would have been described by Kindī and Ṭaḥhān⁴²⁶ received no criticism for decades. This seems to be commonplace with the musicology of maqām music (including Byzantine chant), probably because for these musics what is said is less important than the moral authority of researchers in this domain, as Neubauer in the article reviewed in Part II of this dossier.

Evidently other, ideological and societal factors interfere with the needs of “science” which, in musicology, seems to be an overrated characteristic.

As stated by my illustrious predecessor Abū-Ṭāhir Muḥammad ibn Muḥammad ibn Ṭaḥkān ibn Uzlagh al-Fārābī:

“To be an accomplished theoretician, whatever science is involved, there are three conditions:

* To know all the principles of the given science.
* To have the capacity to deduce the necessary consequences of these principles in the beings (the data) which belong to this science.
* To know how to answer erroneous theories and analyze what is true from what is false and correct the errors⁴²⁷.

I would add: knowing that (one of) the burden(s) for the future generations of scientists will be to correct our errors today.

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⁴²³ All these topics are explored in the “Annexes” of [Beyhom, 2010b], namely and respectively in appendices II.5 and II.6, appendix II.4 and appendix II.2.B.
⁴²⁴ [Wright, Poché, and Shiloah, 2001, p. 805 (Arab music, §1, 3, IV)].
⁴²⁵ Notwithstanding the Byzantine influence on the Eastern – while often changing – border, and its interaction with Arabian influence.
⁴²⁶ See [Beyhom, 2011 : Bouterse, 1979].
⁴²⁷ Translated from [Fārābī (al-), 1930, v. 1, p. 2].
APPENDIX A: THE ‘UD, ITS COMPONENTS AND ITS PROPORTIONS

I have explained elsewhere that most, if not all, Early Islamic speculations on music theory used the ‘ud as the main vector for their explanations. In turn, as inheritors of the Greek tradition through the translation enterprise set by Caliph al-Mansūr in the 9th century, Arabian philosophers and theoreticians adapted Greek theories for this instrument (notably used as a “poly-chord” – as compared to a “monochord” – with strings tuned in successive fourths), which became thus the main vector for the maqām genos – and mode – theory.

First detailed descriptions of the ‘ud by Kindī

The first known complete description of the ‘ud and its construction is found in the epistle Risāla fī-l-Luhūn wa-n-Nagham by 9th-century “Philosopher of the Arabs” Yaʿqūb ibn Isḥāq al-Kindī. Kindī’s description says (FHT 2:158):

“[and the] length [of the ‘ud] will be: thirty-six joint fingers – with good thick [‘full’] fingers – and the total will amount to three ashbār. And its width: fifteen fingers. And its depth seven and a half and a half fingers. And the measurement of the width of the bridge with the remainder behind: six fingers. Remains the length of the strings: thirty fingers and on these strings take place the division and the partition, because it is the sounding [or ‘the speaking’] length. This is why the width must be [of] fifteen fingers as it is the half of this length. Similarly for the depth, seven fingers and a half and this is the half of the width and the quarter of the length [of the strings]. And the neck must be one third of the length [of the speaking strings] and it is: ten fingers. Remains the vibrating body: twenty fingers. And that the back (sound box) be well rounded and its ‘thinning’ (khart) [must be done] towards the neck, as if it had been a round body drawn with a compass which was cut in two in order to extract two ‘ūd(s)”.

Kindī adds complementary information further below in his text:

“Then they adopted (ṣawāri), the ratio which is after the third [of the length of the strings] – and it is the half – for the width and it is the largest width it must be, and its position on the ‘ud must be three fingers away from the end of the bridge in the direction of the [‘following the’ – ‘āl mā yadd al-] strings [width of the bridge = 3 – 7.5 + 6 = 1.5 fingers], and the reason for this is that it is placed along [bi-muḥāḏbār = at the proximity of] the place where the strings are plucked, and this because this emplacement [on the ‘ud] is the widest and the most perfectly sounding. With regard the plucking of the strings, it is at three fingers from the [front of the] bridge [6 + 3 = 9 fingers from the bottom] because it is the position of one of the parts of the strings and it is its tenth”.

To summarize, Kindī’s proportions for the ‘ud in this epistle are (FHT 2) as follows (fractions are given in relation to the total length L, the unit is “ff” (or “full fingers”):

- Total length: 36 ff = L
- Total width: 15 ff = 10L/24 = 5L/12
- Total depth: 7.5 ff = 5L/24
- Length: 10 ff = 5L/18
- Soundbox length: 26 ff = 13L/18
- Position of the bridge: 6 ff from the lower end = 4L/24 = L/6
- Total speaking length: 30 ff = 20L/24 = 5L/6
- Speaking length above soundboard: 20 ff = 5L/9
- Optimal plucking point (from the lower end): 9 ff = L/4
- Soundbox: width/length = 15/26, or around 3/5; depth/width = 1/2

Note, however, that the proportions of the total depth to the total width, then to the total speaking length is 1:2:3, or the two first tetradic ratios based on the first three elements of the tetrad.

328 This appendix relies on [Beyhom, 2011].
329 In [Beyhom, 2016].
330 Very few theoretical descriptions were, in Early Islam (the civilization), undertaken using the neck of the tunbūr, mostly for music of particular areas and periods – see the appendix on the ‘ud and the tunbūr in [Beyhom, 2010b] and the “First Interlude” in the main text of this dossier.
331 Abū Yūsuf Yaʿqūb ibn Isḥāq Al-Kindī (ca. 800–870 CE) was the first self-identified philosopher in the Arabic tradition. He worked with a group of translators who rendered works of Aristotle, the Neoplatonists, and Greek mathematicians and scientists into Arabic. Al-Kindī’s own treatises, many of them epistles addressed to members of the caliphal family, depended heavily on these translations – in [Adamson, 2011]. More information on Kindī is provided in the main text.
332 (Reminder) Literally “full fingers with good flesh”.
333 The shāb (singular of ashbār, “span” in English) is a measurement unit which equals roughly 20 cm. It equates to the length between the tip of the thumb and the tip of the auricular finger when stretched flat and in opposite directions. The shāb otherwise measures 12 fingers (which equates to 36:3 in Kindī’s description): a “full” finger should be about 2 cm in width.
334 Translated from the original Arabic [Kindī (al-), 1965, p. 11].
335 Translated from the original Arabic [Kindī (al-), 1965, p. 15].
Description of the “Modern” ‘ūd by Ṭahhān

Whenever Kindī’s ‘ūd appears to be a monoxyle lute-type instrument,336 the first extant detailed description of the “modern” ‘ūd337 is Abū-l-Ḥasan ibn a-t-Ṭahhān’s (11th century):338

“The dimensions of the lute should be as follows [see FHT 3:159]: Its length should be 40 ʿaṣābi339 madness. Its width should be 16 ʿaṣābi madāruma. Its depth should be 12 ʿaṣābi madāruma. The bridge should be placed at about 2 ʿaṣābi [i.e., the flexion of ḫaṣa’ī for the dual case] odd from the bottom. The neck should be 1 ʿaṣūr + 1 ʿaṣūf341 in length. The pegs should be eight unless there is a ḥād string342 when there will be ten strings,343 but this is not known in our times”.344

If we compare the proportions of Ṭahhān’s ‘ūd to Kindī’s, we note that the ratio (Total) depth/width/speaking length of the string is no more 1:2:3 but (FHT 3:159) 12:16:38, which is equivalent to 3:4:8, slightly further from the “ideal” Pythagorean proportions.

This also applies to modern ‘ūd(s) with proportions shown on FHT 4:160 to FHT 8:164 namely:

- The ‘ūd described by Khulāʾi (beginning of the 20th century – FHT 4:160 and FHT 5:161),
- the ‘ūd of the well-known Munīr Bashīr (2nd half of the 20th century – FHT 6:162),
- the two Bītār ‘ūds(s) made by the Lebanese luthier for, respectively, Saad Saab (FHT 8:164) and Amine Beyhom (FHT 7:163) (the latter being an electro-acoustic instrument).

Such “modern” instruments may have even more “inharmonic” proportions as Ṭahhān’s, with a resulting quality of sound345 which is probably different, but not necessary less pleasant than with (Pythagorean influenced) ‘ūd(s) with “harmonic” proportions. I show elsewhere346 that this evolution from the purely theoretical application of Pythagorean mathematics to more practice-oriented methods and proportions applies also to Arabian music theory.347

336 And most probably a forerunner of the barbat.
337 In Ṭahhān’s description of the ‘ūd, as in the modern instrument and unlike Kindī’s description, the back (or the shell) is assembled from thin strips (rīḥa) of hardwood, joined (with glue) edge to edge to form a deep rounded body, and is at a later stage of its construction joined to the monoxyle neck.
338 Ṭahhān was a musician of high repute during the Egyptian Fatimid Period, who died sometime after 1057. He was mainly a singer and an instrumentalist, and is with Kindī one of the very few having described the ‘ūd and its structure. His work entitled Ḥawāl al-Parīnū wa Saddat al-Maṭrūzī is in two parts, the second of which being about praxis.
339 Plural of ḫaṣa’ī, Arabic for “finger”.
340 The verb ḫārma means “to join”, madāruma, or mundārum meaning “joined” or “tightened”. Farmer’s error was the confusion between “joined” and “doubled”, which made him double the sizes of the ‘ūd(s) he described in his “The structure of the Arabian and Persian lute in the Middle Ages” [Farmer, 1939b]. (This is detailed in [Beyhom, 2011].)
341 The ‘aṣūf is a particular Arabian value which in context equates to a “unit” (1) or to “ten” (10); in this context it is equivalent to “10 joined fingers”.
342 The (theoretical) 5th string of the ‘ūd, the ʿaṣūd (or simply ḥād – “sharp”) – or “2nd string” for some authors) is already cited by Kindī in his Kitāb al-Muṣawwītāt al-Watārīyya min Dhu al-Watār al-Wajhīl ‘alā Ḫatr al-Ashr[at] Fhtār [Kindī (al-), 1962b, p. 78]. As a reminder: the first four strings were called (from the lowest to the highest – acoustically and conventionally) the bamm, the mathlāth, the mathnā and the ʿaṣūd. Whenever today’s ‘ūds incorporate six (or seven) (double – except generally for the lowest, acoustically) courses of strings (FHT 5:161 and FHT 7:163), it seems that, in Fatimid Egypt at the time of Ṭahhān, this fifth string was still not in use, or came to be in disuse, which may seem less likely but is possible; note that iconographic sources show five strings as early as the 10th-11th centuries – see [Beyhom, 2010b, v. 1, p. 92] and [Farmer, 1966b, p. 49], the latter showing six courses. The need for the ʿaṣūd string was mostly theoretical in the time period of the Forerunners (see footnote 45:119 for time periods for Arabian music theory), to complete the double-octave. We find a mention of five courses of strings in the practice of the instrument in Urmawi’s epistle A-r-Risāla a-sha-Sharafyya [Urmawi (d. 1294) and Jurjānī (al-)], 1938, v. 3, p. 110) (reedited as [Urmawi (d. 1294) and Jurjānī (al-)], 2001), in the 13th century.
343 In fact, five courses with two identical strings each.
344 [Ṭahhān (ibn a-t– al-Musīqī), 1990, p. 172].
345 The tone-color (or timbre) for example, although this characteristic of sound depends on other, organological and environmental factors as well. Mainly in [Beyhom, 2010b], and partly in this dossier.
346 See also [Hilgarn, 2005] for a comparative study of the Malay-Lutes (Gambus) with the Arabian lutes, which gives an insight into the variety of shapes of short-necked lutes together with [Helmig, 1974] (for Western lutes).
Kindī’s description of the ʿūd, in “full finger (ishlist – pl. ʿistabī) thickness” measurements, and deduced (calculated) proportions.

The same procedure is used for the “Harmonic division” shown on Fig. 9:131. (“Vibrating string” = speaking length of the string.)

First published in [Beyhom, 2011].
FHT 3 Drawing of the ‘ūd described by Tahhān.\(^{350}\) (Reminder: “The dimensions […] should be as follows: its length should be 40 \(\text{aṣābi}^{351}\) \(\text{madāma}^{351}\). Its width should be 16 \(\text{aṣābi}^{351}\) \(\text{madāma}^{351}\). Its depth should be 12 \(\text{aṣābi}^{351}\) \(\text{madāma}^{351}\). The bridge should be placed at about 2 \(\text{aṣābi}^{351}\) odd from the bottom. The neck should be 1 \(\text{ṣibr}^{351}\) + 1 ‘\(\text{aqd}^{351}\) in length. The pegs should be eight unless there is a \(\text{zīr}^{351}\) \(\text{ḥād}^{351}\) [double] string and ten strings [in all], but this is not known in our times.” Note also that “vibrating string” = speaking length of the string.)

\(^{350}\) First published in [Beyhom, 2011].

\(^{351}\) Arabic grammar is complicated: the plural for more than 10 \(\text{aṣābi}^{351}\) (or anything or anyone) is like the singular form, \(\text{ṣbr}^{351}\). Hence: 40 \(\text{ṣbr}^{351}\), 16 \(\text{ṣbr}^{351}\), 12 \(\text{ṣbr}^{351}\), etc., but also \(\text{imr}^{351}\) (a – or one – woman), \(\text{imr}^{351}\)-\(\text{att}^{351}\) (two women), three (to ten) \(\text{nīs}^{351}\) and 11 (and more) \(\text{imr}^{351}\)-\(\text{a}^{351}\)!
Revision of the ʿūd described by Khulaʿī in his *Book of Oriental Music* [Khulaʿī (al-), 1904]. The measurements are those taken from the original drawing (next figure).

(*Vibrating string* = speaking length of the string.)

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FHT 5  Depiction of a ʿūd in [Khulai’i (al-), 1904, p. 52].
Drawing of the ‘ūd of Munir Bashir (1957 – described in [Rashid, 1999]). (“Vibrating string” = speaking length of the string.)
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FHT 7  Front and side views of the Bīṭār 2001 electro-acoustic ʿūd with thin soundbox, engineered and re-designed by the author and crafted by Lebanese luthier [string instrument maker] Georges Bīṭār in 2001. This instrument is a straightforward adaptation of the physical elements of which the Bīṭār-Saab ʿūd (FHT 8) is made. No Pythagorean proportions can be seen were it for this instrument or for Khulaʾī’s in FHT 4 and for Bashīr’s in FHT 6.
FHT 8  Drawing of the Ǧbṭār-Saab ʿūd. The original instrument was made by the Lebanese luthier Georges Ǧbṭār in 2001-2002 following the specifications of ʿūd teacher Saad Saab for teaching purposes at the Lebanese National Conservatory. The transverse-slice view is from the electro-acoustic Ǧbṭār 2001 ʿūd shown in FHT 7.
About the strings of the ‘ūd and their proportions

The strings of musical instruments – including the ‘ūd – were usually made of gut or of threads of silk, according to extant writings, and with degenerative proportions from the banūm – the lowest acoustically – to the zar – the highest acoustically. One of the most complete descriptions of the “making of” gut or silk strings is written in the well-known Kanz a-t-Tahaf, the 14th-Century Persian treatise (“epistle”) on music, here translated by Tauge:

“Chapter Five: concerning the twisting (fatt) of the silk strings (abxtamit) – Distortion and straightforwardness in sound (āvar) depends on goodness and poorness in quality of the strings. Strings of musical instruments may be twisted either from silk (abrxtam) or gut (amnta) of sheep, which are indispensable. For the sake of silk strings, raw silk should be prepared. The cocoon for silk reeling must be white, smooth, and even in terms of size and quality, and round (muladhr). [Raw silk] should be polished (pardaghe), well spun (gib rēste) from the cocoon, which must be boiled in water mixed with ash (qalye). After that, being taken out, it should be washed in pure water two or three times, and hung up to dry in the shade. When it is spun, however, it should be exposed to the sun. The following conditions should be fulfilled in the making of silk strings. When a banūm string is spun it should be made from 64 threads of silk, a mlaft string should be from 48 threads, and a mndt string should be from 32 threads, a zar string should be from 24 threads, and a ḥad string should be from 16 threads. And silk strings should be gently spun. After that, glue (ṣerdon) should be boiled and mixed with a small amount of sulfur (zafrañ). On the condition that its density and viscosity is moderate, an old cloth of linen is [soaked in it], and silk strings should be rubbed with it until they are infiltrated thoroughly with the ingredient. And then they are released and left until they are dried.

Chapter Six: concerning the twisting of the gut strings (meṯaṯ) – The wise are agreed that bass strings should be spun from sheep gut. Because its components are rarefied (takálkolt), the bass strings are called ‘mother of the strings’ (amn-owlāt), too. In terms of the kinds of gut, that of the ewe (mūtīne) is considered better than that of the ram (boamte). Some people might say that gut of the white ewe (mūtīne ye sfrd) is better than [that of] the black ewe, but this notion (māḏra) is exaggerated. In order to make the bass strings, one should prepare guts that are even throughout in terms of thickness and thickness. The gut should be soaked in poppy juice (litrae) all night, and should be spun the following day. For the sake of proper spinning, one must watch carefully. If the gut is thin, three-ply should be twisted together for the banūm; however, if the gut is thick, two-ply will suffice. Some people may spin the mlaft string also from gut, on the condition that the mlaft string is thinner than the banūm string by single-ply. After that, an old cloth of linen [soaked in it] in whitewash (sfnhdb) with saffron dissolved, and [one] should rub the gut strings several times strongly (with it). And then the strings are released and left until they are dried.”

If we apply the gradation given by the epistle to the strings made of silk strands, i.e. (18)254, 24, 32, 48 and 64, we can easily calculate the corresponding sections and diameters of the strings in relation with the section or diameter of the smallest string, that we name respectively s, and d. (Or, simply, s and d as shown in THT 1.255)

<table>
<thead>
<tr>
<th>Number of threads</th>
<th>64</th>
<th>48</th>
<th>32</th>
<th>24</th>
</tr>
</thead>
<tbody>
<tr>
<td>Division by 8</td>
<td>8</td>
<td>6</td>
<td>4</td>
<td>3</td>
</tr>
<tr>
<td>Section</td>
<td>8/3 s</td>
<td>6/3 s</td>
<td>4/3 s</td>
<td>3/3 s</td>
</tr>
<tr>
<td>Diameter = (2 \times \sqrt{\frac{d}{10}})</td>
<td>11/6 s</td>
<td>8/5 s</td>
<td>4/3 s</td>
<td>9/8 s</td>
</tr>
<tr>
<td>Diameter (2)</td>
<td>1 5/6</td>
<td>1 3/5</td>
<td>1 1/3</td>
<td>1 1/8</td>
</tr>
</tbody>
</table>

THT 1  Theoretical sections and diameters of the silk strings in Kanz a-t-Tahaf. (Not including the thinnest string – the ḥad.)

Hence, the section of the threads being equal, theoretically and as shown in Fig. 26:147 for strings made of gut and explained in the corresponding footnote, to the sum of the sections of the silk threads (or guts) of which each string is made, the relation between the diameter d (or its half, the radius r) and the section s of a string is (FHT 12:167):

\[ s = \pi r^2 = \pi \frac{d^2}{4} \quad \text{with} \quad d = 2 \times \sqrt{\frac{3}{\pi}}. \]

Proportions for the strings of the ‘ūd were also given by Kindi (FHT 9:166), the Ilkhwān Aṣ-Safī (“The Brethren of Purity” – FHT 10:166), and (ibn a-t-) Taḥḥān (FHT 11:167), with the latter proposing further proportions by “weight”.

Finally, let’s note that gut strings are very sensitive to hygrometry; in a dry climate, gut tends to become (or remain) well stretched while in Northern Europe, as an opposite example, gut strings (and tie-frets) tend to lose their tension.256 This fact alone pleads for caution when stringing and “fretting” the instrument.

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253 [Tauge, 2013, p.178]: See also the interesting comparison established in [Leoni, 1996].
254 We shall not include the last – and thinnest – string (the ḥad) in this review, as the other reviewed authors give the proportions for the four strings from banūm to zar exclusively.
255 “THT 1” = “Tableau Hors Texte 1” or “table outside the main text”.
256 Jean During told me (private communication) that more often, the gut tie-frets of his long necked lutes which have been tightened in Iran lost their tension (due to the higher hygrometry) in France, and became so loose as to prevent from playing the instruments. In some cases, once the instrument was brought back to Iran, the tie-frets tightened again.
Proportions of the strings of the ʿūd according to Kindī in the Risāla fi l-Luḥūn wa-n-Naḥām\(^{357}\): \(s_1\) to \(s_4\) are the cross-sections, \(d_1\) to \(d_4\) are the diameters of the strings from ẓīr to bamm. The proportions of the sections from ẓīr (right) to bamm (left) stand as 1:2:3:4. The intermediate strings are called the mathlath (\(s_3\)) and the mathnā (\(s_2\)).

Proportions of the strings of the ʿūd according to Ikhwān aṣ-Ṣafāʾ in their Fifth epistle (“On Music”)\(^{358}\): \(s_1\) to \(s_4\) are the cross-sections, \(d_1\) to \(d_4\) are the diameters of the strings from ẓīr to bamm. (See figure above for the names of the strings.)

Originally published in [Beyhom and Makhlouf, 2009].

Following the hypothesis that the diameters of the twisted strands of guts remain unchanged after the twisting – see Fig. 26:147 and corresponding footnote.

See [Ibn Sīna, 1966; al-Kindī, 1962; al-Kindī, 1965, p. 117–118]; for the Ikhwān note [Wright, 2001b]: “A 10\(^{th}\)-century group of Islamic encyclopedists of Ismaʿili tendencies centred on Baṣra, one of whose epistles (Rasāʾil) deals with music. Unlike most other music theorists of the 10\(^{th}\) and 11\(^{th}\) centuries, the Ikhwān al-Ṣafāʾ were chiefly concerned with the neo-Platonic and Hermetic aspects of the Greek heritage. Their work is of some interest for its scientific aspects (in particular the theory of the spherical propagation of sound) and for its treatment of musical practice: for example, following al-Kindī, the discussion of the lute gives, in addition to a (simple Pythagorean) fretting, details of proportions and construction. But the most characteristic features of their work, again following al-Kindī, are to be found in their study of cosmology, where the notion of cosmic harmony (based on the Pythagorean concept of the primacy of number and numerical relationships) is the unifying principle in the discussion of such topics as the music of the spheres, the moral and medical effects of music, and the sets of natural phenomena (including the elements, winds, humours, colours and perfumes) to which the rhythms and the four strings of the lute could be related.”

Following the hypothesis that the diameters of the twisted strands of guts (or silk) remain unchanged after the twisting – see Fig. 26:147 and corresponding footnote.
Proportions of the strings of the ‘ūd according to (ibn a-ṭ) Ṭaḥḥān’s Ḥāwīl-l-Funūn wa Salwat al-Maḥṣūn: s₁ to s₄ are the cross-sections, d₁ to d₄ are the diameters of the string from zīr to bamm. The proportion are originally given by weight of the string by this theoretician, which corresponds to proportions by the section (with the weight – if the material of the gut is homogeneous – being proportional to the section of the string and to its length as the product of the multiplication of the two values equals the volume of the string). Ṭaḥḥān also proposes the same proportion “by sight” – meaning by their thickness or diameter. The corresponding diameters and thicknesses are shown as “Ṭaḥḥān II” in THT 2:177 while the set shown in this figure – which is more realistic with regard to a possible fretting of the ‘ūd – corresponds to “Ṭaḥḥān I” in the same THT 2, and in THT 3:177.

Proportions of the (silk) strings of the ‘ūd according to Kanz aṭ-Tubaf: s₁ to s₄ are the cross-sections, d₁ to d₄ are the diameters of the string from zīr to bamm. (Not including the thinnest string – the ḥād.)

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361 Originally published in [Beyhom and Makhlouf, 2009].
362 Following the hypothesis that the diameters of the twisted threads of silk remain unchanged after the twisting – see Fig. 26:147 and the corresponding footnote.
A digression: When theory contradicts practice (and facts)

The lengthening of the strings as a result of concurrent stopping of the strings and of the presence of solid frets such as those described by Kindî is examined here.

Fārābî, as well as (ibn) Sinâ and his student (ibn) Zayla, all three state that there is a significant modification of the tension in the strings of the ‘ūd when these are stopped: I show that this modification is in fact insignificant when the instrument is not fretted.

The arguments of the three authors are similar, of those below (ibn) Zayla’s (see FHT 14:169 and FHT 15:169):

“If the mawṣth [bridge] – or the anf [nut] – is so high that the strings would be far from the fingerboard, stopping the string will lengthen it because, instead of forming a straight line it would form 2 lines delineating the unstopped string. Thus, and the sum of the lengths of two sides of a triangle being greater than the length of the third side, the string can but lengthen, and lengthening modifies the register [a-t-tabaaq] and produces a higher sound.”

FHT 15:169 shows a ‘ūd in cross-section (the missing parts are shown in dashed lines), with raised bridge and nut for clarity.

While the height of the bridge does not exceed 8 mm on modern ‘ūd(s), and the height of the nut does not exceed 1 mm (see an example of Modern ‘ūd in FHT 13:168 and compare with the neck of Hamdi Makhlouf’s ‘ūd with a raised nut in FHT 22:177), we shall simplify the problem by positing that the contact points between the string and the fingerboard as well as between the string and the nut or the bridge are ideal (points).

Provided (see FHT 14:169) the total vibrating length of the string is $L_g$, and that the string is stopped somewhere on the fingerboard at a contact point dividing it in 2 parts $L_{s0}$ (Length of the – lengthened – string in direction of the nut) and $L_{c0}$ (Length of the – lengthened – string in direction of the bridge), and the projections of these string-parts on the fingerboard of the ‘ūd be $L_{s0}$ and $L_{c0}$ (which are the corresponding lengths of $L_{sa}$ and $L_{ca}$ when these are not lengthened).

FHT 13  The neck of a Modern ‘ūd

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363 Among other authors.
364 For realistic proportions of ‘ūd(s): very high nuts or bridges can affect the results shown below in the text.
365 Although (ibn) Zayla’s statement seems coherent, it lacks of precision about the exact height(s) for bridge, nut and “ties”: for modern ‘ūd(s) and as shown below, the exact height of the bridge (or the nut) plays a major role for the perception of the difference between two pitches.
366 Note that a lengthened string, strictly speaking – and theoretically – and with all other variables (except the frequency) being equal, would sound “lower” acoustically as shown by Taylor’s formula expounded further; this would occur only if the tension of the string remains unchanged, in which case the frequency would drop in order to compensate the lengthening of the string (in the formula).
367 (Zayla (ibn), 1964, p. 76).
368 For this and other organological procedures about the fretting of the ‘ūd, the two videos originally made by Hamdi Makhlouf for the CIM09 were still available (on the 21st of October 2020) at (respectively)  http://www.hamdi-makhlouf.com/cim09/video-1-kindl.mp4 and  http://www.hamdi-makhlouf.com/cim09/video-2-tahhan.mp4 – and referenced as [Makhlouf, 2009a ; 2009b]. Two other copies, subtitled in English by Amine Beyhom, have been made available on YouTube at https://youtu.be/d7TTinH_pKM and https://youtu.be/demT-hpcX1s. These videos are practical demonstrations of some organological problems raised by the fretting of the ‘ūd. For both Kindî and (ibn a-t-) Ṭahḥān, two divisions of the fingerboard, “Harmonic” and Pythagorean with two different sets of strings, are experimented.
369 We will also contend that the effective length of the unstopped string is (nearly) equal to its projection $L_{g}$ in FHT 14.
370 Retrieved 20/10/15 from [Anon. “Mike Ouds - My Ouds Page”]: “This oud was made in 1925 by the oudmaker, Mohamad el-Hifnawi. It was owned by Mohamad el-Qasabji […]”
Amine Beyhom  
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**FHT 14** Lengthening of a ‘ūd string when stopped on the fingerboard. Above: section of the ‘ūd with unstopped string. Below: same as above, with a stopped string. The bridge and the nut are oversized in height. The circled part is magnified in the next figure. (“Vibrating string” = speaking length of the string.)

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**FHT 15** Lengthening of a ‘ūd string when stopped on the fingerboard – magnified length section of the fingerboard. The thickness of the stopping finger is approx. 2 cm, the tip of the finger is approx. 1 cm. Lengths of the total speaking length of the string (L₀ = 60 cm) and of the string-part over the soundboard (L₀/3 = 20 cm) and over the neck (L₀/3 = 20 cm) are coherent with Kindī’s description, and with the proportions of modern ‘ūd(s).
$L_{sa}$ and $L_{aa}$ compose each a triangle with, respectively, the nut and $L_{sa}$ and with the bridge and $L_{aa}$, while forming right-angle corners with the nut or the bridge.

The total speaking length, and lengthened, string $L_0$ is equal to the sum of the two lengthened string-parts, be it $L_{sa} + L_{aa}$. If we apply Pythagoras’ formula for right-angle triangles, then:

$$L_0 = \sqrt{L_{sa}^2 + H_s^2} + \sqrt{L_{aa}^2 + H_a^2} \quad (1)$$

where $H_s$ and $H_a$ are, respectively, the heights of the bridge and of the nut, and where $L_{sa}$ and $L_{aa}$ are the lengths of the projections of $L_{sa}$ and $L_{aa}$ on the finger-board of the ‘id (or the lengths of the unshortened string-parts $L_{sa}$ and $L_{aa}$).

Replacing variables $H_s$, $H_a$, $L_{sa}$ and $L_{aa}$ with realistic values, and stopping the string at 1/3 of $L_0$ (estimated at 60 cm, the third of which is 20 cm) from the nut and the heights of the nut and the bridge being given values respectively equal to 0,1 and 0,8 cm, and applying formula (1) we get:

$$L_0 = \sqrt{20^2 + 0,1^2} + \sqrt{40^2 + 0,8^2} = \sqrt{400,01 + 1600,064} = 20,00025 + 40,00088 = 60,0015 \text{ (cm)}.$$

The proportional lengthening of the string will be $(60,0015 - 60)/60 = 0,000025\%$ which is negligible, be it for the tension (see Taylor’s formula below) or for the length of the string.

The only difference in frequency occurs because of the shortening of the string when stopped.$^{373}$

However, and if the height of the bridge be, for example, ($H_a$) 3 cm, the resulting length of the stopped string would be:

$$L_0 = \sqrt{20^2 + 0,1^2} + \sqrt{40^2 + 3^2} = \sqrt{400,01 + 1609} = 20,00025 + 40,11234 = 60,11259,$$

which is approx. one mm lengthening for 60 cm of total length which, when applying the modified Taylor’s formula$^{374}$ $T = 4(mLF)^2$, where $T$ is the tension of the string in Newtons, $m$ is its mass in Kgs, $F$ is the frequency and $L$ is the length of the string in meters, gives a proportional difference in tension (provided that – to simplify – the mass and the frequency remain unchanged):$^{375}$

$$\frac{T_2}{T_1} = \left(\frac{L_2}{L_1}\right)^2,$$

with the tension being proportionate to the length.

The proportional difference in tension would then be:

$$\left(\frac{60,11259}{60}\right)^2 = 1,003758,$$

which is about 75 times more as with $H_a=0,8 \text{ cm}$ for which the differential would be

$$\left(\frac{60,0015}{60}\right)^2 = 1,00005.$$

This being clearer, let us examine the stopping of a string on the neck of the instrument.

The comments of the cited early authors are explicit for this point: strings must be stopped directly on the

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$^{371}$ Which corresponds to a just fifth.

$^{373}$ The highest point in the fret must be as close as possible from the nut to facilitate performance while allowing for (1) a complete stopping of the string (it must be sufficiently thick for that purpose) and (2) higher (thicker) than the following tie-frets (towards the bridge), for these not to stop the string before the tie-fret which precedes them. This is why the bridge is always, in guitars for example, but also in ‘id, higher than the nut as the asymmetrical disposition of the string (higher to the side of the bridge) allows for more homogeneous thicknesses of the frets. The whole process consists in finding an acceptable compromise between organological constraints (and imperfections, such as slight unevenness of the neck and others) and ease of performance. In the case of the prototype ‘id shown in FHT 16 sq., with a nut with 1 mm height and the bridge being 8 mm high, the tie-fret of the sasbaba, considered to be 1 mm thick, would be close to the string without touching it which is ideal for performance as less pressure is needed to stop the string. For our reconstruction of the “frettings” of Kindif and (ibn) Ėţâlîn from musiciologist ‘id player Hamûd Makhlaouf from Tunisia (see Beyhom and Makhlaouf, 2009) and FHT 26: 180 sq., and due to the thickness of the tie-frets described by Kindif and Ėţâlîn, we had to raise the nut by adding a layer under it (FHT 22: 177 – this solution was suggested by Richard Dumbrill who worked concurrently on the reconstruction of the Silver lyre of Ur), making thus the performance possible.

$^{374}$ Note that for instruments such as the Indian sitar, which have thick frets (curved and placed far away from the hollow neck – see for example https://bzimages.withfonts.com/actual/5966819665630890520434.jpg, last visited 2019/12/20), the lateral pressure of the finger on the already stopped string induces a substantial lengthening, concurrently with increased tension and heightened pitches – see an example of performance in [The Biryani Boys, 2005].

$^{375}$ See http://www.physics.usyd.edu.au/~cross/StringTension.pdf (last downloaded 06/01/20) and http://planomaker.co.uk/technical/stringformulae/ (last visited 06/01/20).

$^{375}$ Which is not the case, but I am avoiding here the complex formulation that would arise from an equation with three unknown variables.
ligatures to obtain the correct pitch. Yet this formulation is inconsistent with “physical” tie-frets the thickness of which is not negligible – such as Kindī’s and Ṭahlān’s.

As all performers on fretted lutes (such as Western lutes, guitars and mandolins, etc.) know, quality emission of notes on these instruments means stopping the string just before the tie-fret or fret, as close as possible to it without compromising the quality of the sound.

FHT 16:172 illustrates these two specific cases as length sections of the fingerboard, on a ditonic division (Pythagorean) of the fingerboard materialized as ties of homogeneous thickness = 1 mm.

The main reason for the stopping of the string before the tie is acoustical and organological: fingertips776 have incompressible thicknesses. When stopping the string directly on the tie the borders of the fingertips will inevitably exceed this point by a few millimeters777 which creates an unpleasant buzzing sound. The best sound is obtained when the string is stopped a few millimeters before the ligature.778 Therefore, an indication for stopping the strings on the ligature is an indication that the “tie-frets” are line markers drawn on the neck, or would be very thin tie-frets.

As for playing between ligatures, FHT 17:172 shows that, even with “thin” tie-frets only 1 mm thick,779 the string will effectively be stopped on the tie below it.780 In the figure, this would be the wustā when pressing the string between the sabbāba (index) and the wustā (middle finger).781

Note that there exists a possibility, in the case of a (very) high bridge, that the string stopped closer to the sabbāba (index) in FHT 18:172 would not even make junction with the wustā (middle finger). This would be an exceptional case (for ‘ūd(s)) and inconsistent for the organology of the instrument as the performer’s task would be much more difficult (he would have to be much more precise in his performance and exert much more pressure on the string to be able to stop it correctly). Furthermore, modification in pitch would occur in such case due to the lengthening of the string.

(See also Appendix B for more details on “ties”, “ligatures” or “frets”.)

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![Fig. 29 Detail from “Two men having fun with music” (c. 1300) from Staatsbibliothek zu Berlin, Diez A, f.71, S11-2; (copyright Staatsbibliothek zu Berlin, Preussischer Kulturbesitz, Orientalabteilung).](image)

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776 Which can be estimated as 1 cm, for an estimated 2 cm for the finger.
777 Due to the thickness of the fingertips.
778 This observation (which is commonplace among performers on fretted lutes) comes from my experience as a guitarist, but also from the aforementioned reconstruction of the frettings of Kindi and Ṭahlān with Hamdi Maklouf.
779 Compare this to ties 8 mm thick as the ones advocated by Maalouf for Kindi’s “fretting” in the section of Appendix B below entitled “Impracticality of the performance with dense divisions”.
780 To the left in the figure. On fretted instruments, to sound the desired note, the string must be stopped just before the “fret” (ligature) corresponding to it; this means that whatever the position between the sabbāba and the wustā, the note sounded would be the pitch (note) of the upper tie-fret (the wustā in the figure). However, stopping the string near the sabbāba (and after it, in the space between sabbāba and the wustā) will (1) produce an unpleasant sound and (2) can in extreme cases (see below in the text) fail at stopping the string on the wustā.
781 This is in fact the main reason for mounting frets on a lute, as the performance will be much easier, although limited melodically, because the performer needs no more be (so) precise in his stopping of the string. An approximate stopping precision is enough to emit an acceptable sound. Note also that, in the case of stopping nearer to the “higher” fret (to the right – the sabbāba in FHT 18), what changes is mostly the quality of the emitted sound (which becomes worse – with regard to traditional performance).
782 From [Tsuge, 2013, p. 258].
Two positions for the stopping finger on the tie of the sabbāba (heights of bridge and nut are realistic = correspond loosely to the measurements of ʿūd(s) nowadays). The 1st position (theoretical and to the left, mentioned by all early authors) is not advised if the ʿūd is mounted with solid tie-frets ("deafness" of the sound occurs), but is coherent with the use of fretless instruments. The 2nd position (to the right in dotted lines) is the (approximate) correct position for a fretted instrument (such as a guitar). The thickness of the fret (tire-fret, ligature) is 1 mm.

Advised position to make the string sound at the length of the wustā (at $27 \frac{L_0}{32}$), between the tie-frets of the sabbāba (index) and the wustā (middle finger). Organological configuration (proportions) is "normal": the string is mounted the closest possible to the tie-frets (and to the fingerboard) for a better quality of the performance; the stopping occurs just before the wustā. ("Tie" in the figure = "tie-fret").

Not recommended stopping of the string at the length of the wustā (27 $\frac{L_0}{32}$), between the tie-frets ("ties" in the figure) of the sabbāba (index) and the wustā (middle finger). The stopped string will "sizzle" or "crackle" (will be accompanied by "squeaks" according to Kindī – see Part II). If the bridge is oversized in height, it is possible that the string will not even touch the tie of the wustā.

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383 The tie-frets are not, in these figures, wound twice (as described by Kindī – see Fig. 25: 146, and as attested for example for the sāz) as to avoid additional complexity of the graphic representation.
APPENDIX B: ORGANOGLOGICAL CLARIFICATIONS

The fretting of the ʿūd is one of the most controversial issues in Arabian musicology. Many studies published in the 20th century have conflicting opinions on a subject the essence of which appearing to stretch beyond organological matters.

Among manuscripts of the Arabian Golden Age from the 8th to the 11th centuries, only two describe a “fret” system made from ligatures tied at specific places on the fingerboard of the ʿūd. As seen in the main text, the first description is from one of (al-) Kindī’s epistles and dates to the 9th century. The second is the 11th-Century description from (ibn a-ṭ-) Ṭahḥān.

Both authors give relatively complete descriptions of ʿūd tie-frets contradicting significant assertions of philosophers and theoreticians such as (al-) Fārābī, in the 9th and 10th centuries – who was known as the ‘Second Master’, Aristotelēs being the first - and (ibn) Sinā, known to the West as Avicenna, and nick-named ‘the Commentator’ (of Aristotelēs), and also with other later writers such as Urmawi, a musician and theoretician of the 13th century, and Shirwānī in the 15th century. Furthermore, only few contemporary authors have studied the possibility of the ʿūd fretted according to ancient descriptions.

In Early Arabian writings about music, both theory and practice use the instrument as a common denominator. Recent research\footnote{Beyhom, 2005.} has also shown the antecedence of the ʿūd and its influence on the contemporary musical repertoire.

Significant peculiarities of the modern instrument, such as the semi truncated conical shape of the neck, possibly a smaller gap between strings and fingerboard, but also practice of subtle variations of intonation, different from any temperament-based systems, all contradict the premise that frets, or actual physical (consistent, thick) ligatures were used. However, the fretting thesis, which was promoted by eminent musicologists such as Farmer and Neubauer, led to the broadly accepted assertion that the early “mediaeval” – in the Western acceptance – ʿūd was fretted.

Nonetheless, descriptions of early practice contradict this assertion. Consequently, the main question explored in this appendix is: How would the instrument respond should it be fretted as described by Kindī and Ṭahṭān?

To answer this question, practical organological questions – notably Sachs’ remark on the shape of the neck of the ʿūd – \footnote{See footnote no. 154:136.} are examined.

* *

The fretting of the instrument was undertaken in 2008-2009 by Hamdi Makhlouf. Two videos\footnote{See footnote no. 368:168 for the two videos made by Hamdi Makhlouf for the CIM09. These videos are practical demonstrations of some organological problems of the fretting of the ʿūd.} were produced, showing the making of four different frettings, with two sets of strings (for Kindī and Ṭahṭān respectively) and two tunings – Pythagorean and “Harmonic” – described by Kindī in his Risāla fi-ṭ Luhūn wa-n-Nagham.

The following two sections address general organological problems concerning the fretting process, which should clarify, in the third section, the next examination of yet another difficulty arising from the multiplication of tie-frets on the neck of the instrument.

These clarifications are most needed for the purpose of this dossier and are justified, notably, by the zeal of Re-Orientalist musicologists who, while concurrently adopting the myth of the fretting of the ʿūd, demonstrate that the Arabian divisions of the fingerboard were “perfect”.

* *

\begin{itemize}
  \item \footnote{Beyhom, 2005.}
  \item \footnote{See footnote no. 154:136.}
\end{itemize}
About organological difficulties arising from the use of frets on the ‘ūd

Ties ("tie-frets" or "ligatures") are commonly used on lute-type instruments, be it on Western lutes or others. As a general observation: frets are used mainly on long-necked lutes with a neck the two upper and lower sides (the edges of the neck) of which are (almost) parallel. This feature is also necessary for the Western exception, the fretted lute. When the neck is in the form of a truncated semi-cone (FHT 20:175), typical difficulties arise for the fretting procedure. Furthermore, some fretted long-necked lutes (for example the Iranian ᵗᵃʳ, ˢᵉᵗᵃʳ and the ᵈᵒᵗᵃʳ, exception made for the Turkish ˢᵉᵈᵉ) have a groove at the back of the neck to make it easier to tie the notes of the tie-frets on the instrument, while this procedure is not described anywhere for ties on the neck of the early ʿūd.\(^\text{387}\)

Moreover: we have learned from Fārābī that some notes on the ‘ūd are sounded when the strings are stopped between the "usual" ᵈᵃˢᵃⁱⁿ (ligatures), while others are sounded when the strings are stopped on the ligatures\(^\text{388}\) – not to mention (ibn) Sīnā’s explanations about ʰᵒʳᵗᵃˡ ᵉˡᵉᵐᵉⁿᵗˢ with the strings of the ʿūd\(^\text{389}\).

All in all, using tie-frets restricts the performance to predetermined series of notes which narrow the possibilities of melodic expression for the performer. To solve – partly – this technical limitation, more tie-frets can be added. However, this raises new organological problems not thought through by Orientalist (and here, mainly, by Re-Orientalist) ʰᵃʳᵃ ṣᵉˡʰ嗉 musicians, more concerned by their theoretical demonstration than by practical "details".

These questions are mainly about the size and the numbers of the "tie-frets". To show these difficulties, I will try to apply indications about the tie-frets as provided by Kindi, in conjunction with the emplacement of the stopping finger(s).

\(^\text{387}\) The tying of the tie-fret is always a delicate operation: see for example the YouTube videos [Zapico, 2015; PaololitaitaPD, 2010; Shepherd, 2016; Carey, 2017; Espinoza, 2015].


\(^\text{389}\) Quote 15:148.

\(^\text{390}\) Shorter than the neck of the Western lute. Note that while Western lutes have frets, we do not know if this was the case from the beginning (which would be surprising). Moreover, Western lutes have – unlike the ʿūd – wide, almost (semi-)cylindrical necks, with nearly no sloping of the neck (see for example the two plates inserted in [Hellwig, 1970, p. 64–65]) which prevents the tie-fret from losing its adherence to the neck as in FHT 20:175.

\(^\text{391}\) It is hence more interesting to explore the infinite possibilities of "micro-modulation" within the span of one string, i.e. one fifth or a little more.

\(^\text{392}\) See for example the Video no. 2 (Tahhān – see footnote no. 394) between 5:36 (mm:ss) and the end, especially the third fret from the right, and more precisely around 6:19. The "tie-fret" of the ʰᵗʳᵗᵗ (third from the right) moves constantly while Hamdi Makhlouf tries to play a melody on his fretted instrument.

ON THE GLOBAL ORGANOLOGICAL IMPRACTICALITY OF TIES ON THE SHORT, SEMI TRUNCATED CONICAL NECK OF THE ‘ŪD

Let’s begin with common sense reasoning: today, the ‘ūd is not fretted (or mounted with tie-frets) and the best Conservatoire technicians are precisely very proud that they can perform chords or arpeggios with an accurate (i.e. as when playing on a well-tuned guitar) pitch and a “clean” (with no crackling or sizzling) sound on a fretless instrument.

As already explained, the ‘ūd has a short neck\(^\text{390}\). This implies that:

- The span (ambitus) on a string is generally reduced, in traditional performance, to a just fourth (or fifth).\(^\text{391}\)
- This in turn implies that there is not much place for tie-frets – much less as with a ṭᵘⁿᵇǔʳ – if these have substantial dimensions.
- This also implies that a non-equal-temperament division with vertical markers (and with a regular tuning in successive just fourths) can not as easily provide octave and fifth correspondences and, more generally, equivalences between the notes of one octave and another octave.
- This in turn implies that, in order to obtain these equivalences a multiplication of the tie-frets is necessary as for example in Kindi’s division in the ʰⁱʳˢᵃˡᵃ ᵇⁱ ᴷʰᵘᵇᵘʳ ᵃⁿᵃ ᵇᵃᵗ-יןᵃᵇⁱṯ shown in Fig. 8:127.
- Furthermore, the neck of the ‘ūd has a semi truncated conical form, slightly flattened and limited by the nut on one side and by the body on the other side (FHT 19:175 and Fig. 9:131). In the course of performance, it is most probable that (even) a firmly knotted tie-fret will not remain in its original position – because of the lateral friction on the tie-frets – (FHT 20:175), which will make it inoperative.\(^\text{392}\)
Amine Beyhom

Was the Early Arabian ‘ūd “fretted”?  

FHT 19  Neck of a ‘ūd (based on Khula‘ī’s ‘ūd shown in FHT 5:161) mounted with a single tie-fret (“tie” in the figure); A and A’ delineate a cross section shown in (free) perspective view in FHT 20.

FHT 20  Free perspective view of section A-A’ in the previous figure. To the left: firmly knotted tie(-fret) on the neck. To the right: tie-fret displaced towards the nut because of wanted or unwanted (which may happen during the performance) lateral thrust: in this case, the tie-fret adheres no more to the surface and fingerboard of the neck, and becomes inoperative.

393 In the case of slightly conical necks, the fret can be tied on the thinner part, just before its intended position, then displaced towards (and on) the intended position, which will ensure a better fixation, but the problem of displacement remains (as, for example, with the Video no. 2 in the previous footnote); this could, furthermore, result in scratches on the neck which is highly not recommended.
PRACTICAL DIFFICULTIES FOR FRETTING THE ‘ŪD – AN EXPERIMENT\textsuperscript{394}

Other problems arise when trying to reconstruct the frettings as proposed in the Arabian literature, such as with Kindī and Taḥḥān – a task that no Orientalist (or Re-Orientalist) musicologist seems to have undertaken before our experiment with Hamdi Makhlouf in 2009.\textsuperscript{395} This experiment aimed to re-create (or simply create) the frettings of the two early authors on a modern ‘ūd – here the instrument of Makhlouf shown in FHT 21.

Two sets of strings (and “tie-frets”) were used (FHT 26:180 & FHT 27:180) which were the closest in diameter, from the available gut strings from Savarez,\textsuperscript{396} to the proportions proposed by Kindī and Taḥḥān (respectively FHT 9:166 and FHT 10:167) with, for the latter, the two proportions per weight (= per section) or per diameter (THT 2 & THT 3:177).

Two videos were produced about the fretting process and its results. The first video is named from here on “Video no. 1”. In this video, Makhlouf uses the set of strings “Taḥḥān II” (THT 2: – also named “Kindī II”). The ‘ūd is strunged,\textsuperscript{397} then fretted first according to the “Harmonic” system of Kindī, then according to the Pythagorean system of the same author. After mounting each set, Makhlouf plays an improvised melody by positioning the fingertips of his left hand firstly directly on the frets, and secondly by positioning them before the frets.

The same procedure is applied in the second video (“Video no. 2”), using the set of strings “Taḥḥān I” (THT 3:177).

\textsuperscript{394} (Reminder:) This section relies on the two subtitled in English videos available on YouTube at https://youtu.be/d7TTinH_pkM (for Kindī) and https://youtu.be/demT-hpcXIs (for Taḥḥān).

\textsuperscript{395} By Makhlouf with advice from the author. This experiment was part of a wider research undertaken with musicologist and ‘ūd(ist) Hamdi Makhlouf for the CIM09 (Cinquième Congrès Interdisciplinaire de Musicologie, Paris, Octobre 2009) conference, and the purpose of which was precisely a better understanding of organological specificities with regard the fretting of the ‘ūd. The research is documented in [Beyhom and Makhlouf, 2009] and in the aforementioned videos.

\textsuperscript{396} Note that Richard Dumbrill, who has an extensive experience in the making of gut strings, explained to me very recently and in a private communication that the Savarez strings, although they are made for Early period instruments, do not result from the same procedure as earlier gut strings; specifically, they are made according to a process originating in 16\textsuperscript{th}-Century Italy, which is: gut strands are sliced (sometimes twice) in the direction of the length and hung to dry. A small rock of given weight is attached to the sliced strands at the bottom, after which the small rock is rotated till the strands are shortened for a given length. This procedure ensures that there are no gaps between the (sliced) strands of gut. The diameters of the resulting strings are then evened with a special tool to make them homogeneous all long, then oiled or varnished. Strings made following this procedure are generally more resistant and sound better than gut strings made in the traditional way.

\textsuperscript{397} And tuned in successive fourths.
This created definite difficulties for playing the instrument, whether directly on the tie-frets (more difficult with an unpleasant sound) or before them (less difficult but still with an unpleasant sound).

Moreover, the tie-frets did not adhere well to the fingerboard (FHT 22:177) and moved laterally during the attempted performance of an improvised melody.

One of the difficulties which arose while fretting the instrument was the exaggerated diameters of the \textit{bamm} and \textit{mathnā} strings, mostly for the set “\textit{Taḥḥān II}” (or “Kindī II”), for which the tying of the frets was very difficult due to their thicknesses.

This is also illustrated in the photographs of FHT 22:177 and FHT 25:180, in which the non-adherence of the tie-frets to the surface of the fingerboard\footnote{This phenomenon is also due to the fact that the fingerboard is completely flat, with relatively sharp edges which (1) results in the non-adherence of dick ties as the ones shown in this figure and (2) creates additional tension of the ties at the edges which can lead them, eventually, to sever.} is evident when using string thicknesses as advocated by this early author (FHT 26:180), which in turn creates problems.\footnote{See Video no. 1, beginning 04:33 (mm:ss).}

Secondly, the thickness of the tie-frets compelled Makhlouf to insert a wooden piece beneath the nut (FHT 22:177)\footnote{See Video no. 1, 01:40 (mm:ss) to 02:00.} to raise it in such a way as for the strings not to be in permanent contact with the frets.

While the second set of strings (“\textit{Taḥḥān I}”) was easier to install and allowed as well for an easier tying of the nots of the tie-frets, the difficulties did not disappear, with the same (but less) unpleasant resulting sound and lateral displacements of the tie-

\begin{center}
\begin{tabular}{|l|c|c|c|c|}
\hline
\textbf{String} & \textbf{Bamm} & \textbf{Mathlath} & \textbf{Mathnā} & \textbf{Zīr} \\
\hline
\textit{Kindī I (section)} & \textit{dv4 (2d)} & \textit{dv3 (1.73d)} & \textit{dv2 (1.41d)} & \textit{d} \\
\hline
\textit{Taḥḥān I (weight)} & 1.54d & 1.33d & 1.15d & d \\
\hline
\textit{Taḥḥān II (diameter)} & 2.37d & 1.78d & 1.33d & d \\
\textit{Kindī II (diameter with Taḥḥān)} & \\
\hline
\end{tabular}
\end{center}

THT 3 Closest string-diameters to the strings proportions of \textit{Kindī} and \textit{Taḥḥān} with Savarez gut strings, taking the \textit{zīr} string to be 0.53 mm in diameter (equivalent to \textit{d}). (For the \textit{bamm} string, values between brackets are the “ideal” – i.e. computed according to the two theoretician’s explanations – values, while the values outside the brackets are the effective values of the closest – in diameter – Savarez gut strings.)
frets – although less accented – during the performance.

Concluding on this point, there exist many organological problems which should be thoroughly examined before asserting that Early ‘ūd(s) were fretted, as some (re-) Orientalist musicologists still do.

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**Impracticality of the Performance with Dense Divisions**

I shall combine here, for the sake of demonstration, two descriptions of divisions of the fingerboard of the ‘ūd, the first by Fārābī as described by Maalouf⁴⁰² and Abou Mrad⁴⁰³, the second being Kindi’s description of the tie-frets (and their interpretation by Maalouf). The “complete” division of Fārābī (FHT 28:181) has 12 possible locations on the fingerboard, which Maalouf and Abou Mrad liken to “frets”. The “frets” are used on the whole width of the fingerboard for some (Maalouf) or all (Abou Mrad – FHT 32:183 and FHT 33:183) of them.

![FHT 23](image)

**FHT 23** Pythagorean division according to Kindi, with a very thick barun string; the photo shows the tie-frets of the sababa (index – above, with a barun string) and of the wasta (middle finger – below, with a mathlath string).

![FHT 24](image)

**FHT 24** Pythagorean division according to Ṭahḥan; the horizontal marks seen above or below the actual tie-frets correspond to the positionings of the “Harmonic” tie-frets. With this set of strings (“Ṭahḥān I”), the tie-frets stick better to the surface of the fingerboard and are easier to place and tie around the neck.

The first practical difficulty, if these “ligatures” were made of physical material (more than marks or thin threads of silk for example), lies with the wasta(s) and their octaves. The “simple” wasta (at 27/32) and the Persian wasta (at 64/81) are, in the most favorable case when the cross-section of the ligature is nil, located at a distance from each other which is equivalent to:

\[
\frac{27l_0}{32} - \frac{68l_0}{81} = \frac{27 \times 81 - 32 \times 68}{32 \times 81} L_0 = \frac{2187 - 2176}{2592} L_0
\]

⁴⁰² [Maalouf, 2002].

⁴⁰³ [Abou Mrad, 2005].
Replacing by the typical length of a ‘ūd string \( L_\omega \) of a speaking length of 60 cm, the distance between the two ligatures will be 0.255 cm, which is 8 times smaller than the thickness of a finger (estimated as 2 cm)\(^{404}\) and 4 times smaller than the thickness of the tip of the finger (estimated as 1 cm). This obviously creates a difficulty for the precision of the stopping of the string at the exact locations mentioned by Fārābī. The same reasoning can be applied to the “frets” located at 17/18 \( L_\omega \) and 243/256 \( L_\omega \).

This difficulty is increased closer to the nut (for the location of the Persian wuṣṭā at 2175/2187 \( L_\omega \)) as the pressure exerted by the performer in order to stop correctly the string for this position is considerably greater than the pressure needed to stop the string at the location of one of the other wuṣṭā(s)\(^{405}\).

The aforementioned difficulties increase exponentially with physical tie-frets, especially for those suggested by Maalouf in her History of Arabic Music Theory.\(^{406}\) In this book\(^{407}\) and while discussing the division of the fingerboard in Kindī's Risāla fi-l-Luhūn wa-n-Nagham, Maalouf assigns (FHT 29:181) a thickness of 8 mm\(^{408}\) to the tie-fret of the sabbāba (index) made of two folds of bayān string, 6 mm to the tie-fret of the wuṣṭā (middle finger) made of two folds of mathlath string, 4 mm to the tie-fret of the binṣir (annular) made of two folds of mathnā string and 2 mm to the tie-fret of the khinṣīr (auricular) made of two folds of zīr string.

As shown in FHT 30:182 and FHT 31:182, with these tie-frets (for the sabbāba – index) the effective tangent point between the tie-fret and the string is offset by more than 1.5 mm, which would change the pitch of the note.\(^{409}\)

Additionally, using tie-frets such as the ones suggested by Maalouf with Fārābī’s division of the fingerboard would lead to considerable difficulties due, firstly (FHT 32:183), to the entanglement (overlapping) of tie-frets at some locations,\(^{410}\) or due to their unreasonable proximity with one another in other locations which creates – in the first case – an impossibility of the performance and – in the second case – impractical areas in which the performance is – at the very least – difficult.

It is evident that no professional ‘ūd player would choose such a configuration for his instrument. On the other hand, and if we use moderately thick tie-frets such as, for example, 2 × 1 mm tie-frets with standardized cross-section, FHT 33:183 clearly shows, for this realistic (if “tie-frets” are not virtual) fretting, the existence of impractical areas, with one probable area of impossibility of the performance for either of the wuṣṭā(s).

How, after such a demonstration of the impracticality of physical frets for the Arabian divisions on the fingerboard of the ‘ūd could we possibly accept the hypothesis of the fretting of the instrument?\(^{411}\)

\(^{404}\) Note that the thickness of the auricular is approximately the half of the thickness of the other fingers (and the thumb being even thicker), but this plays no role in our reasoning because the finger in question here is the middle finger (wuṣṭā).

\(^{405}\) The string is stiffened near the nut and the bridge, with the result that more pressure is needed for stopping the strings near the nut, and consequently less pressure is needed in the central part of the string.

\(^{406}\) [Maalouf, 2002].

\(^{407}\) Mainly a compendium of Orientalist musicology of the maqām.

\(^{408}\) [Maalouf, 2002, p. 94]: “the bayān string tied twice around the sabbāboa fret fills an area of 4 mm on each side of the fret […] The mathnā string tied twice around the binṣir fret fills an area of 2 mm on each side of the fret […]”.

\(^{409}\) With such thick tie-frets, and knowing that almost all early (and less early) authors insist on a precise stopping of the finger on the tie, we may wonder and ask ourselves: “on which port of the tie-fret should I stop the string”.

\(^{410}\) I wonder if it is possible to tie a knot when the tie-frets overlap.

\(^{411}\) Especially when such frettings are supposed to ease the performance.
Reconstructed Harmonic division of Kindi in the *Risāla fī-l Luhūn wa-n-Nagham*, using tie-frets of the set “Kindī II”.

**FHT 26**  Set of gut strings “Kindī II” used in the reconstruction of the “fretting” of Kindi’s *Risāla fī-l Luhūn wa-n-Nagham* with diameters, from *zīr* (thinnest string) to *bamm* (thickest string): 0.53 mm, 0.71 mm, 0.94 mm and 1.27 mm.\(^\text{412}\)

**FHT 27**  Set of strings “Ṭaḥḥān I” with similar proportions as given by Ṭaḥḥān (proportional weights/sections) with diameters, from *zīr* to *bamm*: 0.53 mm, 0.61 mm, 0.71 mm et 0.81 mm.

\(^{412}\) Detailed information for the procurement of thicknesses of strings for Kindi’s and Ṭaḥḥān’s ʿūd(s) is available in [Beyhom and Makhlouf, 2009].
FHT 28  Impractical areas appear when including the octave equivalences for the scale of (al-) Fārābī as described by Maalouf.\textsuperscript{413} This figure is adapted and translated from [Beyhom, 2010c, v. 1, p. 175, 357]: virtual fingers reproduced in the figure are approx. 2 cm wide.

FHT 29  Computer re-created copy of the upper part of figure no. 3.5 in [Maalouf, 2002, p. 94], showing the proposed thicknesses of Kindī’s tie-frets described in the Risāla fi-l-Luḥūn wa-n-Nagham.

\textsuperscript{413} [Maalouf, 2002, p. 126]. Many musicologists maintain that the Early Arabian ‘ūd was “fretted” notwithstanding the complex divisions described by Arabian theoreticians, and forgetting (or overlooking) the fact that some of the positions for the notes are alternative positionings, as here for the wustā(s). Moreover: “tying frets” on only half of the neck (as for the first six positions beginning from the right) is a practical impossibility. Note that this description is espoused in [Abou Mrad, 2005, p. 773–774] with “full frets” on the fingerboard. In the same reference, Abou Mrad cites [p. 784] Maalouf’s book and asserts that “frets were associated to the fingers of the left hand and placed on the fingerboard of [the ‘ūd] till the end of the Middle Ages” (“des frettes associées aux doigts de la main gauche sont disposées sur la touche [du ‘ūd] et ce, jusqu’à la fin du Moyen Âge”). Note also that Shireen Maalouf is a pianist, while Abou Mrad is a violinist, (both being Ph.D. holders from Université du Saint-Esprit – Kaslik in Lebanon) which would explain their non-familiarity with the specificities of the fretting of lute-type instruments.
FHT 30  Tangent point of the string with the tie in the case of a lowered bridge, and in the case (as advocated by Maalouf) where gut strands are superposed. (“Tie” in the figure = “tie-fret”; Each gut is considered as homogeneous and cylindrical, in accordance with Maalouf’s indications: Richard Dumbrill – personal communication – reminds that it would not be possible to have exactly superimposed guts in the manner in which they are described in this figure. The upper row of guts would force its way in between the guts of the lower register. But moreover the guts would not be of circular section surface due to the fact that they would have needed to be wet when affixed and would be of ovoid section surface.)

FHT 31  Tangent point of the string with the tie: as above but in the case of a heightened bridge. (“Tie” in the figure = “tie-fret”.)
Was the Early Arabian ‘ūd “fretted”?  

FHT 32 Fārābī’s division as described by Maalouf (and advocated by Abou Mrad) with overlapping (or very close one to another) “frets” in case tie-frets are wound around the neck of the ‘ūd following Kīndī’s indications. Performance is practically impossible in this case.⁴¹⁴  

FHT 33 Fārābī’s division as described by Maalouf (and advocated by Abou Mrad) with overlapping (or very close one to another) “frets” in case “realistic” tie-frets (thickness is taken as equal to 2 × 1 mm) are mounted on the neck of the ‘ūd. More impractical areas appear while one zone of (nearly) impossible performance remains for the plain (27/32) and Persian (68/81) wūṣṭāt(s).⁴¹⁵

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⁴¹⁴ Translated and adapted from [Beyhom, 2010b, v. 1, p. 358].  
⁴¹⁵ Adapted and translated from [Beyhom, 2010b, v. 1, p. 358].
APPENDIX C: THE RISĀLA Fī-l-MŪSIQĀ BY (AL-) MUNAJJIM (856-912)

The first extant theoretical (and historical) divisions of the neck of the ‘ād are, as explained in the main text, by Kindi and Munajjim. While previous reviews of Arabian theories assert, with a little haste it seems, that these divisions are Pythagorean and ditonic, and based on the tuning of the strings of the instrument in successive fourths, things do not stand however in such a simple fashion.

The manuscripts of these authors are not explicit about this information and, while Kindi proposes an alternate harmonic division – which is far from Pythagoreanism – Munajjim’s alleged “Pythagorean” division, even if it were possible – if not probable – must still be sustained.

\[\text{**} \]

Yahyā ibn ‘Ali ibn Yahyā ibn ābī Mansūr al-Munajjim comes from a family of astronomers, 420 of poets and of historians. He was close to al-Muwaqqaf, the brother of Caliph al-Mu’tamid (870-892), and he is known for his division of the fingerboard of the instrument, on the other side. The following section contains a few, simple algebraic formulae for Munajjim’s division of the fingerboard of the ‘ād. An accessible review of algebra is available in [Pratt, 2007].

419 Please note here that by “division” I mean a theoretical mesh of the neck which could have been materialized by the strings, on one side, and by – perpendicular to the strings – drawn lines, or by threads tied on the fingerboard of the instrument, on the other side. The controversial – and very rare – descriptions of physical “ligatures” (or “tie-frets”) are examined in Part II of this dossier.

420 This is the Pythagorean ascending-descending division shown in FHT 13 in [Beyhom, 2016, p. 186].

421 [Farmer, 1929, p. 167].


423 Including anecdotes, stories and poetry from the time of the Jāhiliyya (the period before Islam – the religion – or “the time [or through one epistle on astronomy and one other on astrology, and would have written (at least) two works on music, one of which – one about singing (ghinā) – is lost. 422

The other epistle, the Risāla fī-l-Mūsīqā, is considered by some commentators as the key for the comprehension of a voluminous compendium of anecdotes and songs of the 10th century, the Kitāb al-Aghānī by Abū-l-Faraj ‘Alī al-Aṣfahānī (or Isfahānī). 425

This epistle brought numerous analyses and interpretations. Munajjim claims in the introduction that he would explain the teaching of Ishāq al-Mawṣili, but this task is not really fulfilled as not only (contemporary) commentators would not agree on the structure of the modes mentioned by him, but also because even the division of his system cannot be proven with the extant data.

The naming system (literal notation) is alphabetic, and uses the same Syriac alphabet as with Kindi (adjad) for the ten named notes, beginning from the unstopped mathnā string (FHT 35:186) and ending on the zīr string for the last one (produced by a shift of the hand position). The exact placement of the “last note” remains conjectural.

426 Munajjim’s division of the fingerboard of the ‘ād is known as “a simple fashion.” – see footnotes no. 45:119 and 226:142) till the 10th century.

427 See a short description in [Sawa, 2001]. Most other writings of Sawa relate to this period of Arabian music theory and practice and could be relevant for the reader seeking additional comments, for example [Sawa, 1981; 1985; 1989; 2002].

428 The title of Yūsuf Shawqi’s 1976 edition, Risālā ibn al-Munajjīm fī-l-Mūsīqā wa Kadhī Rumūţa Kitāb al-Aghānī [The epistle of ibn al-Munajjīm on music and the unveiling of the symbols of Kitāb al-Aghānī], is for example explicit about this matter. Abū-l-Faraj al-Aṣfahānī (or Isfahānī, 897-967) n.k.a. Abūfīrāj, “was an historian of Arab-Quraysh origin who is noted for collecting and preserving ancient Arabic lyrics and poems in his major work, the Kitāb al-Aghānī. He was born in Isfahan, but spent his youth and had his early studies in Baghdad. He was a direct descendant of the last of the Umayyad caliphs, Marwan II, and was thus connected with the Umayyad rulers in al-Andalus, and seems to have kept up a correspondence with them and to have sent them some of his works. He became famous for his knowledge of early Arabian antiquities” – [Wikipedia Contributors, 2017c] (see also [Neubauer, 2001c]).

429 For a review of these interpretations, see [Sawa, 1989, p. 74-78].

430 [Munajjīm (al-), 1976, p. 189].


432 There are contradictory statements in the epistle about the “10th [last] note” – see [Beyhom, 2010b] and [Wright, 1966] for more details.
Each note of the lower octave corresponds to the starting point of a mode, with courses (majari – sing. majra) running through (either of) the binisir (annular) or the wustä (middle finger).  

No mention is made of the tuning of the strings, or of intervals. Furthermore, the drawing that Munajjim mentions for the division of the fingerboard of the instrument is missing in both copies. The division can however be reconstructed – assuming the tuning of the ’ad is a variable – using indications about correspondences of octaves (or unisons – FHT 36:186). If – and only if – the tuning is in consecutive just fourths (FHT 38:187), the division becomes Pythagorean (ascending, with one descending tone from the khañir), but there is an infinity (as for infinite steps) of other possible divisions (FHT 36:186 and FHT 34:185), including an infinity of Zabalian divisions. No other indications in the epistle allow for more precision or provide more information about the division.

FURTHER EXPLANATIONS ABOUT FHT 34:185 TO FHT 38:187

The equivalences Munajjim provides allow for the establishment of relationships between positions of the vertical markers of the four fingers, the interval between the nut and the sabbaba (X in the drawing, in semi-tones) being equal to the interval between the sabbaba and the binisir and between the wustä and the khañir. If we name Y the distance between the binisir and the khañir, W the distance between the nut and the wustä, Z the distance between the nut and the khañir, and with O being the octave (12 tempered semi-tones), inter-relationships can be deduced in the form of the following algebraic relations:

\[5X + 2Y = O \text{ ("octave")},
\]
with \(0 < Y < X < O/2\) ; \(Z = 2X + Y\) ; \(W = X + Y\)

or, for \(X\) and \(Y\) expressed as functions of one another:

\[Y = 6 - \frac{5X}{2},\] with \(0 \leq Y \leq X \leq 6;\]
\[X = \frac{12 - 2Y}{5},\] with \(0 \leq Y \leq X \leq 6\)

An example for function "Y" above depending on the evolution of "X" is provided in FHT 34, and the general case with interval boundaries is shown in FHT 37:187. Note that when \(X = 2.04\) (slightly augmented Pythagorean tone), \(Y = 0.9\) (leimna). This is one out of an infinite number of solutions, which depend on the precision of the measurement of \(X\) and \(Y\).

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430. These “courses” in [the ligature (dastari) of] the wustä or of the binisir correspond to successions of notes composing a modal scale, starting with a particular note and making its way through either the binisir or the wustä – see [Beyhom, 2010b] and [Wright, 1966] for more details.

431. “The organization, or at least the classification, of the modal system of Umayyad and early Abbasid music seems […] to have been influenced by the recently formulated Byzantine Oktiochoi. Some features of the Arab system, which likewise consisted of eight modes, are described by al-Munajjim (386–912), who discussed them in terms of the diatonic fretting, to which their names relate, on the two upper strings of the ’ad. Assuming a tuning in perfect 4th, the fretting yields a series of intervals consisting of the Pythagorean whole tone (T) of 204 cents, the limma (L) of 90 cents and (by subtraction) the apotome (A) of 114 cents” – Wright in [Wright, Poché, and Shiloah, 2001, p. 800–801]. (Bold type mine)

432. Although these are unlikely, with regards the context – see for example, on the same subject, [Wright, 1966, p. 45, fn. 7]: “Even if we ignore the evidence of the early theorists, the tuning of the ’ad in Munajjim’s epistle, in perfect fourths, is corroborated by Al-Khawwarizmi ([Masjar al-Ulam], ed. van Vloten, p. 239), speaking specifically of musical practice”.

433. We find in the epistle: “the reason for this disposition of the ligatures is a discussion which exceed the limits of this epistle [kalām yasad il-khañir b-intif[a]b]” – Munajjim (al-), 1976, p. 221.

434. Detailed explanations on how the formulae were established and on alternative solutions are available in [Beyhom, 2010b, v. 1, p. 581–589].

435. Reminder: sabbaba for the index, wustä for the middle finger, binisir for the annular and khañir for the auricular.
FHT 35  Stylized fingerboard of a ‘ūd showing the sequential assignment of the 10 notes by Munajjim in his Risāla fī-l-Ḳasīdah. The division and the position of the 10th note are still undetermined.

FHT 36  Stylized fingerboard of a ‘ūd with unspecified intervals corresponding to algebraic formulae deduced from the epistle of Munajjim fi-l-Ḳasīdah. The double sided arrows show (sequentially numbered) equivalences between octaves (bold) or unisons (bold italics).
FHT 37  Calculated boundaries (in cents) of the intervals between the vertical markers for the general case, in the division of Munajjim. $D$ is the interval between the nut and the “10th note”.

FHT 38  Stylized fingerboard of a ‘ud with, assuming a tuning of the strings in fourths, with Munajjim’s resulting Pythagorean “ascending then descending one tone” division. (This corresponds to two ascending whole-tones then a leimma from the nut, to which we add a whole-tone descending from the Khinṣir which completes the division.)
APPENDIX D: ORIGINAL TEXTS

Due to the necessity of including multiple quotes in the dossier, and to the importance of their translation for a better understanding of sometimes subtle (but effective) differences between interpretations, the original texts are included in this appendix, except for small quotes which are kept for quick reference in the main text.

*[Kiesewetter, 1858, p. 32]:

“Ueberhaupt kann ich mich schon lange des Gedankens nicht erwehren, dass die ausübende Musik verschiedener älterer und neuerer asiatischer Völker ein ganz anderes Ding gewesen sein oder noch sein müsse, als jene metaphysische oder mathematische Musik ihrer Philosophen, deren Theorien, ein Werk bloßer Spekulation, sich von der Wahrheit entfernt gehalten haben mussten. Ich meine, […] dass man demzufolge nicht sagen sollte: die musikalischen Systeme ihrer Philosophen, deren Theorien, ein bloßer Spekulation und fürmessungs- und untersuchungszwecke verwendet wurden, so dass sie für die Musikpraxis keinerlei Bedeutung haben konnten. Zu ähnlicher Folgerung war auch Curt Sachs schon früher gekommen”.

*[Tahhan (Ibn a-t— al-Mūsiqi), 1990, p. 175-176 (89-90)]:

"بعض الناس يظن أن النغم التي في العهد المختلفة اختلافهم في شذ المسايات ولكل منها نغمات وظيفة. ونغم أخرى، غير أنهم يتلفن إلى أن يقيسون ذلك ما يتلفن في نغمات مختلفة، ومتفرع، ويشير في ذلك هو مощة هذا النغم الذي يتناسب بينه وبين المسايات.

*[Chabrier, 1982]:

"Avec les Califes Abbasides de l'Iraq, [le 'ād] va devenir le luth concepteur des genres et modes des musiques méso-islamiques et créateur des mélodies, rôle qu'il conservera jusqu'à nos jours dans les musiques arabes savantes et populaires".

*[Kindi (al-Kindī), 1990, p. 175]:

"Avec les Califes Abbasides de l'Iraq, [le 'ād] va devenir le luth concepteur des genres et modes des musiques méso-islamiques et créateur des mélodies, rôle qu'il conservera jusqu'à nos jours dans les musiques arabes savantes et populaires".

*[Jargy and Chottin, 2001, p. 527]:

“1) Période bédouine, depuis la djâhilîya jusqu'aux premiers temps de l'Islam (mort d'Ali, 661); 2) Période d'assimilation, de la dynastie omeyyade au premier cycle Abbaside (vers 830); 3) Période d'opposition et de dispersion, avec le second cycle Abbaside et l'établissement des Omeyyades en Espagne; 4) Période de repli, de la prise de Grenade (1492) à la fin du XVIIIe siècle; 5) Renaissance : la Nahda, du XIXe siècle, à partir de l'expédition de Bonaparte en Égypte, jusqu'au congrès du Caire (1932)".

*[Manik, 1969, p. 12]:

“In bezug auf die Lautenbünde, die die mittelalterlichen Musiktheoretiker zur Darstellung ihrer Tonsysteme ausführlich beschrieben, vertritt nun Berner die Meinung, daß diese Bünde niemals bestanden haben, weil es sich hier, wie er wörtlich sagt, nur um eine „bloße Fiktion“ handele. Dabei beruht sich Berner auf Geiringer, der, nachdem er festgestellt hatte, daß eine Lute mit Bünden in dem ikonographischen Befund der Zeit nirgends anzutreffen war, zu dem Schluß gelangt, daß Bünde nur für Messungs- und Untersuchungszwecke verwendet wurden, so daß sie für die Musikpraxis keinerlei Bedeutung haben konnten. Zu ähnlicher Folgerung war auch Curt Sachs schon früher gekommen”.

*[Farībī (al-Farībī) and al-Qarāgī, 1967, p. 655]:

"In bezug auf die Lautenbünde, die die mittelalterlichen Musiktheoretiker zur Darstellung ihrer Tonsysteme ausführlich beschrieben, vertritt nun Berner die Meinung, daß diese Bünde niemals bestanden haben, weil es sich hier, wie er wörtlich sagt, nur um eine „bloße Fiktion“ handele. Dabei beruht sich Berner auf Geiringer, der, nachdem er festgestellt hatte, daß eine Lute mit Bünden in dem ikonographischen Befund der Zeit nirgends anzutreffen war, zu dem Schluß gelangt, daß Bünde nur für Messungs- und Untersuchungszwecke verwendet wurden, so daß sie für die Musikpraxis keinerlei Bedeutung haben konnten. Zu ähnlicher Folgerung war auch Curt Sachs schon früher gekommen”.
وقد كانت صناعة الألفية صعبة يتقبلها إلى لتم دستائنا المختلطة لتم أو دوي يُدفعت أطفالها، فيضحك الإنسان عندما تم إعداد الدستائي 
المختلطة أعاد ما بدأ، بما ما فعل لله في الدنيا.

[Farabi (al-), 1967, p. 663-664]:
"عالم أكاد موجد في مستعملة هذه الألفية من العرب، فإنهم لا يستعملون
دستاء الجاهلية، لكن يُؤثث أصواتهم أسفل من دستائي (س ع).
فجعلو دستائي (س ع) دستاء الجاهلية، ووضعوا النصر أسفل منه إلى
نابية (ع) وطلحتوه بالنصير، وأمر الإنسان بوضعه على خصوصهم هو دون
رعب جميع التور، بقي صالح الفكر، وجعلو وسطلياهم بين (س ع) وبين
أكلته بنساءهم، وأكبرهم يملؤون أنفسهم ما بين أصواتهم مقاسية، أو
يعملون مسافات ما بين أصواتهم تجربة من مسافات ما بين دستائي
لا يمكن دستائي فإنه يستميلون في آخر دستائي الجاهلية، و
دستائي (س ع).

[Kindi (al-), 1965, p. 12-16]:
"قال الدستائي الذي يسمى الفكاء المفسر، فإنه يُعطى الألف وهو
الذي نقل عليه الحساب المسمى. وهو دستائي لجميع الدستائي ولا يقع عليه
من الإصلاح لشبه الدستائي فقط. وتركب: أن يُدفن ثلاثة أساطير من هذه
الثلاثين التي في طول الوتر - ويعود المزية من أساطير هذه الثلاثين التي في
النقطة أذى على ذلك المقام أو يُعطق على طريق وتراء يقف على ذلك الدستائي
من مدن الثلثين، ثم يرتدي على طريق وتراء يقف على ذلك الدستائي
لا يبتغي له ليسته
أن يولد من موضوعه.
ثم يُقهر من هذا الدستائي - إل ما يُغطيه - أصبيع الخبر، وينب

على الموضوع قطعة من المشت في سبيل الدستائي الأول: وهذا لدستائي
الوثب [113] في جميع الأستر.
ثم يُقهر من ذلك أصبيع أحد جبال المشت ثم يُحشد عليه دستائي من مثي.
ثم يُقهر من هناك أصبيع واسع ويديد على الموضوع قطعة من زرع على
سليس الدستائي المقدمة. ولهذه قسمة الدستائي، وأنا مبنية بشرح علي
هذه القسمة موضوع ما صارت ذلك بل زاده ونقص.
إن هذه المسألة ليس لها كلي أو فهي في الفقه العلمي: أما هندسة وأما عزبة
وأما توجيه، فأنا صريحة فعلى ذلك فنّ إليه مبكر، وأن يكون
طول الوتر ثلاثين، وفي لب المشت له يملأ أجزاءه سهولة، ويكون
ثلاث أساطير، فيكون موضوع نصه ويشت تمالك الدستائي السابق، وأن
كان أساطير عش - جزء من أحد عشر، وأن يكون نصه، وليست
من الأجزاء - لا يقله له جزء مطلق علا أنه اسم له، وانا الأسم
لغة واحدة كحرة ونمضت من يل بحسة.
ثم تملأوا الجدار الذي يلقي الفجر في مكان دستائي كان أساطير، ثم
هجم على ثلاثين تسعة، ولم يكن هناك موضوع دستائي أن الوتر لا ينظف إلا
من موضوع جزء من أجزاء فعِّلوز [113] ومنتظراً أيضاً إلى التلم نمود
من الثلاثين، وكان الأسم كذلك يجازي، ثم تملأوا الفجر - وهو خمسة
فقدان وضع دستائي فشلفوا في ستام الوتر وهو على أصبيع من
دستائي السابق. وهب معه من ولد الدستائي، وهو ستة - قرروا هناك دستائي
الوسط.
ثم تملأوا الجدار الذي يلقي الفجر في مكان دستائي كان أساطير، ثم
هجم على ثلاثين تسعة، ولم يكن هناك موضوع دستائي أن الوتر لا ينظف إلا
من موضوع جزء من أجزاء فعِّلوز [113] ومنتظراً أيضاً إلى التلم نمود
من الثلاثين، وكان الأسم كذلك يجازي، ثم تملأوا الفجر - وهو خمسة
فقدان وضع دستائي فشلفوا في ستام الوتر وهو على أصبيع من
دستائي السابق. وهب معه من ولد الدستائي، وهو ستة - قرروا هناك دستائي
الوسط.
ثم تملأوا الجدار الذي يلقي الفجر في مكان دستائي كان أساطير، ثم
هجم على ثلاثين تسعة، ولم يكن هناك موضوع دستائي أن الوتر لا ينظف إلا
من موضوع جزء من أجزاء فعِّلوز [113] ومنتظراً أيضاً إلى التلم نمود
من الثلاثين، وكان الأسم كذلك يجازي، ثم تملأوا الفجر - وهو خمسة
فقدان وضع دستائي فشلفوا في ستام الوتر وهو على أصبيع من
دستائي السابق. وهب معه من ولد الدستائي، وهو ستة - قرروا هناك دستائي
الوسط.
ورغم أن الموضوع في هذا الوتر - أي الأشياء - ليس للكلة التي تذكرها:
من معق الهواء وعاجته إلى مسواة الهواء تحمل الهواء إلى مسواة.
ثم صبرا الجدار الذي يعد رعب - وهو الكلة - حسب المال الذي تصرف، وهو 
معق الهواء الذي يعد الكلة - وهو النص، وهو أمر.
ويعد المعوق بجرب أن يكون فيه، يجب أن يكون من فصوله على ثلاث
أصابع من نهاية المشت إلى ما في الاتوار، والكلة في ذلك: محاكاة لضرب
الكلة. والكلة، وذلك أن هذا الموضوع في اللواء أدرك سهولة وأكله الدواء، وإنما 
صار مضروب الأتار على ثلاث أصابع من المشت لأنه موضوع جزء من أجزاء الوتر
والكلة.
وينبغي أن يكون اسمها في غاية ما يمكن [114] من القدرة أو يكون ذلك
عجاباً في جميع أجزاءه. حيث لا يكون في وجهه موضوع أرق وكثير من
وضوع كذلك في بطنه، فإن الفيلة أجزاءه في القصة واللغة ما يحبه
عن بعض الأتار واتهام الفكاء.

الفصل الثاني

في معرفة الأتار والنصم

أما الأتار في أربعة: أولًا: البين وهو وتر من معاء دقيق متشابه الأجزاء
وليس فيه موضوع أرض ولا قدام من موضوع، ثم ينقل حاكم أطعاط.
ولكن فهل جداً.
وبعد: شملت سبيله سبيل البين وعبر أنه من ثلاث طبقات.
وبعد: اليهود وهو أيضًا أقل من الثلاثة طبقات - وهو من طبقات - غير أنه
من أبيض، حتى قبله فصقل حسب الوتر الذي تم جربه. ونحله.
وبعد: اليهود هو أيضًا أقل من الثلاثة طبقات واحدة - وفي أنه يكون من
طبقات واحدة - وهو في الأبيض. وأيضاً في حال تقل طبقات الأهم
فجعل الجيش أربع طبقات لأنه أسس الأولى النصم والمسمى الخارجي
من أصول موضوع في الوتر - وهو الأبيض، وهو إذا إذا إذا إذا إذا
تفرج على موضوع - الذي هو على موضوع الأتار - أن يعم طرب وترته
هب على صفحة [114] وصفت الأتمر. ويرجى الهجأ ته
إيام اليهود. فإذا استوحاً مع هذه الظاهرة. فإنها على ذلك المء آبأ
مرتبطة في النص، وأنا جزءه الكناية على هذه السبيل من غلط الجماع
ليسوا هذه النصب الغلطية في الجنة.
ثم ترارز النصم في الأتار كيفر في النصم لفعة حتى ينفلت إلى
أسماء في الأتار، ولذلك صار المال أقل من اللفة لأن النصم إذا

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ترافقت في الصخرة دفعة واحات من الذيل، من الأثر إلى نُفَع دفاعًا كميتاً، ولذل هذه
العملية أيضًا صار الذيل أقوى من الذيل، والذراع أقوى من الذئب.

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فألا لصائر الذئب والذراع برنوتش دون الدم والمثل؟ فلذا تعلمنا
إذا، إننا إذا تعرفنا في BITS من طيب من الطيب والذئب احتاجنا إلى صيحة طيني الإبل والذئب.[12] إن زوار(...) دُعِيَ أن يتعلموا
من الاعتقاد. والثقة الثابتة: أن الزوار في هذا الموضوع يجب أن يكون من الملك، نغفته وانقفها إلى ما لا نهاية على طبيعة وأحدث من المعاء الدقيق ولا
طيبلة، فكان الإبل إذا تغير بحسب ذلك المعاء في ظل فوقي على ما
يحتاج إليه من الفوقي المعاء.

[Fārābī (al-), 1967, p. 560-563]:

"وإن الإبل هي قريبة من عب الرحي، فنوصًا قرب من
الغريب، بمعنى أن ليس ببخاخه، وإذا وقع ذلك بين أن
يكون طرف المقصود منشأة إلى حدف الموضوع الذي
تنصرف النضبة المستودع، لكن ربما حاول أن أزيد أو أقصَى إذا كان مقصود طبي، فمـ ازأل عن موضوع النضبة فزادت بسيرة، صار بقية فلم يسع له
الCEPT، وأن كان مقصود بعيدة، أي أن فن موضوع النضبة تستمتعان
بمسائر أمال البقية إلى عب الرحي معه لها اقتصاد ما [38] فنلم ذلك صار يصير
عليه الحكم في النضبة التي في العد، اما عليه النضبة، النضبة.

[Fārābī (al-), 1967, p. 516]:

"ANGER أن ترى على نكتة سيتها كبير غدا، وكثير من الناس يستعملون
نففًا غير هذه يتحمل حاجة إليها في تحميل المطرقة التي يستعملها أو
في نهاية، من غير أن يكون ذلك النضبة آلافاً محدودة، فإن تلك النضبة
يستخرج فيما بين الناس وسيبير وتستخرج نفس دلتان العنصر،
ويعبار عن النضبة السابة، وتمدّد استبخراها أن تعرز النضبة، ويخ
وحب إن كان يعلم تلك النضبة، فلما يشتر من ذلك وللملامه في
الثقة المشتركة، لا على مدى معينة أخر.

[Sinā (Ibn) or Avicenna (980-1037), 1956, p. 140]:

"وال vọngات - هو أيضًا من جنس التوجي، أو مؤالي لها - وهو: أن تقرر
دلتان، ثم تحرك الإشعاع إلى نكتة فوقه أو تحته على الإشارة، إرادة لإن
نفي الصوح من حدة إلى تلك، أو تلل إلى دقة، تنص على الإشارة.

[Zayla (Ibn), 1964, p. 76]:

"فإن الاستحيل إذا كان مرتين - أو الكف - حتى صبر ذلك سبباً لتنباه.
وضع الوقت عن الجهة: فإذا قضى الوقت إلى دلتان حي ينضب
بوجها الأرجل، اجتاح ضروب إلى ان يندفع، والسبب في ذلك أنه قد قبل
حلما مستقبلاً، والإردن أن يصرح بالخطاب، وثابت جرأت، وكان ضعفًا مجموع من الذيل أطول من الثالث، ولن يطول
النضبة إلا يأجل، وتعدم بيغ طيفية إلى الجدة.

[Lādhiqi (al-), 1986b, p. 179]:

"وأعمال المعنى المتآثرين ينفعه على ساعد تلك الآلة وترزا سادراً ويسعة
عهد آملا وقد وضع على ساعد تلك الآلة مستعدًا دالًا على ماجرة نفيسات
مهد الآلة من تلك الساءات ويسع تلك الآلات بالساعات سواء كانت
أوارات مضروبة أو خطوات مكونة وغيرها.

Neubauer’s German translation of the latter in [Neubauer, 1993, p. 325]:

"Man bringt (quad waffrâ) auf dem Hals dieser Instrumente [d.h.
der Lauten] Zeichen (tâlâmârâ), die die Ausgangsorte des Tönes
auf dem Griffbrett bezeichnen, in denen sich die Melodien
bewegen (makharâj-nângwâtâ mâdâr tâlâmârâ min tilâ sa-
sawrâ). Man nennt (wâ-yânânu) diese Zeichen Bünde
(dasâtîn), ob sie nun [aus] Saiten [bestehen], die [um den Hals]
gewunden werden (awâr madâhâ), aus Linien, die [darauf]
gezeichnet sind (khâlîq maktûbâ), oder aus anderem”.

[Neubauer, 1993, p. 325]:

"Die Bünde (dasâtîn) bestehen aus einer Reihe von Zeichen
(nešâ‘î-ye čand), die man auf den Halsen (sawrî-î)
der Saiteninstrumente (âlî-î dâwâm-e outâr) anzubringen pflegt
(wafr kardâ) zum festen [und sicheren] Aufsetzen (tašâdod)
der Finger auf die Saite und zum Hervorbringen der Töne
(esteherqâg-î nangwâtî) auf ihr”. (Bold font is used here for
Persian terms.)

[Fārābī (al-), 1967, p. 498-499]:

"وهذة الآلة من الآلات التي نجدها نجم في نجمة الأيام، فننصح
هذة الآلة التي نجدها نجم في نجمة الأيام، ونجعل موارد
للفاعل الآلة التي نجدها نجم.

[Neubauer, 1993, p. 325]:

"An anderer Stelle sagt er, daß Töne, die oberhalb der Bünde
liegen, ohne zusätzliche Bünde nur von Meistern der Zunft
gespielt werden können”.

[Neubauer, 1993, p. 325]:

"Beim einer Quintstimmmung der Saite können beispielsweise die
Quinten nur hervorgebracht werden, wenn sich dort ein Bund
befindet, sonst nicht. Es sei dem, es gelingt [dem Spieler], den
Finger [korrekt] dahin zu setzen”.

[Fārābī (al-), 1967, p. 600]:

"وفي هذه المنتج، فإن نحن كل واحد من الآلات الثلاثة. الذي هو أصغر من
الآله، ترتفع فوق الدلتان الذي كتب عن نفسه في التنويم المدهورة بعد
طبي، فإن صادقت عنه دلتان أخرجت فيه إلا لم تخرج، أو تقع أن
يقع عليه إ çıع.

Erlanger translates in [Fārābī (al-), 1930, v. 1, p. 208]]

the quote above thus:

“Dans cet accord à la quinte [entre la corde la plus grave et la
suivante], les notes qui produisaient les trois cordes à la suite
de la première dans l’accord à la quarte, se trouvent déplacées
au-dessus de leurs touches vers le grave, de la distance d’un ton.
Les points fournissant certaines de ces notes coincident avec des ligatures sur lesquelles on les produit. D’autres ne coincident pas avec une ligature et ne peuvent être produites, à moins qu’on ait la chance de placer le doigt au point juste”. (Bold type mine.)

[Neubauer, 1993, p. 330]:


[Neubauer, 1993, p. 331-332]:


[Neubauer, 1993, p. 331]:


[Ṭahḥān (ibn a-t— al-Mūṣīqī), 1990, p. 175]:


[Fārābī (al-), 1930, v. 1, p. 2]:

“Pour être un parfait théoricien, quelle que soit la science dont il s’agit, il faut trois conditions : En bien connaître tous les principes. Avoir la faculté de déduire les conséquences nécessaires de ces principes dans les êtres (les données) qui appartiennent à cette science. Savoir répondre aux théories erronées, et analyser le vrai du faux et redresser les erreurs”.

Was the Early Arabian ‘ūd “fretted”?

FHT 39 First page of the Risāla fī-L-Lūbān we-n-Nagham (Mukhtasar al-Mūṣīqī fī Taḥlīf a-n-Nagham wa Shī‘at al-‘ūd) by Yaʿqūb ibn Isḥāq al-Kindi, taken from [Kindi (al-), 1965]. 436

436 The image was edited and cropped for clarity.
References


25. Carey, Travis: Free Tying with Travis Carey [2017-4-19] | [https://www.youtube.com/watch?v=6T5MgtQSofI].
30. COLEBROOK, Henry Thomas : Algebra, with Arithmetic and Mensuration, from the Sanscrit of Brahmagupta and Bhaskara, John Murray [London, 1817].


36. DURING, Jean : Quelque chose se passe : le sens de la tradition dans l'Orient musical, Verdier [Lagrasse, 1994].


40. FĀRĀBĪ (Al-), Abū-n-Nāṣr Muhammad ibn Muhammad ibn Tarkhān : La musique arabe (1) – I [Al-Fārābī, Grand traité de la musique (Kītab al-Miṣāqi al-Kabīr)] (Livres I et II), editor Rodolphe d'Erlander, translator Rodolphe d'Erlander (d') Erlanger, 1st ed. 2/6 (vols.), Librairie orientaliste Paul Geuthner [Paris, 1935].


43. FARMER, Henry George : Historical facts for the Arabian musical influence, Ayer Publishing [1930].


47. FARMER, Henry George : The sources of Arabian music : an annotated bibliography of Arabic manuscripts which deal with the theory, practice, and history of Arabian music from the eighth to the seventeenth century, E. J. Brill [1965].


49. FARMER, Henry George : Geschichte der arabisch-islamischen Musik, VEB deutscher Verl. für Musik [1966b].

50. FARMER, Henry George, Werner BACHMANN, Heinrich BESSELER and Max SCHNEIDER : Musikgeschichte in Bildern, Band III: Musik des Mittelalters und der Renaissance / Lieferung 2, VEB deutscher Verlag für Musik [Leipzig, 1966].


93. NĀDĪM (BIN-A-N-), Muhammad ibn Iṣḥāq al-Warrāq: Kitāb al-Fihrist, Librariae Hiaytii (rue Bliss) [Beirut, s.d.].


96. NEUBAUER, Eckhard: “Mawsūli, al-: (2) Iṣḥāq al-Mawsili”, Grove Music Online [2001b] [ ]


98. PAOLONI-TATIAN D: Fooling gas frets [2010-12-5] [https://www.youtube.com/watch?v=6AltqG2X0sA].


100. PLATON: The Republic Of Plato, translator Benjamin Jowett [1908] [http://www.plato.org/ak.html].


103. QIPH (BIN AL-), Jamāl-ad-Dīn Abī-Hāṣan Abī Yūsuf, August MÜLLER and Julius LIPPERT: Tarnīk al-Hukumārī, Dieterich [1903 - 1904] [http://www.plato.stanford.edu/entries/algebra/].


106. RÛHAN, Sharīl: موزم خاص: ترجمه و میزان‌سازی CNSM (Conservatoire National Supérieur de Musique - Liban) [Beirut, 2001].

107. SACHS, Curt: The History of Musical Instruments [1940] [http://www.plato.stanford.edu/entries/algebra/].


117. SHEPHERD, Martin: Lutebooks’ Top Tips - Tying Frets [2016-10-23] [http://www.youtube.com/watch?v=QspxODvlLJ].


121. SHIRWANI (A-S-H), Fath-al-Lāh: Majalla Fil-Mūsīqā (MS. 3449), Topkapi (Istanbul), 95 f°, editor Eckhard Neubauer, Institut für Geschichte der Arabisch-Islamischen Wissenschaften [Frankfurt am Main, 1886].

122. SHIRWANI (A-S-H), Fath-al-Lāh and Muhammad ibn ‘Abd-al-Hamīd LADĪHIQ (A-S-H): Le musique arabe (4) - I. Traité anonyme (attribué à Shītwānī (a-s-h) - Majalla Fil-Mūsīqā (MS. 3449), Topkapi (Istanbul), 95 f°, editor Eckhard Neubauer, Institut für Geschichte der Arabisch-Islamischen Wissenschaften [Frankfurt am Main, 1886].

123. SHIRWANI (A-S-H), Fath-al-Lāh and Muhammad ibn ‘Abd-al-Hamīd LADĪHIQ (A-S-H): Le musique arabe (4) - II. Traité anonyme (attribué à Shītwānī (a-s-h) - Majalla Fil-Mūsīqā (MS. 3449), Topkapi (Istanbul), 95 f°, editor Eckhard Neubauer, Institut für Geschichte der Arabisch-Islamischen Wissenschaften [Frankfurt am Main, 1886].


128. STEINGER, Bruce and Greg BEAR: Mozart en vers vers minirs, Denoël [Paris, 1996].