

Near-Eastern Musicology Online

Vol. 5 Nos. 8 & 9 – November 2020

نفس

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Near-Eastern Musicology Online

NEMO-Online (Near-Eastern Musicology Online, <http://nemo-online.org/>) is the brainchild of research groups ICONEA, in the UK, and CERMAA, in the Lebanon. These groups affiliated in 2011 and launched NEMO-Online. PLM in France, another research group (now integrated in IReMus), became an associate member of NEMO-Online in January 2012:

- ICONEA (*International Conference of Near-Eastern Archaeomusicology*) is a research group of The Institute of Musical Research, School of Advanced Study of the University of London, and specialises in Near and Middle-eastern archaeomusicology.
- CERMAA (*Centre de Recherche sur les Musiques Arabes et Apparentées*) is part of FOREDOFICO, the Foundation for Research, Documentation and Field Collection for Oriental and Arabian Traditional and Folk Music and Arts. Both promote Arts and Music in the Lebanon and are dedicated to researches on *maqām* music and modality.
- IReMus (*Institut de Recherche en Musicologie*, UMR 8223) is a research unit under the authority of the CNRS (Centre National de la Recherche Scientifique), of the université Paris-Sorbonne, the Bibliothèque nationale de France and the ministry of Culture of France: it integrates the previous PLM (*Patrimoines et Langages Musicaux*), a professional research group of musicologists, most of them being also musicians, working at Sorbonne University in the realm of history of music, ethnomusicology, music analysis and/or theory of music.

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EDITORS' LETTER

TWO VERY SPECIAL YEARS¹

NEMO-Online has been active for the past nine years! We were founded in 2011 with CERMAA (Lebanon) and ICONEA (Great Britain). In 2012, a third research centre joined us. This was the PLM group of the University Paris IV-Sorbonne. Soon, PLM blended with IReMus, a research unit at the University Paris IV-Sorbonne, the CNRS and the Bibliothèque Nationale de France (BNF), rooting NEMO in an international sphere, principally European and Middle-Eastern and confirmed by its Scientific Committee.

During the same year 2011 of the foundation of our publication, uprisings and revolutions of the 'Arab Spring' succeeded one another, starting from the Tunisian Revolution to its Syrian counterpart. The Lebanon where most of the staff and logistics are based, was hit full front by the aftermaths of the Syrian uprising of 2011 welcoming a million and a half refugees which increased its population by a third, which greatly contributed to the financial and strategic problems of our publication.

As the Near and Middle-East dig in a more and more serious chaos, (Civil wars in Libya and in the Yemen, security issues and political murders, boundary conflicts, etc.), we managed to publish our nine issues and five volumes to this day with a total of 27 articles by 16 authors.

NEMO managed to survive more major obstacles brought up in 2019-2020, with the Lebanese Revolution of 2019, the Covid 19 pandemic and the Lebanese bankruptcy which threatens of destruction the Lebanese entity celebrating this year its centenary...

These events have made us even prouder with the publication of the last issue (9) and the fifth volume of our series. We would like to mention that the downloading statistics reveal a growing interest for our works since some of them have already been downloaded two thousand times.²

¹ Notes: 1) The multilingualism in NEMO has led its editors into harmonizing English and French typographical conventions whenever possible. As a result the reader may be surprised at times by unusual typography, consequence of this harmonization. 2) Each submission to NEMO is assessed by at least two members of the editorial board. Some papers dealing with more complex themes would be submitted to external expertise. It remains that opinions produced in any form in the present volume is the responsibility of their authors as well as the quality of the language in which the contribution is submitted, this applying particularly to the English language.

² Knowing that an article which has been downloaded can be redistributed thus increasing the number of readers.

NEMO-Online No.8

Our last call for papers dated December 2018 was entitled “Music as science or music as art?”. This question has been controversial for millennia and it seemed useful to engage in a debate about where musicological thought stands. Unfortunately, we have not received any articles of sufficient quality about this fundamental question³ which may suggest that the debate about the musicological Orientalism which was launched in the No 5 of Amine Beyhom’s Dossier has not encouraged reactions in the musicological community which is regrettable as we believe that a radical reviewing of musicology is a necessity.

No. 8 (November 2019) found itself in the dossier by the same author of ‘The Lost Art of Maqām’ by **Amine Beyhom**, a continuation of the article ‘MAT for the VIAMAP’ published in 2018 with four video analyses of *maqām* music.

The first part of the dossier groups three analyses previously published by the author’s research centre and which include various aspects of the *maqām* following a growing complexity (but not of performance). The first 3D analysis (of a Taksim [in] Huseynî by Neyzen Tevfik) is included among the three analyses.

The three analyses proposed in the first part of this dossier explain diverse aspects and technical or artistic competence of the singer (Evelyne Daoud) and of the two musicians (Neyzen Tevfik et Hamdi Makhoul) while the second part is dedicated to the *qaṣīda* ‘*Yā Nasīm a-ṣ-Ṣabā*’ sung by cheikh ‘Ali Maḥmūd accompanied by the violinist Sāmī a-sh-Shawwā, a unique example of the art of the *maqām* at the best of its development at the beginning of the 20th century.

If the three first analyses tend to confirm that *maqām* music and others can be better explained by methods devised by eminent ethnomusicologists such as Charles Seeger in the 1950 and 1960s and using complementary techniques developed by the author and his team, the analysis of *Yā Nasīm a-ṣ-Ṣabā* needed the improvement of even more refined methods to make up for the poor quality of historical recordings – noting that these recordings are essential for a better understanding of this music. A research on the lyrics of the *qaṣīda* (written by cheikh Maḥmūd a-sh-Shahhāl of Tripoli - Lebanon) is included at the beginning of the second part.

We are equally delighted to offer this first series of recensions of books and of a CD in this eighth issue.

- **Avra Pieridou Skoutella** : *Small musical worlds in the Mediterranean: ethnicity, globalization and Greek Cypriot children’s musical identities*, Ashgate |Farnham, Surrey ; Burlington, VT, 2015|.
- **Jean-François Goudesenne** : *Émergence du chant grégorien : les strates de la branche Neustro-insulaire (687-930) – Tome I. Étude historique et philologique, Tome II. Annexes, planches et édition*, MŪSAM (MUSICALIA ANTIQUITATIS & MEDII AEVI) 2 vols., Brepols |Turnhout (Belgique), 2018|.
- **Melpo Merlier** : ‘*and let us sing in praise*’ – Byzantine Hymns recorded in 1930 by Melpo Merlier, EDO (HERE) |Athens and Volos (Greece), March 2000|.

³ Many articles were rejected by the Editorial Board for they were of mediocre quality or after refusal of their authors to make requested emendations.

NEMO-Online No. 9

The ninth issue was not given any specific theme but has welcome a new author offering some of the best quantitative statistical of the *maqām*, with **Ozan Yarman's** article “Search for an Optimal Tonal-System for an Authentic Turkish Soundscape” which follows on an article co-written by the author in 2009 to attempt at finding the best temperament – notably for the *qānūn* instrument – and to reproduce a maximum amount of degrees of the Turkish musical scale, for each *maqām*.

In the same issue, **Amine Beyhom** follows his thoughts about the musicological Orientalism and dissects, in his Dossier, “Was the Early Arabian *ūd* ‘fretted?’”, what he considers as a fabrication of orientalist musicology, the “fretting” of the Arabian *ūd* at the dawn of Islam.

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In our times of self-criticism of American and Anglo-Saxon musicology, and generally concerning ‘White Supremacism’ the editors can only but ask the question about intellectual regression of other musicologies which, while our American colleagues are in the process of rethinking their disciplines and of their usage of academic and economic power, continue their fight to protect racists processes inherent to the musical theory.

We are active defenders of a complete review of musicology, of ethnomusicology, of music theory and of the history of music to extract out of it all white supremacism and for the admission of damage caused by musicological Orientalism to music and musicology of Near and Middle-Eastern countries.

ÉDITORIAL

DEUX ANNÉES TRÈS SPÉCIALES

NEMO-Online a neuf ans ! Fondée en 2011 par le CERMAA (Liban) et ICONEA (Grande Bretagne), la nouvelle revue s'est vu adjoindre en 2012 un troisième centre de recherche, le groupe PLM de l'Université Paris IV – Sorbonne. PLM allait bientôt s'intégrer dans IReMus, une unité de recherche de l'Université Paris - Sorbonne, du CNRS et de la Bibliothèque Nationale de France (BNF), enracinant NEMO dans un environnement international – majoritairement européen et moyen-oriental – confirmé par la composition de son Comité Scientifique.

Dans cette même année 2011 de fondation de la revue, les soulèvements et révolutions du « Printemps Arabe » allaient se succéder, de la révolution tunisienne en passant par la syrienne. Le Liban, où est basée la majorité du personnel et du matériel de la revue, a subi de plein fouet les contrecoups du soulèvement en Syrie (en 2011 également) avec un million et demi de réfugiés sur son sol, ce qui a fait augmenter sa population d'un bon tiers et a grandement contribué à l'augmentation des difficultés logistiques et financières de la revue. Alors que la région du Moyen et Proche-Orient s'enfonçait dans un chaos de plus en plus accentué (guerre civiles en Lybie et au Yémen, incidents sécuritaires et assassinats politiques, soulèvements populaires, incidents de frontière, etc.), la revue a réussi à faire paraître régulièrement ses 9 numéros et 5 volumes à ce jour, avec un total de 27 articles par 16 auteurs différents.

Incontestablement une gageure par ces temps mouvementés, NEMO a survécu dans des circonstances difficiles qui sont soudain devenues, en 2019-2020, quasi-réduites : « Révolution d'Octobre 2019 » au Liban, pandémie mondiale de Covid-19 jusqu'à ce jour, faillite de l'état libanais et menace de destruction de l'entité libanaise qui a « fêté » cette année son centenaire... Nous sommes d'autant plus fiers à la rédaction d'avoir pu boucler le dernier numéro (9) et publier le cinquième volume de notre revue. Il est utile ici de souligner que nos statistiques de téléchargement montrent un intérêt soutenu pour nos articles, dont certains ont déjà été téléchargés plus de deux mille fois.⁴

⁴ Sachant qu'un article téléchargé en pdf peut être redistribué, nos statistiques de lecture dépassent probablement fortement ces chiffres.

NEMO-Online n° 8

Notre dernier appel à propositions date de Décembre 2018 et était intitulé *Musique en tant que science ou musique en tant qu'art ?* Cette question soulève la controverse depuis des millénaires, et il semblait utile de faire un état des lieux de la pensée musicologique et musicale à ce sujet. Nous n'avons reçu malheureusement aucun article de qualité suffisante⁵ sur cette question fondamentale de la musicologie. Ce fait paraît indiquer que la réflexion sur l'Orientalisme musicologique entamée dans le no. 5 dans le dossier d'Amine Beyhom n'a pas suscité d'émules ou de réactions dans le milieu musicologique, ce qui est dommage car nous pensons à la rédaction qu'une remise en cause radicale de la musicologie est nécessaire de nos jours.

Le no. 8 (Novembre 2019) s'est réduit dans ce contexte au dossier du même auteur « The Lost Art of *Maqām* », une continuation de l'Article « MAT for the VIAMAP » publié en 2018. Le nouveau dossier est accompagné de quatre analyses vidéo de musique de *maqām*. La première partie réunit trois analyses publiées précédemment par le centre de recherche de l'auteur, et qui couvrent différents aspects du *maqām*, suivant une complexité croissante de l'analyse (mais pas de la performance).

La première vidéo analyse en 3D (d'un *Taksim* [en] *Huseynî* par Neyzen Tevfik) est incluse parmi ces trois. Ces trois premières analyses expliquent divers aspects et compétences techniques ou artistiques de la chanteuse (Evelyne Daoud) et des deux musiciens (Neyzen Tevfik et Hamdi Makhlouf), tandis que la deuxième partie de l'article est consacrée à la *qaṣīda* « *Yā Nasīm a-ṣ-Ṣabā* » chantée par le cheikh 'Alī Maḥmūd accompagné par le violoniste Sāmī a-sh-Shawwā, un exemple unique de l'Art du *maqām* au faîte de son développement au début du xx^e siècle.

Si les trois premières analyses tendent à confirmer que la musique de *maqām* et d'autres peuvent mieux être expliquées et analysées avec les techniques déjà mises en œuvre par d'éminents ethnomusicologues – tel Charles Seeger – dans les années 1950 et 1960, et utilisent les techniques supplémentaires mises au point par l'auteur et son équipe, l'analyse de *Yā Nasīm a-ṣ-Ṣabā* a nécessité la mise au point de techniques encore plus raffinées pour remédier aux problèmes inhérents à de tels enregistrements historiques – ceci, d'autant plus que l'importance de ces enregistrements pour une meilleure compréhension de cette musique n'est plus à démontrer. Notons qu'une recherche sur les paroles de la *qaṣīda* (par le cheikh Maḥmūd a-sh-Shahhāl de Tripoli – Liban) est incluse au début de la deuxième partie.

Nous avons également eu le plaisir de proposer cette première série de recensions de deux livres et d'un CD dans ce huitième numéro de NEMO-Online :

- **Avra Pieridou Skoutella** : *Small musical worlds in the Mediterranean: ethnicity, globalization and Greek Cypriot children's musical identities*, Ashgate |Farnham, Surrey ; Burlington, VT, 2015|.
- **Jean-François Goudesenne** : *Émergence du chant grégorien : les strates de la branche Neustro-insulaire (687-930) – Tome I. Étude historique et philologique, Tome II. Annexes, planches et édition,*

⁵ Plusieurs articles ont été refusés soit d'emblée par le comité de rédaction – pour cause de qualité clairement insuffisante – ou après renoncement de l'auteur à cause des modifications demandées.

MŪSAM (MUSICALIA ANTIQUITATIS & MEDII AEVI) 2 vols., Brepols |Turnhout (Belgique), 2018|.

- **Melopo Merlier** : ‘and let us sing in praise’ – *Byzantine Hymns recorded in 1930 by Melopo Merlier*, EDO (HERE) |Athens and Volos (Greece), March 2000|.

NEMO-Online n° 9

Le no. 9 ne s’est pas vu attribuer de thématique particulière, mais voit l’apparition d’un nouvel auteur dans la veine des meilleurs écrits de statistique quantitative du *maqām*, l’article « Search for an Optimal Tonal-System for an Authentic Turkish Soundscape » par **Ozan Yarman**, qui reprend les résultats d’un article co-écrit par l’auteur en 2009 pour essayer de mieux cerner le meilleur tempérament – notamment pour l’instrument *qānūn* – à même de reproduire au plus près un maximum de degrés de l’échelle de la musique turque, rapportés à chaque *maqām*.

Dans ce même numéro, **Amine Beyhom** poursuit sa réflexion sur l’Orientalisme musicologique et dissèque, dans son Dossier : « Was the Early Arabian ‘ūd ‘fretted’? », ce qu’il considère comme une « invention » de la musicologie occidentale, le « frettage » du ‘ūd des Arabes aux premiers temps de l’Islam.

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En ces temps d’autocritique de la musicologie américaine – et anglo-saxonne de manière générale – concernant le « Suprématisme Blanc », les éditeurs ne peuvent que poser la question de la régression intellectuelle des autres musicologies qui, alors que nos collègues d’outre-Atlantique sont en pleine refondation de leurs disciplines et de leurs utilisation du pouvoir académique et économique, continuent à mener des combats d’arrière-garde pour sauvegarder les procédés racistes inhérents à la théorie musicale.

Nous sommes à NEMO d’ardents défenseurs d’une refonte complète de la musicologie et de l’ethnomusicologie, de la théorie musicale et de l’histoire de la musique, et pour l’extirpation de la pensée suprématiste blanche de ces disciplines, ainsi que pour la reconnaissance des torts causés par l’Orientalisme musicologique aux musiques et musicologies des pays du Proche- et du Moyen-Orient.

كلمة الناشرين

عامان مميّزان

بلغت مجلة نيمو-أونلاين عامها التاسع! بعد تأسيسها عام 2011 بتعاون بين مركز البحوث في الموسيقىات العربية والمتقاربة (CERMAA) والمجلس الدولي للعلوم الموسيقية الأركيولوجية الشرق أوسطية (ICONEA) بالمملكة المتحدة، انضم إلى هذين المركزين مجموعة تراث ولغات موسيقية (PLM) سنة 2011 وهو مركز أبحاث تابع لجامعة السربون بباريس، ما لبث أن تحوّل إلى IReMus، وحدة بحثية تجمع بين الجامعة، الـCNRS والمكتبة الوطنية في فرنسا (BNF). كل ذلك ساهم في ترسيخ مجلة نيمو-أونلاين ضمن إطار دولي نراه واضحًا في تشكيلة اللجنة العلمية ذات الطابع الأوروبي والشرق-أوسطي.

خلال العام التأسيسي، نشطت التظاهرات والثورات تحت شعار "الربيع العربي" وتوالت بدءًا من الثورة التونسية مرورًا بالثورة السورية. تضرر لبنان بشدة من جراء إرتدادات الثورة السورية سنة 2011، علمًا أنّه مركز أغلبية الطاقم والمعدات التابعة للمجلة. مع ازدياد العدد السكاني إلى ما يقارب المليون ونصف لاجئ، تنوّعت المشاكل الحياتية اليومية وازدادت وتحوّلت تلقائيًا الصعوبات اللوجيستية والمادية التي تواجهها المجلة إلى وضع أسوأ. بالرغم من الأوضاع الغوغائية المتصاعدة في منطقة الشرق الأوسط والأدنى (على سبيل المثال لا الحصر: الحروب الأهلية في ليبيا واليمن، الحوادث الأمنية والاعتقالات السياسية، الثورات الشعبية، الحوادث على نقاط الحدود، وغيرها)، نجحت المجلة في نشر منتظم لـ5 أجزاء ضمّت 9 أعداد وجمعت حتى الآن 27 مقال لـ16 مؤلّف مختلف.

تخطّت نيمو هذه الصعوبات وواصلت نشاطها على مدى السنين إلى أن استجدّت أوضاع تعطيلية من نوع جديد في سنة 2019-2020: ثورة أكتوبر 2019 "في لبنان، وباء عالمي من جراء الكوفيد-19 ما زال حتى يومنا هذا، إفلاس الدولة اللبنانية، تهديد لاستمرارية الكيان اللبناني الذي "احتفل" هذه السنة

بعيده المائة منذ تأسيسه... في ظلّ هذه الأجواء، يفتخر طاقم نيمو بإنجازه العدد التاسع ونشر الجزء الخامس من المجلة. تجدر الإشارة هنا إلى أنّ إحصاءات التنزيل التابعة لموقع نيمو-أونلاين تبين اهتماما كبيرا بمقالاتنا، حيث أنّ بعض المقالات تمّ تنزيلها أكثر من 2000 مرّة.

نيمو-أونلاين عدد 8

يعود آخر نداء للمساهمة في مجلّتنا إلى كانون الثاني 2018 وكان يتناول موضوع "الموسيقى، علم أم فنّ؟" لطالما أثار هذا السؤال الجدل فكان بديهياً أن نطرحه ونحاول مقارنته من النواحي الموسيقولوجية والموسيقية. غير أنّ المقالات التي اقترحت علينا حول هذه المسألة لم تكن بالجودة المطلوبة أو لم تتوغّل بجدية في الموضوع؛ الأمر الذي يدلّ أنّ التساؤلات المعروضة في ملفّ أمين بهم في (العدد 5) حول الاستشراق في علم الموسيقى لم تُثر مع الأسف تحرك أو ردّة فعل في الوسط الموسيقولوجي. إنّنا نثق في نيمو بضرورة إعادة النظر الجذرية في المفاهيم الموسيقولوجية الحالية.

يحتوي العدد الثامن (تشرين الثاني 2019) ملفاً وحيداً لـ **أمين بهم** (Amine Beyhom) "فنّ المقام المفقود" (The Lost Art of Maqām) وهو تكملة لمقاله "أدوات تحليل المقام من أجل مشروع تحليل الموسيقى المتحرّكة بالفيديو" (MAT for the VIAMAP) المنشور سنة 2018. يتضمّن هذا الملفّ 4 تحليلات فيديو لموسيقى المقام. يعالج الجزء الأول منه 3 تحليلات فيديو قام بها مركز CERMAA وهي معروضة بشكل ترتيبي للمعرفة (لا لأداء الفنّانين) وتغطّي أوجّها متعدّدة من المقام. ومن ضمن هذه التحليلات، نعرض على القارئ أوّل تحليل بالبعد الثلاثي (3D) وهو تقسيم على مقام الحسيني من أداء نيزن توفيق (Neyzen Tefvik).

تفسّر التحليلات الثلاث الأولى من الملفّ أوجه عدّة ومهارات فنيّة يقوم بها المغنية إيفلين داود (Evelyne Daoud) والموسيقيين نيزن توفيق (Neyzen Tefvik) وحمدي مخلوف (Makhlouf Hamdi) بينما يركّز الجزء الثاني من الملفّ على قصيدة "يا نسيم الصبا" (Yā Nasīm a-ṣ-Ṣabā) بصوت الشيخ علي محمود (Alī Maḥmūd) يرافقه عازف الكمان سامي الشوا (Sāmī a-sh-Shawwā)، وهي مثال مميّز لفنّ المقام في ذروته بداية القرن العشرين. تطلّب إتمام تحليل هذه المقطوعة تنفيذ العديد من التقنيات

الدقيقة مع الحفاظ على جودة صوت التسجيل، مما أظهر أهمية هذه التسجيلات التاريخية في عملية فهم المقام. أما المقطوعات المُحلّلة في الجزء الأول، فكانت تمهيداً وتأكيداً أنّه من الممكن تفسير الموسيقى بواسطة تحليل الفيديو الذي طوّره أمين بهم مع فريق عمله، على خطى وتقنيات وُضعت في خمسينات وستينات القرن الماضي من قبل علماء موسيقى مثل شارلز سيجر (Charles Seeger). ننوّه هنا بأنّ البحث الكامل حول القصيدة وتحديدًا حول شعرها (تأليف الشيخ محمود الشهبّال في طرابلس – لبنان) ومضمونها موجود في بداية الجزء الثاني من الملفّ.

كما يسرّنا أن نقدّم للقراء في خضم هذا العدد الثامن من نيمو-أونلاين، السلسلة الأولى من مراجعات الكتب والأقراص المدمجة ونعرض كتابين وقرص مدمج:

- **Avra Pieridou Skoutella** : *Small musical worlds in the Mediterranean: ethnicity, globalization and Greek Cypriot children's musical identities*, Ashgate |Farnham, Surrey ; Burlington, VT, 2015|.
- **Jean-François Goudesenne** : *Émergence du chant grégorien : les strates de la branche Neustro-insulaire (687-930) – Tome I. Étude historique et philologique, Tome II. Annexes, planches et édition*, MŪSAM (MUSICALIA ANTIQUITATIS & MEDII AEVI) 2 vols., Brepols |Turnhout (Belgique), 2018|.
- **Melpe Merlier** : *'and let us sing in praise' – Byzantine Hymns recorded in 1930 by Melpe Merlier*, EDO (HERE) |Athens and Volos (Greece), March 2000|.

نيمو-أونلاين عدد 9

لم يتقيّد العدد التاسع بموضوع معيّن لكنّه يحوي مقالا مميّزا من عائلة الكتابات الإحصائية حول موسيقى المقام، تحت عنوان "البحث عن أفضل نظام نغمي من أجل تحقيق مشهد صوتي تركي أصيل" من تأليف **أوزان يرمان** (Ozan Yarman). تتناول هذه الدراسة نتائج مقال شارك المؤلّف بكتباته سنة 2009 وبنيت عليه محاولات لإيجاد التعديل الأنسب لآلة القانون، فيقدّم للقارئ العدد الأقصى لدرجات سلّم الموسيقى التركية العائدة للمقامات التي درسها.

كما يتابع أمين بهم في هذا العدد التفكير في مسألة الاستشراق في علم الموسيقى ويشرح في ملقه "هل كان العود العربي مقسوم الزند؟" المحاولات الموسيقولوجية الغربية لتحويل العود العربي منذ بداياته إلى آلة ذات دساتين.

*
**

يتساءل الناشر حول التراجع الفكري الحالي للموسيقولوجيا في العالم. ونحن نعتقد جازمين بأن السبب، بكل بساطة، هو مواصلة هذا العلم لنفس المنوال الفكري وترويجه للمحافظة على نفس المفاهيم العرقية الموجودة في النظريات الموسيقية، بينما تتحرك الموسيقولوجيا الأميركية والانجلو-سكسونية للتخلص من "هيمنة الأبيض" وتقوم بنقد ذاتي تلحقه بتأسيس جديد لاختصاصاتها ولسبل محقة في استعمال القوة الاقتصادية والأكاديمية.

نؤيد في نيمو بجدية الإصلاح الشامل للموسيقولوجيا والاتنوموسيقولوجيا، للنظريات الموسيقية ولتاريخ الموسيقى، من أجل إزالة التفكير "المهيمن الأبيض" من هذه الاختصاصات وأيضاً من أجل إقرار الاستشراق الموسيقولوجي بالأضرار التي سببها للموسيقى والموسيقولوجيا في بلاد الشرق الأدنى والأوسط.



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Dossier:

THE LOST ART OF MAQĀM

With four video analyses of performances by Evelyne Daoud, Neyzen Tewfik, Hamdi Makhoulf, and by ‘Alī Maḥmūd and Sāmī a-sh-Shawwā

Amine Beyhom*

INTRODUCTION

This article is a sequel to the dossier “MAT for the VIAMAP”¹ published in NEMO-Online in November 2018. A few VIAMAP video analyses have since been published on the website of the CERMAA, namely – and chronologically:

- “*Paotred er gueù à bleuigner*” performed (2003) by Jorj Botuha²
- “*Greis mad pier gali galan*” by the same performer³
- An improvisation for the ‘ūd played in *maqām Šabā* by Hamdi Makhoulf (Ḥamdi Makhluḥ)⁴
- “*Akh tagorye h’ashyrie*” (Syriac Orthodox Chant) sung by Evelyne Daoud (Evlin Dāwūd)⁵

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¹ “*Maqām Analysis Tools for the Video-Animated Music Analysis Project*” – [Beyhom, 2018b]. (Note that all the author’s writings – except for the book on Byzantine chant – are available for free download at <http://foredofico.org/CERMAA/publications/publications-on-the-site/publications-amine-beyhom>.)

² Available at <http://foredofico.org/CERMAA/archives/1167>, referenced [Beyhom and CERMAA, 2018a].

³ Available at <http://foredofico.org/CERMAA/archives/1198>, referenced [Beyhom and CERMAA, 2018b].

⁴ Available at <http://foredofico.org/CERMAA/archives/1238>, referenced [Beyhom and CERMAA, 2018c].

⁵ Available at <http://foredofico.org/CERMAA/archives/1273>, referenced [Beyhom and CERMAA, 2019a].

- Two 3D video analyses featuring 3D techniques:
 - An alternate take of Hurrian Song No. 6⁶ sung by Lara Jokhadar⁷
 - A *Huseynî Taksim*⁸ performed by Neyzen Tevfik⁹

Each of these videos features additional techniques for the analysis – and for the presentation of the results. Only the three analyses related to *maqām* music (the third, fourth and sixth listed above) are proposed in the first part of this dossier, following an order of growing complexity of the analysis (but not of the performance).

However, none of the aforementioned six analyses, and likewise none of the 44 video analyses previously published by the CERMAA has necessitated as much time, details in the analysis, and research – were it upstream or downstream – as the *qaṣīda* “*Yā Nasīm a-ṣ-Šabā*” performed by *Shaykh* ‘Alī Maḥmūd and violinist Sāmī a-sh-Shawwā in 1927 and proposed in Part II of this dossier.

While the analyses in Part I unveil the skills of exceptional performers in the *maqām* realm, Maḥmūd’s and a-sh-Shawwā’s performance¹⁰ take us to heights of mastery and complexity which seem difficult to reach today, and gives a unique example of the Art of *maqām* as it came to be fully developed towards the beginning of the 20th century.¹¹

* * *

⁶ A first take – [Beyhom, 2018a] – was analyzed for the aforementioned “MAT for the VIAMAP”.

⁷ Available at <http://foredofico.org/CERMAA/archives/1433>, referenced [Beyhom and CERMAA, 2019b].

⁸ The transliteration of Turkish terms is kept as is from the original published CD.

⁹ Available at <http://foredofico.org/CERMAA/archives/1386>, referenced [Beyhom and CERMAA, 2019c].

¹⁰ An early release of the video analysis of this performance was planned for the 29th Conference on Arabian music organized by Dar al-Opera in Cairo in November 2019; due to the revolt in Lebanon (starting 17th of October and ongoing as I write these lines), this public preview had to be cancelled.

¹¹ See the introductory paragraphs for both Part I and Part II. The Video analysis is available at <https://youtu.be/et4iT3HLxno>.

Preliminary notes and conventions for the graphic representations of melodic contours and sound intensity in the proposed video analyses

In all 2D graphic analyses of the VIAMAP, the pitch contour is shown as a black broken line,¹² with the relative intensity – when present – shown as a brown(ish) semi-transparent line. Score scales for *maqām* analyses – when present – are based on the conventional quarter-tone division (half-flat “♭” and half-sharp “+” accidentals).

Two special terms are used to qualify scales and the music:

- *Semi-tonal* polychords or scales are based on a division of the octave in 12 semi-tones – An over-simplified representation for such scalar elements would be the equal-tempered common scale of Western music.
- *Zalzalian* scales and polychords are based on the non-tempered use of the vertical melodic (musical) space – An over-simplified concept of *zalzalism* presents it as based on the quarter-tone division of the octave, with *zalzalian* intervals being odd multiples of a quarter-tone (mainly three-quarter-tones and five-quarter-tones intervals).

Digital (numerical) representations of scales are proposed in multiples of the approximate quarter-tone, but can also be composed – for semi-tonal scales – of multiples of the semi-tone. For example, the Western “major” scale can be represented as a suite of seven digits 2212221 in multiples of the semi-tone, and as 4424442 in multiples of the quarter-tone.

In the semi-tonal representation, this corresponds to (for example) $c\ 2\ d\ 2\ e\ 1\ f\ 2\ g\ 2\ a\ 2\ b\ 1\ c'$ with the interleaved numbers corresponding to the intervals (represented by the number of semi-tones they contain) between the successive pitches of the scale. This scale cor-

responds to $c\ 4\ d\ 4\ e\ 2\ f\ 4\ g\ 4\ a\ 4\ b\ 2\ c'$ in the representation based on multiples of the quarter-tone – which is the main one used in the VIAMAP video analyses.

Graphic scales are based on the same intervallic division and feature to the left (and in the intermediate column) the names of the degrees of the scale (Fig. 1). These names follow the author’s proposed solmization in 2012¹³ namely, for the main degrees of the scale of *maqām Rāst*: $rā = RĀST = c$, $dū = DŪKĀ = d$, $sī = SĪKĀ = e$, $ja = JAHĀRKĀ = f$, $na = NAWĀ = g$, $ḥu = ḤUSAYNĪ = a$, $aw = AWJ = b$ and $Rā = KIRDĀN$ ¹⁴ = c' (C).

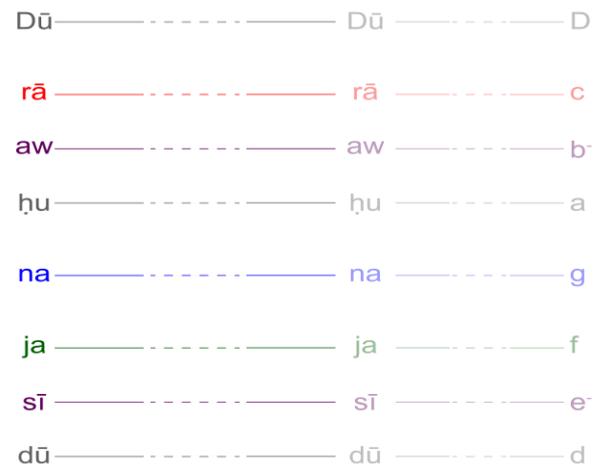


Fig. 1 Typical graphic scale used for the video analyses of *maqām* music in the VIAMAP, here from d to D . (Partly dashed lines are substituted to the wider lines of the effective scales used in the videos; the scale and note names to the right side are dimmed.)

In literal explanations above, note names are italicized. The tonic is – always – relative while note names change their initial letter with the change of octaves. Intermediate notes (called ‘*arabāt*’) are likewise given corresponding solmization syllables. (FHT 1:56 for these and for detailed explanations about the solmization.)

As a short reminder, the analyses of the VIAMAP series are animated with moving graphs and (moving or) fixed cursors. In the 2D analyses, the screen is divided

¹² This changes in 3D and multi-parts analyses as different colors are needed to differentiate supplementary elements of the analyses.

¹³ The basis of the solmization was proposed in [Beyhom, 2012, p. 68]. It was further developed in FHT 57 p. 245 in the article “MAT for the VIAMAP” by the author/editor – downloadable [here](#), and is further detailed in FHT 1:56 in this dossier.

¹⁴ The denomination of this degree varies: it can be found as *KARDĀN* – and I used it thus in previous writings and analyses – and *KOURDAN* (Turkish – probably *KURDĀN* in transliteration) in (al) Faruqi’s *Annotated Glossary* [Al Faruqi, Racy, and Randel, 1981, p. 139]. Further linguistic research shows that the right name for the upper octave of *RĀST* would be *KIRDĀN*. (See <https://www.almaany.com/ar/dict/ar-ar/کردان/>, accessed 19/09/19.)

in two horizontal stripes (Fig. 2 and FHT 3:58) with the upper stripe showing a large scale view of the graphic analysis, while the lower stripe shows a more detailed view depicting approximately one sixth of the time span in the upper view.

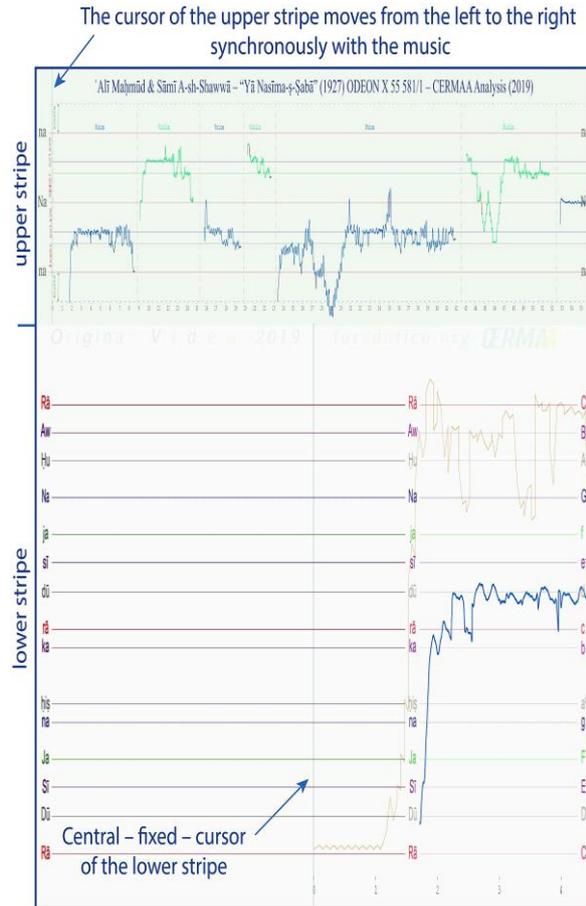


Fig. 2 First frame of the video analysis of “*Yā Nasīm a-ṣ-Ṣabā*” by performed by ‘Ali Maḥmūd and Sāmi a-sh-Shawwā with explanations. (Equivalent to FHT 3:58, here shrunk horizontally to fit within the column.)

In the upper view, the cursor moves – generally¹⁵ – from the left to the right synchronously with the music (and with the upper graphic which moves synchronously from right to left¹⁶), whenever in the lower view, the – Central – cursor is fixed while the graphic moves

¹⁵ Right to left (“Arabic”) versions were produced to demonstrate the possibility of undertaking them with the currently existing tools.

¹⁶ From the right to the left in the “Arabic” versions.

¹⁷ The upper stripe is standard for 2D analyses of the VIAMAP: it allows for a wider view of the graphic analysis. In 3D analyses, the point of view of the observer can be changed in order to similarly have a wider view of the analysis – or also to concentrate on particulars of the performance – which makes the upper stripe superfluous.

steadily – and synchronously with the music – from right to left.

The color code for graphic scales used by the author for previous analyses is used as a standard procedure in the upper stripe – when present¹⁷ – which features a division of the vertical space based on the tonic and its octave (red horizontal lines, plain for the tonic), the fourth (green – sometimes dashed – line) and the fifth (blue – sometimes dashed – line). (This can be modified, adapted or extended according to the specificities of each analysis as shown in Fig. 3.)

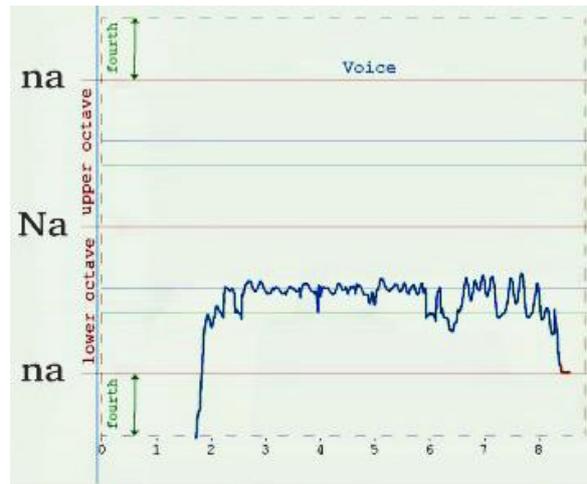


Fig. 3 Detail from FHT 3:58 (unshrunk left upper corner of Fig. 2) showing the division of the vertical space with horizontal lines following the color code proposed by the author, namely: red for the tonic (central *Na*) and its octave(s) (*na-na*), green for the – ascending – fourth(s) and blue for the – ascending – fifth(s), delineating here a near three-octaves span. (The blue vertical cursor is here slightly displaced to the left for a better view of underneath positioned details.)

The same color code is used – in an adapted form – in the lower stripe, but with $rā = c$ being the tonic (red line) whatever the ongoing *maqām* is.¹⁸ (Fig. 1)

As was the case with previous analyses of the VIAMAP and in the general view, the graphic scale moves – slightly, and only when needed – vertically to

¹⁸ This is kept unchanged from one analysis to the other for the sake of continuity, on one side, and within the same performance, on the other side, because changing the colors of the graphic scale with the changes of tonic could (1) have a disturbing effect on the viewer – because of a possible loss of visual bearings – and (2) because this would require a considerable amount of supplementary editing.

better approximate the changes of the pitch of the tonic, mainly for singers.

FURTHER NOTES

In the literal descriptions and explanations – be these superimposed to the graphic analyses or in the text, the timing for the analysis (the row of numbers below in the lower stripe – Fig. 2 and Fig. 4 – and for most analyses in the upper stripe – Fig. 3) is conventionally given as “s_a” = “seconds of Analysis time”. Video time is different as the analysis is always preceded by an introductory part, which compels to differentiate video time (in seconds) as “s_v” = “seconds of Video time”.

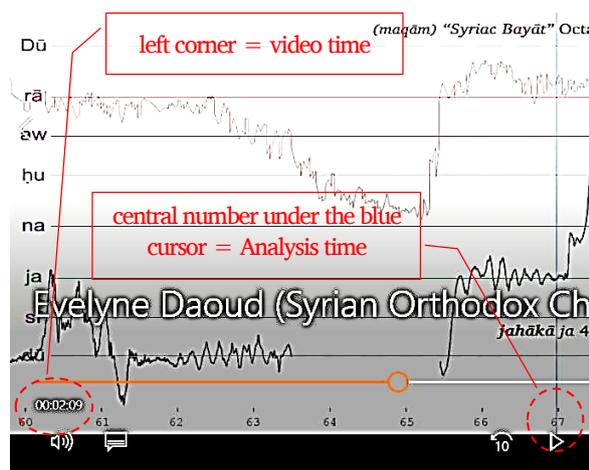


Fig. 4 Detail from a snippet view of the video analysis of the *takhshefto* (supplication) “*Akh tagorye h’ashyrie*” (Syriac Orthodox Chant) performed by Evelyne Daoud as shown by the Windows 10 standard video reader.¹⁹

In order to differentiate homonymous names of *maqām(s)* from degrees of the scale and from *genē* (called *ajnās* in Arabic – see FHT 2:57), upper and lower cases lettering differentiates (the scale of) for example *maqām Rāst* (initial uppercase, 4334433 in multiples of the approximate quarter-tone) from the (pitch) tonic *RĀST* (uppercase) and the tetrachord (or *genos* or – Arabic – *jīns*) *rāst* (lowercase, 433 in multiples of the quarter-tone).

¹⁹ Video time is shown in the left bottom corner (00:02:09 = 129 seconds = 129 s_v in the convention used within the VIAMAP); Analysis time is shown in the lower row with the time of the current frame marked by the number under the – or closest to – the blue (still) vertical cursor, i.e. here 67 seconds = 67 s_a.

²⁰ A table of the main polychords used in *maqām* music is provided in FHT 2:57.

In both literal analysis and annotations to the graphic analysis numbers between brackets are additional bordering intervals used (or neglected) in the performance: for example, a *rāst* tetrachord²⁰ on *NAWĀ* = *na* will be noted *na* [3]433[4] – with digits expressing successive multiples of the quarter-tone – if the performer uses one-interval extensions for the original tetrachord *rāst* 433 on *RĀST*.

The rest note of the tetrachord is always *na* but the performer may use a lower (“leading”) interval of one tone (“4”) between *f* and *g*, and a higher one-tone interval between *Rā* = upper *RĀST* = *KIRDĀN* = *c’* or (*C*) and *Dū* = upper *DŪKĀ* = *d’* (or *D*). In a similar way, a *hijāz* tetrachord on *DŪKĀ* = *dū* will be noted *dū* 26[2] if the performer *does not* use the upper semi-tone of the original tetrachord *hijāz dū* 262 (the “[2]”) in the described performance.

In another example, a *hijāz* tetrachord on *DŪKĀ* = *dū* may be noted *dū* [2]262[4] if the performer uses one-interval extensions for the original tetrachord *hijāz dū* 262. The rest note of the tetrachord is always *dū* but the performer may use a lower interval of one half-tone (“2”) between *c#* and *d*, and a higher one-tone interval between *na* = *NAWĀ* = *g* and *hu* = *HUSAYNĪ* = *a*.

A similar example featuring the graphic representation of a *maqām Sīkā* performed by ‘Alī Maḥmūd is shown in Fig. 5.



Fig. 5 Detail from a frame of the video analysis of *Yā Nasīm a-ṣ-Ṣabā* (see Part II) around 99 s_a.²¹

²¹ The performer – here *shaykh* ‘Alī Maḥmūd – uses only part of the upper scale (the upper interval “[3] between *Dū* = *D* and *Sī* = *E* – which complements the octave *e_-E* – is not used) and uses a near-instantaneous lower pitch *dū* corresponding to the bottom of the (three-quarter-tones interval represented by the) initial “[3]” for the interval *dū_sī* = *d_e*.

PART I: THE MANY SUBTLETIES OF MAQĀM MUSIC

“Three Arabian musicians, a Moroccan nāy-player²², a Syrian kamān-player²³, and an Egyptian ‘ūd-player, meet.

Bragging about his skills the first says:

– Yesterday I played a *taqsim*²⁴, at Salle Pleyel in Paris. It lasted half an hour and blew the crowd away for twenty minutes.

The Syrian retorted:

– A week ago, at the Albert Hall, I played such a sublime one that the god of music came down to the stage and told me: ‘You are the best *kamān* player in the world!’.

Suspiciously, the Egyptian ‘ūd-player asked: – Did I really say that?”

[in Philippe Vigreux, “Centralité de la musique égyptienne”]²⁵

The realm of *maqām* music stretches from Spain to India, and from Central Europe to Central Africa. This music is far from being monolithic, and declinations all over the vast surface for which this music is – more or less – characteristic are countless.

More specifically, however, “*maqām*” pertains to Art music as it was performed in city centers, at the courts of

the Caliphs – why not? – or of local potentates – also called “Emirs” – and in the houses of rich merchants and other various patrons and benefactors of the arts.

Despite its abundantly described refinement and effect on the affect of listeners²⁶ – and until the 18th century, this art was predominantly transmitted in Aural form, notwithstanding scarce attempts at giving it a (pseudo-) scientific – or theoretic – justification,²⁷ or at setting down in writing its volatile content.²⁸

In the 19th and 20th centuries, and in parallel with the growing influence of Western nations on the countries previously under – or soon to be free from – Ottoman rule or influence, a boom of musical creativity took place²⁹ which resulted, on one hand, in an increased complexity of the compositions in this music, together with the irruption of Western music and musicology in the musical circles of these countries.³⁰

Most of the music in the area shifted from Aural to written teaching, using mainly western terminology and concepts to explain, evidently, the inexplicable. This resulted in new trends³¹ of westernized music which coexisted with further refinements of the early traditions and, somehow, today, in a sharper division between religious and secular musics, with the religious mostly refusing the latter qualification for their chant,³² and with the

²² A reed flute used commonly in *maqām* music.

²³ In this context, a western violin.

²⁴ The *taqsim* is an improvised – usually solo – musical piece mainly played as an introduction to a – mostly sung – composition/*maqām*. It has become today – for the most part influenced by the “Iraqi School” of Brothers Jamil and Munir Bashir – a musical form by itself, performed mainly in concert halls. (See also in Part II the quotes from A.J. Racy explaining *taqsim* and *taqāsīm*.)

²⁵ Translated from [Vigreux, 1991, p. 28], who explains that this is a *nukta* (joke) which was still told (at the time of publication of his article) in musical circles of the *Maghrib* countries.

²⁶ Mainly in the 9th-Century *Book of Songs [Kitāb al-Aghānī]* of Abū-l-Faraj ‘Ali ibn Husayn ibn Muḥammad ibn Aḥmad ibn al-Haytham al-Marwānī al-Umawī (al-Qurashī) al-Aṣfahānī – See for example the Beirut edition [Aṣfahānī, 1990].

²⁷ Mainly in the writings about music of al-Kindī, al-Fārābī (Alfarabius) and ibn Sīnā (Avicenna) – Early and Golden Ages of Islam – then Ṣafīyy-a-d-Dīn al-Urmawī in the 14th-15th centuries, which all are based on Ancient Greek – and mainly Pythagorean – theoretical descriptions of music.

²⁸ Two inconsequent attempts by (al-) Kindī and (al-) Urmawī. (See also previous footnote.)

²⁹ See notably (in French) [Vigreux, 1991, p. 3] for the technical aspects of this development of music in Egypt, and notably in *inshād*.

³⁰ This aspect of musical and musicological Orientalism is documented in [Beyhom, 2016]; concerning more specifically the influ-

ence of western music on the teaching of music in Egypt: “Institutionalized learning of music was introduced in the 1820s and 1830s by the Albanian ruler Muḥammad ‘Ali (r. 1805-1848), who founded five schools of Western military music where Italian and French instructors taught young working-class Egyptians band instruments and the rudiments of Western notation and theory. These schools introduced Western notation and inaugurated a tradition of Western-style military music in Egypt, supplying trained musicians to military bands, orchestras, and music institutions. In the twentieth century, Arab and Western ‘art’ music learning was institutionalized, and Western music was incorporated as a basic component in the training of Arab musicians. In addition, the use of Western notation and solfège for the teaching and performance of Arab music became pervasive” – [El-Shawan Castelo-Branco, 2001a].

³¹ The westernization of *maqām* music in the 19th and 20th centuries is documented in numerous writings – or even recordings with extended liner notes such as *Athar al-Gharb fi-l Mūsīqā al-‘Arabiyya [The influence of the West on Arabian Music]* [Sahhab, 1999] –, and notably for Byzantine chant in [Beyhom, 2015a; 2016]. (See also previous footnote.)

³² This is a constant attitude for sheikhs of the Muslim religion – for example – as a member of the CERMAA research center in Lebanon could experiment while trying to research Islamic chanting with local sheikhs. Note also that, at the 3rd *International Musicological and Psalitic Conference on Psalitic Art and Practice of Psaliti* – Volos, Greece (May 30 to June 2 2018), Jordan Banev, a Bulgarian cantor and musicologist, demonstrated with examples the intrusion of western musical

secular abandoning little by little the sung foundations of the art of *maqām* to replace them with instrumental performances³³ – or with “pop” Arabian singing.

While the concept of “Grand” (understand Western Classical) music pervaded the teaching – and the minds – in the various conservatoires of the region,³⁴ and while the art of *maqām* singing became a – nearly despised, but still worshipped by the masses³⁵ – sub-category of the “new”, written teaching of this art,³⁶ the ancient art of *maqām* slowly faded away, being kept alive in scarce pockets of resistance – notably in the religious chanting in both Islamic³⁷ and (Eastern)³⁸ Christian teachings.³⁹

“Arabian” music to be heard in the Arabian countries in the 1960s-1970s was already mostly hybridized, especially for the mainstream performances by Abd-al-

schemes in Byzantine chant and linked this influence to the fact that this chant was considered as “music”.

³³ (Sole) Instrumental music was reputed, still in the 11th century and in the writings of al-Ḥasan Ibn a-ṭ-Ṭaḥḥān [Ṭaḥḥān (ibn a-ṭ- ~ al-Mūsīqī), 1976; 1990] (himself a singer by trade), as the lowest form of musical art. (Personal communication by Rosy Beyhom.)

³⁴ Most of the “conservatoires” in the region were founded in the first half of the 20th century, and the first music schools relying on western notation and music theory as early as the 1820s in Egypt – see also [El-Shawan Castelo-Branco, 2001a] (quoted in footnote no. 30) and [Vigreux, 1991, p. 11]. A few more decades were however necessary before Egyptians would appreciate western music (in fact not before the 20th century according to [El-Shawan Castelo-Branco, 2001b, p. 611], notably when “[t]raining in Arab and Western music became a requirement for Egyptian musicians after the study of music was institutionalized in the 1930s” – [El-Shawan Castelo-Branco, 2001b, p. 612]; see also – in French – the very concise and documented [Roy, 1992]): “In 1840, in a survey of life in Egypt during Muḥammad ‘Alī’s reign, A. Clot-Bey—a French physician who was the head of the first Egyptian medical school—described Egyptians as indifferent to European military music and expressed his own skepticism about the utility of Western military music in an Egyptian context: ‘Our music does not affect Egyptians at all. Even the patriotic hymn Marseillaise... neither causes their hearts to vibrate, nor opens their chests, nor catches their attention. Requiring that Egyptians use our instruments and sing our hymns does not fulfill the aim of military music. Egyptians who faint with joy when they hear their own singers and instrumentalists are bored and upset when they hear European instruments and songs’” – in [El-Shawan Castelo-Branco, 2001b, p. 609].

³⁵ The frenzy generated by concerts of Abd-al-Wahhāb and Umm Kulthūm in their late period is a striking example of the survival – and at the same time of the evolution towards westernization – of the art of *maqām* singing in the modern era.

³⁶ The written – theoretical and notational – teaching is mostly based today on Western theory and terminology.

³⁷ This will be further expounded in the Introduction of Part II in this dossier.

³⁸ Mostly Orthodox, as Maronites and (Oriental, Melkite) Catholics integrated pop music and equal temperament in the liturgy – notably in Lebanon – beginning with the 1960s, and till today for parts of the liturgical service and chant. (This I know from personal experience.) Note

Wahhāb and Umm Kulthūm⁴⁰ in Egypt⁴¹, which took over the whole Arab world and sustainably changed not only the music, but also the very concept of it.⁴²

In parallel to this “Classical” Arabian music co-existed traditional, rural or Bedouin (or Gypsy) “Folk” music which was partly processed for Urban performance – and thus also hybridized –, or remained otherwise (more or less) “authentic”.

* *

The 1960s and 1970s were very interesting decades in the world, but also in the Arabian countries, and especially in the most – albeit superficially – Occidentalized country among these: Lebanon.⁴³

that the Maronites were, originally, Syrian Christians: “Some Chalcedonian Syrians, instead of becoming Byzantinized, formed another ecclesiastical unit in western Syria, with its leadership centered at the monastery of St Maron (d c410). Opinions differ as to whether they ever adopted the Monothelite heresy condemned by the Third Council of Constantinople in 681, but with the Muslim conquest they were driven into the mountains of Lebanon, where their descendants are known as Maronites. During the Crusades, in 1182, the Maronites affirmed allegiance to Rome and became a uniate rite, the only branch of Syrian Christianity with no interdenominational divisions” – [Husmann and Jeffery, 2001, p. 858].

³⁹ Note that even religious chant (see previous footnote) underwent changes, be it in Islamic chant or in Byzantine chant – the latter changes are abundantly explained in various writings from the author including [Beyhom, 2015a; Beyhom, 2016] (and a few presentations in Cyprus and Greece in 2018 and 2019, the proceedings of which are under publication).

⁴⁰ And the other Five of the “Great Seven” representatives of Arabian music – as they are called by Victor Sahhab in his homonymous book [1987, سحر] – namely Zakariyyā Aḥmad, Riyād a-ṣ-Ṣunbātī, Muḥammad al-Qaṣabjī, Sayyid Darwish and Asmahān. (See also “Stardom in Egyptian Music: Four Case Studies” in [Danielson, 2001].)

⁴¹ Not to forget composers such as Lebanese (but in the Egyptian “style”) Farīd al-Atrash and other composers, singers and musicians – for example ‘Umar Khūrshid (Omar Khorshid as he was commonly known – see notably [Wikipedia Contributors, 2019a]) who first introduced a fretted electric guitar in the Arabian “orchestras” and first launched the fashion of electrified “Belly Dance” music –, all of which were active in the Egyptian “Post-Renaissance”, a *de facto* westernization of the arts and, partly, of the mores.

⁴² About the cross-influences of music in the Arab world – and notably with Egypt – in the 19th and 20th centuries, see the vivid description (in French) by [Vigreux, 1991, p. 24–26].

⁴³ Egypt and Lebanon have today – as before – a peculiar relation in the field of music: “[Y]outh in Cairo have come to judge the authenticity of their Egyptian subjectivity against the political subjectivity of their elders’ generations, and the authenticity of their gendered, racial, and cultural subjectivities against those of the West and those of other Arab countries, most particularly Lebanon” – [Gilman, 2010, p. 7]. See also Chapter 4 [Gilman, 2010, p. 98–142] in this thesis about the – notably

It is in this country – even more than in Egypt⁴⁴ – that the most incredible cultural mix, which evidently included music, took place. It is this cultural mix that I grew up within, listening – mostly from what members of my family played on the turntable, or from the radio – to Abd-al-Wahhāb or Umm Kulthūm, or to Farīd al-Aṭrash and Abd-al-Ḥalīm Ḥāfīz and other representatives of the mainstream, but also to more specific singers such as Ṣabāḥ Fakhri or Nāzīm al-Ghazālī, or to even more “popular”⁴⁵ singer such as Samīra Tuwfiq,⁴⁶ or “local” such as Ṣabāḥ, Fayrūz, Wadī^c a-ṣ-Ṣāfi, and Lebanese urbanized Folk music by the Raḥbānī brothers or the less known⁴⁷ (albeit – most probably – musically more interesting) Zakī Nasif and the sublime Philemon Wehbeh, all these together with classical western music or the Beatles, the Rolling Stones and other mainstream pop bands such as Pink Floyd and CSNY⁴⁸, not forgetting French *Chanson* (or simply Pop), American and Bollywood Film music, Demis Roussos, Dalida and other Mid-Eastern “Mustafā(s)”⁴⁹ who all – composers and performers – contributed in shaping the musical panorama of these decades.

Growing in this maelstrom of musical influences doesn’t necessary help locals shaping a musical identity, and even less musical authenticity. The very concept of

“Arabian” music was – and still is – so blurred in the country⁵⁰ that even “Arabian” musicians performing “Arabian” (or *maqām*) music couldn’t describe or explain the differences between the music they performed and other musics of the world.⁵¹

* * *

While I was still living in Paris in the 1990s, and first trying to understand what characterizes *maqām* music from other musics, I became acquainted with Bernard Moussalli⁵² whose particular views on music and musicology impressed – and lastingly influenced – me. After a preliminary (and initiatory) tour of the musics of the world⁵³ – which I had to undertake for two years before he accepted me as his “apprentice” – came numerous and frequent sessions of listening to the recordings collected by Moussalli, during which I learned little by little to appreciate the various aspects of *maqām* (and other) music, and slowly came to understand the richness of its more authentic (*i.e.* less – or differently – hybridized) expressions.

Beyond my personal desire to recover an identity that I knew was lost,⁵⁴ or at least faltering, my – continuously

hilarious – competition in the minds (if not in the affect) of the young Egyptian generation between the (so superficially) “western, sophisticated” looks of Lebanese pop (Arabic?) singers (“Stars”) and the more conventional looks of Egyptian singers. (See notably [p. 117] this commentary by an Egyptian – female – writer: “Now, in Egypt, the beauty standards have been raised to a par that the more Lebanese you look, the more acceptable you are”, and this comment [p. 137] by Gilman: “Nowadays, Egyptians receive images and ideas through globalized capitalism, more than they export them. They get their beauty ideals from Lebanon now, and in some ways, perhaps, Lebanon has simply replaced France or England in this regard”, adding [p. 139], “[This] is an intensely regionalized phenomenon, and an intra-Arab world phenomenon. Egyptians receive these images from Lebanon’s video clips, which are populated with Lebanese stars and, in many cases, financed by entrepreneurs from Saudi Arabia and the Emirates. It is tempting to make the argument that at least some of the beauty ideals evinced in these Lebanese video clips originated in Western Europe and entered Lebanese society as part of French colonialism [...]”.)

⁴⁴ (See previous footnote) Egyptian and Lebanese musical soundscapes were shaped differently – although they influenced one another and still do – because of the geographical particularities, and because of the differences in sizes between the two countries. Egypt was for example more open to music from other North-African Arabian countries whenever Lebanon shared the same “Folklore” – differing from the Egyptian one – with Syria and Palestine. Moreover, and while the might of Egyptian surface and population gave it the upper hand in influencing other Arabian countries and exporting its music to those countries, Lebanese musical production was also well known, including in the Maghreb.

⁴⁵ In the sense that they perform “non-classical” Folk-like music.

⁴⁶ And other, less known interpreters of Folk songs such as the today nearly forgotten (female) singer Samra (“Samrā”).

⁴⁷ Internationally, but not necessarily locally.

⁴⁸ “Crosby, Stills, Nash and Young”, either the four together, in trio, in duo, or as solo performers with or without accompanying musicians.

⁴⁹ From the multilingual song “*Ya Mustafā*” (in Arabic يا مصطفى), apparently composed by Egyptian Musician Muḥammad Fawzī (1918–1966), and which became popular in Europe with its release by Egyptian singer Bob Azzam (of Lebanese origin, how not surprising), in 1960 in France – see [Wikipedia Contributors, 2018] and <https://www.youtube.com/watch?v=2pE0T07zs5s>.

⁵⁰ And in most countries of the *maqām* realm.

⁵¹ Arabic language, which was the last haven of Arab musical identity in these decades, was already being replaced – and not only in music – by a French-Arabic-Spanish-Italian (and also Greek) mix, and the musical language conveyed by popular performers in the Mid-Eastern region established a musical *lingua franca* which sustainably influenced subsequent music in the region. The last stronghold left to these musicians was the invented/adopted concept of the “quarter-tone” in Arabian music, which was – partly – a marker of superiority (over western music) in the same time as it “othered” Arabian music – See [Beyhom, 2016].

⁵² Who was – sort of – an arbiter of elegance of *maqām* music at that time.

⁵³ This included more traditional forms of *maqām* music, but also contemporary western music, Free Jazz and so on.

⁵⁴ In a country such as Lebanon, where all bearings are lost except for religion, tribal allegiance, power and money, most Lebanese who can

growing – passion for music, were it western, ethnic or more specifically *maqām*, led me soon after to abandon a career in “hard” sciences, then to the music production business, to finally become a musicologist the main aim of whom was to understand the specifics of the latter music and to explain them – if not to others then to myself.

However, while researching contemporary expressions of Arabian music and discussing with my (musicology) teachers, on one hand, and with performers and theoreticians of *maqām*, on the other hand,⁵⁵ I discovered the abyssal misunderstanding between the two worlds, together with the attempts at bridging this gap undertaken by, mainly, Tunisian musicology.⁵⁶

In what concerns the local “science of music” in the countries of *maqām*(ic) expression, as well as with representatives of the classical musicology and ethnomusicology, another deep misunderstanding lay in the concept of musical science as such.⁵⁷

Having a solid foundation in “hard” sciences, I experienced real difficulties in accepting the contradictory, inconsequent and highly volatile explanations provided by this “science of music”,⁵⁸ not only for specific characteristics of specific musics, but also about musical fundamentals such as the number of degrees of the scale and the sizes of the intervals that compose it – as one example among others.⁵⁹

At some point (at least a decade and a half ago), I realized that the available tools of (ethno-)musicology, were they auditory, written or graphical, would never suffice to explain *maqām* music in a satisfactory way. The double problematic of the loss of culture with local performers and theoreticians,⁶⁰ together with the invasion of

their music – and minds – by western terminology and musical concepts created a cultural gap that was becoming impossible to mend.

In other terms, while the pleasure of listening to recorded or live *maqām* music was still intact – and growing with the amount of listening to it and enjoying it –, a wall was still standing between pleasure and comprehension, thickened by the strata of theoretical discourses inherited from the musicology of Western music.

Years of further research were necessary before the alternate tools described in the – aforementioned – dossier “MAT for the VIAMAP” reached maturity and allowed me to discover and explain, notably in the past two years, some of the characteristics of this music that still remained unexplained – or unreachable with classical tools of (ethno-)musicology.⁶¹

The following analyses expound further some of these characteristics, beginning with simpler – but not least enjoyable – expressions of *maqām* music, and ending – in Part II – with the analysis of the most complex composition I met in my musical (and musicological) life, the aforementioned “*Yā Nasīm a-ṣ-Ṣabā*” performed in 1927 by *Shaykh* ‘Alī Maḥmūd and Sāmī a-sh-Shawwā.

* * *

look beyond this limited horizon experience a real difficulty in determining their belonging. (Note that the writing of this article began well before the 17th of October 2019 people’s revolt in Lebanon.)

⁵⁵ These “discussions” could also be undertaken, evidently, through the reading of specialized literature on the subject.

⁵⁶ Tunisian musicology, until very recently, remained however very dependent on French musicology which, in my view, is still today beset by the contradictions of the colonial and pre-colonial eras.

⁵⁷ If not in the concept of “music as science” (the main theme for this number of NEMO-Online) which has pervaded the minds of – among others – Arabian scholars, such as [Zakī and 1995, زكي, p. 9–10]: “**Music: Science, Art, Language.** Music is a science among humanities which is studied as any kind of education sciences is. Music has its own rules, theories and applications. This science has many branches that are of interest to whom wishes to study music: from a hobby perspective, professional study or learned amateur perspective. There are essential rules related to composition, instrumental arrangement, vocal arrangement and also what precedes those such as harmony [...], comparative

musicology, aesthetics of music, analytical history of musical forms ... and others”. As [Vigreux, 1991, p. 15] underlines: “[for Arabian] Modernist theoreticians, [...] traditional Arabian music is an obsolete form of music [...] and we find in many of their writings the idea that [a] music without harmony is a dead music form”.

⁵⁸ In fact, the more these musicological explanations relied on numbers and so-called mathematics, the more I realized that these were based on hollow ground...

⁵⁹ I have explored this and other similar problematics in my thesis [Beyhom, 2003b], but also in most of my subsequent writings, notably the last three articles for NEMO-Online [Beyhom, 2016 ; 2017 ; 2018b].

⁶⁰ This loss of culture had become so generalized that there existed no more guides which would help understand and analyze the music – or, when these guides still existed, they were obscured by the heavy influence of the theory of the “International [or ‘Global’, or ‘World’ – ‘*ālamīyya*] music” (which is how local musicians call western classical music).

⁶¹ See [Beyhom, 2018b] – Part III.

A. An analysis of “Akh tagorye h’ashyrie” (Syriac Orthodox Chant) performed by Evelyne Daoud

FOREWORD

While I was preparing a lengthy presentation in 2015 entitled *Paroles (et gestes) mélodiques dans les musiques d’Orient*,⁶² I used one of the tracks of the CD *Syrian Orthodox Church – Antioch Liturgy* (1983/1992) D 8039 Auvidis-Unesco (Fig. 6 and Fig. 7) as part of a four-tracks audio mix (see Fig. 8 and Fig. 9, and watch the video NO-5-8-1_AB_VS01-04⁶³) to show (1) the similarities between – at first sight (or rather “at first listening”) – seemingly very different musical cultures and (2) the virtues of heterophony as a unifying agent in *maqām* music.

The track I used featured a religious choir from the town of Qāmishli in Northern Syria (Fig. 10) the intrinsic heterophony of which was stunningly beautiful, if not unusual to my ears.

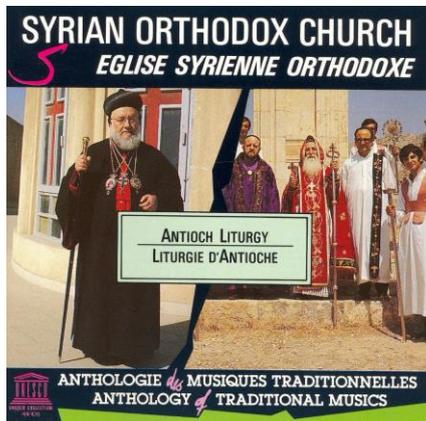


Fig. 6 Cover of the CD *Syrian Orthodox Church – Antioch Liturgy*, (1983/1992) D 8039 Auvidis-Unesco.⁶⁴

I had already been exploring, at that time, heterophony in solo performances of Byzantine chant⁶⁵ as a need for variation and embellishment of the melody. While listening recently once again to the tracks of this beautiful recording⁶⁶, I was delighted at the sumptuous⁶⁷ performance of one of the deaconesses and concluded that this

⁶² For the 3rd International Conference for the Analysis of the Musical Discourse in Sfax (Tunisia), March 30-31 and April 1st 2015.

⁶³ For: “NEMO-Online Vol. 5 No. 8, Article no. 1, Video-slides nos. 01 to 04” – Also available at <https://youtu.be/cxu74UuPmLO>.

⁶⁴ Retrieved from <https://www.allmusic.com/album/syrian-orthodox-church-antioch-liturgy-mw0000069908> – Analyzed track and liner notes courtesy of Smithsonian Folkways Recordings.

⁶⁵ [Beyhom, 2015a]. Note that a first attempt at recreating a – heterophonic, evidently – Byzantine chant choir was undertaken in this book, and further expanded in upcoming publications of the proceedings of

song was definitely worth a separate analysis to try to determine its particulars.

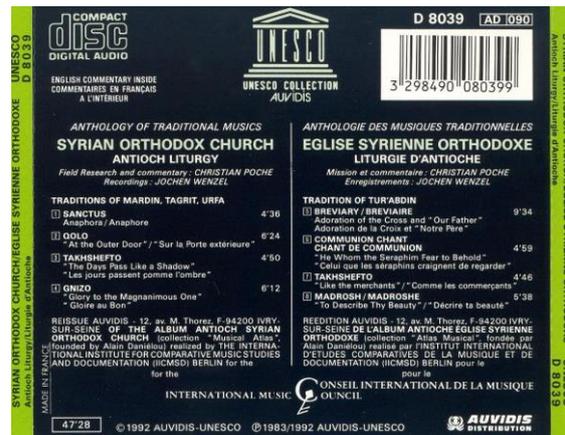


Fig. 7 Back cover of the CD *Syrian Orthodox Church – Antioch Liturgy* (1983/1992) D 8039 Auvidis-Unesco.⁶⁸

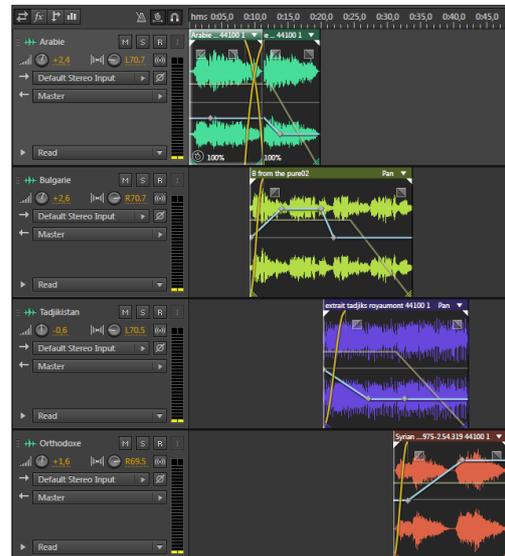


Fig. 8 Detail of the (Medley like) mixing panel for four extracts from different songs proposed at the 2015 Sfax conference (NO-5-8-1_AB_VS02).

The result is proposed in the video analysis of “*Akh tagorye h’ashyrie*” (Syriac Orthodox Chant) performed by Evelyne Daoud,⁶⁹ which was published on the YouTube

the *Modus-Modi-Modality* conference held at the European University of Cyprus – Nicosia (September 2017) and of the 3rd *International Musicological and Psallic Conference on Psallic Art and Practice of Psaliki* – Volos, Greece (May 30 to June 2 2018).

⁶⁶ Made by Jochen Wenzel, with liner notes by Christian Poché.

⁶⁷ According to the appreciation of friend and musicologist Jean During (personal communication).

⁶⁸ Origin as in previous footnote.

⁶⁹ See [CERMAA, 2019b] and [Daoud and CERMAA, 2019].

channel of the CERMAA⁷⁰, and posted with concise comments on the website of the research center.⁷¹

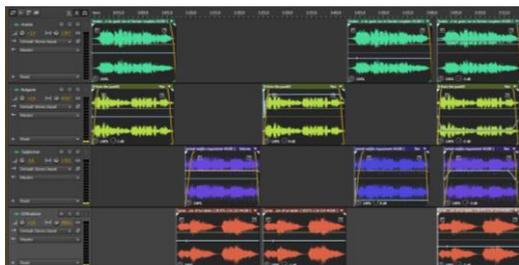


Fig. 9 A more elaborated mix of the four extracts of Fig. 8, likewise proposed at the 2015 Sfax conference. (NO-5-8-1_AB_VS03)

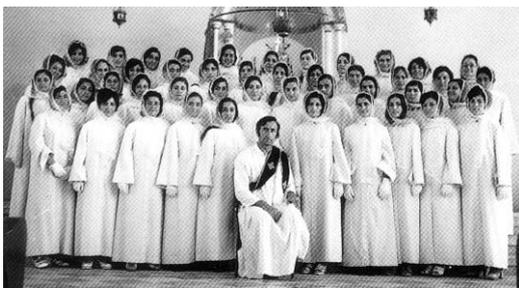


Fig. 10 A capella choir of deaconesses of the Church of the Virgin (Qamishli) and conductor Malfono Paul Mikhael.⁷²

PRELIMINARY RESEARCH AND EXPLANATIONS⁷³

The first information about the recording and the particular performance analyzed here came, as could be expected, from the liner notes of the CD:

“This is another *takhshefto* (supplication) based on the sixth mode⁷⁴ according to the tradition of Tur ‘Abdin [Ṭūr ‘Abdīn, طور عبيدين] (the equivalent of the *maqām ‘ajām*)⁷⁵ which, due to its melismatic character, does not function at all like a *qinto* [melodic style], but is rather in the spirit of the *maqām*”.⁷⁶

It should be first noted that the word *h’achiryē* in the title of the song is pronounced “*kashīrīh*” by the singer

⁷⁰ First uploaded 12/01/2019, updated as V. 1.1 22/01/2019: <https://youtu.be/hlwztzFrCtU>.

⁷¹ At <http://foredoifico.org/CERMAA/archives/1273>: Analysis and editing by Amine Beyhom. Note that this analysis is included under “*maqām*” and not under “Byzantine” analyses on the website of the CERMAA, due to the particular scale of the chant.

⁷² Detail from the back cover of liner notes SOC Auvidis D 8029 – Photo credit: Jochen Wenzel.

⁷³ Special thanks to Hamdi Makhlouf (Tunisia) and Saad Saab (Lebanon) for their insight for the *maqām* analysis, and to Aboud Zino (Lebanon) who kindly provided additional historical and descriptive material concerning this chant and the performer. More information about Syrian church music can also be found in [Husmann and Jeffery, 2001] – note that this chant is *not* limited to Syria, but originated in Southern Turkey and extends to neighboring countries (including Lebanon), and even to India as explained in [Palackal, 2004, p. 229]: “A unique feature

as can be read in the “Karshuni” (transliteration of Syriac in Arabic) version “*Akh tagorye h’achiryē*” (Fig. 12) listed as No. 419 in the book *The Bread of Life* published in 2002. (Fig. 11)

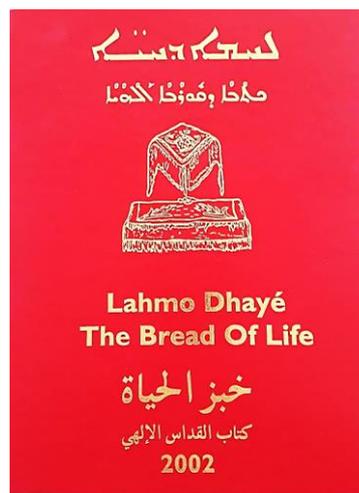


Fig. 11 Cover of the book Lahmo-Dhayé (*The Bread of Life*).⁷⁷

An Arabic translation (Fig. 13) is also provided in this book along with the original Syriac (Fig. 14). The English translation provided in the liner notes of the CD stands:

Like the merchants

Like the merchants, the martyrs entered into battle

They shed their blood in order to obtain spiritual wealth, in the manner of skilled merchants.

They bartered their lives for death, preferring torment to rest

They chose death rather than a short life

of the Christian music repertoire of South India is that it continues to preserve Syriac chants that originated in the Middle East. The liturgical traditions of the early Christians in Antioch (Antakya, in southern Turkey) and Persia (present-day Iran and Iraq) reached South India at various stages in the history of the St. Thomas Christians’.

⁷⁴ The sixth mode in the Greek-Orthodox tradition is a plagal mode, the scale of which is equivalent to the scale of *maqām Hījāz-Kār* (d 2624262 in an ascending scale expressed in – here concatenated – approximate multiples of the quarter-tone).

⁷⁵ The scale of what is otherwise (in Arabian conservatoire circles, or in modern theoretical descriptions) known as *maqām ‘Ajām* does not correspond to the scale used by the singer. (See the discussion about the scale of the performance farther.)

⁷⁶ [Saint Ephrem Church Choir, 1983, p. 5].

⁷⁷ Courtesy of Aboud Zino.

On the other hand, the web page featuring the extract of this song on the Smithsonian Folkway Records website⁸⁵ says that the original album was released in 1971 under the title *Ritual Chant and Music* with the catalog number UNES08103_114, as Track 14 (the caudal number 114 seems to indicate the CD number “1” and track number “14”) with duration 3:58 (m:ss), whenever the actual analyzed track has a duration of 4:50... (!) and that, moreover, the web page of the album⁸⁶ and the release tab⁸⁷ both list August 10, 1996 as the first release of this album?

When examining, however, more closely the identification numbers of the two CDs, common sense led me to conclude that track 14 in D 8103 was picked up from D 8039 (track 7), as the CD rank numbers indicate (8039 comes before 8103). Knowing that the back cover (last line) of D 8103 (Fig. 15) also states that recording copyrights (©) for this compilation range from 1971 to 1996, this would explain the confusion on the track page.

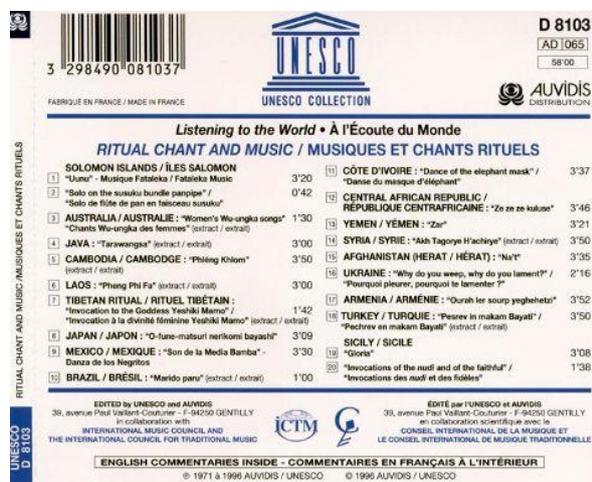


Fig. 15 Back cover of the CD *Ritual Chant and Music* (1996) D 8039 Auvidis-Unesco.⁸⁸

⁸⁵ “Smithsonian Folkways.” Smithsonian Folkways Recordings, accessed 18/12/19. <https://folkways.si.edu/evelyne-daoud/syria-akh-tagorye-hachiry-extract/music/track/smithsonian> accessed 18/12/23.

⁸⁶ <https://www.allmusic.com/album/ritual-chant-music-smithsonian-mw0000021870> (accessed 18/12/23).

⁸⁷ <https://www.allmusic.com/album/ritual-chant-music-smithsonian-mw0000021870/releases> (accessed 18/12/23).

⁸⁸ Retrieved from <https://www.allmusic.com/album/ritual-chant-music-smithsonian-mw0000021870> (accessed 18/12/23).

⁸⁹ [Husmann and Jeffery, 2001, p. 858].

ABOUT THE SYRIAN ORTHODOX – AND THEIR *OKTOËCHOS*

The “Syrian” (“Assyrian”) tradition is probably the most ancient one to have avoided Roman influences:

“The first Syrian rite to achieve its classic form was also the only ancient Christian liturgy to develop outside the Roman empire. It originated in the Sassanian or Persian empire further east, in the region of Mesopotamia or ancient Babylon (modern Iraq and Iran). It is of great interest to liturgical historians for its many archaic features, and because it is the most thoroughly Semitic (as opposed to Hellenistic) tradition of Christian worship. After the Council of Ephesus (431 CE) condemned the teachings of Nestorius, Patriarch of Constantinople, many of his supporters fled over the border into the Persian empire, so that the Church of this area came to be regarded as Nestorian by the Greco-Roman majority. Today, however, these Christians call themselves the Church of the East, or (unofficially) the Assyrian Orthodox, in view of their linguistic ancestry. Hence, [...], the liturgical tradition will be called ‘Assyrian’. Medieval Assyrian missionaries carried their faith along the Silk Route into Turkestan, India and Tibet, and even into China, where the famous Nestorian Stone remains a monument to their activity.”⁸⁹

As for the “Syrian” tradition:

“In 451 CE the Council of Chalcedon condemned the heresy that would become known as Monophysitism. The Latin, Byzantine and, eventually, the Georgian Churches opted for the Chalcedonian doctrine, but the Coptic and Ethiopian Churches rejected it, and they were ultimately joined by the Armenian Church. Syrian Christians who opposed the teaching of Chalcedon were eventually organized into a separate Church by James (Jacob) (Ya‘qūb al-Bardā‘ī, c500-78) and are thus colloquially termed ‘Jacobites’. They call themselves Syrian Orthodox.”⁹⁰

The liner notes of the CD are more specific – but barely – about the musical tradition of the (As-)Syrian church:

“The tradition of Tur ‘Abdin, tenaciously upheld in the Syrian border town of El qamishli (Syria), is a reflection of the remarkable golden age of Syriac, from which it has assimilated the various tendencies. The Syrian Church, as is the case for all the eastern Christian communities, groups its melodic styles (*qinti*) within an overall unit (*oktoëchos*, or set of eight modes),⁹¹ also

⁹⁰ [Husmann and Jeffery, 2001, p. 858].

⁹¹ “According to Aelred Cody, the system [of classifying melodies into eight categories, known by the Greek name *oktoëchos* (‘eight voices’)] originated in the Greco-Syriac linguistic frontier in Syria and Palestine as part of ‘a musical culture shared largely by both Hellenistic and Aramaean Christians’ [...]. After extensive research on the early history of *oktoëchos* in Syria, Cody concluded that ‘[t]here is really no evidence for the existence of an *oktoëchos* in any sense before the eighth century, or perhaps the seventh’ [...]. In doing so, Cody disqualified the widely-

known as *ikhadia*, and indicates the mode to be used for each Sunday of the year, rising every week by one scale degree. The Syriac word *ikhadia* was formed from the Greek *ikhos*, meaning “sound” and *athos*, meaning “chant”. It refers to simple melodic formulae which, by virtue of the historical developments, have begun to relate to the Arabic notion of *maqām*, without adopting all its aspects, however. The *bet-gazo*, or treasure of melodies, also known as *shimo*, or ferial breviary, is a compilation of non-biblical texts used as reminders for the deacons. In practice, it is impossible to generalize the use of the eight modes throughout the community. Experience shows that the *oktoēchos* varies in terms of the nomenclature of its scales according to province. It is as though a practice, patterned after the musical dialects stemming from local customs and usage, corresponded [...] to a universal theory of *oktoēchos*.⁹²

While the liner notes attribute a denomination ‘Ajām to the mode used for this chant, we will see that this is far from being as simple.

ANALYSIS OF THE TAKHSHEFTO “LIKE THE MERCHANTS” (“AKH TAGORYE H’ACHIRYE”)

This 45th video analysis of the VIAMAP series uses the original (published) recording – lasting approximately 4:50 seconds⁹³ – made in the town of Qamishli in North-eastern Syria. It features an introduction explaining the basics of video analyses for *maqām* music, concerning mainly the solmization (Fig. 16) and the scale (Fig. 17).

It also explains the functions of the two horizontal stripes, with more detailed (and animated) explanations for the color code used in the upper stripe (Fig. 18). It further provides a plot of the intensity of the sound in parallel (synchronously) with the plot of the pitch (Fig. 18 and Fig. 19).

The tonic, determined around 7 s_a (Fig. 20 and Fig. 21), rises slowly (and continuously) for a total (Fig. 22) of one half-tone.

held belief that Severus of Antioch (ca. 465-538) was the progenitor of *oktoēchos*, and that ‘the musical system of eight modes or the Byzantine liturgical arrangements of texts by mode or both were already in use in Antioch in the early sixth century’ [...] – [Palackal, 2004, p. 232]. Compare with: “Indeed, the Gregorian eight-mode system is directly related to the Syrian Orthodox system, even when the latter uses Greek terminology. In modern practice this system shows Arab and Turkish influence: Syrian church musicians freely admit this, claiming to be Christian Arabs. In order to discover whether the original Syrian system was identical with the Byzantine *oktoēchos*, or an indigenous system to

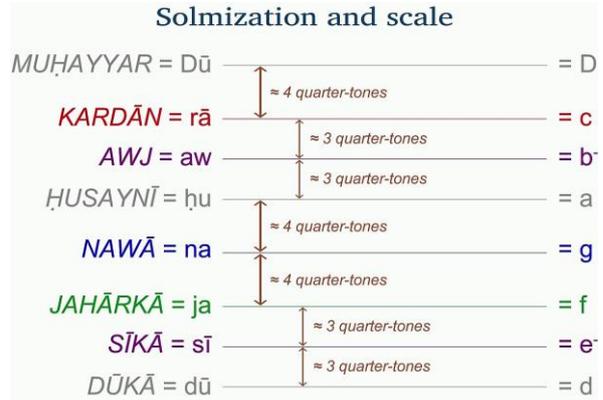


Fig. 16 Solmization and scale as shown in the introduction to the video analysis of the *takhshefto* “Like the Merchants” (“*Akh tagorye h’achirye*”) performed by Evelyne Daoud.



Fig. 17 Effective (non-dimmed right side of the) scale from *d* to *D* used for the graphic analysis.

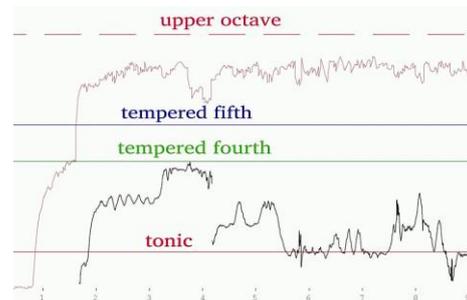


Fig. 18 Detailed graphical/literal explanations in the video about the color code used in the upper stripe. (The black broken lines reproduce the pitch while the maroon broken line represents the relative intensity of the sound.)

which Greek terminology was only superficially applied, it is necessary to attempt to distinguish the elements originally present in the repertory from those that derive from Arab and Turkish origins” – [Husmann and Jeffery, 2001, p. 860]. Such contradicting views (including Poché’s) seem to be the norm for the musicology of Eastern churches, notably Byzantine... (See [Beyhom, 2016].)

⁹² [Saint Ephrem Church Choir, 1983, p. 3].

⁹³ The recording in the analysis is trimmed – from the caudal silence – to 4:48 minutes, while the total time of the video is 6:17 minutes (372 s_v).

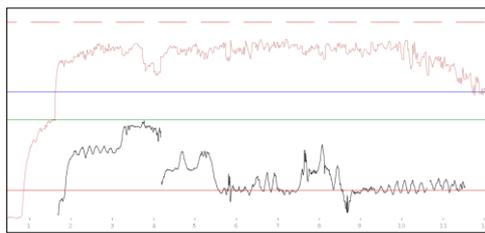


Fig. 19 Detail from the effective upper (Graphic) stripe (first 12 seconds) of the video with the pitch in black and the relative intensity in semi-transparent maroon.

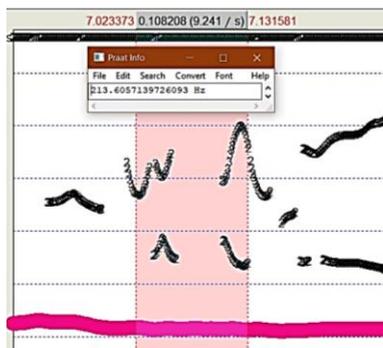


Fig. 20 Determination with Praat of the original tonic (around 7 s_a). (Detail)

LITERAL ANALYSIS OF THE PERFORMANCE

The whole performance spans one octave from *dū* to *Dū* and is based on three successive polychords, a *bayāt* tetrachord based on the tonic *dū*, a median *jahārka* trichord with *ja = JAHĀRKĀ = f* as a rest note, and a *rāst* pentachord based on *na = g (NAWĀ)*, with the three polychords delineating the general ascending scale of what I eventually called *maqām Syriac Bayāt*⁹⁴ (equivalent to the scale of *maqām Ḥusayni dū 3344334*).

The cantor begins with a jump of third from *dū* to *ja* slightly lower than the theoretical pitches corresponding to the first (more or less) stabilized tonic measured around 7 s_a. It rises then to *na* to complete the *jins bayāt* 334 on *dū* and concludes this introductory section of the first part on the tonic [end at 11.5 s_a].

Follow then [14-38 s_a] in a very linear manner a *jahārka* trichord *ja 44* with a brush of the *aw*, a *rāst* 433 on *na* with occasional brushes of the *ja* and a stop on *ja* for what may be understood as a transitory (and intricate) *jahārka 44* in trichord (skipped from the usual caudal semi-tone when tetrachordal) then by a conclusive *bayāt 334* on *dū*.

⁹⁴ See the discussion about the scale farther.

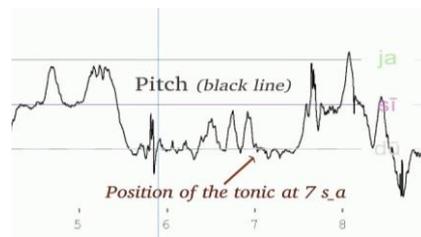


Fig. 21 Detail from the lower (Graphic) stripe of the video analysis showing the position of the originally determined tonic around 7 s_a.

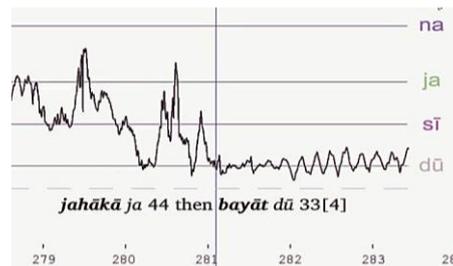


Fig. 22 Detail from the lower (Graphic) stripe of the video analysis showing a near half-tone difference – between the horizontal gray line of the *dū* and the lower, dashed gray line – for the tonic around 282.5 s_a when compared with the initial tonic (previous figure) measured at 7 s_a.⁹⁵

This first part is similarly concluded [40-53 s_a] by a *jahārka* trichord on *ja*, however interwoven with a *bayāt* trichord 33 on *dū*.

The second part [55-103 s_a] has a similar structure (as with the first part).

The third part [105.5-142 s_a] is initiated with a (near) jump of fourth on the (upper) *rā* and features a *jins rāst* 433 on *na* with a rest on this secondary tonic, the whole repeated once, followed after a silence directly by [144.5-193 s_a] a *jins bayāt* which announces the remake (here by the same performer) of Part 1, 3, and 1 [which become, sequentially, Parts 4, 5 and 6].

(Note a clear tendency to raise the final *na* for *jins rāst* on *na*.)

SOME EXPLANATIONS ABOUT THE SCALE (AND ITS DENOMINATION)

While named “*Ajam*” in the liner notes (see Poché’s explanations above), the scale seemed at first sight (listening) to be composed of two sometimes slightly shrunk *bayāt* tetrachords with a central disjunction – sometimes wide – and with a steadily rising tonic. This would have been equivalent to the scale of *maqām*

⁹⁵ Compare the position of the horizontal line of the *dū* with the position of the gray dashed line below.

Ḥusaynī, as explained for example under *maqām Bayātī* in Salīm al-Ḥilū's theoretical manual⁹⁶ and in Erlanger's Tome 5⁹⁷ and others...⁹⁸

It should be however here reminded that, while *maqām 'Ajām* is frequently today equated with *maqām 'Ajām-Ushayrān* with the scale b^b 4424442,⁹⁹ *maqām 'Ajām per se* (without the caudal *'Ushayrān*) may have an equivalent scale to *maqām Bayāt* (3344244)¹⁰⁰ but would be notably distinguished by the necessary use of a *'ajām* tetrachord (442) or trichord (44) on b^b and of a *jahārkā* tetrachord (442) on f . However, the use of $NAW\bar{A} = na = g$ as a secondary (if not first)¹⁰¹ tonic and the rare use of the upper $D\bar{U}K\bar{A}$ ($MU\bar{H}AYYAR$) = $D\bar{u} = D$ argue in favor of a tetrachord *rāst* (433) on $na = g$ (= $NAW\bar{A}$) instead of a *bayāt* (334) on $ḥu = a$ (= $HUSAYN\bar{I}$).

While a few *maqām(s)* do have such a configuration in the lower ascending octave, *maqām Ṭāhīr*¹⁰² seems to be another mode based on the tonic $d\bar{u}$ which has an identical ascending scale (in the lower octave) composed of tetrachords *bayāt* on $d\bar{u}$ and *rāst* on $na = g$, with an insistence on the central na . The descending scale of *maqām Ṭāhīr*¹⁰³ contains however a *būsālīk* (4 2 4) tetrachord, which eventually makes it a poor candidate for this performance.

Other *maqām(s)* which have a similar scale equally fail when comparing the polychordal structuring with the inner structuring of Daoud's performance, made up of (effectively) a lower *bayāt* tetrachord 3 3 4 on $d\bar{u} = D\bar{U}K\bar{A} = d$ (Fig. 25) and of a joint *rāst* tetrachord 4 4 3 on $na = NAW\bar{A} = g$ (Fig. 23), but with an intermediate trichord *jahārkā* 4 4 on $ja = JAH\bar{A}RK\bar{A} = f$ (Fig. 24).

This seems to indicate that this *maqām*, which – as aforementioned – I eventually called “Syriac *Bayāt*” (*Bayātī-Siryānī*), is specific to this particular tradition, or at least not of common use as I could not find an equivalent in the literature nor could specialists of Arabian music which I consulted¹⁰⁴ do so.



Fig. 23 Detail from a frame of the video analysis showing the clear use of the upper *rāst* tetrachord on na (= $NAW\bar{A}$ = g).

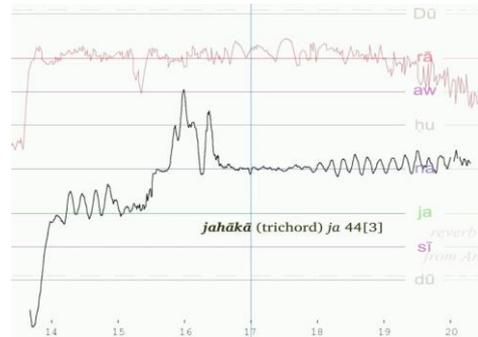


Fig. 24 Detail from a frame of the video analysis showing the clear use of the central *jahārkā* trichord on ja (= $JAH\bar{A}RK\bar{A}$ = f).

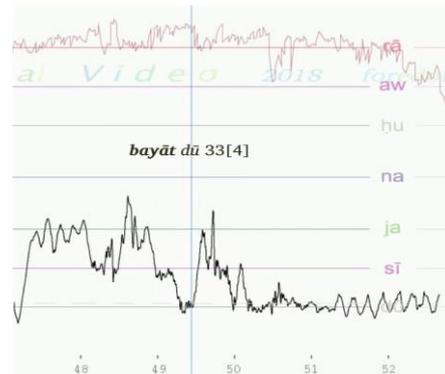


Fig. 25 Detail from a frame of the video analysis showing the clear use of the lower *bayāt* trichord on $d\bar{u}$ (= $D\bar{U}K\bar{A}$ = d).

⁹⁶ Mode no. 59 in [Ḥilū (al-), 1972, p. 118–119].

⁹⁷ Mode no. 57 in [Erlanger, 1949, v. 5, p. 240].

⁹⁸ See the scale (0,19,4,4,3344334) in the author's Ph.D. thesis [Beyhom, 2003a, p. 57].

⁹⁹ A further discussion of the differences between *maqām 'Ajām* and *maqām 'Ajām-Ushayrān* is undertaken for the analysis of “*Yā Nasīm a-ṣ-Ṣabā'*” in Part II.

¹⁰⁰ See the scale/mode no. 62 in [Erlanger, 1949, v. 5, p. 250].

¹⁰¹ In this case this is a “plagal” mode, but we have seen above (in the quotes from Husmann, Palackal and Poché – and upcoming quote for the first) that this would be most difficult to determine.

¹⁰² See scale/mode no. 72 in [Erlanger, 1949, v. 5, p. 270].

¹⁰³ Which is otherwise unknown to both Saad Saab and Hamdi Makhlof, i.e. not of common use today.

¹⁰⁴ Notably aforementioned Saad Saab and Hamdi Makhlof.

CONCLUSION

While the analysis of this song, if limited to the scale and *genē*, is straightforward, the particularity (and beauty?) of the performance also lies with the ample vibrato, combined with rapid alternations of pitches above and below the main melodic line which emphasize the expressivity of the – otherwise – simple melodic contour.

Note that the difficulties in determining the particular mode of this chant are not new to specialists of Syrian orthodox chant:

“A broader view of Syrian modality, based on analyses of large quantities of material, shows that a single modal name (e.g. 1st mode) may serve at different times and places for a number of different modes; these may be indigenous Syrian or Arab modes, and may exchange places. It shows too that the Syrian modes, like those of Gregorian and Byzantine chant, have notes with special functions, comparable to the finals and ‘dominants’ of medieval chant. Within a mode, the final and dominant can exchange places [...]. This exchange of functions occurs also in the modern Greek ecclesiastical modal system; in both cases it can be explained as the result of Arab influence [...]. Another variable factor in the modal system is that of ambitus. A single modal number may refer to scales with different ranges (e.g. mainly above, or mainly below, the final) even when the final remains the same. Thus in Syrian chant the ‘authentic’ and ‘plagal’ varieties of a mode may often be grouped as subdivisions of a single mode, rather than as two separate modes”.

The scale of the performance is, ultimately, very simple with no structural changes, and the complexity of the *oktoēchos* system(s) in Eastern churches should not prevent us, at least for this performance by Evelyne Daoud, from enjoying the sheer beauty of this chant and the sumptuous and delicately embroidered unwinding of the melody by this unique cantor.

* * *

¹⁰⁵ I use in this section the Turkish transliteration for names of persons and *maqām*(s).

¹⁰⁶ This was however the 47th video analysis to be made public – See [CERMAA, 2019a] (<http://foredoifico.org/CERMAA/archives/1433>) and [Kolayli, CERMAA, and Beyhom, 2019]. Turkish “*Neyzen*” means “Ney player”, and is equivalent to “*Nāyatījī*” in Arabic. (The same applies to other instruments and performers, such as “*ṭunburjī*” for a *ṭunbūr* player.)

¹⁰⁷ The last sequence of the video analysis, preceding the end credits, proposes the following text by the author (entitled “Imagine, a scientific fantasy”): “now imagine what it would be if we could... apply 3D graphic

B. Imagine: A Scientific Fantasy – or Video analysis from 2D to 3D on the example of a Huseynî Taksim performed by Neyzen Tevfik Kolayli¹⁰⁵

FOREWORD

This 46th video analysis of the VIAMAP series¹⁰⁶ features 3D graphic techniques as well as a short introduction explaining the scale used in the analysis. It is intermediate – for the complexity of the structuring scale – between Daoud’s and Makhlouf’s performances. It concerns – as with Makhlouf’s performance – instrumental music including, in this case, a harmonic accompaniment in the lower register played with a cello.

It is also a demonstration of some of the possibilities offered by 3D handling of graphic analysis of melodies,¹⁰⁷ on the example of a Huseynî Taksim performed by Neyzen Tevfik Kolayli (Fig. 26 and Fig. 27) and corresponding to track 11 on the CD 199 from Kalan Müzik, entitled *Hiç’in Azâb-ı Mukaddes’i – Neyzen Tevfik (2000-2001)*¹⁰⁸.

As for the performer:

“Neyzen Tevfik Kolayli was one of the most interesting and unusual personalities of Turkish Music, and is remembered as one of its ‘legendary heroes’. He was born in Bodrum on March 28, 1879, and died on January 28, 1953 in Istanbul, at the age of 74. His life was a series of adventures that might seem startling or at least incongruous to the common person. He might be found playing his ney one day in the Grand Vizier’s mansions with the repose of a king, and the next day on the street, a handkerchief spread out in front of him, playing for drinking money. [...] He was smitten at the early age of 7 by the voice of the ney, and was so bound by his passion for this voice that it was the most basic element of his existence. From surviving recordings, as well as awe-filled testimonies of those writers who heard him play, we can gain some idea of how that passionate bond moved him”¹⁰⁹.

analysis and animation to all aspects and characteristics of sound, stop, rewind, slow down the music and animation at will, zoom in, zoom out, keep selected characteristics and look up each and all details from the desired point of view and, finally, apply all these to the analysis of multi-part music with each part shown separately, or together with other parts...”.

¹⁰⁸ [Kolayli, Ergün, and Various, 2000], accessed 19/02/09. Note that a preliminary version of the video analysis was published privately February 8, 2019 on the YouTube channel of the CERMAA.

¹⁰⁹ [Kolayli, Ergün, and Various, 2000, p. 51, 53]: notes by Mehmet Ergün – Translated by Bob Beer.



Fig. 26 Tevfik Kolayli.¹¹⁰

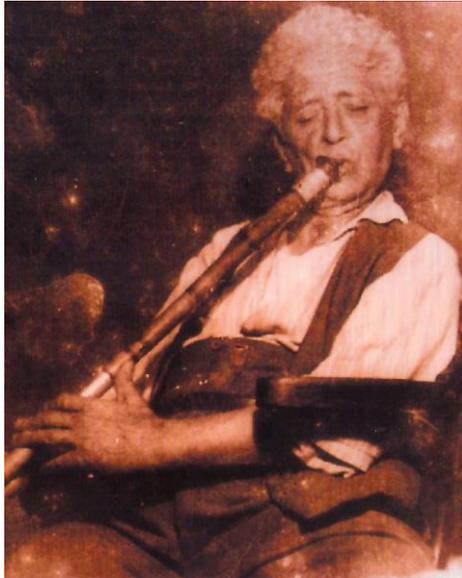


Fig. 27 Neyzen Tevfik performing.¹¹¹

NOTES FOR THE GRAPHIC REPRESENTATION

The pitch contour is – as for previous analyses in 2D – shown as a black broken line in the 2D analysis, while in blue(ish) color in the 3D analysis, with the relative intensity shown in both cases as a brown(ish), partly transparent line.

In the 3D analysis, the pitch and intensity contours are shown in two parallel planes (separate graphs for pitch and intensity – Fig. 32 and FHT 4:59)¹¹² with a corresponding cursor for each of them, while the graphic scale (Fig. 28) follows the same conventions as

for other video analyses of *maqām* music in the VIAMAP.

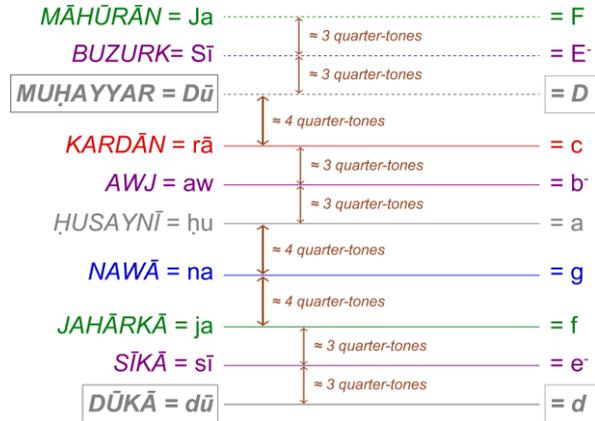


Fig. 28 Explanations about the graphic scale used in the video.

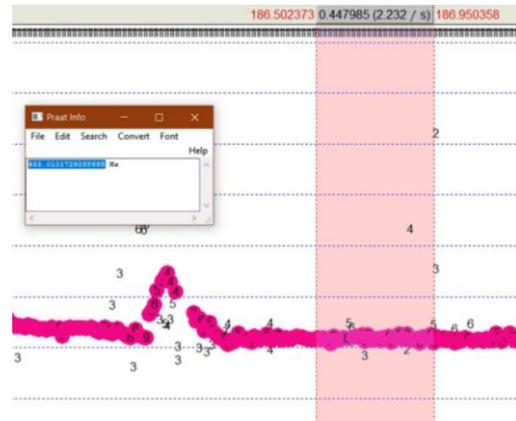


Fig. 29 Pitch of the End tonic determined with Praat. (Detail)

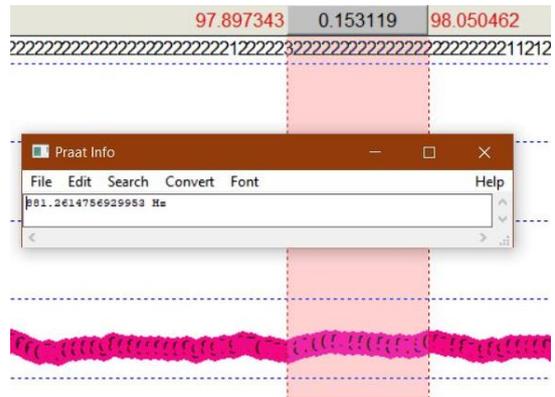


Fig. 30 Measuring with Praat the pitch of the upper (Octave) tonic. (Detail)

Similarly, the tonic (here also *dū* as for all three analyses proposed in Part I) is relative with note names undergoing a change of the case of the initial letter with

¹¹⁰ [Kolayli, Ergün, and Various, 2000, p. 13].

¹¹¹ [Kolayli, Ergün, and Various, 2000, p. 44].

¹¹² This is but one among numerous possible choices for 3D analyses.

the change of octaves. Intermediate notes (*‘arabāt*) are likewise given corresponding solmization syllables.

The first (post-introductory) part of the video shows some differences between 2D and 3D handling (Fig. 33 and Fig. 34) of graphic analyses, with the possibility of rewinding the recording and graph while accelerating or decelerating (64-77 s_v).

In the 3D analysis as such, left to right (FHT 5:59) versus right to left (FHT 7:60) analyses are proposed with a 180 rotation (FHT 6:59) around the vertical axis, and the possibility to focus on one or more elements of the analysis and/or to change the point of view is underlined.

Note also that, due to two factors which are the accompanying cello and the bad condition of the recording, all details of the analysis could not be reproduced and that the reproduction of the tonic of the scale performed by the neyist may – among other characteristics – be slightly influenced by the (lower) tonic (and harmonic notes) performed by the cello (see Fig. 32 in which the tonic is too low around 70 s_a).

3D techniques were also used in the intro and outro of the video (Fig. 31).



Fig. 31 A 3D CERMAA logo used in the video.

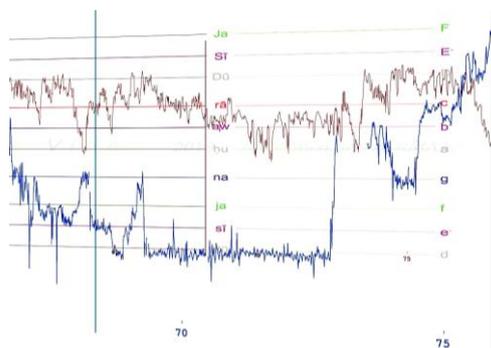


Fig. 32 Frame showing the reproduction of the tonic of the *maqām* as performed by the ney (beg. 70 s_a), here influenced by the lower tonic of the cello. (Detail)

GENERAL ANALYSIS OF THE PERFORMANCE¹¹³

On the general ascending scale of *maqām Ḥusaynī dū* (*d*) 3344334 (in concatenated one-digit multiples of an approximate quarter-tone) the performer begins with a jump of fourth from *dū* (*d*) to *na* (*g*) then to the fifth *ḥu* (*a*) and ascends to the upper *Ja* (*F*) then exposes the descending scale till lower *Rā* (*C*) (thus defining the span of the performance, *i.e.* one octave + fifth, with exceptional rises to the upper *Na* = *G* at 130 and 137 s_a) while returning to the central *ḥu* (*a*) and stabilizing around it with various developments until the return (at 51 s_a) to the tonic. Follows a display of the different subdivisions of the *maqām* scale and of virtuoso techniques, including an extended (in time) portamento from (below) the upper *Ja* (*F*) to the upper *dū* (*d*) [111-119 s_a] followed by developments on *rā* (*c* – at approx. 130 s_a with probably a *jins rāst* 433[4] leading to the upper *Na* = *G*), while returning to the main development of the scale from 152 to 162 s_a (with modulations) followed by the conclusion of the performance (164-188 s_a) on the tonic *dū* (*d*).

Parts I and II are balanced (about 80 seconds each) with a shorter (25 seconds) conclusive part.

A (MORE) DETAILED ANALYSIS

Part I from 0 to 79 s_a (77 to 156 s_v):

The initial sub-part (I.I) of Part I of the performance consists in a development of the scale of *maqām Ḥusaynī* with an initial jump of fourth from *dū* (*d*) to *na* (*g*) then a call from the fourth to the fifth *ḥu* (*a* – 1-2 s_a) followed by a modified *bayāt genos* [*ḥu* – *a* – 33̣4 + 33] resulting in a low *rā* in portamento to the “tpps” (“Theoretical Position of the Pitch on the Scale”) around 7 s_a (see also at 9 s_a – Fig. 33 and Fig. 34), then a descending development of the scale from the octave tonic *Dū* (*D*) suggesting a *būsalīk* aspect of the descending *na* to *dū* (*g* to *d*) part [424 on *dū* = *d*] – because of the low *na* (*g*), *ja* (*f*) and *dū* (*dū* = *d*) is frequently, if not systematically, lower than the tpps which hints to the handling of the *maqām* as a plagal *maqām Bayāt* centered on *ḥu* (*a*).

Rise beginning 11 s_a at *DŪKĀ* (*t-zī* = *d*) in *būsalīk* [424] with always low *ja* (*t-bū* = *f*) and *na* (*t-ḥij* = *g*) – note also

¹¹³ Reminder: In the analysis below “s_a” = “Analysis time in seconds”; s_v = “Video time in seconds”; “tpps” = “Theoretical Position of the Pitch on the Scale”. Also: as in previous analyses, the upper and lower

cases lettering differentiates for example (the scale of) *maqām Rāst* (initial uppercase) from the (pitch) tonic *RĀST* (uppercase) and the poly-chord (or *genos*) *rāst* (lowercase).

the low na^- (g^-) at 15 s_a. Then comes a descending development of the upper *genos bayāt* (beg. 16 s_a) with beautiful descending portamentos from aw^+ (equivalent to $ka = NA-HAFT = b$) to hu (a) around 18 and 20 s_a, with a concluding first part (21-30 s_a) and with a confirmation of the lower *būsālīk* on $t-zī$ ($=d$) closing on hu (26-28 s_a). Note that $sī$ (e^-) and hu (a) are here pivotal notes which remain stable throughout this first (sub-)part.

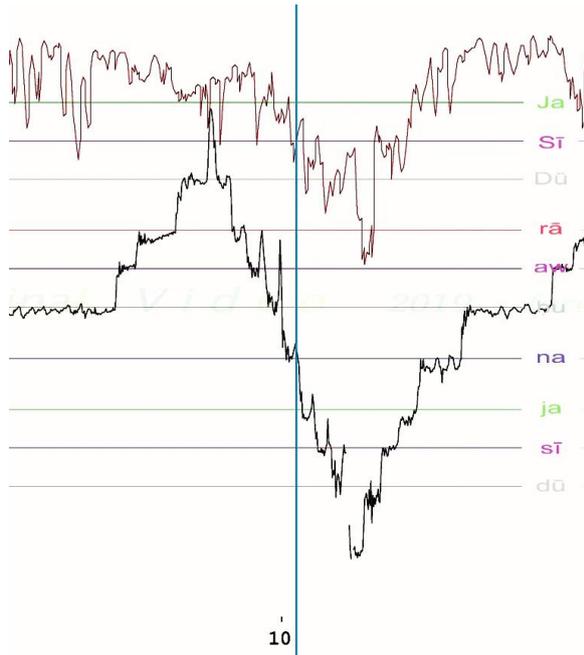


Fig. 33 2D version showing the low $rā$ ($=RĀST=c$) around 9 s_a. (Detail)

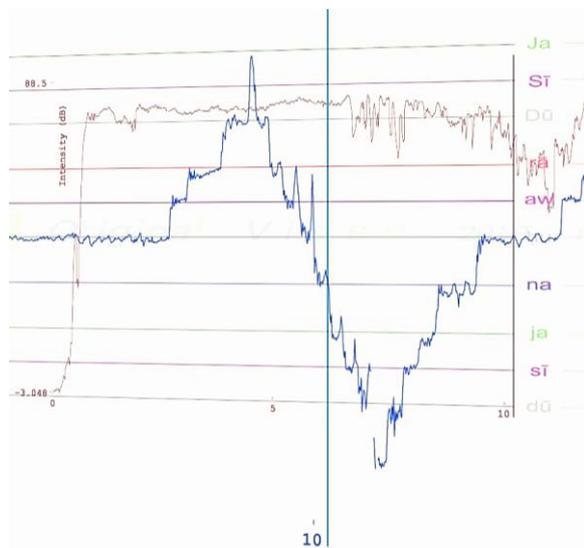


Fig. 34 3D version of the previous figure.

The second sub-part (I.II) starts with a similar initial call from fourth to fifth while it however hints a lower na ($“n-na”=t-hij=g$ at 29.5 s_a) with a similar also hint of low $rā$ ($“n-rā”=t-ka=c$) rising to $rā$ (c) at around 35 s_a – repeated around 37 s_a – during the development of the upper *bayāt* ($hu = a$ 334).

In the descending development of this *genos* undertaken by the performer beg. 37 s_a, a $‘aj = b^b$ ($“n-aw”$ or aw^-) is first hinted, then confirmed at 41 s_a in what becomes a descending *nahawand* (or *būsālīk*) *genos* on na [= g 424] extended below to the $ja = f$ [ja 4424] which transforms it in a $‘ajam$ tetrachord on $ja = f$ (43-44 s_a) and back (45-49 s_a) to *bayāt* [334] on $dū = d$ with a confirmation of $hu = a$ as pivotal degree of the scale, and closing (around 51 s_a) on $t-bū$ (f^-).

In both upper and lower part of the scale, for these two initial sub-parts (from 0 to 50 s_a), subtle changes in pitches and the use of portamentos create constant variations between the use of lower (than $hu = a$) *bayāt* [$dū = d$ 334] and *būsālīk* [$dū = d^-$ or $t-zī$ 424] tetrachords with a definite tendency to shift from – mostly ascending – “minor” (*nahawand* or *būsālīk*) to – mostly descending – “zal-zalian” (*bayāt* tetrachord) with occasional hints of “major” ($‘ajam$ tetrachord) aspects, the latter being underlined by the change in the accompaniment by the cello (from predominant $hu = a$ to $ja^- = f^- = t-bū$) at approx. 50 s_a.

While the third sub-part (I.III) starts like the first two with a $na-hu$ ($g-a$) call, it concentrates at first (around 60 s_a) on the upper part of the scale with a development of *rāst* [433] on $rā$ (c), immediately followed by a reaffirmation of the *Husaynī* character of the *maqām* with a hint of *rāst* [433] on $na = g$ (63 s_a) centered on $hu = a$ and with a closing *bayāt* [334] on $dū = d$ reaffirming the (lower, around 71 s_a) tonic of the *maqām*, followed (73 s_a) by a reversed jump from hu to na (a to g) and a brisk display of the ascending (from aw to $Ja - b^-$ to F) then (complete) descending scale, closing (78 s_a) with the $dū$ (d).

Part II from 83 to 162 s_a (160 to 239 s_v):

The different feeling of the second part (beg. 83 s_a) is announced by a jump of fourth from na to $rā$ (g to c) with a development of the (upper) *rāst* [$rā = c$ 433] and a rapid display of the (descending till lower $Rā = C$) scale stabilizing on (the upper) $rā = c$ (93-94 s_a), then a variation stabilizing on the (upper) $Dū = D$ with a pentachordal *rāst* [$na = g$ 4334] closing (108 s_a) the first sub-part II.I.

Follows (beg. 110 s_a) the second (II.II) sub-part which consists in an approach of the upper *rāst* [$r\bar{a} = c$ 433] from below the tpps with a beautiful rising then descending portamento from $t-B\bar{u} = F^-$ to $K\bar{u} = E^b$ stabilizing on $D\bar{u} = D$ after tackling the lower two degrees, and variations in the upper *bayāt* [$D\bar{u} = D$ 33] beg. 120 s_a and a virtuoso display of the (descending then ascending) lower octave + 1 (reaching the lower $R\bar{a} = C$) scale insisting (around 127 s_a) on the unresolved (upper) $r\bar{a} = c$ and upper *rāst* [$r\bar{a} = c$ 4334] with a nearly continuous descending portamento from (upper) $H\bar{u}^+ (A^+)$ to (lower) $h\bar{u}^- = a^-$ (137-140 s_a) which shifts (140 s_a) to a trill between $aw = b^-$ and $r\bar{a} = c$.

This is followed by a very short (in time) ascending *bayāt* [$h\bar{u} = a$ 334] stabilizing on $D\bar{u} = D$ (142 s_a), and a modulation to *kurd* on $h\bar{u} = a$ [$h\bar{u}$ 244] from 143 to 148 s_a, suddenly modulating (with a change in the accompaniment) to *rāst* [433] on $na = g$ stabilizing (149 s_a) on $r\bar{a} = c$, followed (152 s_a) after a short silence by a *būsālīk* [424] on $d\bar{u} = d$ beginning (and insisting) on the central $b\bar{u} = e^b$, and closing with a double ascending call of fifth from (lower) $R\bar{a}$ to na (C to g) then $na = g$ to (upper) $D\bar{u} = D$ (155-158 s_a) followed by a descending call of octave and a closing ascending call of fifth (159 s_a) from $d\bar{u} = d$ to the stabilized $h\bar{u} = a$.

Part III: Conclusion from 164 to 188 s_a (241 to 265 s_v):

The closing part is initiated by a jump of third (165 s_a) from $na^- (g^-)$ to $aw^+ (\approx b)$ ascending to $D\bar{u} = D$ followed by the display in portamento (167-170 s_a) of the descending scale of the *maqām* till the central (“plagal”) tonic $h\bar{u} = a$ then an ascending pentachordal *rāst* [4334] on $na = g$, followed (170-173 s_a) by the descending scale featuring a $n-ja = f^-$ in place of the $ja = f^{14}$, followed (175-183 s_a) by variations between *būsālīk* [424] and *bayāt* [334] on (the lowered tonic) $d\bar{u} = d$ with a (pre-) final (ascending) call of octave $H\bar{u}-h\bar{u} (A-a)$ and a final descent (184-187 s_a) from the $h\bar{u} = a$ to the tonic $d\bar{u} (d$ at 187-188 s_a).

¹¹⁴ This corresponds to the insertion of a tetrachord *kurd* 244 on $s\bar{i} = e^-$.

¹¹⁵ The main reference for the changes in Ottoman-Turkish music in the period of time preceding Kolayli is [Feldman, 1996].

¹¹⁶ By the Arabs themselves, for once... with *sharqī* meaning “Oriental” (where the sun rises), as opposed to other subdivisions in the realm of *maqām* music such as *Maḡhribī* (from the *Maḡhrib*, where the sun sets down). In Arabian music, these are two main divisions (*maḡhribī* and *sharqī*) while other declinations exist in the music of the (Perso-) Arabian

CONCLUSION

Tevfik Kolayli was a dreamer, like most sincere musicians for whom the joy of performing supersedes the necessities of survival. His music in this performance, while pertaining the emotionality and delicacy evidenced in Daoud’s performance, uses limited modulation techniques from *zalzalian* to semi-tonal *genē* (and *vice versa*) and is already influenced by the overwhelming westernization of Ottoman music, documented elsewhere for the 20th century.¹¹⁵

He is also a representative of the new, instrumental trend of *maqām* music which, notably in the Arabian countries and in what became to be named *sharqī* (“Oriental”) Arabian music,¹¹⁶ would rely on a set of complex modulations within one and same *maqām*.

This *sayr al-‘amal* (“evolution of the melodic discourse within the performance of one and same *maqām*”) is masterfully demonstrated in the *taqsim* in *maqām Ṣabā* by Hamdi Makhoul analyzed hereafter.

* * *

Gulf and the Arabian Peninsula, notwithstanding Turkish, Iranian and other subdivisions. Note that according to El-Shawwan Castelo-Branco, and “[s]ince the 1930s the phrase *al-mūsīqā al-‘arabīyya* (Arab music) has been used as a generic term to designate musical idioms that are composed and performed by Arabs and that adhere to the norms of Arab music style as perceived by musicians and audiences. It replaced the term *al-mūsīqā al-sharqīyya* (oriental music)” – [Anderson, Castelo-

C. An analysis of an improvisation in maqām Ṣabā by Hamdi Makhoul on ‘ūd



Fig. 35 Photo of ‘ūd-player Hamdi Makhoul on stage – Courtesy of the performer.

FOREWORD

I first met Hamdi Makhoul in 2004, recommended by the (married) couple of Tunisian musicologists¹¹⁷ ‘ūd-player Nabil Saied and *qānūn*-player Khadija El Afrit.¹¹⁸ This was the beginning of a long-lasting friendship, and of numerous recordings¹¹⁹ I made in Paris – where Hamdi was residing¹²⁰ at that time – with (me recording) him.

Branco, and Danielson, 2001, II.1. General background]. A wider definition of “Arab[ic] music” – which includes notably Turkish and Armenian music – is proposed by Johanna Spector: “Arabic music is part of the Middle Eastern musical culture area which stretches roughly from Morocco across North Africa and Northern Arabia to Central Asia. This culture area is divided into subareas, each constituting major musical subcultures, such as: the Maghreb (Morocco, Tunisia, Algeria), Egypt, Arabia (Palestine, Syria, Iraq), Iran, Turkey, Armenia, Afghanistan, and Central Asia [...]. Although each of the subareas have developed distinct styles of their own, differing in particulars from each other, they do agree in general on the following musical traits and complexes: micro-tones, rich ornamentation, *maqāmāt*, homophony, heterophony, improvisation, complex rhythms, meters and instruments” – [Spector, 1970, p. 243], with footnote no. 1 [p. 256] explaining: “The author makes a distinction between the geographical area of the Middle East and its ‘musical culture area.’ A ‘musical culture area’ is a region which has a relatively similar way of making music, common to its component socio-economic systems and cultures. The musical configuration in most of its musical traits is similar in all cultures of that area. This is why e.g. Central Asia is included in the musical culture area of the Middle East, while the geographical Middle East excludes it. The Middle East musical culture area coincides roughly with the geographical area of the Arab

The particular *taqsīm* (instrumental improvisation) analyzed here was recorded on the 16th of March 2005. I had at that time neither the technical, nor the auditory – and even less the cognitive – tools to try to analyze it.¹²¹

Incidentally: this analysis took place in Lebanon in the summer of the year 2018; while friend and colleague Hamdi was visiting Lebanon for the first time with his family, I let him watch and hear an anonymized version of the video analysis, which I asked him to help me improve. As it might have been expected, he didn’t recognize – as this session took place 13 years later – his own performance right away.

While the final analysis was eventually refined in common with him and with his full knowledge, it is however worthwhile (1) to outline Hamdi’s first reaction to his performance, considering it as being rather “scholarly”, and (2) to note that, while his ‘ūd-playing and understanding of *maqām* have evidently evolved since, this 2005 recording was notably made shortly after he received his First Prize for ‘ūd performance in Tunisia. This performance can therefore be considered as representative of Mainstream *maqām* music of the *sharqī* tradition as it is taught today in the conservatoires of the region.¹²²

Empire of 750 C.E.”. Note also that Tunisian musicians – at least some of them which I happen to know well – use the terms *al-mūsīqā a-sh-sharqīyya* to differentiate *al-mūsīqā al-‘arabīyya* from local Tunisian traditional music. (See [Davis, 1997] for more details about the differences between Tunisian music and the Egyptian ensembles of “Arab” music and the influence of Egyptian music on Tunisian music.)

¹¹⁷ Who happened to be also seated beside me on the same university bench, for their respective Ph.D. theses.

¹¹⁸ Nabil wasn’t available at that time for the type of research I needed to undertake.

¹¹⁹ Some of which were partly published as by-products of writings of the author, and many more – as with the *taqsīm* analyzed farther – which remain till today unpublished.

¹²⁰ See <http://www.hamdi-makhoul.com/> (visited 19/07/09) for more information about this exceptional musician and musicologist.

¹²¹ This was also the case for numerous recordings of Breton music made in the years 2000.

¹²² Note that Makhoul, on that occasion, played (nearly) exactly what I asked him to play: a typical display of the *sayr al-‘amal* of *maqām Ṣabā*.

NOTES FOR THE GRAPHIC REPRESENTATION IN THE VIDEO ANALYSIS OF THE *TAQSĪM*

This 44th video analysis¹²³ of the VIAMAP series featured (for the first time – chronologically¹²⁴ – in the *maqām* series) a graphic representation of the intensity of the sound in parallel to pitch representation.

The original tonic of the performance is *dū* = *DŪKĀ* = *d*, which corresponds to an unstopped string of the *ūd*. This means that the tonic is stable (Fig. 36) and the graphic scale remains therefore still (no vertical displacement).

Intermediate pitches between the pitches of the unstopped strings may vary (Fig. 37) according to the modulation, the techniques used or to the organology of the instrument and the morphology of the performer, while pitches corresponding to unstopped strings may vary if played as stopped notes.

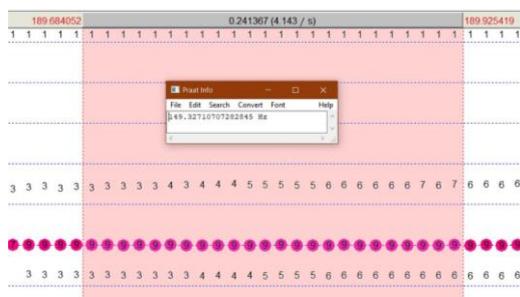


Fig. 36 Stable tonic of the performance (unstopped double-string of the *ūd*) measured towards the end of the performance. (Detail from the Praat “View (Pitch)” window.)

Furthermore, the performer uses stopped or unstopped pitches in the lower octave in rapid alternation – and sometimes simultaneously – with their equivalents at the (upper) octave, to underline the tonic or enrich the melody. In the latter case, a choice had to be made, for each occurrence of such simultaneous playing, between the upper or lower octave representation of the pitch. (Fig. 38)

LITERAL ANALYSIS

Part I (0-57 s_a): Development of the lower octave of *maqām Šabā* with *ajnās šabā* 332 on *dū* and *hijāz* on *ja* 262

The performer starts (1-7 s_a) with the characteristic formula of *maqām Šabā* on *dū* – between *dū* = *DŪKĀ* = *d*

and *hij* = *hijāz* = *g^b* – and stabilizes on the *ja* (= *JAHĀRKĀ* = *f*), with subsequent variations (9-25 s_a) including a lower part of a *hijāz* tetrachord on *ja* (*ja* 26[2] in multiples of the quarter-tone, with “[2]” being the missing – hinted – part of the *hijāz* tetrachord in the performance).

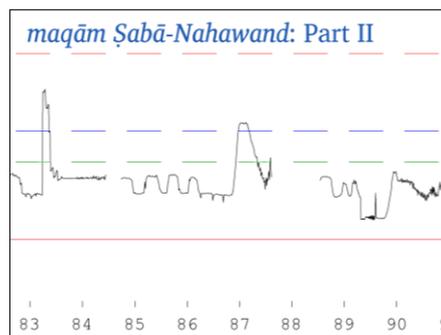


Fig. 37 Detail from the analysis in the upper stripe featuring the color coded boundaries for the tonic and octave (red), the fourth (green) and the fifth (blue).

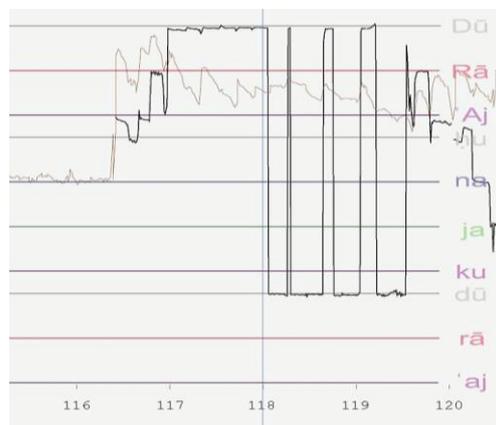


Fig. 38 Detail from a frame showing the alternate/simultaneous use of stopped (higher *Dū*) and unstopped (lower *dū*) strings by the performer.

In the second section of this first part (28-57 s_a) of the *taqsīm* (instrumental improvisation), the *jins hijāz* on *ja* 262 is fully developed with an extension to the upper *rā* at 36.5 s_a and to the lower *sī* (*e⁻*) at 41 s_a, which marks the return (41-52 s_a) to *jins šabā* on *dū* extended to the lower *Rā* (*C* = *RĀST*) at 47 s_a with a further extension (around 53 s_a) to the upper limit (*c[#]*) of the non-octavial scale featuring an intricate *jins hijāz* 262 on *hu* = *a*. A silence (57-63 s_a) marks the transition to the 2nd part.

¹²³ See [Makhlouf, CERMAA, and Beyhom, 2018] and [CERMAA and Makhlouf, 2018].

¹²⁴ This analysis took place before the two preceding ones expounded in Part I.

Part II (63-113 s_a): Development of the full lower scale of maqām Ṣabā-Nahawand with the ajnās ṣabā 332 on dū, hijāz on ja 262 and nahawand 42[4] on ‘aj

At the beginning of this second part (62-71 s_a), the performer uses the note ‘aj = ‘AJAM = b^b as a secondary tonic for *jins nahawand* [2]42[4] (with $\text{ḥu} = a$ as a leading note) with a hint of lower *jins hijāz* (around 69 s_a) then a repeated hint (71-75 s_a) of upper *jins nahawand* 42[4] on ‘aj – it may be that the performer intended to develop either this *nahawand* or possibly a *jins ‘ajam* b^b 442 but this was not the case. Instead, a regular descent of the canonic scale of *maqām Ṣabā* is used (75-100 s_a) with *hijāz* 262 on *ja* and *ṣabā* 332 on *dū*, with portamento and string lifting techniques notably around 95 s_a for the string stopped on the note $\text{sī} = e^-$, followed (101-113 s_a) by a rapid ascent of the *Ṣabā-Hijāz* scale $\text{dū} 33, f 262, b^b [4], c 26[2]$, then by a step by step descent of the scale i.e. *nahawand* on ‘aj, *hijāz* on *ja* and *ṣabā* on *dū*.

This last step consolidates *maqām Ṣabā* and prepares the upcoming modulation. A short silence (113-116.5 s_a) marks the transition to the 3rd part.

(In short: 1st and 2nd parts performed on the scale of Ṣabā-Nahawand.)

3rd Part (116.5-192 s_a): Development of maqām ‘Ajām-‘Ushayrān on ‘aj = ‘AJAM with a modulation to jins ṣabā-zamzama 242 on ḥu then closing with descending Ṣabā-Nahawand

In the third part of this *taqsim*, Makhlof modulates (116-123 s_a) to *maqām ‘Ajām-‘Ushayrān* 4424442 on (lower) ‘aj[am] = b^b (the *maqām* changes, the tonic changes too) beginning with the upper section ‘Aj [2]44 then descending until the lower ‘aj. He then develops (124-134 s_a) *jins ‘ajam* [2]44 on the (upper) ‘Aj followed by a *jins ‘ajam* 442 on *ja* then by a modulation (134-149 s_a) in the *jins kurd* on *dū* beginning with its upper section.

¹²⁵ [Erlanger, 1949, v. 5, p. 282, 284, 286] for *Ṣabā*, *Ṣabā-Najdī* and *Ṣabā-Zamzama*, [Hilū (al-), 1972, p. 122] for *Ṣabā* and *Ṣabā-Zamzama*, and the concise description of *Ṣabā* in [Collectif, 1933, p. 228m].

¹²⁶ See previous footnote: the author relies on these three main sources for the *ṣayr al-‘amal* of the *maqāmāt*: many others do exist in which particulars of Makhlof’s performance could be found, but

Continuing developing (151-163 s_a) the upper *jins ‘ajam* 442 on ‘aj (with a modulation to the *jins nahawand* 424 on upper *rā*), Makhlof proceeds then to a modulation (163-167 s_a) to *ṣabā-zamzama* 242 on $\text{ḥu} = a$ followed by the return (168-177 s_a) to *jins hijāz* 262 on *ja* = f then (177-192 s_a) to a closing *jins ṣabā* on *dū* = d . Note (Fig. 39) the typically small semi-tone in *maqām ‘Ajām-‘Ushayrān* between ḥu and ‘Aj (120-135 s_a).

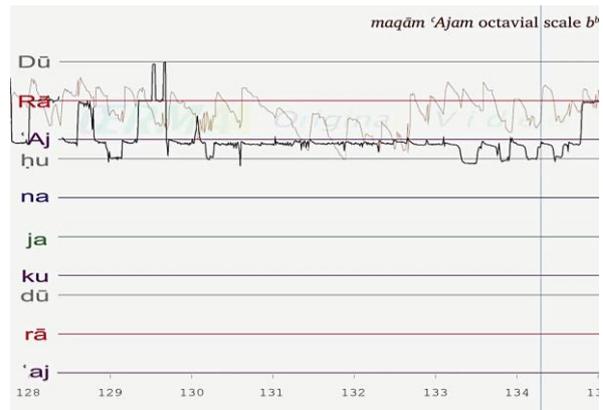


Fig. 39 Detail from a frame showing the typically small semi-tone in *maqām ‘Ajām-‘Ushayrān* between ḥu and ‘Aj [120-135 s_a].

CONCLUSION

If we were to compare Hamdi Makhlof’s rendition of *maqām Ṣabā* with the description of this *maqām* in the literature,¹²⁵ we would find the first part of his performance corresponding to these descriptions whenever the insertion of the intricate *jins hijāz* 262 on $\text{ḥu} = a$ seems to be an addition non-accounted for in the reviewed literature.¹²⁶

The use of a *nahawand* (or *būsalik*) tetrachord on ‘aj marks another peculiarity¹²⁷ – thus the denomination *Ṣabā-Nahawand* given by the author to this scale – as well as the major modulation to *maqām ‘Ajām-‘Ushayrān* in the third part.¹²⁸

All in all, the performance seems to be a compound of *maqāmāt Ṣabā* and *Ṣabā-Zamzama* with a major modulation to *maqām ‘Ajām-‘Ushayrān*.

these would equally be – most probably – “deviations” from the mainstream (and not “errors”).

¹²⁷ Erlanger does mention a *būsalik* for *Ṣabā-Zamzama*, but on the upper *G* as a variant of ‘ajam on the upper *F*.

¹²⁸ Erlanger mentions the use of a ‘ajam tetrachord 442 on (upper) ‘Aj in *maqām Ṣabā* while Hilū favors a *jahārkā* tetrachord (same intervallic composition) on the upper *F*.

General Conclusion for Part I

Makhlouf's performance – in the last analyzed recording in Part I of this dossier – is indeed a classical display of the conventional (as for “conservatoire”) *sayr al-ʿamal* (melodic unwinding) of *maqām Ṣabā*, with his own feeling for music and using virtuoso techniques he notably learned from his mentor Wahid Triki. This performance is representative of the contemporary trend of instrumental *maqām* music which has contributed, at least to the eyes of Arabian musicians, in establishing the *maqām* in the concert halls – mainly in the West.¹²⁹

However, the Art of *maqām* cannot be reduced to solo instrumental display of techniques – and could even be antinomic with it, as explained by El-Shawwan Castelo-Branco for Egyptian music:

“In 20th-Century Egyptian conceptualizations of music, its domains and styles and the terms used to designate them are multifarious, reflecting individual perspectives, social status, political conjuncture, religious convictions, commercial interests, changing musical referents and academic concerns. Egyptian music historians and theorists and some urban musicians use the term *mūsīqā* both as a generic designation for a wide range of musical domains and as a specific term referring to Arab instrumental music, as distinct from *ghināʾ* (vocal music). However, not all domains of expressive culture in which words and organized ‘music sounds’ are central are conceptualized as ‘music’.”¹³⁰

Whatever interesting, if not enjoyable, these techniques may be, while traditional creativity can equally not be reduced to the conventional *sayr al-ʿamal* of a *maqām*.¹³¹ The example of “*Akh tagorye hʿashyrie*” performed by Evelyne Daoud on a single scale is a striking illustration of the expressivity that this art can reach, even with such a simple scale and no modulations whatsoever¹³², when it is performed by an exceptional cantor.¹³³

Both descriptions apply to Kolayli's performance, who uses a – limited – set of modulations for *maqām*

Husaynī together with an expressivity – some would say an emotionality – that is sorely missed from today's mostly technical displays of *maqām* music.

Indeed, and whenever the trend today is towards the fusion of *maqām* with western music – were it Jazz or Neo-Classical –, less than a century ago, exceptional musicians and singers were reinventing this music by expanding the boundaries of tradition, independently from western influences.

In the article “MAT for the VIAMAP”,¹³⁴ I proposed in 2018 two analyses of vocal *maqām* music performed by contemporary Muḥammad al-Ghazālī and by the late – and greatly missed today – *shaykh* ʿAlī Maḥmūd. The latter's performance of “*Yā Nasīm a-ṣ-Ṣabā*” with virtuoso violinist Sāmī a-sh-Shawwā takes us however to new heights in the art of *maqām* that I am more than happy to comment in Part II of this dossier.

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* *

¹²⁹ See for example [El-Shawan Castelo-Branco, 2001c], notably [p. 557]: “Since the late 1960s, a new model for the representation of Arab music has been established, and performances have become highly formalized and fixed”.

¹³⁰ In [Anderson, Castelo-Branco, and Danielson, 2001, II.1. General background].

¹³¹ Compare for example the *sayr al-ʿamal* of *maqām Ṣabā* performed by Hamdi Makhlouf with the description of this *maqām* in [Erlanger, 1949, v. 5, p. 282] or with the graphic/score description proposed in [Beyhom, 2016, p. 189] – FHT 19 and FHT 20. (See

also the comparison of the effective *sayr al-ʿamal* of *Yā Nasīm a-ṣ-Ṣabā* by Maḥmūd and Shawwā with the one(s) described by Modern authors, at the end of Part II of this dossier.)

¹³² Except for the internal shifts of rest notes within the same scale.

¹³³ Daoud's performance is also a reminder that many aspects of this art are still unknown to – or ignored by – mainstream musicologists of *maqām* music, and a reminder of the role of Eastern Christianity in shaping this music, or at least part of it, regardless of the beauty of its declinations in those religious circles.

¹³⁴ Aforementioned [Beyhom, 2018b].

PART II: THE DIFFICULT AND INSPIRING ART OF
MAQĀM MUSIC¹³⁵

“[E]ach maqām is part of a fabric that includes all the maqāmāt (or at least a large number of neighboring maqāmāt). To know any one maqām fully, the student must know all the places one can modulate to. This stands in marked contrast to the situation that exists in Indian music, where the rāgas are understood to stand each on their own. In North Indian music, it is commonly felt that a student can learn a given rāga for three to five years and, in a sense, master it without having studied a second rāga. This is not the case in Arab music where to master one maqām is to master virtually all the maqāmāt”

[Scott Marcus, *Arab music theory in the modern period*].¹³⁶

¹³⁵ The author wishes to express his heartfelt thanks to CERMAA members Rosy Beyhom and Saad Saab – who also happens to be the president of FOREDOFICO – who not only helped analyzing the unique performance of *Yā Nasīm a-ṣ-Ṣabā*, but took also an active part in the deciphering and the translation of the lyrics. Further: the contributions of the two reviewers, Scott Marcus and Hamdi Makhlouf, were numerous, detailed and fully helpful, while allowing for further expansions of – otherwise – insufficiently expounded points. Most of these contributions and discussions are mentioned in the text and referenced in the footnotes.

¹³⁶ [Marcus, 1989, p. 758].

¹³⁷ “*Mashāyikh*” is, with “*shuyūkh*”, one of the – numerous – possible declinations of *shaykh* in the plural form. (See [Geoffroy, 2012], [Wikipedia Contributors, 2019b] and, in Arabic, [Manzūr (ibn), 1981, p. 2373 (شَيْخ)].)

¹³⁸ “Since the mid-nineteenth century, Egyptian musicians have sought to develop (or to re-discover) an authentically Egyptian music. In the views of many Egyptian music historians, such a music would be fundamentally Arab, yet modern, with new components successfully integrated into a recognizably Arab style [...]. With the growth of nationalist sentiments in the late nineteenth and early twentieth centuries, and with the spread of the popular sentiment ‘Egypt for Egyptians,’ support for ‘authentic’ (*aṣīl*) expression in all cultural domains gained steadily in strength” – [Danielson, 1990, p. 113]. (See also – in French – [Vigreux, 1991].)

¹³⁹ “The style associated with the *mashāyikh* has had tremendous influence in twentieth century Egypt as the source of authentically

Egyptian – music by the forms, temperament, theories and terminology of western music, the rare pockets of resistance remaining at the beginning of the 20th century were concentrated – and distributed – among, on one side, the “*mashāyikh*”¹³⁷ and, on the other side, a few exceptional musicians. Together, these traditional innovators were the protagonists of a musical evolution of the “old” music, aiming notably at “renewing” the language of *maqām*¹³⁸ in parallel with a conscious movement of avoidance of Western, Turkish and other “extra-Arabian” influences.¹³⁹

This movement took place at times which were exceptional not only for the eclecticism of the reigning class,¹⁴⁰ but also by the desire to overcome the “original sin” of Arabian music – the fact that (mainly in its absence of “harmony”) it was unrelated to the music of the conquerors:

“During the twentieth century [solfege and Western notation] have become pervasive not only in Arab theory books but also in the teaching and performing of Arab music. The adoption of these two systems was in keeping with the commonly held perception that Western music was a more highly evolved music tradition than Arab music, and that Arab music needed to embrace the scientific foundations which helped Western music achieve its advanced state. [...] Solfege was not borrowed in

Egyptian song. Many of the musical qualities outlined here also resonate in Arab music history [...]. The centrality of the singer is a long-standing feature of Arab musical life, as is the close relationship of poetry and song. [...] The style recognized by Egyptians as *min al-mashāyikh* [“coming (stemming) from the *mashāyikh*”] is clearly related to an Arab vocal style that may be viewed as classical. [...] To identify the *mashāyikh* as the source of authentic culture is to recognize a simple matter of fact at one level, but also, and perhaps more importantly, to stake a significant ideological claim. The association of the *mashāyikh* with the idea of authenticity defines the essence of Egyptian culture as both Arab and Islamic, in the face of the cultural incursions of the various foreign powers present in the country, whether Turkish, European, or American” – [Danielson, 1990, p. 123].

¹⁴⁰ “Modern, yet authentically Egyptian-Arab art enjoyed support from all socio-economic classes. Though often characterized by their interest in European and ‘international’ culture generally, the upper classes also lent support to local musicians and repertoires. Khedive Ismā‘īl was the principal patron of singer ‘Abduh al-Ḥāmūli at the same time that he commissioned Verdi’s ‘Aida.’ Princess Nazli Fāzil, a great admirer of European culture, was known to invite Egyptian singer *al-Shaykh* Yūsuf al-Manyalāwī to entertain her guests. Even among those who considered European music to be more prestigious or more modern than Egyptian music, traditional musicians were hired for traditional occasions” – [Danielson, 1990, p. 113–114].

isolation. Rather it was part of a larger body of Western musical practices which were adopted with enthusiasm, including Western notation, Western terminology, Western instruments, and Western methods of teaching”, [while] “the adoption of Western notation was widely regarded [in Arabian countries] as a necessary step in order to assure the continued vitality, even the very survival, of Arab music”.¹⁴¹

In such a context,

“the *mashāyikh* constituted, in the words of one journalist, ‘the traditional school for the teaching of music in Egypt’ [...]”.¹⁴²

Thus, (and in the words of “Soliman Gamil”)¹⁴³,

“[i]n spite of the repeated visits of foreign symphony orchestras and continuous presentations of seasons of Italian song at the Opera House of Cairo and the appearance of other kinds of European music in Egyptian locales, new generations of Egyptian musicians have remained committed to [their] own musical life up to the present day [1970s] and the works of these musicians are linked in song and composition, directly or indirectly, to the oral teaching of the *mashāyikh*”.¹⁴⁴

However contradictory Gamil’s statement may appear when comparing it with his musical deeds – and those of other musicians and composers who felt like him that *maqām* music would gain a new dimension by using the forms and techniques of western music – the concerns of that time are still relevant today, when a whole generation of Arabian musicians find their “salvation” in Fusion – if not in Pop – music...¹⁴⁵

It remains, nevertheless, that

“the brilliant ‘Renaissance’ of Arabic chant [...], a skillful and complex art *par excellence* which purified its forms to reach the highest degrees of *tarab*, starts to fall during WWI and disappears brutally at the beginning of the 1930s”.¹⁴⁶

Whenever it may seem today that this Art of *Maqām* became out of reach and even obsolete – if not inconsequential for contemporary Arabian musicians,¹⁴⁷ a close scrutiny of the musical production of that time is the only way to realize the extent of this loss.¹⁴⁸

Such an investigation was initiated in the “MAT for the VIAMAP” dossier for *Ahlan bi-Ghazālin* by ‘Alī Maḥmūd which, while it expounded the mastery of this near-perfect musician, remains but a foretaste of what *qaṣā’id* (pl. of *qaṣīda*) such as *Yā Nasīm a-ṣ-Ṣabā* can offer to the listener.

* * *

¹⁴¹ Successive excerpts from [Marcus, 1989, p. 123–124], [Marcus, 1989, p. 125–126] and [Marcus, 1989, p. 154]. (See also a report on the conflicting views on the future of Arabian music in the *Congrès du Caire* of 1932 in [Racy, 1992].)

¹⁴² [Danielson, 1990, p. 115].

¹⁴³ Soliman Gamil is the name under which the Egyptian composer (notably for films) Sulaymān Jamīl is better known in the western countries. (Note that the “j” is pronounced “g” – as in “go” – in the Arabic-Egyptian dialect.) He attempted to integrate the two – Western and Egyptian Folk – musics in various musical pieces, some of which are put together in [Gamīl, 2001]. (One example of his music is available at <https://www.youtube.com/watch?v=IhXRBTQvEg> – [Gamīl, 2011].)

¹⁴⁴ [Danielson, 1990, p. 116] – quoting “Sulaymān Jamīl, *al-Inshad fīl-Ḥadrah al-Sūfiyah* (Religious song in the Sufi Hadrah), Cairo: Matba‘at al-Kilāfī, 1970, p. 22” – comments: “The link between authentic culture and religious expression has historical foundations which have been described elsewhere”, with footnote no. 4 [p. 124] explaining: “The association of the styles and genres of religious music with cultural authenticity is not unique to Egypt”.

¹⁴⁵ I thought also some time ago – so ignorant I was about the real art of *maqām* – that Arabian music could be “revitalized” by the influx of some of the techniques used in western music, which is

why I shall not be the one casting the first stone at the younger generation, or at the older one.

¹⁴⁶ [Vigreux, 1991, p. 7]. (About the influence of copyrights on the decline of *maqām* music see [Vigreux, 1991, p. 8].)

¹⁴⁷ As I was beginning to analyze *Yā Nasīm a-ṣ-Ṣabā* by ‘Alī Maḥmūd and Sāmī a-sh-Shawwā, I asked one of the best teachers of “Arabian” music in Lebanon – whom I’ll keep anonymous – what he thought about this piece: his first answer was that it was a rather silly piece with ridiculous, unidentified variations by the singer. It is only after I did the analysis and showed it to him that he – albeit reluctantly – acknowledged the mastery of Maḥmūd. To understand this first reaction, it suffices to remember that most Arabian musicians do not consider a music which is devoid of “harmony” to be worthy, either for them or for the “International” audience (see footnote no. 57:12): we can feel in this attitude of Arabian musicians today the influence of Muḥammad ‘Abd al-Wahhāb and Umm Kulthūm – who have indeed long past won the battle (see footnote no. 153:32), and sold their culture to the highest bidder.

¹⁴⁸ Most Arabian musicians are today in near-complete denial concerning the cultural wealth of this legacy (see previous note), and most of them do not even have the means of appreciating it, and even less to analyze it.

A. *Yā Nasīm a-ṣ-Ṣabā performed by ‘Alī Maḥmūd and Sāmī a-sh-Shawwā*

Yā Nasīm a-ṣ-Ṣabā is a *qaṣīda*¹⁴⁹ – some say a *muwashshah*¹⁵⁰ – which is best known to musicians through the performance of ‘Alī Maḥmūd and violinist Sāmī a-sh-Shawwā in the 1927 ODEON recording. Unique due to the mastery in the handling of different *maqām(s)* in modulation by Maḥmūd, it also features a traditional exercise of “translation” (*tarjama*) in which the singer (Maḥmūd) initiates a melodic phrase which is reproduced and partly revisited by the violinist (a-sh-Shawwā).

This means that in such a procedure, and at some key points of the interpretation, and while Maḥmūd generally leads the *ṣayr al-‘amal* (or “melodic progression”)¹⁵¹, a-sh-Shawwā may hint to a particular modulation that Maḥmūd would further explore – or not – in his next phrase.

¹⁴⁹ A *qaṣīda* is, according to <https://en.oxforddictionaries.com/definition/qaṣīda> – accessed 19/05/29, “[a] classical Arabic or Persian monorhyme poem in uniform meter, consisting of ten or more distiches set in a usually tripartite episodic structure, frequently with a panegyric or elegiac theme”. Note that, musically, the performance of *Maḥmūd* (personal communication by Hamdi Makhoul) could be compared to a *mawwāl*, or “a non-metric vocal improvisation on a colloquial poetry text of 4 to 7 lines [which] can be sung with an instrumental accompaniment (usually a *qānūn* or *ūd*) or without [it], and is used as a means to demonstrate the singer’s virtuosity. The singer has complete freedom to modulate to different *maqāmāt*. During a *mawwāl* the accompanying musicians follow the singer’s lead, and summarize each phrase after the singer has performed it (called *tarjama*, literally translation)” – [Anon. “Mawwāl”, 2019]. (The complete definition of *mawwāl* in the *New Grove* [Anon. “Mawwāl”, 2001] is: “Important Arabic song form performed in melismatic style”.)

¹⁵⁰ According to the *Encyclopedia Britannica* (<https://www.britannica.com/art/muwashshah>), “*Muwashshah*, (Arabic: ‘ode’), an Arabic poetic genre in strophic form developed in Muslim Spain in the 11th and 12th centuries. From the 12th century onward, its use spread to North Africa and the Muslim Middle East. The *muwashshah* is written in Classical Arabic, and its subjects are those of Classical Arabic poetry—love, wine, court figures. It sharply differs in form, however, from classical poetry, in which each verse is divided into two metric halves and a single rhyme recurs at the end of each verse. The *muwashshah* is usually divided into five strophes, or stanzas, each numbering four, five, or six lines.” As we shall see, *Yā Nasīm a-ṣ-Ṣabā* is a *qaṣīda* used partially for the performance (5 verses only) and has the form of classical poetry, namely “in which each verse is divided into two metric halves and a single rhyme recurs at the end of each verse”. As also explained in [Anderson, Castelo-Branco, and Danielson, 2001, II.1. General background]: “Islamic hymnody (*al-inshād al-dīnī*) comprises several genres of intoned or sung religious poetry and is a vital domain of expressive culture that is intended as a form of worship. It features several characteristics common to Qur’anic recitation and Arab music, including the central role of the solo

While this translates above all into a cooperation – and sometimes a competition¹⁵² – between the performers, and while Maḥmūd’s performance seems to be thoroughly – and at least partially – pre-composed, it should be nonetheless clear to the listener, after this analysis, that part of it is improvised and constitutes an interactive discussion between the two participants.

Many difficulties arose in the process of the analysis, concerning the music as such, the lyrics and their interpretation, the recording – in very bad shape –, and the fact that graphic analysis is not suitable – still today – for the analysis of overlapping parts. All these difficulties were answered, the most important being however the analysis of the progress of the melody, and of the modulations that structure it.

The performance is historical, very rare, and establishes a unique example of the art of *maqām* at the highest level.

vocalist, melodic creativity, melodic modes (*maqāms*) and the precise enunciation of texts. The *qaṣīda* is the central poetic genre; the religious *muwashshah* (metric song), *ibtihāl* (supplication), *madīḥ* (praise for the Prophet Muhammad) and *qīṣṣa* (story) are also part of the *inshād* repertoire”.

¹⁵¹ “*Maqām* (pl. *maqāmāt*) is the fundamental principle for pitch organization in Arab music and related musical domains. Literally meaning ‘place’ or ‘position’, the term designates a modal entity found throughout a vast geographical area stretching from North Africa to West and Central Asia. [...] At the beginning of the 21st century *maqām* is a melody type, the characteristics of which include a hierarchy of pitches, variant intonation and specific melodic shapes that largely determine the melodic contours of improvisation and composition. Tetrachords are often used as a basic framework for melodic elaboration. Typically, the lower tetrachord is developed, followed by the upper tetrachord; the melody may modulate to other *maqāmāt* before returning to the lower tetrachord of the original *maqām*. Prominence is usually given to the tonic and its octave (*darajāt al-rukūz*), on which a *maqām* often begins and ends; there is at least one other dominant note (*ghammāz*), which is often the fifth degree of the scale. Characteristic melodic motifs are associated with some *maqāmāt*, especially in cadential formulae (*qafḥāt*), and are used to highlight important notes. While some *maqām* degrees are fixed, others are variable [...]. Modulation plays a central role in *maqām* practice and helps to define the structure of many compositional genres. Composers and performers display their technical mastery and understanding of *maqām* aesthetics through appropriate use of modulation, which proceeds on the basis of an established system of relationships between *maqāmāt*, in which they are grouped according to their common tonics and tetrachords. Most modulations occur between *maqāmāt* with a common tonic or tetrachords; alternatively, a composer may use a common note as a pivot to move from one *maqām* to another” – [Anderson, Castelo-Branco, and Danielson, 2001, II.2. (ii)].

¹⁵² That Maḥmūd wins hands down.

The fact that it took place just before the 1932 *Congrès du Caire* gives us the possibility to compare the “findings” of the conference with actual music at that time.¹⁵³

1. ABOUT THE PERFORMERS

Both performers were well-known in the *Nahḍa*¹⁵⁴ period and renowned for their mastery of the art of *maqām*. The main difference lies in the fact that ‘Alī Maḥmūd (Fig. 40) was a religious sheikh – and a Muslim – while Shawwā (Fig. 41) was a – Christian – layman.



Fig. 40 Photo of *Shaykh* ‘Alī Maḥmūd: origin and date unknown.

As already explained in the dossier “MAT for the VIAMAP”,¹⁵⁵ *Shaykh* ‘Alī Maḥmūd¹⁵⁶ was a blind *qārī* (reader of the Koran) of great renown, born in 1878 in Cairo. His celebrity as a *muṭrib* (profane singer) and a *munshid* (religious singer – cantor)¹⁵⁷ can be ascribed to his very complete background in music and Koranic studies, however also to the fact that he was extremely

¹⁵³ Neither of the two performers was recorded for the *Congrès du Caire*. Shawwā was however one of the participants and [Vigreux, 1991, p. 18] pinpoints the ideological influence of the representatives of the “Berlin school” at the conference in the choices of the invited musicians. He also notes that, in the discussion on the musical scale – which mobilized almost all of the means of the participants, Abd al-Wahhāb was supporting an equal-temperament scale for Arabian music while a-sh-Shawwā was supporting the opposite position. The consequences of the position of Abd al-Wahhāb (see footnote no. 147:30) is that the complex of inferiority of the previous generations *vis-à-vis* classical western music has today pervaded the minds not only of Arabian musicians, but also of Arabian society as such.

¹⁵⁴ The Arabian “Renaissance” of the beginning of the 20th century.

¹⁵⁵ [Beyhom, 2018b, p. 195]; what follows is a shortened version.

¹⁵⁶ See also, in the VIAMAP series, the video analysis of *Ahlan bi-Ghazālin* performed by *shaykh* ‘Alī Maḥmūd (uploaded 09/10/2018): https://youtu.be/s_Nsm4mzFns.

¹⁵⁷ “*Al-inshād al-dīnī* (often simply *inshād*) is the melodic vocal performance of Arabic poetry as an Islamic practice. The vocalist,

gifted. He had many students some of whom became well known such as *shaykh* Zakariyya Aḥmad, Muḥammad Abd al-Wahhāb, Umm Kulthūm and Asmahān. He died on the 21st of December 1946 leaving few recordings after him.¹⁵⁸

As for Samī a-sh-Shawwā, he

“was born in Cairo to an Orthodox family from Aleppo [...]. His great grandfather Joseph was a violinist at the beginning of the eighteenth century and founded a *takht*¹⁵⁹ he called the ‘n[ū]bat Shaww[ā]’ with his brothers Antoine (violin), Abbūd (‘ūd), Ḥabīb (*tabla*) and his son [I]līās (*qānūn*) who was Samī’s grandfather.



Fig. 41 Photograph of violinist Sāmī a-sh-Shawwā: origin and date unknown.

[...] [Sāmī] quickly rose to fame in Aleppo and became known as a musical miracle. As soon as he became fourteen years old, his father sent him to Egypt where he mesmerized audiences supported by senior musicians who were friends of his father. [...] Shawwā maintained strong relationships with many intellectuals and literary figures in Egypt [...]. [His] advanced knowledge of Arabi[an] and Iraqi music, allowed him to play an important role

called a *munshid* (plural, *munshidīn*), is usually male; he is addressed as *shaykh* to indicate his elevated religious status. By text or context, *al-inshād* is regarded as a form of worship, though it lies outside the core of Islamic ritual. But even when intended as a religious act, *al-inshād* may produce a wide range of emotional experiences, from mystical rapture to aesthetic enjoyment” – [Frishkopf, 2001, p. 166]. Note that it was – and still is – not uncommon for a *munshid* to perform with secular musicians, “[n]early all *munshidīn* (except within Sufi orders) are professionals, concerned with profit and recognition; some become celebrities. Most consider themselves artists and are well acquainted with the Arab musical tradition; some have performed both religious and secular music, and some have crossed over entirely to the latter” – [Frishkopf, 2001, p. 167].

¹⁵⁸ See also “الشيخ علي محمود الصفحة 6 منتدى سماعي للطرب العربي الأصيل” – in Arabic, accessed May 24, 2019, <https://www.sama3y.net/forum/showthread.php?p=629077> for a most complete biography – evidently in Arabic – of this performer.

¹⁵⁹ The *takht* is equivalent to a small chamber orchestra for *maqām* music, limited to four or five musicians with, usually, a lead singer.

in planning and preparing for the Arab[ian] Music Conference held in 1932. Specifically, he participated in the committee of the musical scale, which began its preparatory work in 1929 and contributed significantly to the activities of the conference and its theoretical discussions. With the shift of modes of music production in Egypt during the mid-thirties of the twentieth century towards modernization and Westernization that were led by [Muḥammad] Abd al-Wahhāb dominating the music scene and replacing previous idioms,¹⁶⁰ Shawwā was no longer able to maintain his previous musical position and influence. [...] [He] died in Cairo on the twenty-third of December 1965, leaving a legacy of important recordings that reflect [the] prestigious standing that he built, after his father, for the Arab[ian] Violin”.¹⁶¹

Shawwā was also the founder, with Manṣūr ‘Awād, of “the first school for the teaching of Arab and European music in 1906 [Cairo]”¹⁶², and the author of a theoretical manual¹⁶³ for *sharqī* (oriental) and *gharbī* (western) music.

2. ABOUT THE QAṢĪDA

Yā Nasīm a-ṣ-Ṣabā was recorded by ODEON¹⁶⁴ in 1927 (see the internal cover of the black disk in Fig. 42) and is one of the most refined art works in *maqām* music. While performed within the general frame of *maqām Ḥijāz*, it features multiple, sometimes very complex or rare, modulations.

The origin of the *qaṣīda* – the lyrics – as such is disputed. While most attribute it to the *shaykh* Maḥmūd ibn ‘Abdullāh a-sh-Shahhāl,¹⁶⁵ one of the sources we could find attributes it – or part of it – to Niqūlāwūs (Nicolas) a-ṣ-Ṣā’igh (1756-1692 نيقولاوس الصايغ) – Fig. 44 – who was the head of the Catholic monks of the Saint-John convent of Shweir (دير مار يوحنا الصايغ الشوير) in Mount-Lebanon (Fig. 43).¹⁶⁶

¹⁶⁰ Cf. “In the 1930s musicians and journalists referred to the *maghna* repertory as *al-qadīm* (‘old’); during the 1930s and 1940s *al-qadīm* was contrasted with *al-jadīd* (‘new’), a term generally associated with a repertory and style created by Muḥammad ‘Abd al-Wahhāb, who consciously embraced the influence of Western music” – [Anderson, Castelo-Branco, and Danielson, 2001, II.1. General background].

¹⁶¹ Accessed 19/05/29 from <http://www.amar-foundation.org/sami-al-shawwa/>. The transliteration of Arabian names is adapted to the norms of NEMO-Online. (See also a most complete biography – in Arabic – of this performer at https://arz.wikipedia.org/w/index.php?title=سامي_الشوا&oldid=776474, accessed 19/05/29.)

¹⁶² [Anderson, Castelo-Branco, and Danielson, 2001, II, 2 (iv)].

¹⁶³ [Shawwā (al-) and 1946 الشوا].

¹⁶⁴ ODEON was a prolific record company which also made religious recordings in Egypt – more in [Racy, 1976, p. 33–36]. The



Fig. 42 The original black disk (copy) of the *qaṣīda Yā Nasīm a-ṣ-Ṣabā* performed by ‘Alī Maḥmūd & Sāmī A-sh-Shawwā with the recording number and date of publication (1927).

A further research led me to the Saint-John monastery, and to Fr. Būlus (Paul) Nazha – former Abbot and actual supervisor of the archives – who happened to be the editor of a booklet about a-ṣ-Ṣā’igh (Fig. 45).¹⁶⁷



Fig. 43 Overview of the convent Saint-John in Khonchāra (Khunshāra) – Lebanon.¹⁶⁸

Fr. Nazha ensured that Fr. a-ṣ-Ṣā’igh effectively composed such a *qaṣīda* and showed me the 6th edition of the *dīwān* (collection of poems) written by this poet (Fig. 46), including the *qaṣīda Yā Nasīm a-ṣ-Ṣabā* (Fig. 47).

company was founded in 1903 by former Zonophone director F. M. Prescott and was the first to introduce the double-sided discs – See [Racy, 1977, p. 93–94].

¹⁶⁵ See for example <https://ma3azef.com/الشوخ-علي-محمود-منشد-الطير-السراج/>, accessed 19/05/29. According to [Zirikli, 1980, v. 7, p. 177], Maḥmūd a-sh-Shahhāl was born in 1836 and died c. 1907; he notably had a “fine voice” and composed melodies besides writing poetry.

¹⁶⁶ See <https://rakhawy.net/153-قراعتفي-كراست-التدريبي-محمود-صاف-153/>, accessed 19/05/29.

¹⁶⁷ I would like to express here my heartfelt thanks to Fr. Makarios Haidamous – of the Convent *Dayr al Mukhallis* (“The Savior”) in Joun (South-Lebanon) and with whom we collaborated a few years ago for my research on Byzantine chant – for recommending me to Fr. Nazha.

¹⁶⁸ From [Karam, 2007, p. 18].



Fig. 44 Portrait of Fr. Niqūlāwūs a-ṣ-Ṣā'igh painted by 'Abd-al-Lāh Zākhir.¹⁶⁹

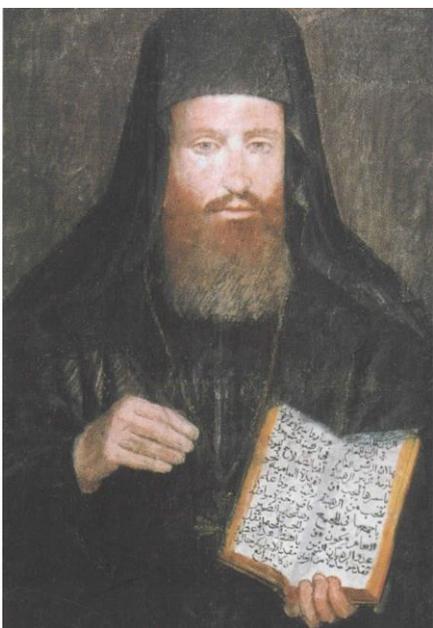


Fig. 45 Portrait of 'Abd-al-Lāh Zākhir (Taken from the cover of [Karam, 2007]).¹⁷⁰

However, and while the incipit – the first hemistich – of the *qaṣīda* composed by Nicolas is identical to the incipit of the *qaṣīda* performed by 'Alī Maḥmūd

¹⁶⁹ From [Karam, 2007, p. 7].

¹⁷⁰ The booklet – as a matter of fact an extended article – is entitled “[Commemoration of] 250 years after the death of the priest and scientist [*allāma*] Niqūlāwūs a-ṣ-Ṣā'igh”. As for 'Abd-al-Lāh Zākhir, he was a *shammās* (deacon) in the Saint-John convent at the time, and is known to have established in it the first printing press with

(يا نسيم الصَّبَا نَحْمَلُ سَلَامِي) or *Yā Nasīm a-ṣ-Ṣabā taḥammal salāmī* – the lyrics are provided in Fig. 48 and below), the remaining part is different while still based on the same meter and rhyme¹⁷¹.

It is nonetheless somewhat intriguing that the second hemistich of the first verse by a-ṣ-Ṣā'igh (Fig. 47) – *thumma balligh taḥīyyat al-mustahāmī* – be partly integrated in the first hemistich of the second verse of the version by a-sh-Shahhāl – *thumma ballighumu taḥāyā muḥibbin* (Fig. 48), with very close meanings for the two hemistichs.

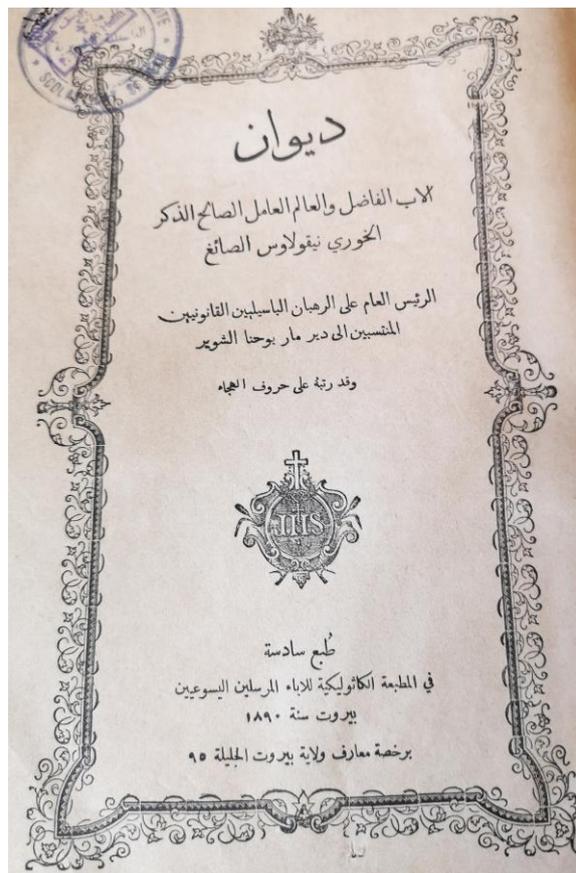


Fig. 46 Front page of the 6th edition of the *Diwān al-Abb al-Fāḍil wa-l-'Ālim al-'Āmil a-ṣ-Ṣālīḥ a-dh-Dhikr al-Khūrī Niqūlāwūs a-ṣ-Ṣā'igh* dated 1890, printed by the Catholic Press of the Jesuit Missionaries in Beirut.

Arabic letters in the Arab world. The original portrait of Zākhir is kept at the monastery and is 60 × 42 cm.

¹⁷¹ Each verse ends, in both poems, with the letter “m” (*qaṣīda mīmīyya*).

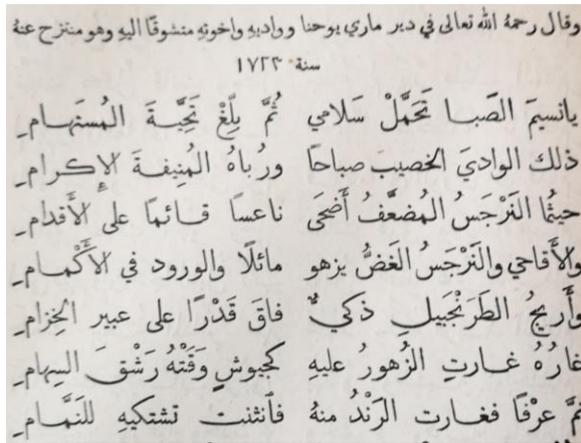


Fig. 47 The beginning of the *qasida* *Yā Nasīm a-ṣ-Ṣabā* by Niqūlāwūs a-ṣ-Ṣā'igh¹⁷² – dated 1723.

While searching further for the original of *Maḥmūd's* rendition, namely for a-sh-Shahhāl, we¹⁷³ could find the first edition of his *dīwān* (collection of poems) dated 1894 (Fig. 49), i.e. only four years after the 6th edition of the *dīwān* of Ṣā'igh, and printed in what seems to be the home town of Shahhāl, Tripoli in Lebanon.

The version included in this latter compendium, while slightly different from Māhmūd's interpretation (Fig. 48 and Fig. 50), is however clearly the source of his performance – and has the same exact second verse.



Fig. 48 Lyrics of *Yā Nasīm a-ṣ-Ṣabā* as transcribed from the performance of 'Alī Maḥmūd: in the last line, second hemistich and between brackets, is the word *fi* (= "in") which was replaced by "bi" (with a similar meaning) in the sung performance.¹⁷⁴

¹⁷² [a-ṣ-Ṣā'igh, 1890, p. 235].

¹⁷³ At the CERMAA, namely Rosy Beyhom.

¹⁷⁴ In the original version (see Fig. 50), the third and the fourth verses are in the reverse order.

¹⁷⁵ [a-sh-Shahhāl (a-t-Tarābulusi), 1894].

¹⁷⁶ The interview took place in the convent Saint-John on May 28, 2019.



Fig. 49 Front page of the *Diwān 'Aqd al-L'āl min Nazm a-sh-Shahhāl* by Shaykh Maḥmūd a-sh-Shahhāl a-t-Tarābulusi (from Tripoli - Lebanon – or *Tarābulus a-sh-Shām* in the Arabic original), published 1894 CE (1312 H) by Maṭba'at al-Balāgha in the same town.¹⁷⁵

Fr. Boulos Nazha explained,¹⁷⁶ however, that while the first expression in the first hemistich of the *qāṣida* – i.e. *Yā Nasīm a-ṣ-Ṣabā*¹⁷⁷ – is common in the literature, notably poetic, the complete hemistich – *Yā Nasīm a-ṣ-Ṣabā taḥammal Salāmi*¹⁷⁸ – is much less common. He even declared that he knew of no other example of the use of such a hemistich, be it in poetry or in prose, except in the *qasida* performed by 'Alī Maḥmūd that I had just submitted to him.

¹⁷⁷ This could be translated (see more explanations about the lyrics below) as "Oh Breeze of the East".

¹⁷⁸ This could be translated (see more explanations about the lyrics below) as "Oh Breeze of the East, bear my salutations".

It became then clear that a more thorough discussion of dates was necessary: by consulting the catalogue “Khalifé”¹⁷⁹ of the *Bibliothèque Orientale* of the (Catholic) Université Saint-Joseph in Beirut (run by the Jesuits), we found a mention of the *dīwān* of (a-ṣ-) Ṣā’iḡh under No. 1470 (Fig. 51), specifying that the first edition of the manuscript of the *dīwān* took place in 1859, which is 35 years before the publication of the *dīwān* of Shāhhāl.¹⁸⁰

✽ وقال حسب امكانه في مديح سيد البشر حضرة المصطفى ✽
✽ صلى الله عليه وسلم وشرف وكرم ✽

بأنسيم الصبا تحمل سلاحي	لظباء الحمى ووادي سلاحي
ثم بلغم تحايا محب	خلفوه نوح نوح الحمام
وأمل ذكراهم علي عسى يش	فهي فؤادي بذكرهم من سقايي
ولعل الزمان يسبح يوما	واری طيفهم ولو في المنام
يا خليبي عرجا بي الى وا	دي زرود لنحو تلك الخيام
وقفا بي علي الطلول وقولا	صبكم قد عناء فرط الغرام
فاسمحو بالوصال منكم لمضني	ذي آكتتاب في حيكم مستهام
آه والوعتي وفرط شجوني	وافنتاني في اهل ذاك المقام

Fig. 50 Detail from [a-sh-Shāhhāl (a-ṣ-Tarābulusi), 1894, p. 6] reproducing the beginning of the *qaṣīda Yā Nasīm a-ṣ-Ṣabā*, with the verses used by Maḥmūd delineated by green rounded rectangles. The 3rd and 4th verses (pinpointed by a double arrow) are inverted in Maḥmūd’s performance, and he uses – as explained in the caption of Fig. 48 – *bi* instead of *fi* in the last verse.

Knowing that the convent Saint-Jean in Khonchara is situated in the North-Metn region (mostly a mountainous area, slightly to the North of Lebanon) while Tripoli is today regarded as the capital of North Lebanon, and knowing that poetry and prose circulated from and to Lebanon, from and to other Arabian countries in the Ottoman Empire – including Egypt,¹⁸¹ and that there were frequent contacts between religious communities, at least on the cultural level (see Fig. 52), it becomes most probable that the Tripolitan *shaykh* a-sh-Shāhhāl was inspired by the *qaṣīda* of the 18th-Century priest of Khonchara for his own *Yā Nasīm a-ṣ-Ṣabā* which was

¹⁷⁹ Available online at <https://bo.usj.edu.lb/pdf/khalife/Poesie.pdf>.

¹⁸⁰ The estimation of the time difference is approximate because of the differences between the (Solar) Western Christian and the Islamic (*Hijri* – Lunar) calendars.

¹⁸¹ As specified by Fr. Boulos Nazha in the aforementioned interview.

¹⁸² Moreover: the last verse of this short poem is composed following numeric equivalences for each word which add up to the date of the founding of the church (see [Karam, 2007, p. 11]). This is a procedure

performed, partially and with minor changes, by ‘Ali Maḥmūd in his 1927 recorded performance with Sāmi a-sh-Shawwā on violin.

1470

Papier ordinaire. — Reliure en cuir jaune foncé, gaufré, mal conservée. — Écriture nasḥī. — Encre rouge et noire. — Le ms., dont un grand nombre de ff. sont détachés et qui est amputé de la fin, est paginé de 1 à 228. — 1 f. de garde au début et 1 seul à la fin. — Hauteur: 216 mm.; largeur: 155 mm. — Surface écrite: 170×90 mm. — 24 lignes la page.

Probablement XIX^e s.

Niqūla as-SĀYIG († 1756) : ديوان الحوري. Nous avons ici le *dīwān* incomplet du Supérieur général des religieux basilien (šuaïrites). En voici l’incipit: وبعد فهذا ديوان الاب العاضل والعالم العامل الصالح الذكر الحوري نيقلوس صايغ الاب العام الرهبان الفاسيليين القانطين المكرمين المنتسبين الى دير ماري يوحنا الشوير القاطنين في بلاد الروم... (Cf. *Echos d’Orient*, XI (1908) 71-76; 154-161. — *al-Maṣriq*, VI (1903) 97-111; IX (1906) 693; XXV (1927) 598-608; XXVIII (1930) 831-835; — Y. I. ad-Dibs, *Tārīḡ Ṣūriya*, VIII, 481. — L. Cheikho: *Ṣarḡ Maḡānī ‘l-‘adab*, II (1888) 661, etc.).

Pour les copies de ce ms. cf. Graf, *op. cit.*, III, p. 204.

Imprimé à l’Imprimerie catholique en 1859.

Fig. 51 Detail from [Anon. “Catalogue Khalifé des Manuscrits de la Bibliothèque Orientale”, p. 105] giving information about the manuscript and the first edition of the *dīwān* of Fr. Niqūlāwūs a-ṣ-Ṣā’iḡh.

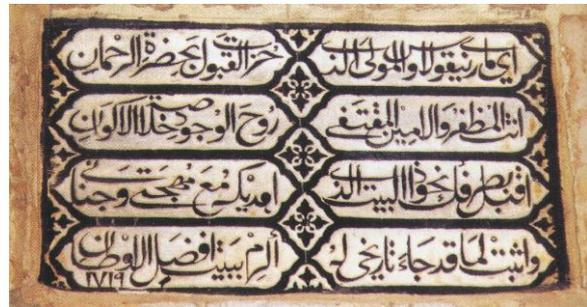


Fig. 52 A eulogy in the form of a short poem celebrating the founding of the Saint-Nicolas church (patron of Niqūlāwūs a-ṣ-Ṣā’iḡh who founded the church within the Saint-John convent in Khonchara - Lebanon) in 1719. The similitudes between Islamic and Eastern Christian calligraphies are obvious.¹⁸²

Furthermore: it is possible to hypothesize that Shāhhāl’s *qaṣīda* was a sort of response to the *qaṣīda* of Ṣā’iḡh, in the form of a *mu’āraḍa shi’riyya* (معارضة شعرية = “poetic opposition”) in which the *baḥr* (rhythm) and the *qāfiya* (rhyme) are kept identical to the original composition. In the present case, the fact that Shāhhāl kept the first hemistich (of the first verse) “as is” would further strengthen this hypothesis.¹⁸³

which is also used by Islamic sheikhs, notably in writings about music, for example in [‘Aṭṭārzādah, xix^e siècle (?)], which is an *urjūza* – a poem in the *rajaz* (corresponding to *mustafīlun* six times) prosodic meter – in form of a numeric puzzle, still not deciphered today.

¹⁸³ This hypothesis – with which I agree – was proposed by Hamdi Makhlouf.

3. TRANSCRIPTION AND transliteration OF THE LYRICS OF THE QAṢĪDA

The transcription below – followed verse per verse by the corresponding transliteration – is undertaken from the actual lyrics of the recording (performance) and follows the classical pronunciation of the Arabic language.¹⁸⁴

يا نسيم الصَّبَا

يا نَسِيمَ الصَّبَا تَحَمَّلْ سَلَامِي لِطِبَاءِ الْجَمِي وَوَادِي سَلَامِي
Yā Nasīm a-ṣ-Ṣabā taḥammal salāmi li-ḡibā'i-l-ḡimā
wa-wādī salāmi

ثُمَّ بَلِّغُهُمْ تَحَايَا مُجِبِّ خَلْفُوهُ يَنُوحُ نَوْحَ الْحَمَامِ
thumma ballighhumu taḡāyā muḡibbin khallafūhu
yanūhu nawḡa-l-ḡamāmi

وَلَعَلَّ الزَّمَانَ يَسْمُحُ يَوْمًا وَأَرَى طَيْفَهُمْ وَلَوْ فِي الْمَنَامِ
wa-la'allā-z-zamān[a] yasmaḡu yawman wa-'arā ṡay-
fahum wa-law fī-l-manāmi

وَأَمَلِ ذِكْرَهُمْ عَلَيَّ عَسَى يُشْفِي فُؤَادِي بِذِكْرِهِمْ مِنْ سِقَامِي
wa-amli dhikrāhumu 'alayya 'asā yushfā fu'ādī bi-
dhikrihim min siqāmi

أَهْ وَالْوَعْتِي وَفَرَطِ شُجُونِي وَافْتِتَانِي بِأَهْلِ ذَاكَ الْمُقَامِ
Āh wā law'atī wa farṡi shujūni wa-(i)ftitāni bi-'ahli
dhāka-l-muqāmi¹⁸⁵

¹⁸⁴ Maḡmūd pronounces some letters in the Egyptian way (for example “g” for “ج”=“j” in Classical Arabic) and takes small liberties with the vocalization in order to adapt the lyrics to the needs of the performance.

¹⁸⁵ There is a very interesting discussion in [Manzūr (ibn), 1981, p. 3781 (قوم)] about the subtle differences – and similarities – between *muqām* (“مَقَام”) and *maqām* (“مَقَام”) with a predominance of “residence” for *muqām* and “place” for *maqām* (أهْ لَا مَقَامَ لَكُمْ ، (أهْ لَا مَوْضِعَ لَكُمْ ، وَقُرَى لَا مَقَامَ لَكُمْ ، بِالضَّم ، أَيْ لَا إِقْلَمَةَ لَكُمْ مَعْلَج: معنى و شرح الصدا في معجم عربي أو قلموس عربي وأفضل قولميس اللغة الصبا/العرية”, namely at <https://www.majim.com/dictionary/الصباء/العربية>).

¹⁸⁶ Possible declinations of the meanings of the tri-letter root *sbā* of *a-ṣ-Ṣabā* are taken from an aggregator of Arabic dictionaries: [Anon. “قلموس”. معالج: معنى و شرح الصدا في معجم عربي أو قلموس عربي وأفضل قولميس اللغة الصبا/العرية”, namely at <https://www.majim.com/dictionary/الصباء/العربية>).

¹⁸⁷ “The *Ṣabā* is a wind which welcomes the house because it has an inclination towards it” – in [Manzūr (ibn), 1981, “Ṣabā”].

4. TRANSLATION AND INTERPRETATION OF THE LYRICS TO ENGLISH

As is the case in general in – particularly – Arabic poetry, many interpretations are possible either for single words or for a hemistich or a verse, or even for portions of the poem relating to this or that social or political event.

For example, *a-ṣ-Ṣabā* bears different meanings,¹⁸⁶ mostly “the rise of the Eastern Winds”, but also, as *a-ṣ-Ṣibā* (with an “i”), “youth”, “childhood”, “inclination [towards]”, with a possible concatenation of two meanings such as in the expression “والصَّبَا رِيحٌ تَسْتَقْبِلُ الْبَيْتَ قَبْلَ لَأْتِهَا تَجَنُّ”¹⁸⁷ which uses both the meanings of “wind” and “inclination towards” – not to mention that poets are allowed some liberty with the use of the language.¹⁸⁸

Furthermore, let us note that the *qaṣīda* is composed in the *Baḡr al-Khaff* (or “light meter”) *fā'ilātun mustafīlun fā'ilātun* (فاعلاتن مستفعلن فاعلاتن) which would correspond to the meaning of the incipit, the “light” breeze of the East.¹⁸⁹

Consequently, the translation below – which is the result of a collective work¹⁹⁰ – is but one possible interpretation of the lyrics.¹⁹¹

O Breeze of the East

O Breeze of the East, bear my salutations to the antelopes of the Keep and to the valley of (my) Peace

Then pass on the regards of a lover they left behind moaning like doves

¹⁸⁸ To which it is necessary to add that *a-ṣ-Ṣabā* is a well-known *maqām* which happens to have nothing in common with this particular interpretation of the *qaṣīda*.

¹⁸⁹ A further thank to Hamdi Makhlof for this remark.

¹⁹⁰ By Rosy and Amine Beyhom, with Saad Saab.

¹⁹¹ As one other interpretation, Lebanese poet Ghassan Michel Abou Chedid, consulted (on May 31, 2019) by Saad Saab for the translation of this part of the *qaṣīda*, proposes: “Oh Eastern breeze, bear my regards and heartfelt greetings to our young love(s) / Let them know of loving greetings left behind crying and moaning like a young dove / Maybe the passage of time will one day allow a view of their shadow even in dreams / Bestow their memories upon me, perhaps my recollection will heal my sickness / Oh loving pain full of worry and sadness with bewildered attachment of thy Folk”.

*Perhaps time will allow some day that I see them
emerging, if in my dreams*

*Arouse in me their remembrance, healing my heart
from its decay*

*Oh! how deep are my sorrow, my grief and my inclina-
tion towards the people in that place*

B. The Analysis

ABOUT THE ANALYSIS WITH PRAAT

The analysis began on March 18, 2018 and continued since.¹⁹² Many difficulties arose when analyzing this recording:

- The available recording is in a very bad condition
- The intensity level of the violin is very low when compared to the intensity of the voice (predominant), which compelled us to boost the intensity of the violin whenever possible.
- Some overlapping segments between the two instruments (voice and violin) forced a manual analysis (evidently approximate) because of the impossibility, today, to separate these voices in an effective way: a further attempt at recreating a stereo separation was made, and the resulting audio track – of the video analysis – reflects these attempts.
- Huge differences exist between the overall intensity of the melody and the intensities of the closing (and generally descending) formulae at the end of most phrases, which creates an additional difficulty in determining an optimal threshold – for Praat – for the intensity. (The overall threshold used in the analysis is shown in Fig. 53.)
- Lastly: the ending of most melodic phrases by Maḥmūd is very short and quiet; when combined with the high level of residual sound – from the analog recording, on one side, and from the general hiss and crackling sounds, on the other side – some of these endings had to be complemented.

¹⁹² The analysis continued, “officially”, till May 19, 2019, which is more than one year. Effectively, however, it went on well after this “official” date as the input of the two reviewers led to further dis-



Fig. 53 Approximate threshold for the (summed) intensity of the recorded sound, used in the Praat analysis. (Detail from a frame of the video around 15 s.a.)

As a general result, a compromise between accuracy and comprehensiveness had to be found, which ensued in some segments (especially the overlapping parts of the violin) being manually added on the graphics, and for missing bits of melody (lasting tenths of a second or less) to be complemented in order to reinstate the integrity of the melodic line. (Fig. 54, Fig. 55 and Fig. 56)

To complete the analysis, additional verifications were made with Rosy Beyhom reproducing particularly complex parts of the melody with a programmable workstation Roland EM-15 OR – tuned to 461.1 Hz and transposed -2 semi-tones (= 200 cents), which was a fair enough approximation of the overall tonic.

Further monitoring of the melody was undertaken by Saad Saab on *ūd*, and half- and third-tempo versions were produced to verify challenging parts of the performance, and eventually refine the analysis.

cussions on the *ṣayr al-ʿamal* (the melodic progression and modulations in the course of the performance) and, eventually, to amendments to the interpretation of the results. (The Art of *Maqām* is a difficult one, and its analysis is open to different interpretations.)



Fig. 54 Example of manually added parts in the video analysis of *Yā Nasīm a-ṣ-Ṣabā*. (See also Fig. 58.)

The literal analysis (below) is *in fine* the result of thorough – and sometimes passionate – discussions over fine details of pitch, or of the adequacy of a scale, or even about the denomination of a *maqām* whenever a few would fit the same scale that was discussed, while sometimes on the same tonic.



Fig. 55 Added part of the violin transposed one octave lower in the general view – Detail.

The proposed video-animations – in the original tempo¹⁹³ and in the third-tempo version¹⁹⁴ – reflect the literal analysis and are used as the base of further explorations such as for the technique of “vibrato” used by Maḥmūd (and Shawwā).

¹⁹³ Available at <https://youtu.be/et4iT3HLxno>.

¹⁹⁴ Available at <https://youtu.be/iHP4ZoKtgE>.

¹⁹⁵ This also became a standard procedure beginning with the 42nd analysis of the VIAMAP series, of (aforementioned) *Paotred er gueù à*

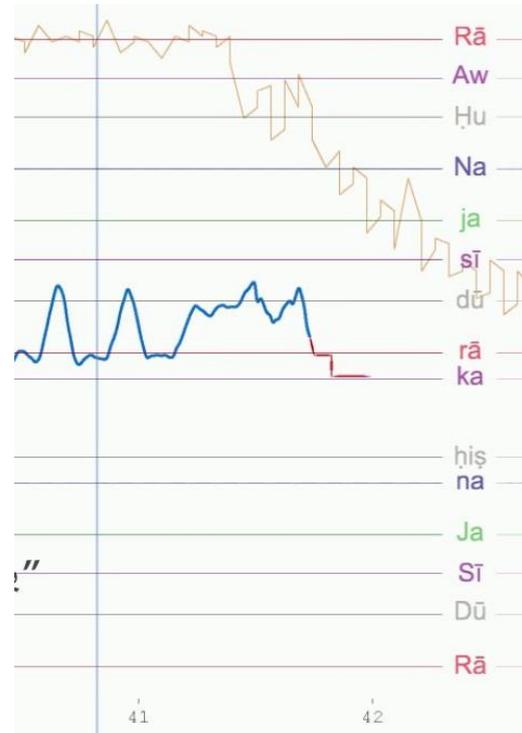


Fig. 56 Reconstructed ending of a melodic phrase by Maḥmūd around 42 s_a (here a detail from a frame of the video at approx. 41 s_a).

ABOUT THE GRAPHIC TREATMENT (VIDEO ASSEMBLING AND EDITING)

This 48th video analysis of the VIAMAP series lasted more than 18 months – including the preliminary research and analysis. It includes techniques already expounded in [Beyhom, 2018b], as well as a set of new techniques and added information about the recording and the music that is analyzed.

As is the case with previous analyses and in the general view, the graphic scale moves – slightly – vertically to better approximate the tonic of the singer; the tonic of the violin is stable.

In what concerns the complementary techniques, these include the implementation of the intensity of the instruments as a brownish light line (Fig. 59 & Fig. 63),¹⁹⁵ a two-octaves main scale (Fig. 61) in the lower stripe, a near three-octaves scale in the upper stripe (Fig. 57), and the aforementioned reconstructions of missing bits or overlapping parts of the melody.

bleuigner performed by Jorj Botuha (<http://foredofico.org/CERMAA/archives/1167>).

While two previous videos¹⁹⁶ used 3D techniques, the current video is in 2D due to the accrued complexity of this interpretation, with frequent changes of scales and ample vertical movements of the pitch.



Fig. 57 The near-three octaves graphic scale in the upper stripe.

Two instruments are analyzed – sometimes simultaneously – and differentiated by color – blue for the voice, green for the violin – with the intensity shown in light brown color, (Fig. 59 and Fig. 63) and the video editing required the use of nearly 170 different graphic and audio elements, including specific graphic scales and separate parts of information used in animation for the preliminary explanations (Fig. 60).

Exactly 16 different graphic scales were used in the analysis, corresponding to no less than 20 different modulations¹⁹⁷ – and a substantial number of different *genē* (or *ajnās* = melodic formulation of a polychord) and *maqāmāt* (modes) – used by ‘Alī Maḥmūd alone.¹⁹⁸ Detailed explanations about the scale(s) and the solmization (Fig. 61) are provided in both the video and in FHT 1:56.

In the general (lower) view stripe, the violin is transposed one octave lower (Fig. 58 and Fig. 59) in order to minimize the vertical space and maximize the clarity of the graphic reproduction.

¹⁹⁶ Aforementioned analyses of Hurrian Song No. 6 – <http://foredofico.org/CERMAA/archives/1433> – and of a *Huseynī Taksim* performed by Neyzen Tevfik at <http://foredofico.org/CERMAA/archives/1386>.

¹⁹⁷ The understanding of modulation in *maqām* music (see notably the seminal [Marcus, 1992]) goes well beyond the restricted acceptance of modulation in Western music of the classical period (or “of Common practice”). The reason for this is simple: in the case of equal-temperament, the only modulations possible in the latter music are from Major to Minor and *vice versa*, or by the changes of tonics (“transposition”). Adding to these procedures the versatility of the scales of *maqām* music – if not the differences in intonation



Fig. 58 Transposition of the violin one octave downwards in the general (below) stripe. (Compare with Fig. 54)

Furthermore: Due to a technical limitation¹⁹⁹, the main graphic results had to be split in three different parts, then reassembled and synchronized separately *and* with one-another.²⁰⁰

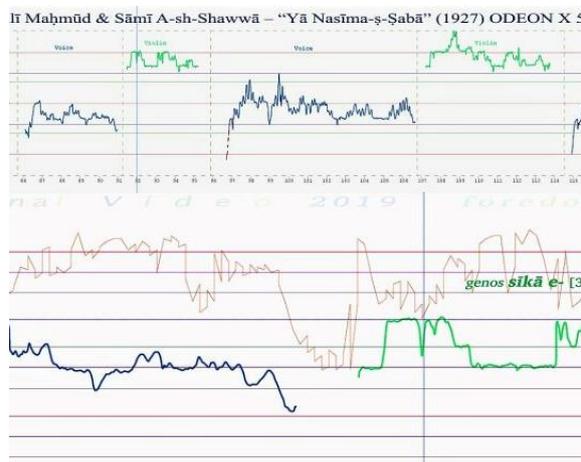


Fig. 59 Detail from a frame around 92 s.a showing the transposition of the part of the violin (upper stripe) one octave lower in the bottom stripe.

The video features also the lyrics of the *qaṣīda* in original Arabic as a prequel to the analysis, with a simultaneous reproduction of the lyrics *and* of the transliteration during the analysis. (Fig. 63)

for non-tempered *maqām* music – we face then a domain that virtually offers an infinity of possibilities, limited only by the ability of the performers.

¹⁹⁸ A complete list of these modulations is provided after the literal analysis.

¹⁹⁹ The assembling of very wide graphics in high resolution – such as those used in this video – is limited by the memory of the computer and/or by the memory that the computer program can handle.

²⁰⁰ The three parts used are:

Part I: 29096×677 pixels, 1-142 s.a (analysis time)

Part II: 29300×677 pixels, 142-285 s.a (analysis time)

Part III: 26845×677 pixels, 285-416 s.a (analysis time)

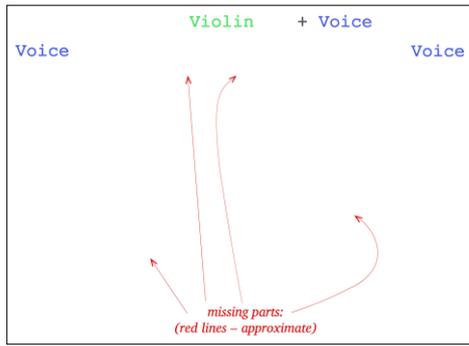


Fig. 60 Explanations used for the video, superimposed to the original graph in Fig. 54.

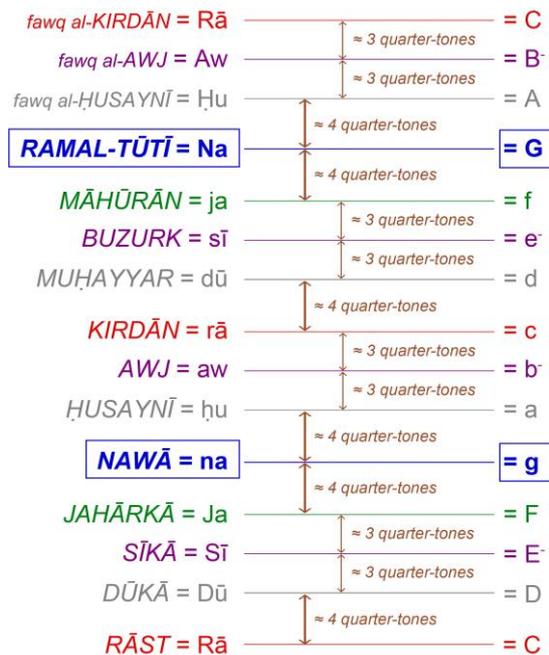


Fig. 61 Main two-octaves graphic – and theoretical – scale of *maqām* music implemented in the video-animated analysis – with intervals in multiples of a tempered quarter-tone. The names of the degrees of the scale (to the left) are equated to their solmization as explained in FHT 1. (Note that the upper Na = RAMAL-TŪTĪ may also be called SAHM – “arrow”.)

Finally: the very complex modulations by both performers and the particular techniques used by Maḥmūd – such as his ample vibrato and his instant endings of melodic phrases – are among the reasons which led us to produce the third-tempo version. This is the – complementary – basis which allowed us to weave some of

the forthcoming interpretations and explanations that the reader/auditor would be able to verify by himself.

PRELIMINARY REMARKS AND CONVENTIONS

Particular conventions are used in the following analysis:

- Pitches bordering intervals are connected with lower hyphen (*naḥu*) while suites of pitches are either connected with (or separated by) a dash (*naḥu*, *na-ḥu*), or not connected (*na ḥu*).
- *Maqām* names and tonic are in bold font: this allows to better differentiate *maqām(s)* from *ajnās* (*genē*) and tetrachords, and to quickly identify the tonic of each *maqām* in the case of a complex modulation.

Moreover, the various declinations of the *ḥijāz* tetrachord are not differentiated by their names (they are all called *ḥijāz* in the text), but by their content (either 262, 253 or 352 – see Fig. 62 for an example of the latter – in multiples of the quarter-tone).

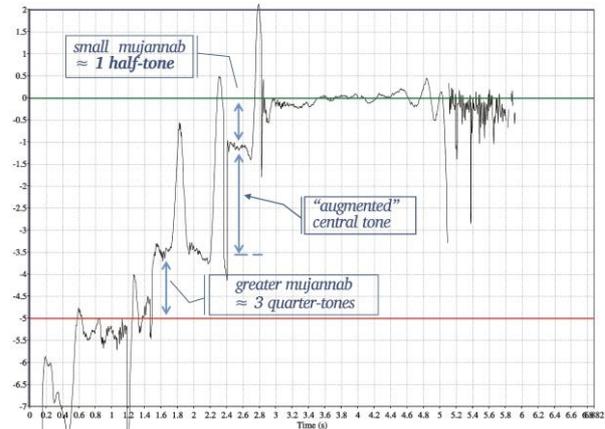


Fig. 62 An example of *genos hijaz 352* performed by Hafiz Kani Karaca.²⁰¹

This happens because the mastery of these two performers in swapping different tetrachords and *maqām* scales – if not *maqām(s)* – far outweighs the confines of tradition, and of the traditional theory of *maqām* music.

²⁰¹ Extracted/adapted from Slide No. 19 in the accompanying PP show of [Beyhom, 2014]. (The excerpt corresponds to 01:32.000-01:38.881 on track 2 [Hafiz Kani Karaca et al., 2002] entitled “Evening Prayer Call in Makam Hicaz” of the CD 02.34.Ü.1896.001 {2},

Aşk ile... - With Love...: Türk dinî musiki formlari - Compositional Genres of Turkish Liturgical Music.)

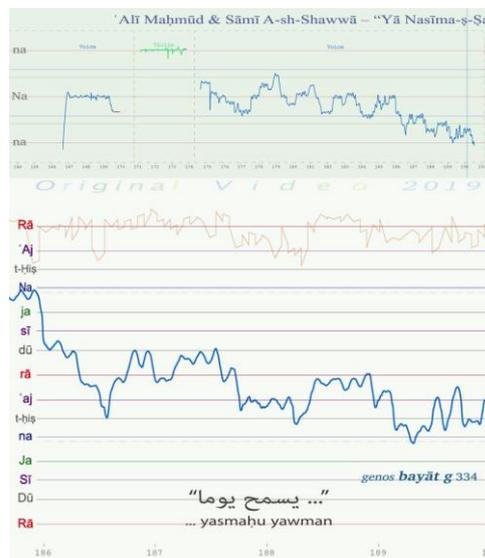


Fig. 63 Detail from one frame of the video displaying the upper and lower stripes, with a near-three-octaves span in the former and a two-octaves span in the latter. The lower stripe features a graph of the intensity (in light maroon color) with complete literal indications on the course of the melody, the lyrics for this segment of the analysis, and the transliteration below.

The same applies to the different versions of scales containing *hijāz* tetrachords, which are not differentiated in traditional theoretical descriptions; thus, *maqām Hijāz-Kār* may have an intervallic composition expressed as one of the suites 2624262 or 3524253, with the first one comprising two bordering symmetrical – and “semi-tonal” 262 *hijāz* tetrachords, while the second one contains two different – and differentiated one from another – *hijāz* tetrachords 352 and 253, which are, however, disposed symmetrically around the central one tone interval (“4”).

Furthermore, in this music and as is well-known to many readers – and mostly in Arabian and *Sharqī* music, different *maqām(s)* may use the same scale, sometimes

²⁰² A major part of the Ph.D. thesis of the author [Beyhom, 2003b] is dedicated to the recension of these *maqām(s)* and *ajnās* (plural of *jins* = *genos*).

²⁰³ A comprehensive comparison of the names and structures of *ajnās* can be found in [Marcus, 1989, p. 300–308].

²⁰⁴ [Marcus, 1989, p. 294].

²⁰⁵ [Marcus, 1989, p. 295].

²⁰⁶ [Marcus, 1989, p. 298]. Additionally, [Erlanger, 1949, v. 5, p. 79–80] explains that the tetrachords *‘ushshāq*, *nahawand* and *būsalīk*, while similar in scalar composition [4 2 4] are used for different positions within the general scale. He also explains that *‘ushshāq* was still used at the time his book (5th Volume) was being written (1920s?) mostly for the occurrences of this tetrachord on *d* or *a*, while *nahawand* would be used more particularly when the tetrachord was based on *c* or on *f*. A rapid survey of the terminology

on the same tonic and sometimes only in ascent when in descent for other *maqām(s)*.²⁰²

The same phenomenon may occur for *genē*²⁰³ – such as *būsalīk*, *‘ushshāq* and *nahawand* (see FHT 2:57) which have the same theoretical composition (424 – or “minor” tetrachord – in multiples of the quarter-tone) but (1) may be formulated differently (notably for the leading interval) and (2) on different starting degrees of the scale (localized tonic of the *jins* or *genos*):

“on occasion, the same tetrachordal structures are given different names depending on where they occur in the general scale. For example, although the *rāst* tetrachord keeps the same name whether it occurs on *GG*, *C*, *D*, *F*, or *G*, the *nahawand* tetrachord is commonly called ‘*nahawand*’ when it occurs on *C* or *F* but is often called ‘*būsalīk*’ when it occurs on *D* or *G*”.²⁰⁴

Thus:

“In his tetrachordal analyses of the various *maqāmāt*, ‘A.H. Nuwayrah makes a distinction between the tetrachords *būsalīk* and *‘ushshāq* based on their leading tones: the former, he says, has a half-step leading tone while the latter has a whole-step leading tone [...]. This idea is based on the leading tones that occur in the modes of the same names, *būsalīk* having the notes (*C[#] / D E F G A B^b c[#] d*) and *‘ushshāq* having the notes (*C / D E F G A B^b c d*)”.²⁰⁵

Note however that

“[m]ost theorists use the names ‘*ajam* and *jahārkā* interchangeably”.²⁰⁶

In the case of the modes used in Maḥmūd’s and Shawwā’s performance, mode ‘*Ajam-Ushayrān* 4424442 (which is originally on *b^b*) becomes, if the tonic swaps to *d*, *maqām Kurd* 2444244 – provided that the melodic line reinforces the *d* as the tonic.²⁰⁷

While the overall complexity of the modulations in Maḥmūd’s and Shawwā’s performance makes it even more difficult to follow – and to dissect – the *sayr al-*

used in [Erlanger 1949] shows a predominance of *būsalīk* over the other two names, mostly on *g* (more than 70 occurrences in different *maqāmāt* and different octaves) and on *d* (approximately thirty occurrences), while rarely on *f* (two occurrences) or on *c* (four occurrences). *nahawand* is cited seldom, mostly on *g* (!) with nine occurrences, on *d* (seven occurrences) and *f* (!) – four occurrences – or *e* (two occurrences) or even on *b^b* (one occurrence). Moreover, *‘ushshāq* is not cited as a tetrachord in the composition of *maqāmāt*. As a (repeated) conclusion: *Maqām* theory is still “under construction” and open to diverse interpretations.

²⁰⁷ This happens when Maḥmūd uses (see below) a modulation from *maqām ‘Ajam-Ushayrān* 4424442 on *e^b* to *maqām Kurd* 2444244 on *g*.

'amal, it is here necessary to give a few complementary explanations, mainly about the denominations of the maqām(s) in the literal analyses below.

PRELIMINARY DISCUSSION OF SCALES AND MODES

Firstly, I use the denominations *Hijāz(-Awjī)* and *Hijāz(-'Ajāmī)* to differentiate the two main scales of maqām *Hijāz* (theoretically – when it is not transposed – on *d*), the one using a *rāst* polychord 433[4] on *a* and passing through *AWJ=b⁻* (or *Hijāz-Awji d* 2624334), and the one using a *būsālīk* polychord 424[4] on *a* and passing through '*AJAM=b^b* (or *Hijāz-'Ajāmī d* 2624244).²⁰⁸

Secondly, I use the denomination '*Ajam-Ushayrān* and not '*Ajam* (without the caudal *Ushayrān*) as it is commonly known today (both in the Mashriq and in the Maghrib), for the (ascending) 4424442 scale:²⁰⁹ there are a few reasons for this choice.

Originally, the scale of '*Ajam-Ushayrān* (Fig. 64 and Fig. 65) has *b^b* as a tonic, which easily transposes to the lower fifth *e^b*. While based on the near-unique use of '*ajam* tetrachords 442 – with the occasional use of a descending semi-tonal *hijāz* tetrachord 262 on *f*, this scale is different in both its composition and tonic from the scale of maqām '*Ajam* (Fig. 66 and Fig. 67) which starts on the tonic *d* with a *bayāt* 334 tetrachord, and does not comprise a descending *hijāz* variant as it is shown for the former maqām. (Fig. 65)

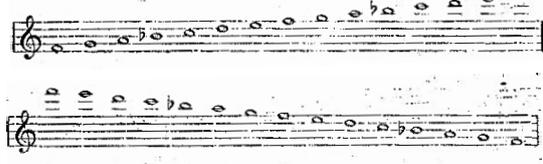
Here not only does the tonic differ, but also the scale and the formulation of the *sayr al-'amal*,²¹⁰ which makes it indispensable to differentiate the two maqām(s), and to name them properly, especially since traditional maqām theory does differentiate them.

However, it is notable that performers such as Maḥmūd and Shawwā had flawless knowledge of the maqāmāt and we will see that they enjoyed, at least in

this performance, blurring the boundaries between even very different maqām(s), not to say between two which have a close internal structure. This is why the reader will find for example both maqām(s) '*Ajam* and '*Ajam-Ushayrān* in the following literal description of the performance (and in the video analysis).²¹¹

مقام عجم عشيران
Maqām Ajam Ouchayrane

جنس عجم (ذو الخمس) على العجم عشيران Genre Ajam Zul khams (quinte) sur le Ajam Ouchayrane	جنس جباركاه (ذو الاربع) على الجباركاه Genre Djahar- kah Zul arbaa (quarte) sur le Djaharkah	جنس عجم (ذو الخمس) على العجم عشيران Genre Ajam Zul khams (quinte) sur le Ajam	جنس جباركاه (ذو الاربع) على الجباركاه Genre Djahar- kah Zul arbaa (quarte) sur le Jawab Djaharkah
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جنس جباركاه (ذو الاربع) على الجباركاه Genre Djahar- kah Zul arbaa (quarte) sur le Jawab Djaharkah	جنس عجم (ذو الخمس) على العجم عشيران Genre Ajam Zul khams (quinte) sur le Ajam	جنس جباركاه (ذو الاربع) على الجباركاه Genre Djahar- kah Zul arbaa (quarte) sur le Djaharkah	جنس عجم (ذو الخمس) على العجم عشيران Genre Ajam Zul khams (quinte) sur le Ajam Ouchayrane
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Fig. 64 The scales and polychordal structuring of maqām '*Ajam-Ushayrān* as reproduced in the proceedings of the *Congrès du Caire* of 1932.²¹²

Thirdly, about the difference between maqām *Sikā* and maqām *Sikā-Huzām*²¹³. While the scale of maqām *Sikā* (as such) is the same as the scales of maqām(s) *Rāst* (on *c* = *RĀST*) and *Husaynī* (on *d* = *DŪKĀ*), with the successive ascending suite 3443343, but with a different tonic (*e⁻* = *SĪKĀ* = *e⁻* one quarter-tone – see Fig. 68), the scale of maqām *Sikā-Huzām* 3426243, while also having *e⁻* = *SĪKĀ* as a tonic degree, includes a *hijāz* tetrachord (which can be the “tempered” version – or 262 in multiples of the quarter-tone, or any of 352 and 253 – with

²⁰⁸ These denominations – with which I totally agree – were suggested by Scott Marcus.

²⁰⁹ From this point on all intervals are expressed as multiples of an approximate quarter-tone.

²¹⁰ According to [Erlanger, 1949, v. 5, p. 148, 250], maqām '*Ajam-Ushayrān* follows the progression II I III IV (see Fig. 65 – second tetrachord on *f* then first tetrachord on *b^b*, etc.) with a regular (IV III II I) descent, while maqām '*Ajam* (Fig. 67) has the ascending progression III II IV (by-passing thus the first *bayāt* tetrachord) and IV III II I in descent (closing with the *bayāt* tetrachord).

²¹¹ This happens notably, for maqāmāt '*Ajam* and '*Ajam-Ushayrān*, between 240 and 259 s_a (see the detailed literal description

farther), with an initial maqām '*Ajam-Ushayrān e^b* 4424442 descending to the lower *Ku* = *E^b* (240.5 s_a) then reaching the upper *Rā* = *C* (approx. 243 s_a) – with a near two-octaves span – while transforming in maqām '*Ajam na* = *g* 3344244 with a *qafta* (closing of the phrase, “cadence”) for both performers in tetrachord *bayāt* at 247-250 (Maḥmūd) and 256.5-258.5 s_a (Shawwā). Note here that the tonics of the two maqām(s) – *e^b* and *g* – are similarly related as with the two maqām(s) on their original (*b^b* and *d*) tonics.

²¹² [Collectif, 1933, p. 200m]. (The Commission of the Modes used *RĀST* = *g*, which results, in comparison with the “Modern” notation, in a transposition to the upper fifth.)

²¹³ Also known as *Sikā-[K]Huzām* – or simply *[K]Huzām*.

a *zalzalian* five-quarter-tones central interval) on *g* = NAWĀ (Fig. 69).



Fig. 65 The scale of *maqām 'Ajam-Ushayrān* as explained in [Erlanger, 1949].²¹⁴

مقام عجم
Maqām Ajam

جنس بیانی (ذو الاربع) على الدوگاه Genre Bayati Zul arbaa (quarte) sur le Dougah	جنس عجم (ذو الخمس) على الدیم Genre Ajam Zul Khams (quinte) sur le Ajam
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جنس چهارگاه (ذو الاربع) على المهارگاه Genre Djaharkah Zul arbaa (quarte) sur le Djaharkah	جنس كرد (ذو الاربع) على للمير Genre Kurde Zul arbaa (quarte) sur le Mohayar
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جنس عجم (ذو الخمس) على الدیم Genre Ajam Zul Khams (quinte) sur le Ajam	جنس بیانی (ذو الاربع) على الدوگاه Genre Bayati Zul arbaa (quarte) sur le Dougah
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جنس كرد (ذو الاربع) على للمير Genre Kurde Zul arbaa (quarte) sur le Mohayar	جنس چهارگاه (ذو الاربع) على المهارگاه Genre Djaharkah Zul arbaa (quarte) sur le Djaharkah
--	--

Fig. 66 The scales and polychordal structuring of *maqām 'Ajam* as reproduced in the proceedings of the *Congrès du Caire* of 1932. (See previous figure).²¹⁵

²¹⁴ [Erlanger, Kriaa, and 2018, قریعة, v. 5, p. 160].

²¹⁵ [Collectif, 1933, p. 235m].

²¹⁶ [Erlanger, Kriaa, and 2018, قریعة, v. 5, p. 262]: Note that the descending scale in the representation of *maqām 'Ajam* in the proceedings of the *Congrès* doesn't comprise a *bayāt* tetrachord, and uses instead a *kurd* tetrachord on *d* (transposed as *f*).

²¹⁷ (See [Beyhom, 2003b; 2004; 2005; 2006; 2010; 2014; 2015b; 2017].) Further details about the Modern theory of *maqām* can be found in the aforementioned [Marcus, 1989], with a short overview in [Marcus, 2001].

²¹⁸ See for an example the commentary on the *Seven Maqāmāt* performed by Muḥammad al-Ghazālī in [Beyhom, 2018b, p. 192]; note however that the performance of this cantor is destined to the



Fig. 67 The scale of *maqām 'Ajam* as explained in [Erlanger, 1949].²¹⁶

Fig. 68 Central part of the general scale of (Arabian) *maqām* music.²¹⁷ (Here with the scales of *maqām Rāst* beginning with the degree *RĀST*, the scale of *maqām Ḥusaynī* beginning with the degree *DŪKĀ*, and the scale of *maqām Sīkā* beginning with the degree *SĪKĀ*. The numbers between brackets (separated by a comma) indicate successively the ranks of the database – here octavial = 0 –, of the hyper-system – here 19 –, of the system – here 4 – and of the sub-system (or differentiated scale) – here 3 to 5 – in the scale classification of Modal Systematics. The last number displays the composition, in concatenated numbers (digits) of approximate quarter-tones, of the ascending scale, for example 3 4 4 3 3 4 3 for *maqām Sīkā* – which become 3443343 in concatenated form.)

The confusion between the two does take place in today's *maqām* music,²¹⁸ whenever the denomination with Erlanger (*maqām Khuzām* – in Arabic in Fig. 69) does not even include the term “*Sīkā*”, while *maqām Sīkā* is considered to be the basis of *maqām (K)Huzām*.²¹⁹

This shows that much more research is still needed in order to clarify the theory of *maqām* music, and should nonetheless be an incentive for researchers to try to be as precise as possible when analyzing this music,

YouTube platform, which necessitated probably an effort for the outreach of the audience and a simplification of the explanations about the *maqām(s)* in his performance, reduced to simple announcements of the latter: this applies even more when such an announcement is made in singing form – as part of the performance.

²¹⁹ [Hilū (al-), 1972, p. 132] explains in a footnote that the name *(K)Huzām* was attributed to this *maqām* by the Turks, while the old name of the mode was effectively *Sīkā*: the most appropriate denomination for this mode appears to be, today, *maqām Sīkā-Huzām*.

and use the most adequate denominations for a *maqām* fitting one scale or another.²²⁰



Fig. 69 The scale of *maqām* [K]Huzām.²²¹

GENERAL LITERAL ANALYSIS OF YĀ NASĪM A-Ṣ-ṢABĀ PERFORMED (1927) BY ‘ALĪ MAḤMŪD (VOICE) & SĀMĪ A-SH-SHAWWĀ (VIOLIN) – ODEON X 55 581/1

As aforementioned, this recording is among the most difficult to analyze, due to the mastery of both performers while undertaking multiple – and complex – modulations, combined with the very ample vibrato sometimes used by Maḥmūd and to the obvious pleasure both performers take in blurring the boundaries between different *maqāmāt*.

The general “mood” of the performance can be described as evolving in and around *maqām Ḥijāz* (or “chromatic”) on *g*. However, the unwinding of the *sayr al-‘amal* (or “melodic progression”) relies mainly on *maqām ‘Ajām* on *na = g* in relation with *maqām ‘Ajām-‘Ushayrān e^b*.

The three main variants of tetrachord *hijāz* are used within the scales of *maqām(s) Ḥijāz* and *Ḥijāz-Kār*, namely (in multiples of the quarter-tone) the “piano” *hijāz* 262 (successively semi-tone, one-tone-and-a-half, semi-tone), and the two *zalzalian* (i.e. comprising odd multiples of the quarter-tone, i.e. not – entirely – semi-tonal) tetrachords *hijāz* 253 (successive semi-tone, five-

quarter-tones and three-quarter-tones intervals) and its symmetric brother *hijāz* 352 (invert the preceding progression).²²²

This whole set of tetrachords, scales and *maqām(s)* interacts constantly with the *zalzalian rāst* 433, *bayāt* 334 and *sikā* 34[4] tetrachords²²³ – and with the corresponding *genē* and modes.

MORE DETAILED LITERAL ANALYSIS²²⁴

The *qaṣīda* begins with *maqām Ḥijāz(-‘Ajāmī)* 2624334 on *NAWĀ* (on the graphic: lower *na = g*) for both performers (Maḥmūd then Shawwā) with a near-immediate modulation by Maḥmūd (16 s_a) to *maqām Ḥijāz(-‘Ajāmī) g* 2624244 and back (23.5 s_a) to *Ḥijāz(-‘Ajāmī)*, alternating melodic phrases until the *taslīm*²²⁵ – in the latter *maqām* scale – by Maḥmūd (to Shawwā) at 42 s_a (seconds of the analysis) after which Shawwā, starting – however – from *ku = e^b* as a reminder of *Ḥijāz(-‘Ajāmī)* and a hint to the coming secondary modulation, displays the complete descending then ascending scale of *maqām Rāst* on lower *Rā = C* with an inception of *genos ṣabā-zamzama b* 242 centered on *c* (47-52 s_a), reminiscent of the scale of *maqām Ḥijāz(-‘Ajāmī)* on *g* 2624244.²²⁶

Back to *maqām Ḥijāz(-‘Ajāmī) g* 2624334 at 53 s_a, Maḥmūd develops a long, ample melismatic phrase concluded on the tonic at approx. 76 s_a, emulated shortly by Shawwā from 77 to 85 s_a. Maḥmūd modulates then (86-91 s_a) to *maqām Sikā* on *SĪKĀ (sī = e⁻)* 3443343 reaching however (while ascending) *Na = G* and stabilizing on the tonic *sī (e⁻)*, followed similarly by Shawwā (91-95 s_a), with a complete development of *maqām Sikā* by Maḥmūd (97-107 s_a) and a variation in *maqām*

²²⁰ An intelligent reform of the theories of *maqām* music is long overdue, but this will not happen anytime soon...

²²¹ [Erlanger, Kriaa, and 2018, قريعة, v. 5, p. 320].

²²² See FHT 2:57, and [Marcus, 1993, p. 43–44] about the modern concept of “shrunken augmented seconds”. (The whole article can interest the reader concerned with variants of intonation – and temperaments? – in Arabian music.)

²²³ Strictly speaking, *genos sikā* is based on the (trichordal) 34 core on *e*, which can be extended below to pentachord *rāst c* 43 [*e*] 34 (which incorporates tetrachord *sikā*) or in the ascending direction by following the general scale of *maqām* music (Fig. 68). It also may be used suggesting a *Sikā-Huzām* (by inserting a *hijāz* tetrachord – or only the first interval of it – on *g*. Moreover, all these *genē* can be transposed to (virtually – see for example [Marcus, 1989, p. 300–308]) any intermediate pitch of the general scale: knowing that even experienced singers have a slight tendency to displace the general tonic pitch in the course of a performance – especially when

modulating a lot –, this means that every *genos* can be virtually transposed to any position of the acoustical vertical space within the span of the performer’s voice. (See for example the commentary on Muḥammad al-Ghazālī’s performance of his *Seven Maqāmāt* in [Beyhom, 2018b, p. 197–201] and [Beyhom and CERMAA, 2018d].)

²²⁴ See also FHT 8:61 for a complete graphical notation of the performance.

²²⁵ “Handover”.

²²⁶ This ascending variant of *maqām Ḥijāz* (called *Ḥijāz-‘Ajāmī* according to Scott Marcus) uses a *nahawand* tetrachord 424 (here) on *rā = c*. Note also here that – as noted by Hamdi Makhlouf – while descending (around 44.2 s_a), Shawwā omits the degrees *aw* and *hu* and replaces them by an intermediate *a^{b+}* (or *a⁻*) pitch, giving in so doing a particular “flavor” to the scale.

*Sikā-Huzām*²²⁷ *sī* (e^-) 3425343 by Shawwā (107-114 s_a).

At 115-129 s_a Maḥmūd modulates using an upper *genos bayāt G* 334 hinting to *maqām ‘Irāq* on *SĪKĀ* ($sī = e^-$) 3433443,²²⁸ then (129-132 s_a) a (lower) *genos rāst c* 433[4] embodying thus the descending scale of *māqām Yākā g* transposed on *c* 4334334 – or of *māqām Nayrūz-Rāst* on *c*²²⁹ – similarly reproduced (133-141 s_a) by Shawwā with, however, an initial insistence on *genos sikā e^-* 34, which reinforces the modulation to come (by Maḥmūd).

The next step of the *sayr al-‘amal* – of this particular performance of *maqām Hījāz* – is a general modulation by Maḥmūd (142-162 s_a) from *maqām Sikā e^-* 3443343 to *maqām ‘Ajām na = g* 3344244, initiated with a hint of *genos ‘ajām e^b* [2]44 (the first semi-tone is below e^b) and concluded (see Fig. 66:44) with a – structural – *genos bayāt g* 334[4] at 161-162 s_a.²³⁰

Returning after a pause to *genos ‘ajām e^b* 442 (167-170 s_a) with Shawwā underlining (171-174 s_a) the third degree $Na = G$, Maḥmūd initiates his next phrase (around 175 s_a) by a *genos hījāz G* 25[3]²³¹ then modulates (176 s_a) back to *maqām ‘Ajām na = g* 3344244 and undertakes (177-192 s_a) to develop the scale of the *maqām*²³² – still concluded (189-191 s_a) by *genos bayāt g* 334[4] –, similarly developed (191-205 s_a) and concluded (205-207 s_a) after him by Shawwā.

²²⁷ By replacing the central tetrachord *rāst* 433 on *g* with *hījāz* 253.

²²⁸ With a possible hint to *maqām Sikā e^-* 3443343, notably at 121-124 s_a.

²²⁹ (Remark from Scott Marcus:) Note that, while a modulation from *sikā* on *SĪKĀ* ($sī = e^-$) 34[4] to *bayāt* on its third degree *G* 334 is common for *maqām Sikā* as such, and while it is also common, when *bayāt* 334 is played on *NAWĀ G*, to include several descents to a *rāst* 433 tetrachord on *RĀST c*, *shaykh* Maḥmūd makes here this into a major modulation.

²³⁰ The modulation from *maqām Sikā e^-* 3443343 to *genos ‘ajām e^b* 44[2] – one quarter-tone difference between the two tonics – is but one example of Maḥmūd’s mastery of the art of the [*mūsiqā*] [*al-‘maqāmīyya* (*maqām* music)]. (For the choice of *maqām ‘Ajām* as a generic *maqām* for this phrase, refer to Fig. 66:44.)

²³¹ This is a passing modulation (see [Marcus, 1989, p. 765–766]) which could hint to *maqām Rāḥat-al-Arwāḥ ku = e^b* 4435242 (theoretically based on b^b), and a reminder of the opening *maqām*.

²³² Note at 178 s_a (remark by Scott Marcus) the use by Maḥmūd of $A = \text{Hu}$ (probably however a $t\text{-Hīs}$), functioning as a lower neighboring tone (rather than $A^b = \text{Hīs}$).

²³³ See also [Marcus, 1989, p. 763]: “Sudden vs. Gradual Modulations[:] Musicians and music teachers have mentioned at least three other ways to classify the modulations. These differ from the

Maḥmūd initiates then a rather abrupt modulation²³³ (208-214 s_a) to what will reveal itself as the central *maqām* in this performance, *maqām Hījāz-Kār g* 3524253 with two *hījāz* tetrachords (352 and 253) symmetrically positioned around the *rā dū* (c, d) interval while, after a similar phrase by Shawwā (214-219 s_a), performing a variation in the same *maqām* followed by a short pause and a new phrase in *maqām Hījāz-Kār g* 3524253 (227 s_a) masterfully turning, at 232 s_a, into *maqām ‘Ajām-Ushayrān e^b* 4424442 descending to the lower $Ku = E^b$ (240.5 s_a) then reaching the upper $Rā = C$ (approx. 243 s_a) – with a near two-octaves span – while transforming in *maqām ‘Ajām na = g* 3344244 and concluding (250 s_a) this phrase as for the first occurrence(s) of this *maqām* with a *genos bayāt* 334[4] on the tonic g .²³⁴

Shawwā repeats (251-258 s_a) the last phrase in *maqām ‘Ajām* while Maḥmūd (259 s_a) returns to *maqām Hījāz-Kār g* 3524253 with (263 s_a) a similar response from Shawwā. Maḥmūd modulates then somewhat abruptly (266.5-270 s_a) with a *genos rāst* on e , imitated by Shawwā (270-273 s_a), before coming back to *maqām Hījāz-Kār g* 3524253 (274-278 s_a) and beautifully modulating, after a long $Na = G$ note (277.5-282 s_a), to *maqām Hījāz-Kār d* 3524253 centered on the – equally central – interval $Na, \text{Hu} = G, A$ with bordering

tonic/non-tonic classification in that they all involve a degree of subjective judgement and are thus open to personal interpretation. The first, used by Jihad Racy in his classes at UCLA and by two of my teachers in Cairo, recognizes sudden versus gradual modulations. Sudden modulations tend to put important contrasting features of two *maqāmāt* in immediate juxtaposition. The new mode is usually presented directly after a cadence in the original mode. The contrasting feature of the new *maqām* is often contained in the new mode’s lower tetrachord. Further, the contrasting feature is often arrived at by an ascending melodic leap [...]. Gradual modulations, on the other hand, often occur almost inconspicuously in the middle of a phrase (rather than after a cadence). Further, such modulations often begin in the new mode’s upper tetrachord. It is only when the melodic line completes a gradual descent to the lower tetrachord of the new mode that the modulation is fully confirmed (for it is the lower tetrachord which is generally understood to contain a mode’s dominant character). {The whole Chapter XI (entitled “Modulation”, [Marcus, 1989, p. 755–788]) of Marcus’ Ph.D. dissertation as well as the article [Marcus, 1992] are of interest to the reader.}

²³⁴ See footnote no. 211:43.

semi-tones (282-285 s_a), nearly immediately imitated – with variants of intonation – by Shawwā (285-290 s_a).

This *tour de force* is followed (290-296 s_a) by a further modulation by Maḥmūd to *maqām Bayāt* on *dū* = *d* with a repetition by Shawwā (297-302 s_a), while Maḥmūd goes on developing *maqām Bayāt* from 303 to 317 s_a and concludes on *Na* = *G*.

After a short silence (with the cheering of one listener in the studio)²³⁵, Maḥmūd initiates (322 s_a) another modulation, beginning on the same note *Na* = *G*, to a *genos kurd dū* = *d* 244 which, before the end of a hint to the same *genos* by Shawwā (328-331 s_a), evolves into *maqām Kurd g* 2444244 (331-344 s_a).

The next phrase modulates from the outset (346 s_a) to *maqām Rāst c* 4334433 (end = 354 s_a) with Maḥmūd going back (357 s_a) to the structuring *maqām Hījāz-Kār g* 3524253 (end = 374 s_a).

This is followed (378 s_a – Shawwā rests since 331 s_a) by a superb modulation to *maqām Rāst c* 4334433 (end at approx. 384 s_a) similarly initiated (384 s_a) from degree *sī* = *e*⁻ by Shawwā; another modulation (back) to *maqām Sīkā-Huzām sī* (*e*⁻) 3425343 (390-394 s_a) similarly reproduced by Shawwā (394-397 s_a) is disrupted (397-401 s_a) by a further modulation by Maḥmūd to *maqām Nawā-Athar c* 4262[262?], with a final phrase (402-414 s_a) beginning in *maqām Hījāz-Kār g* 3524253 and modulating (404.5 s_a) to *maqām Hījāzayn* – or “two [successive] *hījaz*(s)”²³⁶ *g* 2622624 with an intermediate *genos rāst c* 433 (410.5-411.5 s_a), superbly concluded (411.5-414 s_a) by *maqām Hījāz-Kār g*²³⁷ 26242[62], a real display of mastery in *maqām* performance.²³⁸

²³⁵ “Listeners play an active role in live *inshād*, responding vocally and with gestures after melodic cadences. Performers make use of such feedback to guide their decisions, and thereby optimize the emotional power of the performance. Such optimization requires live performance as well as improvisatory flexibility in the genre” – [Frishkopf, 2001, p. 166].

²³⁶ According to Hamdi Makhlouf, this is a common form of *tarṣī* (ترصيع = “incrustation”) for the *qāfla* (قفل = conclusion) of *maqām Hījāz-Kār*.

²³⁷ Another change from *e*⁻ to *e*^b.

²³⁸ Knowing that the generally acknowledged rule for the *ṣayr al-‘amal* is [Marcus, 1989, p. 771]: “one must return to the original *maqām* (*al-maqām al-asāsī*) before ending a given piece”, and that

Some observations deduced from the combined Graphic/Video/Literal analysis

Analyses like this one for *Yā Nasīm a-ṣ-Ṣabā* take a considerable amount of time, and require for the most complex ones adapted – sometimes high-end – computer equipment and the use of multiple computer programs. This is however not always the case, as most graphic analyses with a program such as Praat can be quite easy and necessitate only limited hard- and software.²³⁹

In “MAT for the VIAMAP”²⁴⁰ I raised the question of the feasibility of graphic analyses of multi-instrumental or multi-vocal music. While this performance is not strictly multi-part music (the singer and the musician do not – generally – play together, but one after another), the answer that was brought is an emergency solution and does not resolve the main question about the future feasibility of such type of analyses.

What it shows, however, is that for important, historical recordings such as the one scrutinized here, there is always a possibility to analyze the music correctly, whatever technical difficulties – such as bad recording, ample vibrato, overlapping parts, etc. – may arise.

What should be understood, however, is that the procedure of editing and assembling the different components of a video analysis – mainly the graph of the melody and the graphic scales – is in itself part of the analysis process. It also determines which techniques must be used to complete the analysis and to present the results to the viewer/auditor.²⁴¹

Naturally, in the course of the analysis other, sometimes even more interesting characteristics – than just pitch and time – pose new questions which lead to further analyses, and accrued knowledge about the performer’s style and techniques.

[Marcus, 1989, p. 369] “the character of a mode is [believed to be] determined primarily by the mode’s lower tetrachord”, the last series of nearly-instant modulations form a final apotheosis reminding of the base-*jins* of the opening *maqām*, the *g*-based *hījāz*.

²³⁹ I wouldn’t be surprised if, sometime soon, such “light” analyses will be made using an “App” on a smartphone.

²⁴⁰ [Beyhom, 2018b, p. 205–206].

²⁴¹ This is not a matter of difference between “style and substance”, but a real issue as the presentation of the results influences not only the discourse on (the analyzed) music, but also the way in which we perceive it. In other words, the methodology that is used influences the way in which we understand the results.

Such a characteristic is, for example, the pitch of the very ample vibratos sometimes performed by Maḥmūd...

ABOUT THE PERCEIVED PITCH OF THE VIBRATO OF ‘ALĪ MAḤMŪD IN *YĀ NASĪM A-Ṣ-ṢABĀ*²⁴²

One example of a particularly challenging passage in Maḥmūd’s performance of *Yā Nasīm a-ṣ-Ṣabā* is the small section between 351 and 353 s_a with the melody rising above *Na* (*G*) and reaching *Rā* (*C*). (Fig. 70)

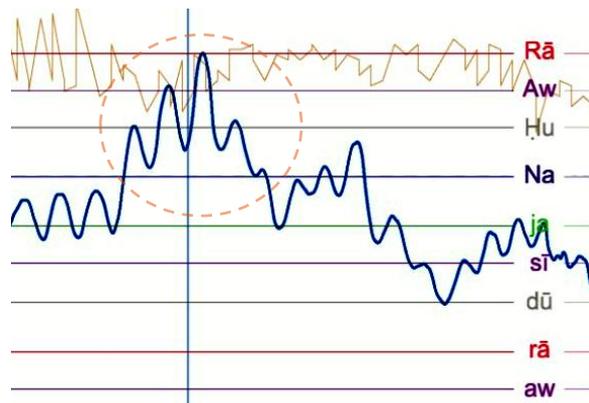


Fig. 70 Detail from a frame of the video, showing a *genos rāst* 433 on *Na* at approx. 352 s_a, underlined by the ridge line (composed from the upper utmost high pitches in the blue fluctuating graph line).

The vibrato of Maḥmūd in this section evolves around 6.5 Hz and varies from less than one half-tone to two whole tones (around 352 s_a). The latter goes clearly beyond the boundaries (5.5-8 Hz and 0.6-2 semi-tones for singers)²⁴³ of “Classical” western music²⁴⁴ and is common in Islamic chant as could be seen in previous analyses by the author of such chants (Fig. 62 and Fig. 71²⁴⁵), including Maḥmūd’s.

²⁴² Explanations about the vibrato and other particulars of the performance and the analysis can be verified in the third-tempo video analysis proposed at <https://youtu.be/liHP4ZoKtGE>.

²⁴³ According to [Timmers and Desain, 2000].

²⁴⁴ The question that could arise when analyzing such chants with the schemes of western musicology is: “Is a vibrato of two tones still a vibrato or a yodel, or even a falsetto?”. Neither of the latter terms defines Maḥmūd’s technique(s) which can only be a vibrato, a “[more or less] regular fluctuation of pitch or intensity (or both), either more or less pronounced and more or less rapid” – [Moens-Haenen, 2001].

²⁴⁵ See also the accompanying PP show of [Beyhom, 2014].

²⁴⁶ Units on the vertical axis represent semi-tones. For example, 7.5 semi-tones = 15 quarter-tones.

²⁴⁷ First published in Slide No. 7 of the Power Point show accompanying [Beyhom, 2014], and corresponding to (minutes:seconds:thousandths of second) 01:13:296-01:16:000 in the original recording.

In the case of this *shaykh*, and in this performance, the vibrato may evolve continuously in extent and, while it fits partly the technical boundaries of a “Classical” vibrato, it lies sometimes clearly outside these limits.

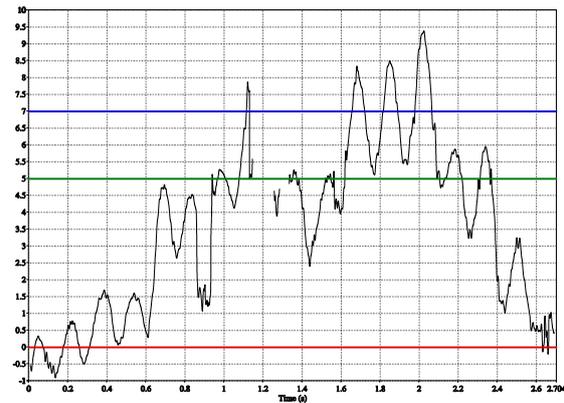


Fig. 71 An analysis on a semi-tonal grid²⁴⁶ of a melodic development of *genos ḥijāz* performed in *Yā Nasīm a-ṣ-Ṣabā* by *shaykh* ‘Alī Maḥmūd, previously proposed in the accompanying PP show of a previous (2014) article by the author, showing the ample vibrato of the *shaykh*.²⁴⁷

Maḥmūd’s technique uses also the upper range as well as the medium or low ranges (Fig. 72) in a near-continuous, varying mostly in extent while regular in its repetition, vibrato.²⁴⁸

A question now arises: “What would be the perceived pitch in this particular example of near-continuous and varying vibrato?”

While

“It seems likely that [...] string performers generally vibrate equally above and below the intended pitch and listeners perceive the intended pitch of the string performer near the mean of the vibrato”²⁴⁹,

(The analyzed excerpt and mix were referenced as [Maḥmūd, Shawwā (a-sh-), and Beyhom, 2014].)

²⁴⁸ In his course on the *Théorie de la Phonation (The Theory of Phonation)* Léauthaud, who apparently refers to Western music exclusively, considers [Léauthaud, 2004, p. 88] that a too ample vibrato affects the precision of the pitch and that the irregularity of vibrato corresponds to a “technical deficiency” or to “an excessive fatigue”. (cf. “Not until the 20th century was ‘incorrect’ vibrato first seen as a problem; earlier, it had simply been considered as resulting from generally poor technique” – in [Moens-Haenen, 2001].) Note that Léauthaud also sets the temporal limits of vibrato to (approximately) 6-8 Hz.

²⁴⁹ [Geringer, MacLeod, and Allen, 2010, p. 360].

other choices can be made by the ear, as

“Galiamian (1962)²⁵⁰ suggested that string vibrato oscillates from the pitch and below, otherwise the intonation will be perceived as sharp”.²⁵¹

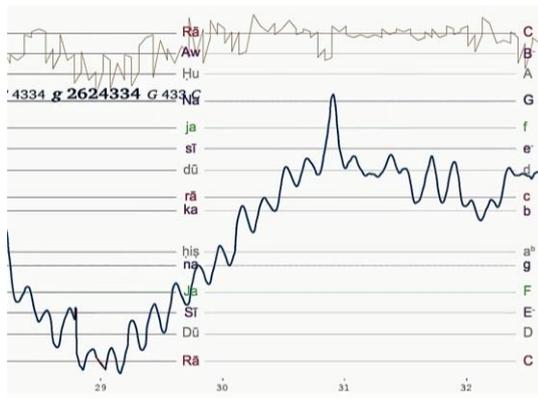


Fig. 72 Detail from a frame of the video analysis showing the technique of continuous – and varying – vibrato of Maḥmūd in the low and mid ranges.

Knowing that

“the analysis of performed musical sounds in order to define the location of [the] principal pitch of vibrato sounds was attempted. But [that] a definite answer has not been obtained from this approach [... as] the results of various experiments have variously indicated that [the] principal pitch is localized in the higher side of the extent of vibrato, another in the middle, and yet another in the lower side”,²⁵²

we had, in this particular case and *in fine*, to listen to this passage at third the original speed of the available recording (with preserved pitch)²⁵³ before deciding that it was the highest positions of the fluctuating pitches (Fig. 70) which determined the perceived pitch – and the corresponding scale and *genos*, at least at this speed.²⁵⁴

²⁵⁰ And others, quoted in the same article.

²⁵¹ [Geringer, MacLeod, and Allen, 2010, p. 352]; cf. “INTONATION OF THE VIBRATO. It is important that the vibrato always go to the flatted side of the pitch. The ear catches far more readily the highest pitch sounded, and a vibrato that goes as much above pitch as below makes the general intonation sound too sharp” – about the “Finger vibrato” in [Galiamian, 1962, p. 42].

²⁵² [Iwamiya, Kosugi, and Kitamura, 1983, p. 74].

²⁵³ See/listen to the third-tempo version at 345-354 s.a.

²⁵⁴ It is possible that the poor condition of this particular audio recording influenced the hearing perception of the three musicians and musicologists who – originally – took part in this analysis. However, it is mostly the fast flow of Maḥmūd in some sections which, when combined with his vibrato technique, does not help in perceiving the pitches. Further research on this subject with well-made audio recordings is a necessity, but is unfortunately impossible, at least today, for this performer.

Finally, let us note that Maḥmūd’s vibrato may also correspond, according to Scott Marcus, to an

“ornamental *maqām* technique of giving each note an upper neighbor. Thus, an ascent (123456) [these digits correspond to the ranks of the degrees of the scale] becomes 1,32,43,54,65,76. Indeed this seems to be the case in 29-31 s_a”.²⁵⁵

While this is a standard procedure in other *maqām* performances – such as for example Daoud’s performance analyzed in Part I (see Fig. 73) – and while it may apply for limited parts of the performance by Maḥmūd (Fig. 74), this is far from being always the case for this performer.

Furthermore, it is interesting to compare Maḥmūd’s technique (Fig. 75) with the imitation by Shawwā (Fig. 76) – namely in the third-tempo version: while Maḥmūd (129.5-130.2 s_a) alternates adjacent (and intermediate) pitches, Shawwā’s imitation of Maḥmūd’s interleaved and ascending vibrato (from 139.2 to 139.8 s_a) also uses three intermediate pitches between *ja* and *Na* (*f* and *G*) but with the basis kept constant as *ja*.

From which we may conclude that Shawwā was at least aware of the fact that Maḥmūd’s vibrato was a conscious evolution of the melody with interleaved neighboring – and intermediate – pitches, but not necessarily with neighboring degrees of the scale.²⁵⁶

This type of evolving vibrato, alternating intermediate pitches between the degrees of the scale, could be called a “dynamic vibrato”.

Further research and analyses are clearly necessary to determine if this technique is particular to Islamic chanting,²⁵⁷ or to *maqām* music in general,²⁵⁸ and if the pronunciation and enunciation of particular syllables or letters may influence this perception.

²⁵⁵ (From the reviewer’s remarks and commentaries:) It is noteworthy that this type of techniques is also – still according to Scott Marcus – commonly used in the vocal music of India, and that it would be interesting to compare an audio excerpt from Maḥmūd’s performance from 28 to 34 s_a with similar South Indian vocal performances.

²⁵⁶ Note that Maḥmūd also uses a “regular” vibrato at some points, such as at 222-224 s_a.

²⁵⁷ It is at least common to find such – and even more – ample vibrato with “Old School” cantors such as Turkish *hāfiẓ* (a title applied to one who has memorized the whole *Qur’ān*) Kāni Karaca and Bekir Sidki Sezgin (Slides Nos. 19 and 21 in the PP show accompanying [Beyhom, 2014], downloadable at <http://nemo-online.org/wp-content/uploads/2014/11/Amine-Beyhom-Hijaz-pour-NEMO-n%C2%B03-141129.ppsx>).

²⁵⁸ See for example the profane singing of Iraqi Yūsuf ‘Umar in Slide No. 10 in the same reference as in the previous footnote.

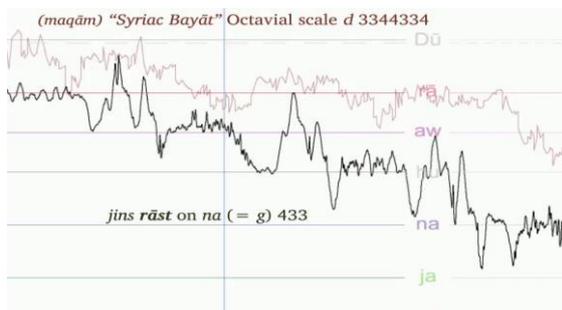


Fig. 73 Detail from the video analysis of Evelyne Daoud's *takhshefto* (see Part I) at 113 s_a, showing a quasi-constant use of the alternation of the neighboring degrees of the scale by the performer – in parallel with a mostly regular vibrato.



Fig. 74 One example of vibrato with alternation of two neighboring degrees of the scale by Maḥmūd around 269.1 s_a. (Detail from a frame of the video.)

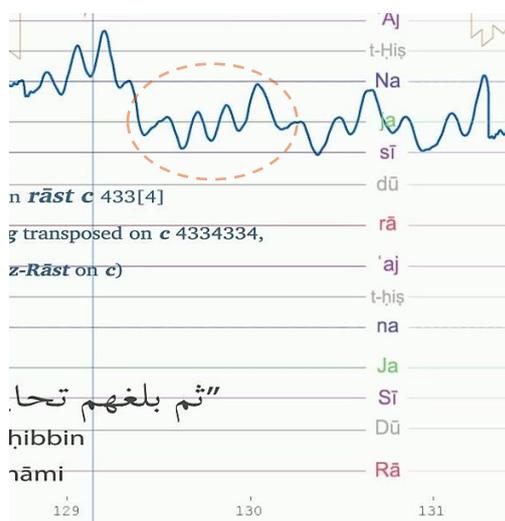


Fig. 75 An example of ascending varying (dynamic) vibrato of Maḥmūd (129.5-130.2 s_a) with alternation of adjacent (and intermediate) pitches.²⁵⁹

²⁵⁹ As can be seen (and heard in the third-tempo extract), Maḥmūd uses three intermediate pitches between *ja* and *Na*, and between *sī* and *ja*.



Fig. 76 Shawwā's imitation of Maḥmūd's interweaved and ascending vibrato from 139.2 to 139.8 s_a, with also three intermediate pitches between *ja* and *Na*, but with the basis kept constant as *ja*.

What is today sure, however, is that statistical analyses of pitch perception²⁶⁰ of the vibrato – and of other characteristics of music – may fail where a thorough and detailed graphic analysis, coupled with an equally thorough listening to extracts in lowered tempos, may give conclusive results in a particular analysis of a performance.

A FEW CLOSING REMARKS ON THE SAYR AL-‘AMAL IN THE PERFORMANCE OF MAḤMŪD AND SHAWWĀ

One of the aims of the analyses undertaken in the VIAMAP is to provide a description of the *sayr al-‘amal* of a given performance, together with as much details as possible concerning the style, the possible idiosyncrasies and the techniques used by the performers.

Evidently, the discussions about such particulars and details could extend *ad infinitum*²⁶¹, and must be at some point concluded. The particular interpretation provided in the preceding (and present) pages is based on thorough verifications and discussions between the members of the analyzing team, and on the remarks of (and further discussions with) the reviewers. The author claims however the sole responsibility for it, as the final interpretation was his.

**

²⁶⁰ Or, simply, statistical analyses of pitch.

²⁶¹ And the author hopes that more detailed information about the performance may be proposed by the reader/auditor of this dossier.

At some point in the analysis of the performance of *shaykh* ‘Alī Maḥmūd and Sāmī a-sh-Shawwā I hypothesized that this performance may be partly pre-composed, and partly improvised.

In Arabian *maqām* music,

“the improvisers utilize the culture’s indigenous musical idiom [and] work with musical ingredients that form the crux of the modal tradition. Their improvisations [...] must display correct melodic intervals, including the basic microtonal steps and the finer intonational inflections that tend to affect the various pitch levels. Similarly expected is the proper rendering of the *qafḷāt* (singular *qafḷah*), or the largely stylized and highly intricate cadential patterns that end certain musical phrases. To add, the *taqāsīm* [singular, *taqāsīm*] genre in particular is recognized as the prime ‘translator’ of the *maqāmāt* [...] as theoretical modal structures, because it is considered ‘purely’ modal. In other words, it flows typically without the imposition of an *īqā’* (plural, *īqā’āt*), or ‘rhythmic mode,’ and without the interference of a sung text. Furthermore, it follows relatively flexible structural tracks, without adhering to the fixed formal and melodic designs that characterize precomposed pieces. In various theory books, the *sayr*, literally ‘path,’ or the brief description of how each mode is expected to unfold, implies that the purest realizations of the modes are textless, meterless, and non-strophic, a stylistic profile epitomized by the *taqāsīm*”.²⁶²

Knowing that this particular performance of *Yā Nasīm a-ṣ-Ṣabā* by ‘Alī Maḥmūd and Sāmī a-sh-Shawwā can be assimilated to a partly sung *taqāsīm* (or *mawwāl*), it would be of interest to compare the progress of the effective *sayr al-‘amal* of the (opening) *maqām* with “brief description[s]”, by theoreticians of the 20th century, “of how [this] mode is expected to unfold”.

Let us first list the different *genē*/tetrachords and *maqām*(s)/scales used successively by the two protagonists, Maḥmūd [M] and Shawwā [S], with major modulations in brown font – and preceded by an * – and passing modulations in green font:²⁶³

1. * [M], 1.5 s-a: scale of *maqām Ḥijāz-Awji* 2624334 based on *g*.
2. [M], 16 s-a: scale of *maqām Ḥijāz-‘Ajāmī* 2624244 based on *g*.
3. [M], 23.5 s_a: back to *Ḥijāz-Awji* 2624334 based on *g*.
4. * [S], 43 s_a: *maqām Rāst* based on *C*.

5. [S], 47 s_a: inception of *genos ṣabā-zamzama b* 242 centered on *c* – hint to *maqām Ḥijāz-‘Ajāmī*²⁶⁴ on *g* 2624244.
6. * [M], 52.5 s_a: back to *maqām Ḥijāz* 2624334 based on *g*.
7. * [M], 86 s_a: modulation to *maqām Sūkā* 3443343 on *e-* initiated by a *genos sūkā* [43] *e-* 34.
8. [S], 107 s_a: modulation to *maqām Sūkā-Huzām* 3425343 on *e-*.
9. * [M], 115 s_a: modulation to *maqām Nayrūz-Rāst* 4334334 on *c*.
10. * [M], 141 s_a: modulation to *maqām ‘Ajām* 3344244 on *g* initiated by the sketch of a *genos ‘ajām* 44[2] on *e^b*.
11. [M], 167 s_a: *genos ‘ajām* 44[2] on *e^b*.
12. [M], 175 s_a: *genos ḥijāz* 25[3] on *G*.
13. [M], 176 s_a: descent from *e^b* in *maqām ‘Ajām* 3344244[244] on *g*.
14. * [M], 208 s_a: modulation to *maqām Ḥijāz-Kār* (1)²⁶⁵ 3524253 on *g*.
15. * [M], 233 s_a: modulation to *maqām ‘Ajām-Ushayrān* 4424442 on *E^b*.
16. * [M], 245 s_a (or 246.5 s_a): modulation to *maqām ‘Ajām* 3344244 on *g*.
17. * [M], 259.5 s_a: back to *maqām Ḥijāz-Kār* (1) 3524253 on *g*.
18. * [M], 266.5 s_a: modulation to *genos rāst* 4334 on *e-*.
19. * [M], 282 s_a: modulation by the variation on *maqām Ḥijāz-Kār* (1) 3524352 on *d* (centered on the interval *G₄A* and using only *f[#] G A B^b*).²⁶⁶
20. * [M], 290.5 s_a: modulation to *maqām Bayāt* 3344244 on *d*.
21. * [M], 321.5: modulation to *maqām Kurd* 2444244 on *g* initiated by a *genos kurd* 244, also on *g*.
22. * [M], 345.5 s_a: modulation to *maqām Rāst* 4334433 on *c*.
23. * [M], 356.5 s-a: modulation to *maqām Ḥijāz-Kār* (1) 3524253 on *g*.
24. * [M], 378 s_a: modulation to *maqām Rāst* 4334433 on *c*.
25. * [M], 390 s_a: modulation to *maqām Sūkā-Huzām* 34253[43] on *e-*.

²⁶² [Racy, 2000, p. 309].

²⁶³ Near-exact repetitions by Shawwā of Maḥmūd’s phrases are not included. Note that the smallest time increment is taken here, per convention and for the sake of simplification, as 0.5 seconds.

²⁶⁴ As aforementioned, Scott Marcus (from his review of this article) differentiates *maqām Ḥijāz-‘Ajāmī* 2624244 and *maqām Ḥijāz-Awji* 2624334.

²⁶⁵ The “(1)” is added here to remind that this is the 3524253 variant of *Ḥijāz-Kār*, different from the *Ḥijāz-Kār* 2624262.

²⁶⁶ Note here that it could be argued, as stated above, that this passage corresponds to a modulation to *maqām Ḥijāz-‘Ajāmī* 2624244 on *d* which would prepare the following modulation to *maqām Bayāt* 3344244, also on *d*.

is better to “touch” the degree RĀST [lower C] before resting on the tonic DŪKĀ [d]²⁷⁹.

Let us at this stage note that Ḥilū does “incidentally” mention²⁸⁰ the (rare, semi-tonal) maqām Ḥijāzayn 2622624 in the same footnote to maqām Ḥijāz, commenting that the tonic of Ḥijāzayn would be ‘USHAY-RĀN [b[♭]] while a similar maqām would be the (equally rare) Ḥijāz-Gharīb²⁸¹ [“strange” Ḥijāz] on DŪKĀ [d].

Concerning Erlanger, his notation of the same maqām (Fig. 78) is very close to Ḥilū’s²⁸² while he does not mention, in his literal description of the maqām (Fig. 79), a bayāt tetrachord as with the latter and whenever he excludes an ascending hijāz tetrachord in the upper octave while relying mainly on tetrachord būsalik in this octave.

76. — LE MODE ḤIJĀZĪ

76 — Echelle du Mode ḤIJĀZĪ

Fig. 78 The scale(s) and polychordal structuring of maqām Ḥijāz according to Erlanger.²⁸³

ANALYSE DU MODE.

GAMME ASCENDANTE :		GAMME DESCENDANTE :	
1 ^{er} genre : Ḥijāzī en « ré ₁ »		4 ^e genre : Busah-lik en « sol ₁ »	
2 ^e — { Busah-lik en « sol ₂ »		3 ^e — { Busah-lik en « ré ₂ »	
3 ^e — Busah-lik en « ré ₂ »		2 ^e — Ḥijāzī en « la ₂ »	
4 ^e — Busah-lik en « sol ₂ »		1 ^{er} — Ḥijāzī en « ré ₁ »	

Mouvement mélodique : Traiter tout d’abord le 1^{er} genre en partant du « ré₁ » précédé du « do₁ » ; associer à ce genre une quinte auxiliaire (sol₁, la, si₁, do₂, ré₂, soit Rāst en « sol ») ; passer ensuite au 2^e genre pour le traiter sous ses deux formes, puis au 3^e et de là au 4^e. — Traiter ensuite le 3^e genre de la gamme descendante sous ses deux formes ou encore sous la 2^e seulement ; puis passer au 2^e et de là au 1^{er} pour la conclusion.

Caractéristiques : Le mode Ḥijāzī se distingue par le Rāst en « sol₁ » et le Ḥijāzī en « la₂ ».

Fig. 79 Literal description of the polychords and of the sayr al-‘amal of maqām Ḥijāz in Erlanger.²⁸⁴ (Ascending polychords to the left, descending to the right.)

Erlanger does also describe the conclusion of the sayr al-‘amal as a Ḥijāz-Kār scale on d, not mentioning however the lower C as part of the qafla.

²⁷⁹ [Ḥilū (al-), 1972, p. 121].

²⁸⁰ [Ḥilū (al-), 1972, p. 120].

²⁸¹ “Gharīb-al-Ḥijāz” in Ḥilū’s words.

²⁸² Or vice versa.

²⁸³ [Erlanger, 1949, v. 5, p. 278].

As for the description of this maqām in the proceedings of the 1932 Congrès du Caire (Fig. 80 and Fig. 81), these mention both bayāt tetrachord and rāst pentachord in the ascent, and allow for both Ḥijāz-Kār (2624262) and Ḥijāz-‘Ajāmī (2624244) in the lower descending octave.

مقام حجاز
Maqam Hidjaz

جنس حجاز (ذو الخمس) على الدوكاه	جنس بياتي (ذو الاربع) على الحسيني	جنس حجاز (ذو الاربع) على المحير
Genre Hidjaz Zul khams (quinte) sur le Dougah	Genre Bayati Zul’arbaa (quarte) sur le Husseiney	Genre Hidjaz Zul’arbaa (quarte) sur le Mohayar

جنس راست (ذو الخمس) على النوا
Genre Rast Zul khams (quinte) sur le Nawa

Fig. 80 Ascending scale and polychordal structuring of maqām Ḥijāz according to the proceedings of the Congrès du Caire of 1932.²⁸⁵

جنس بوسلك (ذو الخمس) على النوا
Genre Bossalik Zul khams (quinte) sur le Nawa

جنس حجاز (ذو الاربع) على المحير	جنس حجاز (ذو الاربع) على الحسيني	جنس حجاز (ذو الاربع) على الدوكاه
Genre Hidjaz Zul’arbaa (quarte) sur le Mohayar	Genre Hidjaz Zul’arbaa (quarte) sur le Husseiney	Genre Hidjaz Zul’arbaa (quarte) sur le Dougah

Fig. 81 Descending scale and polychordal structuring of maqām Ḥijāz according to the proceedings of the Congrès du Caire of 1932.²⁸⁶

* *

²⁸⁴ *ibid.*

²⁸⁵ [Collectif, 1933, p. 231m]. (Reminder: in these proceedings RĀST = g.)

²⁸⁶ *ibid.*

Coming back to the progression of the melody in *Yā Nasīm a-ṣ-Ṣabā*, we can note that the beginning of *maqām Hījāz* in the first polychord from *na* to *dū* (from *g* to *d*) fits the common description, as well as the second ascending polychord as *rāst* 4334 on *rā=g*, embodying thus the ascending *Hījāz-Awji*. The use of *būsalik* in the second ascending polychord is also attested, as a first secondary modulation at 15 s_a.

The modulation by Shawwā to *maqām Rāst* on *C* at 43 s_a is a major modulation that Maḥmūd does not adopt or follow – at least immediately –, returning at 53 s_a to *maqām Hījāz-Awji* and developing the melody within the lower scale.

The next primary modulation, at 86 s_a to *maqām Sīkā e* 3443343, is not documented in the three reviewed references, but its further integration in *rāst c* and *Yākā c* may be a hint to the former *maqām Rāst* of Shawwā on *C*.

Of more importance still is the next major modulation at 142 s_a, to *maqām ‘Ajām g* 3344244, which is also absent from the reviewed literal descriptions but which allows for the further major modulation (at 208 s_a) to *maqām Hījāz-Kār g* variant 3524253.

The further major modulation (233 s_a) to *maqām ‘Ajām-Ushayrān E^b* 4424442 then (243 s_a) to *maqām ‘Ajām g* 3344244 is a display of Maḥmūd’s technique and of his ample use of the vertical space and intervallic leaps, as well as a lesson in modulating to neighboring *maqām(s)*.

The return (259.5 s_a) to *maqām Hījāz-Kār g* variant 3524253 marks a dramatic shift in the performance while rooting a zalzalian core around the upper tonic *G*, which allows (266.5 s_a) for the (wonderful!) placement of *genos rāst* on *e*.

The following modulations are a display of mastery in the Art of *maqām* and include *maqām Bayāt d* 3344244 at 290.5 s_a – completely absent from the reviewed literature – followed (337 s_a) by a complete modulation to *maqām Kurd g* 2444244 (also absent from the reviewed descriptions) and, as if Maḥmūd was holding Shawwā accountable (Shawwā rests since 302 s_a)²⁸⁷ for his initial, and probably unwelcome modulation²⁸⁸, by *maqām Rāst* on *C* (346 s_a) in what could be

a (beautiful!) secondary modulation marking the difference with the return to the (core) *maqām Hījāz-Kār g* scale (357 s_a).

A further modulation (378 s_a) to *maqām Rāst* on *C* is probably an invitation to Shawwā to join back Maḥmūd (which he does by translating Maḥmūd’s phrase) with *maqām Sīkā-Huzām e* 3425343 (390 s_a) as a further wink to Shawwā (and hint to his *Sīkā-Huzām* at 107 s_a) announcing the return to the initial developments of the *sayr al-‘amal* and the upcoming end of the performance in *maqām Hījāz-Kār g* in the 2624262 variant, preceded by an incredible firework of six last-moment modulations spanning (390²⁸⁹-414 s_a) 24 seconds, and including (397-414 s_a) *Nawā-Athar c*, *Hījāz_Kār g*, *Hījāzayn g*, *rāst c* and the final *Hījāz-Kār g*, as if Maḥmūd wanted to include in these last few seconds all possible variations of *hījāz* in one single statement.

* *

When comparing the descriptions in the reviewed literature with the effective *sayr al-‘amal* of *Yā Nasīm a-ṣ-Ṣabā* by Maḥmūd and Shawwā, one cannot help but wonder at the paucity of these descriptions – this applies mostly to the proceedings of the 1932 *Congrès du Caire* – and ask oneself the following question: is the effective *sayr al-‘amal* of this *maqām* – and of every *maqām* – the one we can find in the literature, or is it the one we can derive from an exceptional performance such as with Maḥmūd and Shawwā?

While *maqām* music is still being transmitted aurally in some religious circles, we can not underestimate the equally aural teaching and transmission from master to disciple, from teacher to student, in this art. Each musician has his own way of looking at the *maqām*, of performing it, and each theoretician of describing it.

We must also not forget that the performance of Maḥmūd and Shawwā is what is closest to the instrumental *taqsim* and vocal *mawwāl* – in fact a compound of the two forms –, in which case:

“As a tradition bearer, the *taqsim* performer must also be innovative. In order to make representational sense, he must include the less ordinary components of the shared musical legacy. That renders his performance artistically engaging, as well

²⁸⁷ Not counting his tentative to “translate” *maqām Kurd* at 328 s_a, clearly declined by Maḥmūd.

²⁸⁸ Because it took place too early in the performance?

²⁸⁹ Including here the last modulation to *maqām Sīkā-Huzām*.

as technically correct. In actual performances, innovation within the bounds of tradition can impress the diehard listeners and prompt them to indulge in judicious listening that in turn inspires the performer and shapes his or her improvised rendition. Known as *muḥāsabah*, or following carefully through a highly discriminating ear [...], this participatory process symbolizes the musical and emotional bond between the artist and the listening initiates, or in a broader sense, his or her musical public. With this in mind, the Arab *taqṣīm* has been interpreted as a means of creating aesthetic sense through the application of common musical knowledge and uncommon artistic sensibility, or as ‘a perfect synthesis ... between originality and tradition’²⁹⁰.”²⁹¹

Yā Nasīm a-ṣ-Ṣabā as performed by *shaykh* ‘Alī Maḥmūd and Sāmī a-sh-Shawwā is a perfect illustration “of the application of common musical knowledge and uncommon artistic sensibility”, an incomparable synthesis between originality and tradition.

*
* *

OVERALL CONCLUSION

A world of expressivity lies between the ample and gradually varying vibrato of Maḥmūd and the precision of the scalpel of Shawwā. Both, as well as various other expressions of *maqām* music can be explained and analyzed using the techniques and tools expounded in the 2018 article “MAT for the VIAMAP”²⁹².

The VIAMAP²⁹³ started in 2017 as a tentative response to classical music notation. It aimed at showing that *maqām* – and other – music can be better explained and analyzed by techniques extensively used in the 1950s and 1960s by eminent ethnomusicologists such as Charles Seeger.

Recent video analyses produced at the CERMAA – and expounded in the first part of this dossier – tend to confirm this point of view, with new, improved techniques added gradually in order to better understand the analyzed music.

In the analysis of *Yā Nasīm a-ṣ-Ṣabā* performed by ‘Alī Maḥmūd and violinist Sāmī a-sh-Shawwā – expounded in Part II –, even more refined techniques were used to remedy the problems that arise with old historical recordings – which are of the utmost importance for the understanding of the evolution of *maqām* music in the previous century.

Other, more classical techniques – such as slowing down the tempo while preserving the original pitch (the “stretching” of the recording) – were used for the latter analysis, especially when confronted with the virtuosity of the performers with changes of scales and *maqām(s)*, and with nearly instantaneous executions of a *genos* or of a melodic passage.

All these techniques are today available to ethnomusicologists, notably in the area of *maqām* studies and research.²⁹⁴ Knowing that there are hundreds of recordings available and still not analyzed in full, the domain of graphic – and video – analysis of pitch can probably hope for a bright future and for a continuous development of its techniques.

This is, at least, what the team of the CERMAA hopes to achieve in the next decades.

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* *

²⁹⁰ Reference to “Elkholy, Samha. 1978. *The Tradition of Improvisation in Arab Music*. Giza, Egypt: Imprimerie Rizq:17” included here by the author. (See reference in the next footnote.)

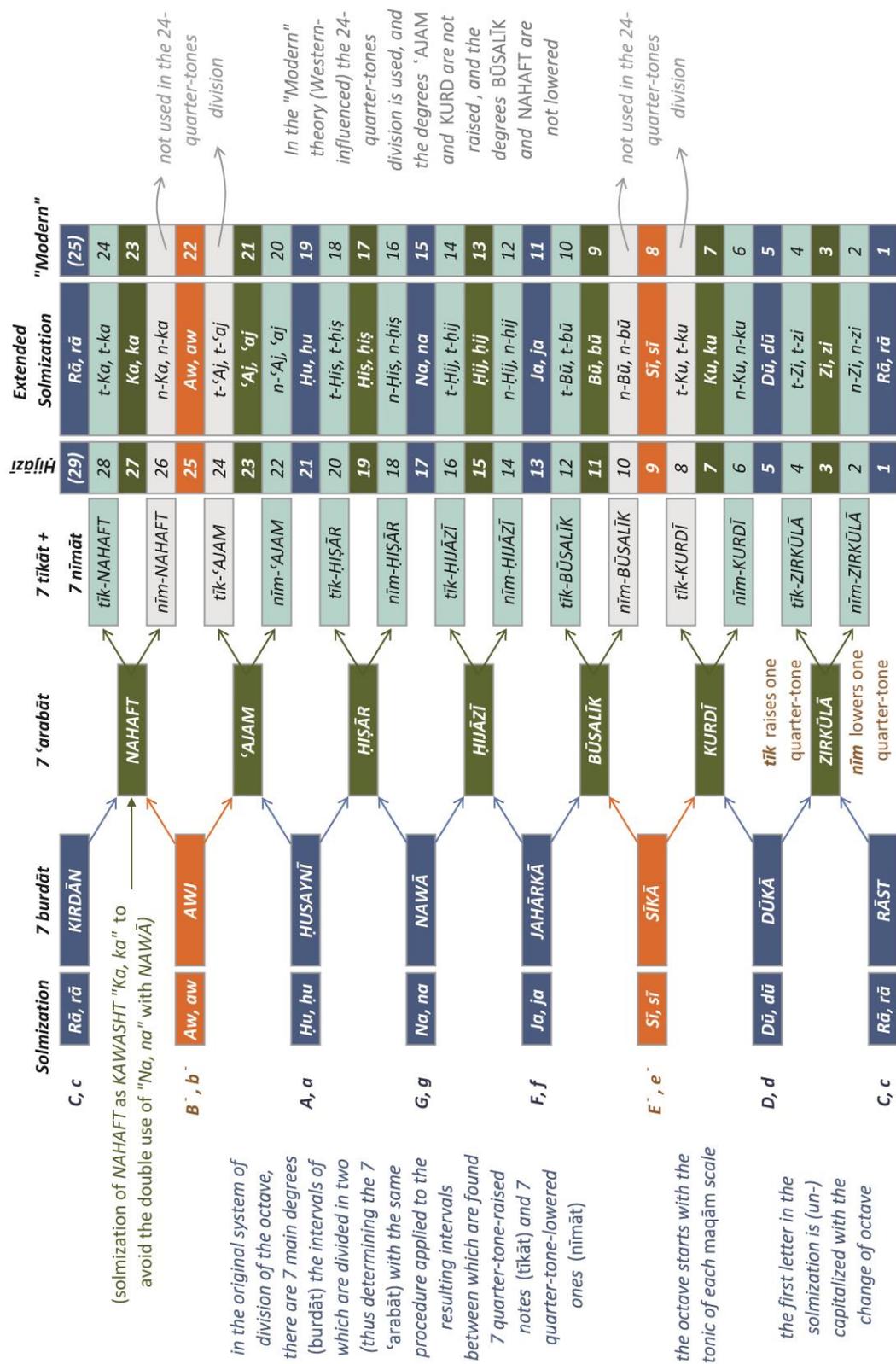
²⁹¹ [Racy, 2000, p. 310].

²⁹² Aforementioned [Beyhom, 2018b].

²⁹³ The “Video-Animated Music Analysis Project”.

²⁹⁴ While this remark concerns ethnomusicologists in general, I would like to add here to “Arabian” musicians – but also to fellow contemporary (and future) – (ethno-)musicologists from the Arabian countries: Please stop being ashamed of your legacy, as there is much more beauty in it than what your spoiled ears can hear...

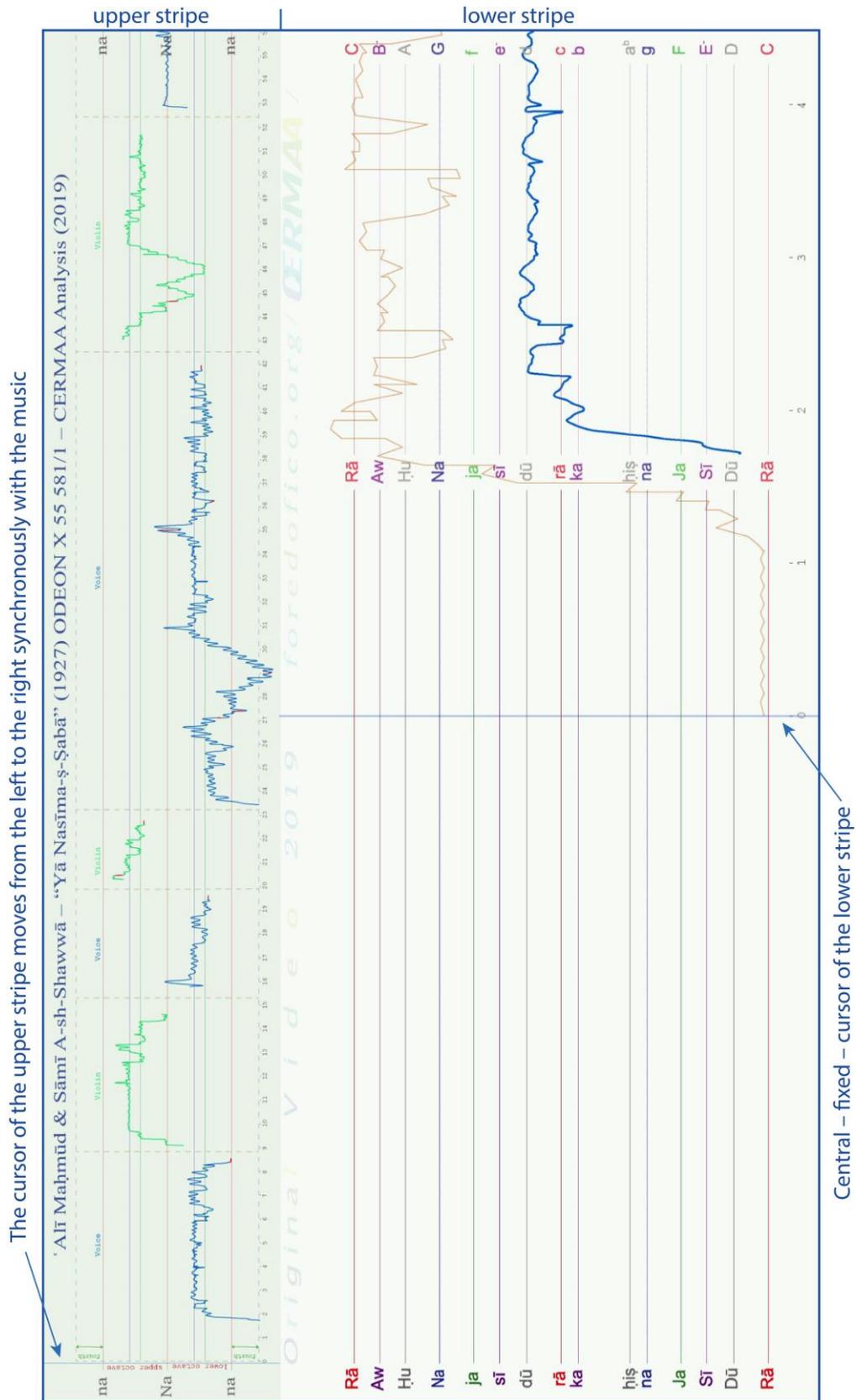
PLATES



FHT 1 Extended solmization of the scale of maqam music with detailed explanations in the figure. Further explanations can be found in the articles [Beyhom, 2012; 2018b].

Type	Name	Main “tonic”(s)	Composition	Polychordal type	Remarks	
<i>Zalzalian</i>	<i>rāst</i>	<i>rā</i> (c) or <i>na</i> (g), also on <i>ja</i> (f) and <i>dū</i> (d)	4 3 3	Mainly tetrachordal	Became prominent with Western influence	
	<i>bayāt</i>	<i>dū</i> (d), also on <i>hu</i> (a) and <i>na</i> (g)	3 3 4	Mainly tetrachordal	Probably the most important component of <i>maqām</i> (s)	
	<i>ṣabā</i>	<i>dū</i> (d)	3 3 (2 [6 2])	Mainly tetrachordal	Structurally intricate with <i>hijāz</i> type tetrachords 262, 352, 253	
	<i>sikā</i>	<i>sī</i> (e ⁻), sometimes on <i>aw</i> (b ⁻)	3 4 [4]	Mainly trichordal	Can be reintegrated within <i>rāst</i> as <i>rā</i> [4 3] sf 3 4; called <i>farahnāk</i> when on b ⁻	
	<i>‘irāq</i>	<i>aw</i> (b ⁻)	3 4 3	Mainly tetrachordal	Sometimes confused with <i>sikā</i>	
	<i>‘ajam</i>	<i>‘Aj</i> (B ^b) (upper octave)	4 4	Mainly trichordal	“major”, probably influenced by western wind instrumentarium	
	<i>‘ajam-‘ushayrān</i>	<i>‘aj</i> (b ^b) (lower octave)	4 4 2 [4]	Mainly pentachordal	“major”, probably influenced by western wind instrumentarium	
	<i>jahārkā</i>	<i>ja</i> (f)	4 4 2 [4]	Mainly pentachordal	“major”, sometimes confused with <i>‘ajam-‘ushayrān</i>	
	<i>nahawand</i>	<i>rā</i> (c)	4 2 4	Mainly tetrachordal	“minor”, but with generally a small semi-tone	
	<i>būsālīk/‘ushshāq</i>	<i>dū</i> (d)	4 2 4	Mainly tetrachordal	Like <i>nahawand</i>	
<i>Semi-tonal</i>	<i>kurd</i>	<i>dū</i> (d)	2 4 4 [4]	Mostly pentachordal	“flamenco”	
	“Piano <i>hijāz</i> ”	(see “Chromatic” below)	2 6 2	Tetrachordal	Hybrid, mostly Mid-Eastern	
	<i>hijāz-kār</i>	<i>rā</i> (c)	2 5 3	Tetrachordal	Two declinations based on the conservation of <i>sī</i> (e ⁻) unchanged in the general scale of <i>maqām</i> music	
	<i>hijāz-aṣl</i>	<i>dū</i> (d)	3 5 2	Tetrachordal		
	Semi-tonal (“piano”) <i>hijāz</i>	<i>nearly anywhere</i>	2 6 2	Tetrachordal	Called <i>hijāz-kār</i> if on c, <i>sūzdal</i> if on b ^b , <i>shah-nāz</i> when on d, <i>shadd-‘arabān</i> on g, <i>awj-ārā</i> on b ⁻	
	<i>nawā-athar (nakrīz)</i>	<i>rā</i> (c)	4 2 6 2	Pentachordal	Mostly used in Maghreb countries and in Balkanic music; may be called <i>hīṣār</i> when on <i>dū</i> (d)	
	<i>Chromatic (hijāz types)</i>					

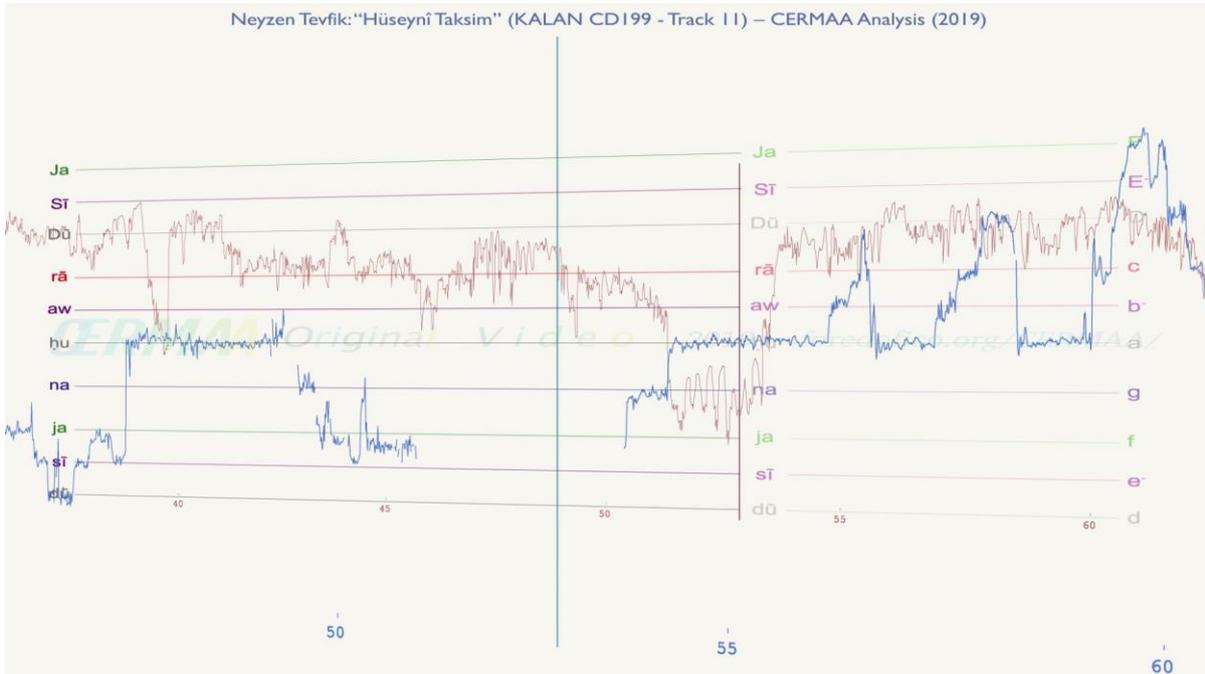
FHT 2 Main polychords used in *maqām* music. (See [Marcus, 1989, p. 300–308] for a comprehensive presentation of *qjnās* in Arabian *maqām* theory.)



FHT 3 General disposition of the elements of the video analysis of *Yā Nasīm a-ṣ-Ṣabā* performed by ‘Ali Maḥmūd and Sāmī a-sh-Shawwā – here at 0 s.a.

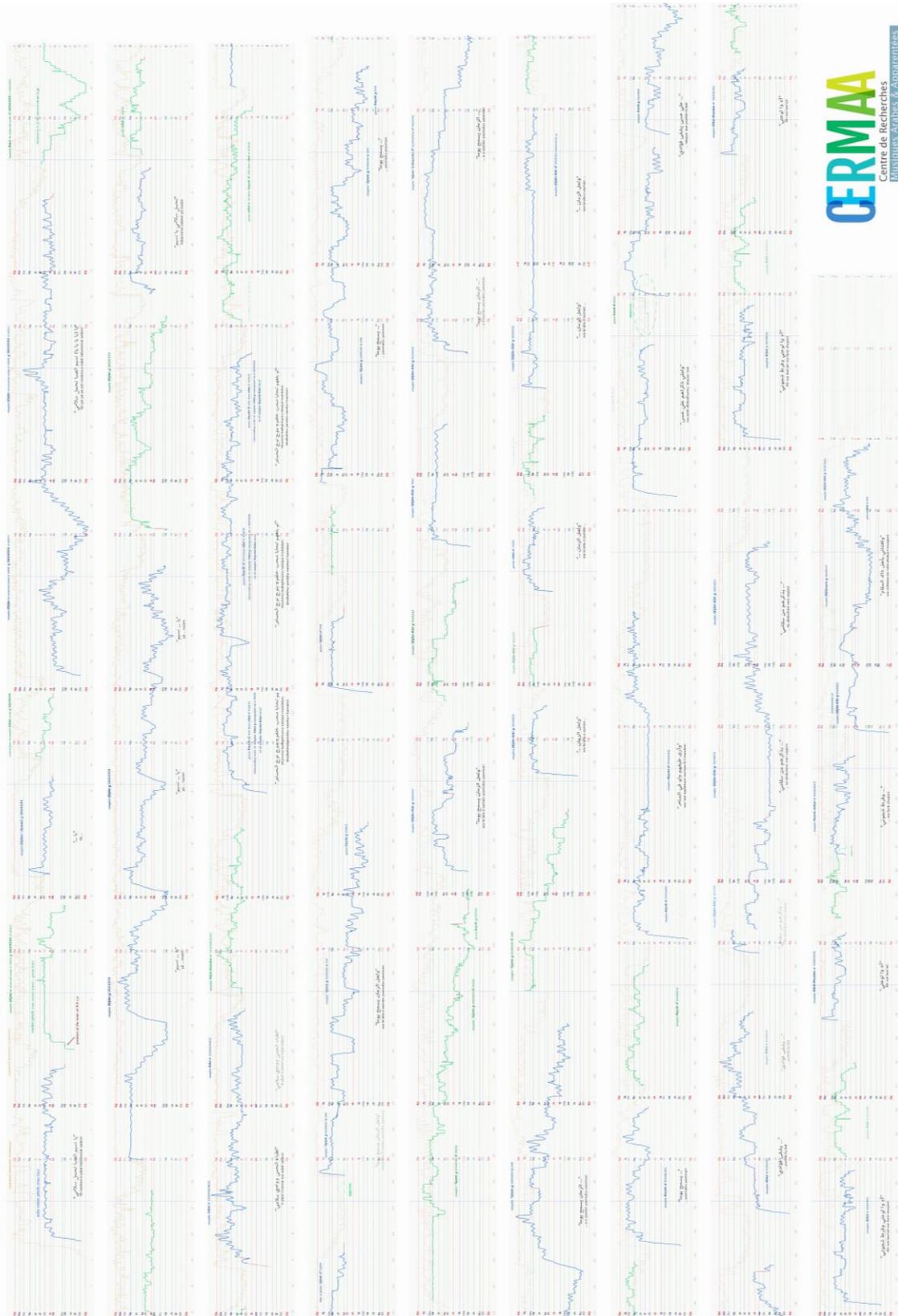


FHT 4 Frame from an early version of the 3D video analysis of the “Hüseynî Taksim” by Neyzen Tevfik, showing the pitch (in blue) without the intensity.



FHT 5 Frame from an early version of the 3D video analysis of the “Hüseynî Taksim” by Neyzen Tevfik, showing the pitch (in blue) with the intensity (in light maroon) in the usual right to left animation.

يَا نَسِيم الصَّبَا تَحْتَلِّ سَلَامِي
performed in 1927 by Shaykh 'Ali Maḥmūd and Sāmi A-sh-Shawwā. Graphic Analysis and Notation



Analyzed in 2018 - 2019 by Amine Beyhom, Saad Saab, Rosy Beyhom, Scott Marcus and Hamdi Maqsoof, edited by Amine Beyhom

FHT 8 Complete graphic notation of *Yā Nāsīm a-ṣ-Ṣabā* printed (A0 format) for the 29th Festival and Conference (and Workshop) on Arabian music 2019 (مهرجان ومؤتمر الموسيقى العربية الثامن والعشرون) in Cairo. (Due to the Lebanese people's revolt on the 17th of October 2019, the author had to cancel his paper and the workshop planned for the aforementioned conference.)

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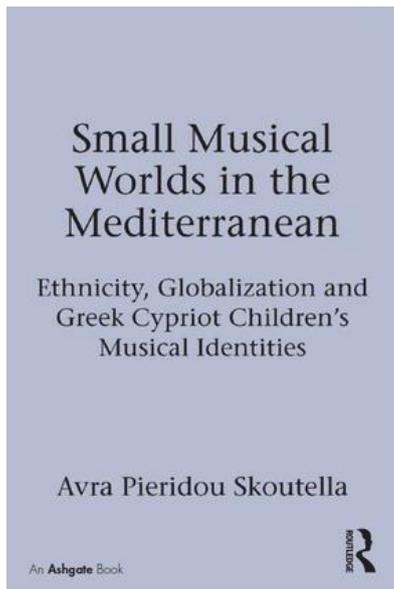
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Book and CD Reviews

Book by Avra PIERIDOU SKOUTELLA : *Small musical worlds in the Mediterranean: ethnicity, globalization and Greek Cypriot children's musical identities*, Ashgate |Farnham, Surrey; Burlington, VT, 2015|.



ISBN: 978-1-4724-5193-4. Received in Hard cover copy from the publisher. 284 pages¹ (internal 23.4×15.5 cm) including a glossary for Greek and Cypriot terms and a general index.

From the publisher's website:

"Avra Pieridou Skoutella is the Founder and President of the Board of Directors of the C.C.R.S.M. Cyprus Centre for the Research and Study of Music, and Founder of the Cyprus Music Leadership Institute. She was Post-Doctoral Research Scholar at the Institute of Education, University of London where she completed her doctoral studies in music education. She has rich teaching experience from early childhood to tertiary level music studies. She holds degrees from the Pedagogical Academy of Cyprus, the Eastman School of Music and the University of Reading".²

Original Abstract:

"Small Musical Worlds in the Mediterranean is a pioneering book-length study of the complex topics of identity, ethnicity and global processes in children's musical lives in the Republic of Cyprus – a Mediterranean country during its post-colonial

era. What is it about this country's musical enculturation that made musical identity such a potent element in Greek Cypriot children's worlds? How is history, tradition, modernity, ethnic fluidity, syncretism and diversification in the Mediterranean negotiated in the construction of musical 'self' and 'other' in children's daily lives? This book, through a journey of 'field-work at home', discusses how children select, reject, reproduce and transform meanings and create new ones at the micro-level of their lives through which individuals and groups define themselves and others. Towards this exploration, musical identity in childhood is discussed in terms of cultural production and reproduction, human expression, inter-relating and learning. Ethnographic vignettes of children's musical practices and direct words add depth and humour to the flow of the book. This study is a synthesis of ethnomusicology, musical anthropology, education and folklore in which the author effectively weaves together theories of musical enculturation and identity, sociocultural learning and human agency. The book will be invaluable to scholars interested in musical enculturation, musical identities, children's contextual musical practices, ethnicity, globalization studies, music education and Mediterranean studies."

The author relates her research to children at school ages (from 5 to 11 years old) both in rural and urban environments in Cyprus, mainly in schools of the island-state. The research focuses from the outset on the musical identity of these children, either through their sayings and answers to the author's questions or through the deductions that can be made from answers and sayings, or further from choices of music listened, music danced to, lived to.

The first part (out of 3 parts) starts with the exposition of the problematics, the history of Cyprus and with methodology. While the aims of the research are clearly stated in this part, it is somewhat burdened by the multiple references to existing literature which may arise from the need for justification, or from an excessive scholarly approach of the subject. A summarized note with the main references would have been welcomed while quotes could have been referenced in more details. Some references are cited twice in the same sentence, while one citation would have been enough.

The second part which is the largest in the book deals with the research as such undertaken by the author in various schools and their vicinities, meeting with

¹ The website of the distributor (Routledge – link provided in the next footnote) specifies "298 pages".

² <https://www.routledge.com/Small-Musical-Worlds-in-the-Mediterranean-Ethnicity-Globalization-and-Skoutella/p/book/9781472451934>.

and studying children's relation to music and to their (musical?) identity.

The book, regrettably lacks musical analyses. The enculturation problematics would have greatly benefited from them, mainly with rhythm and pitch. Whenever traditional (excluding "Neo-Traditional") Cypriot music is still embedded in its surroundings, the discussion about cultural identities and children's negotiations of these identities loses much of their potential values as no comparison is really possible between this music and the music of the neighboring countries, not to speak of the music in the northeastern (Turkish) part of Cyprus.

Only scarce analyses are proposed and deal with children's musical games (Chapter 11) and with the *Tsiattista*, a musical semi-improvised and rhymed genre which seems very close, according to Pieridou's description, to the Lebanese *Zajal*. Regrettably, an analysis written in Western score is far from being sufficient for the comparison of the two genres, as *Zajal* is performed in the Arabian *maqām* (un-tempered) system, while the choice of Western notation, in lieu of graphical pitch representations – or even of an adapted notation – for each performance, does not allow for comparison.³

The most critical aspect is that this book is about musics in their wide variety in the ("Greek" part of the) island without providing, however, the reader with the music itself, apart from already published music material – as CDs, television programs etc. – for which, unfortunately, not even a commercial reference or a link is provided.⁴

Notwithstanding that this research is an example of what good – and interesting – anthropological ethnomusicology could be, it is nevertheless burdened by restrictions that hinder the discipline: the lack of analytical depth (lack of adequate analysis) and a discourse on music to the detriment of the understanding of music itself. Most striking, however, is the *quasi* absence of comparative research – despite the multiple statements

of the author about her open-mindedness with other influences – restricted to predominantly Ottoman⁵ and Western influences, but disregarding the Arabian (probable) input. Does the author succumb to the mainstream trend she claims to oppose, placing the powerful afore the weak? Shall we proceed as ethnomusicologists allowing ourselves a discourse on music without giving oral clues to the reader? We will not know until perhaps other material from this author is published, possibly filling some of the lacunae underlined in this review.

Rosy and Amine Beyhom

Book by Jean-François GOUDESSENNE : *Émergence du chant grégorien : les strates de la branche Neustro-insulaire (687-930) – Tome I. Étude historique et philologique, Tome II. Annexes, planches et édition*, MŪSAM (MUSICALIA ANTIQUITATIS & MEDII AEVI) 2 vols., Brepols [Turnhout (Belgique), 2018].



ISBN: 978-2-503-57978-8. Received in Soft cover (paperback) copy from the publisher. Two tomes (in French), 584 pages total (304 + 280), 98 b/w ill. + 6 colour ill., 216 x 280 mm, 2018.⁶

³ An internet search on *tsiattista* returns many possibilities, including the most interesting <https://www.youtube.com/watch?v=LSeiVCKnWl8>, which confirm the kinship with *zajal* but not as directly related traditions.

⁴ When asked about this major shortcoming, the author explained that this was the policy of the publishing house (Ashgate), which deemed it unnecessary to provide the reader with samples of the researched music. It is regretful nonetheless that the author didn't provide the musical samples online on a separate website from the

publisher, for the sake of research and of a better understanding of her thesis in the whole.

⁵ But strangely enough, as pinpointed above, not the Turkish culture of the other part of Cyprus.

⁶ From the publisher's website (http://www.brepols.net/Pages/ShowProduct.aspx?prod_id=IS-9782503579788-1). The promotional flyer (<https://st3.ning.com/topology/rest/1.0/file/get/1560875298?profile=original>) specified "approx. 700 pages, 44 b/w ills, 42 col. ills, 216x280 mm".

About the series:⁷

“Music was one of the core liberal arts during the Middle-Ages and is situated at the intersection of culture and reflective thinking. Musicology, born in the 18th century with roots in philology and the historical sciences, continued to develop multidisciplinary approaches in mediaeval studies. This series places this approach in a timeframe which begins with Graeco-Roman and late Eastern Antiquity, an essential prelude to the lengthy Middle Ages. Thanks to the artistic endeavours and contemporary musical performances, the corpus of texts and sources of Medieval Music remain[s] a living cultural heritage, just like those of theatre, poetry and dance [...]. The international series *MUSAM* will include several types of publications: Monographs or edited volumes of studies on a specific topic, conference, symposia and colloquia proceedings, critical editions of texts, works, treatises, or exceptional manuscripts (witnesses to an important historical tradition or a particular notation tradition), music pedagogy in the ancient and medieval worlds, or *Variora* collections of articles by distinguished scholars”.⁸

About the author:

“Since 1999 Jean-François GOUDESSENNE has undertaken researches at the musicology section of the Institut de Recherche et d’Histoire des Textes⁹ (CNRS), founded in Orléans by Michel Huglo in 1979. He specializes in liturgical Latin chants of the Carolingian period. After [his] study of the *historiae* of the Province of Reims (Brepols 2002), the edition of the office of saint Denis the facsimile edition of an antiphonarium from Saint-Omer, followed by numerous colloquia and articles (including *Cantus Planus*) and reviews, he spent many years cataloging the corpus of manuscripts from the libraries of the north of France, and undertook researches on Gregorian chant and its transmission in North-Western Europe. He directs seminars and practica about Mediaeval musicology in often interdisciplinary perspectives including liturgy and the history of the arts at the Centre Européen de Conques, at Chartres, Tours and Paris, in partnership with co-cantors and directors of choirs specialized in Mediaeval music”.¹⁰

Original abstract:

“In his endeavors to reconcile ‘Gregorian’ erudition with the works of liturgists and philologists, Jean-François Goudesenne scrutinizes, in the genesis of ‘Gregorian’ chant, the hypothesis of a first, French-insular stage rooted in the ancient Merovingian Neustria, vivified by the Irish and Anglo-Saxon monastic contributions in connection with, in the Carolingian time, centers of influence in the Piedmont and in Lombardy. This hypothesis allows for the reconstruction of the genesis of a Gre-

gorian chant applied in plural form: as for the Carolingian minuscule, the *cantus* was “crafted” as a mosaic, stepwise and not spreading from a unique centrum. Such a diversity, which is nonetheless unified, induces several templates. The multiple interferences of orality in the notation, the specific nature of the sung texts as well as the role of the manuscripts of liturgy allow for the attribution of its successive rewritings – far from the dogma inherited from a neo-Lachmanian vision of the ‘unique original’ – to two opposite branches of which the Lotharingian and the Alemannic-German were widely favored, from the Ottonian period till the Vatican edition.

Thanks to the exceptional resources of the Institut de Recherche et d’Histoire des Textes and to the research programs which began more than fifteen years ago, Goudesenne revisits the European cultural areas while incorporating the ‘Gregorian advent’ in an evolutionary acculturation following a genealogic scheme which is far more complex than a simple linear transmission – a posture slowly constructed from a vast corpus, served by a large panel of sources in the Imperium and by the depth of long-term transmission. Independent from the methods of the Solesmian endeavors of the first half of the 20th century, from the renditions of the post-Cardinian school or from the improbable theory of the ‘antiphonal of Charlemagne’ of Levy, he adheres readily to the works of Treitler, Van der Werf, Bernard, Saulnier and Jeffery. The abandonment of the ‘Gregorian myth’, of the equivocal notions of authors and texts opens up real horizons for these repertoires ‘in transition’ between the Roman, Isles, Frankish and Italic, with differentiated local usages that a ‘new history’ of *cantus* can no more brush aside”.¹¹

This impressive two-parts research on the early formation of Gregorian chant is published in a voluminous format which makes its handling uneasy. The text is set in two columns with wide lateral margins, which places this book in two parts as a luxury edition (the selling price is over 154 \$ or 120 £), in which the layout could prevail over the content. This first impression is soon eluded as the content is firmly documented and theses thoroughly discussed throughout the three hundred and four pages of the first – separate – part, with a rich second part with appendices which complements and illustrates the author’s postulations in the first one.

This first tome is divided in three parts and seven chapters. Editing methodology and sources are expounded in the introductory part, with long lists (26 pages) of abbreviations and manuscripts from the different regions of Europe relating to Gregorian chant. The

⁷ Note that J-F Goudesenne is one of the editors of the collection.

⁸ From the promotional flyer (<https://st3.ning.com/topology/rest/1.0/file/get/1560875298?profile=original>).

⁹ Institute for Research and History of Texts.

¹⁰ Translated from the publisher’s website.

¹¹ Translated from the publisher’s website.

bibliography at the end (p. 285-304) is thematic and comprehensive.

The introductory text (p. 27-32), entitled *Gregorius fabricator Cantus?*, exposes the problematics of the authenticity of the sources – today a common concern among musicologists working in the area of historical musicology – on the examples of the myth of the dove which inspired Gregory the First, and of the fable of the (notated) “antiphonal of Charlemagne”. The author expounds his own doubts and the progression of his musicological and historical research together with the need to combine the two disciplines in his area of research, with a short but enlightening retrospective of previous research on the subject.

The first part of the first tome – entitled “Philology and Musicology” – includes two chapters with the first one stressing on the variability of the effective – and successive – writings of the source texts, and on the still active aural transmission of the music at the beginnings of Gregorian chant. He concludes this first chapter by challenging past reconstructions and the arbitrariness of the choices – among many possible variants – of representative elements of the repertoire, mostly in the paraliturgical aspect of the latter (historical, hagiographical and poetical chants).

The second chapter begins with a reevaluation of the Carolingian reform, and of its efficacy. According to the author, most Early Gregorian sources do not belong to a unique archetypal template, but are compilations from different geographical and historical strata, and are based on even earlier sources differentiated in their compositions. The whole chapter is fundamentally a call to include more diversity in the reconstruction of the sources, and to allow for previously neglected sources to be considered for this procedure.

Part II is entitled “Acculturation in the Carolingian space”, and comprises three chapters (III-IV-V). The third Chapter can be summarized with this lapidary expression (lifted from the text), applied to the geographical space of Gregorian chant: “The Carolingian Empire has combined unity with diversity”.¹² The author opposes the narrative sources to the musicological ones,

with the latter highlighting a far more diverse distribution than what was formerly proposed, and stresses the influence of the Neustrian centers on the formation of Gregorian chant and formulates the thesis of a Neustrian-Isles nucleus while stressing on the role of the Royal abbey of Saint-Denis in transmitting a tradition rooted in the Merovingian period, and of Tours as a disregarded – or forgotten, due to the lack of extant sources – center of propagation and conservation of the liturgical art. Geographical discontinuities and fragmentation of the Carolingian space are underlined, with notable excursions to the Norman-Burgundian, Italic and Anglo-Isles spheres.

The fourth chapter is dedicated to the process of hybridization within and without the Carolingian sphere, including some research on possible interactions between the Roman-Gregorian and the Eastern liturgies, notably a small passage about the “Greco-Latin Halleluia of Syrian origin” (p. 138-139) and a few others about a possible Byzantine origin for some elements of the (sung) liturgy, used as examples of the complexity of the hybridization of Gregorian chant, with a more in-depth study (p. 149-152) of the Byzantine influence on the example of the “Adoration of the Cross”.

The next chapter begins with a quote from French linguist Bernard Cerquiglini’s *Éloge de la variante*,¹³ and “shows in detail, with the help of [musical notation], how to reshuffle the cards of all the philological issues, most importantly for transcriptions made in the purpose of actual musical performance, and to adopt new attitudes towards texts that resist sometimes very strongly any attempt of normalization”.¹⁴

While stressing in parallel on the Aural transmission of the chant and on its non-written origins, the author notably underlines the weaknesses of musical paleography for Gregorian chant and the “inoperability of regional geographical typologies”, and gives concrete examples of regional similitudes contradicting a somewhat nationalistic division of the sources.

The third part of the book is composed of two chapters (VI and VII) which focus on the main hypothesis of the author, the “French-Insular” anteriority – or at least

¹² “[L]’empire carolingien a conjugué l’unité avec la diversité”.

¹³ “In Praise of the Variant: A Critical History of Philology”, originally *Éloge de La Variante: Histoire Critique de La Philologie*. Des Travaux. Paris: Seuil, 1989.

¹⁴ P. 164, translated by the reviewers.

contemporaneity – in the process of formation of Gregorian chant while interacting with the Roman and Germanic spheres. It concludes with a passionate plea for a renewed ecdotic science and for a multi-disciplinary approach of the history (and musicology) of Gregorian chant, building on the diversity of the sources and of the variants, while taking into account the Aural transmission and its importance.

In conclusion: The authors of this review could not but notice, from the outset, the parallel between this research on Gregorian chant and contemporary researches on Byzantine chant¹⁵ which express the same need in demystifying fables on religious chant conveyed by 19th-20th-Centuries “musicologists” out of ideological – if not political – concerns.¹⁶

While the author’s style is rooted in the well-established French tradition of recursive and complex intellectual discourse – to say otherwise that the reading of the book is a little exhausting due to this particular writing style –, the erudition and the passion of the author are reflected in the content which is far from being disappointing. His insistence on the importance of aural transmission reinforces the link with other, living traditions of liturgical chant – notably the Byzantine and other Eastern liturgies.

The whole research is thoroughly documented and details are expounded throughout the first tome, and the impression that predominates after having finished examining all the hypotheses proposed by Goudesenne – and notably the “Neustrian-Insular” hypothesis – is that much more research is necessary until the author’s multifarious propositions can be confirmed or infirmed: there remains also no doubt, whatsoever, that such further research will bring more sources and, with them, further explanations as well as further hypothesizes.¹⁷

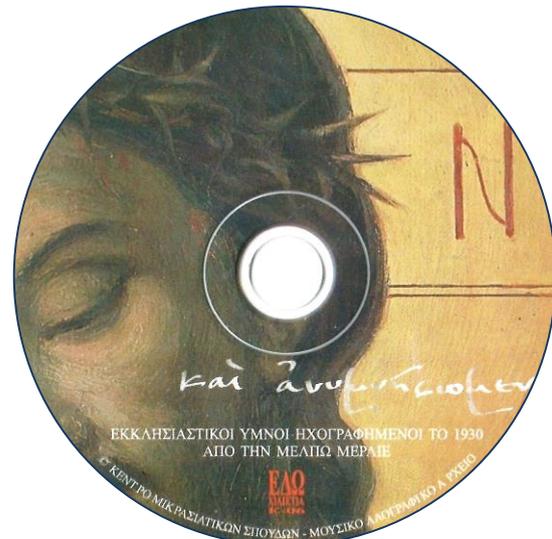
¹⁵ One example of which is Amine Beyhom’s book on Byzantine chant *Théories et pratiques de l’échelle dans le chant byzantin arabe: Une approche comparative et analytique proposant une solution inédite pour le système théorique de Chrysanthos le Madyte*. Broummana (Liban): Par l’auteur, 2015, and the “Byzantine” appendices of his NEMO-Online “Dossier: Hellenism as an Analytical Tool for Occidentism (in Musicology) (V2).” *Near Eastern Musicology Online* 3, no. 5 (November 2016): 53–275.

¹⁶ The authors of this review first met J-F Goudesenne at a conference on Byzantine chant in Volos in the spring of 2018. A further visit – during the Fall of the same year – of J-F Goudesenne to Lebanon and a common interview with Amine Beyhom of the former Bishop of the Syrian-Catholics in Aleppo – which took place in the mountainous Bishopric of the (Lebanese) Syrian-Catholics in

Lastly (and unfortunately), some typesetting¹⁸ and editing errors¹⁹ appear in this otherwise superb edition and wide scope research.

Rosy and Amine Beyhom

CD recorded by MELPO MERLIER: ‘and let us sing in praise’ – *Byzantine Hymns recorded in 1930 by Melpo Merlier, EDO (HERE) |Athens and Volos (Greece), March 2000|*.



The CD has no serial number. It has a cardboard cover with a plastic CD holder. It includes a 27-pages 2-colors booklet in Greek and English.

Published as a limited (2 000 numbered copies) first edition by the Centre for Asia Minor Studies in Athens in 2000, this CD consists in a collection of hymns sung by the Bishop of Samos Irineos Papamichail (tracks 1, 2, 3, 4, 8, 10, 12, 14, 15, 17, 18, 19), Simon Karas and the Choir of the Society for Dissemination of National Music

Charfeh - Lebanon – convinced the writer of the review of the seriousness with which the author checked his sources, and of his wide interest in Eastern religious chant.

¹⁷ As Goudesenne himself writes (p. 158): “There is an immense amount of work still remaining to be done to establish, in a systematic or exhaustive manner, the many variants of rewriting the music which are not only linked to the ornamental or the typological, but also to the cultural and linguistic divisions”. This could apply to the whole sub-discipline of musicology (and philology, and Music history) studying Liturgical chant.

¹⁸ For example, the use of a colon instead of a point at the end of p. 154.

¹⁹ For example, p. 30, 2nd column, 1st line.

(tracks 5, 6, 9, 11, 16, 20), Dimitris Papapostolis (tracks 7, 13) and Dimitris Karonis (track 21), recorded in 1930 by the well-known Greek-French musicologist Melpo Merlier. The contents are divided in two parts: I. Hymns of the Passion and the Resurrection (tracks 1-11), and II. Hymns of the daily Services and of the feasts of the year (tracks 12-21).

The two prefaces included in the booklet are self-explanatory and written by musicologist Markos F. Dragoumis and anthropologist Costis Drygianakis.

Preface (“I”) of the booklet:

“This album includes the majority of the recordings of Byzantine music, made in 1930 by Melpo Merlier and her collaborators, on 78 rpm records, for the ‘Society of Folk Songs’ (or the Folk Music Archives, as it is now called). The voices heard here are those of the Bishop of Samos Irineos Papamichail (1878-1963), of Simon Karas (1903-1999) with his, then new established, choir, and of two chanters from Megara, Dimitris Papapostolis (1869- 1933) and Dimitris Karonis (1891- 1955). In this small collection, not only the eight modes, but also the three ‘types’ of Byzantine music are represented: the syllabic, the intermediate and the me[li]smatic one. All four chanters were chosen for their beautiful voices, but mainly for the respect they had for the oral tradition. As Merlier herself mentions, ‘good or bad, this tradition dominates till today, and it has to be studied, side by side with the printed music books of the Orthodox Church’.

She also believed that the Byzantine records of the Folk Music Archive could be used for lessons and lectures, but mainly for the examination of the differences existing ‘between the printed scores and the oral tradition’. Thus, it is already confirmed, that the way Irineos chants the Palm Sunday hymns (no. 1) is not wrong, but belongs to a traditional system of interpreting the ‘Legetos’ (a branch of mode IV), which is very common in Constantinople.

No need to explain why this album is of interest. Irineos’ voice is presented to a public for the first time, while these recordings of Simon Karas (and his choir) are the very first, by forty years earlier of his well[-]known ones. As for the humble, ‘anonymous’ chanters from Megara, any comment is useless. The crystal clear waters of the fountains, are always found away from the ‘nasty waters of the mooring sites’, at the mountains where the wild goats are grazing, as poet Andreas Empeirikos puts it forth”.²⁰

²⁰ By Markos F. Dragoumis, p. 9 in the booklet.

²¹ Indications appended to each track’s description are from the reviewers. They specify the performer(s): “– B.S. I.P.” for Bishop of Samos Irineos Papamichail, “– S.K.” For Simon Karas and the Choir



Bishop Irineos photographed in 1935. (From the booklet, p. 15.)

Details of the audio content:

I. Hymns of the Passion and the Resurrection

1. **The Lord is God ... let us keep the feast together -Why do ye rage, ye heathens?**, selections from the Kanon (ode nine) and **Come forth, ye nations**, stichero idiomelo at Lauds of the Palm Sunday Matins (mode IV “legetos”) – B.S. I.P.²¹
2. **Alleluia - Behold the Bridegroom**, dismissal hymn of the Service of the Bridegroom (mode IV plagal “triphonos”) – B.S. I.P.
3. **Shuddered the body of the benevolent children - With purified souls** (mode II), hirmoi of the Matins of Holy Monday and Holy Wednesday respectively, and **I see Thy bridal chamber**, exapostelaron of the Service of the Bridegroom (mode III) – B.S. I.P.
4. **Everything that hath breath - The Lord, as He camest**, stichero idiomelo at Lauds of Holy Monday Matins (mode I) – B.S. I.P.*
5. **Let my prayer be directed** from the Divine Liturgy of the Presanctified (mode II plagal) – S.K.
6. **Glory be to the father - They stripped Me of my garments - Both now - I gave my back to scourging**, doxastikon at Lauds of the Holy Passion Service (mode II plagal) – S.K.
7. **Thy tomb, o Savior**, resurrectional kathisma of the Lamentation on the Tomb (“Epitaphios”) (mode I chromatic) – D.P.
8. The Praises (“Egcomia”) of Epitaphios: **Thou who art the life - It is meet to magnify Thee** (“Axion esti”) (mode I plagal) - **All generations - Myrrh-bearing women came** (mode III) and **When Thou didst descent unto death**, resurrectional dismissal hymn (mode II) – B.S. I.P.
9. **Lord, I have cried unto Thee - Let my prayer be directed** from the Divine Liturgy of the Presanctified (mode I plagal) – S.K.

of the Society for Dissemination of National Music, “– D.P.” for Dimitris Papapostolis and “– D.K.” for Dimitris Karonis.

10. **Come, receive ye light** (mode I plagal) - **Thy Resurrection, Christ** (mode II) - **Gospel of the Resurrection** (Mark 16: 1 - 8) - **Christ is arisen** ("Christos Anesti") (mode I plagal) - **The day of Resurrection - Let us purify our senses** (mode I) from the Matins of the Resurrection - B.S. I.P.
11. **Without the experience of corruption**, hirmos (ode nine, instead of "Axion Esti") of the Kanon of the Pentecost (mode Varys) - S.K.



Melpo Merlier around 1960. (From the booklet, p. 12.)

II. Hymns of the daily Services and of the feasts of the year

12. **Most holy Mother of God - By many temptations am I distressed - Higher than the heavens - Speechless be the lips of the impious** (mode IV plagal "triphonos") - **O ye Apostles from afar** (mode III), troparia from the Small and the Great Supplicatory Kanon - B.S. I.P.
13. **The most pure shrine of the Savior** (mode IV chromatic) Kontakion of the Presentation of Virgin Mary - D.P.
14. **I will love thee** - "Axion Esti" from the "pontifical" Divine Liturgy (mode II) - B.S. I.P.
15. **Our Master and Bishop**, "chanted during the veneration of the holy icons by the bishop" from the Service of the Matins (mode Varys) - B.S. I.P.
16. **Blessed is the man** from the Vespers of Saturday and in feasts of Saints (mode IV plagal) - S.K.
17. **I shall open my mouth**, hirmos (ode one) from the Kanon of Akathistos Hymn (mode IV "legetos") - B.S. I.P.
18. **Awed by the beauty of Thy virginity**, Theotokion of Akathistos (mode III) - B.S. I.P.
19. **Glory to thee who hast shown forth the light**, selections from the slow Doxology of the Service of the Matins (mode Varys) - B.S. I.P.

20. **The renewal of mankind**, katavasia (ode four) of the Kanon of the Matins of Christmas (mode I) - S.K.
21. **Everything that hath breath - Make glad, o ye righteous**, stichero idiomelo at Lauds of the Matins of Christmas (mode IV "legetos") - D.K.

The "Second preface" is more centered on Merlier and the styles of the cantors, with further explanations and analyses:

"Merlier [...] regarded [the living tradition of the Ecumenical Patriarchate, represented here by Irineos as] the most important tradition, devoting to it the greater part of the recordings. The second is the research of the new musicologists, seeking the roots and the restoration of the church tradition - Karas is such a case. The third is the chanting art performed locally by chanters of regional Greece [which is here represented by Dimitris Papapostolis and Dimitris Karonis].

These three fields have their particularities. The tradition of the Patriarchate carries a formal education and a rather peculiar technique (of pronouncing, probably reciprocating to the demand for a higher volume (on an era when there were no microphones). In Karas, there is a flaming passion for the revival of old traditions. On the contrary, in Papapostolis and Karonis there are obvious influences from the folk tradition, even with some shades of the westernized 'light' music of the epoch, though not altering the overall style.

This album is a[n] anniversary, let's say, edition, for the second millen[n]ium of Christianity; and Christianity, especially Orthodox, has a particular relationship with the past and the traditions. The patina of time is an aesthetic element. So, we decided not to update completely the quality of the recordings, leaving a little of the feeling of a previous age".²²

The booklet includes further explanations about the performers with a text by Lykourgos Angelopoulos entitled "Simon Karas: the first recording", stressing the importance of the performance - including the "the use of large choirs, and the application of some 'horizontal' harmony" - and its historical and didactical value.

The reviewers' impression after listening to the tracks - and partial analysis - is that all the audio contents are indeed most interesting, and give a unique example of Byzantine chant of this period. They are also a testimony to the zalzalian (Eastern, *maqām*) rooting of contemporary Byzantine chant in Greece.

Rosy and Amine Beyhom

²² Excerpt from the booklet, p. 12-13, the text being signed by Costis Drygianakis who is also cited (on p. 27) as one of the supervisors of the project.

Search for an Optimal Tonal-System for an Authentic Turkish Soundscape

Weighing several theoretical models on Makam music against pitch-histograms

Ozan Yarman*

THE PRESENT-DAY MAKAM¹ THEORY SCENERY²

In a preceding musicological paper that I had co-authored³, a groundbreaking analysis was performed in which we juxtaposed 5 contending tone-systems against peaks of collated histograms generated from pitch measurements of renowned masters of Turkish Classical/Art music. The theoretical models of concern were 53-tone

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¹ (Note from the Editors:) The editors are using in this article the Turkish terminology for *maqām* music, with regular plurals when nevertheless in italics. Furthermore, the Turkish *ı* and *i* appear identical in the capitalized letters, for consistency with previous publications by NEMO-Online. We have also kept the latin *genus* and *genera* used by the author instead of the Greek *genos* and *genē* used in other NEMO-Online articles.

² I am grateful to M. Uğur Keçeciöğlü and Anthony Prechtl for their guidance towards my preparation of the cumbersome formulae used in the MS Excel worksheets referred to in this manuscript that facilitated tedious calculations tremendously. I also wish to thank my three exceptional reviewers who commented very positively and constructively. Finally, I thank, in the person of Amine Beyhom, the Editorial team of the NEMO-Online Journal for their painstaking efforts to elevate the quality of this contribution to the

Equal Temperament (tET⁴) as used by the Mus2okur software⁵; Yarman-24a as a barebones substitution for the official tone-system⁶; the official Arel-Ezgi-Uzdilek (which is simply a restyling of Rauf Yekta’s precursor 24-tone Pythagorean tuning⁷); the derelict Karadeniz-41 that is just a subset of 106-tET⁸; and the contemporary Yavuzoğlu-48⁹ that just appropriates – the way I had disclosed back then¹⁰ – Edward J. Hines’ 48-tET grid for *makams* – with the first two tunings coming out on top, and the last two acquiring the worst overall rank (i.e., they overshoot or undershoot performed pitches by no less than “a whole comma” in general due to either poor choices or technical hardships in the suitable determination of given *makam* scales).

I recently computed and corrected very minor calculation errors in the mentioned study, to the extent that they do not affect the end results in any significant way. Be that as it may, I will use the updated information when referencing this work hereunder.

Checking the match between said histograms grouped under 9 *makam* categories and several more alternative tunings flooding the market nowadays will reveal whether or not the proposed theoretical solutions actually have true merit in the authentic representation of *makams*¹¹. This is especially important since there is

highest level. The finalization of this article coincided with the chaotic wake of the massive chemical explosion in Beirut on the 4th of August 2020 concurrent with the second wave of the Covid-19 pandemic; and even so, I benefitted immensely from the professional camaraderie of my colleagues.

³ [Bozkurt et al., 2009].

⁴ Some theorists may also use the abbreviations -ET (standing for “Equal Temperament” or “*Eşit Taksimat*” the way I had Turkicized it), -EDO (standing for “Equal Divisions of the Octave” or “*Eşite Dilimlenmiş Oktav*” the way I had Turkicized it), and -ED2 (standing for “Equal Divisions of 2/1”), with the last one submitted as a terminological “overkill” in driving the point home, if only for the sake of satisfying a methodical concern towards punctiliousness.

⁵ [Karaosmanoğlu et al., 2011] – See Appendix B for its encapsulation and adaptation of Arel-Ezgi-Uzdilek pitch ratios.

⁶ [Yarman, 2010b, p. 64–99]. (Also cf. [Moriarty, 2014] for “MOS” of Ervin Wilson.)

⁷ cf. [Yarman, 2007a]

⁸ [Karadeniz, 1965] and [Yarman, 2007a].

⁹ [Yavuzoğlu, 2008].

¹⁰ cf. [Hines, 1989] and [Yarman and Karaosmanoğlu, 2009].

¹¹ If one should ask me why I am using “*maqām*” (Arabic = *maqām*) in one place, and “*makam*” in another place: this is the current tendency when trying to separate the last two centuries of Turkification north of the Levant from the Arabization/Arabicness/Ottoman imperialism of the previous centuries south of Asia Minor. In other

still an ongoing (albeit somewhat abated) crisis with regards to which tone-system is the correct one for traditional music-making in Turkey (and possibly elsewhere, too).

Before I elaborate on what these are, let me first enumerate the digital files that come along with this manuscript:¹²

- *MehmetYektay-65tET-Kanun_Mandallama_Birlesik_Dosya.pdf* (Mehmet Yektay’s framework for affixing *mandals* on Turkish *Qanuns* based on dividing the octave into 65 equal parts. He also gives some elemental *makam* scales in degrees of this equal temperament);
- *MehmetYektay-TheoryPractice-65tET-Makamlar.xls* (My effort to decipher and octave-normalize some of Mehmet Yektay’s elemental *makam* scales that relate to the scope of this manuscript);
- *Gunalcin-Weiss.xls* (Calculations for the *rast-çargâh* tetrachordal span of Gunalçin’s “Model 2” versus Weiss’s rational¹³ “Q9” *Qanun*);
- *Chronicles_Yarman24.xls* (A comparative outline of how the Yarman-24 idea evolved);
- *YA24-to-Mus2.xls* (Schematics of what cent values AEU accidentals get in the *b-c-d* variants of the Yarman-24/31 cast for their incorporation into the Mus2 score editor released by DataSoft);
- *Yarman24d_equalizationOFmeantonefifth.xls* (Sketch of a mathematical optimization with respect to the Yarman-24/31 cast);
- *Yarman24E.pdf* (A monograph in Turkish detailing my Yarman-24/42e venture following in the footsteps of the previous Yarman-24 variants);

- *Yarman36_ahenkler-PB-beats.xls* (Derivation of Yarman-36 from a specially given reference frequency and recommended transpositions);
- *79-tones_mandal-ADO.xls* (String lengths-based *mandal* locations to effectuate the 79-tone *Qanun* tuning);
- *WeighingAgainstHistograms-oldbatch2009.xls* (Original and amended data from the preceding musicological study¹⁴ where theorized *makam* scales had been compared against pitch measurements);
- *WeighingAgainstHistograms-newbatch2020.xls* (Data corresponding to the cornerstone tables and figures of Appendix C in this contribution, where even more theorized *makam* scales are now compared against the same pitch measurements).

The theoretical models I hereby aim to investigate are:

1. *79 MOS 159-tET* formal (with scales “formally defined” in my Expanded Ph.D. Thesis)¹⁵,
2. *79 MOS 159-tET* matching (with closest and most meaningful matches to the peaks instead for the sake of fairness),
3. *Yarman-24a* (with occasional modifications to the original *makam* scales the way I had suggested in the aforementioned [Bozkurt et al., 2009],
4. *Yarman-24b* (that copies the updated *makam* scales of the above),
5. *Yarman-24/31c* (that I lately endorse the most among these Yarman-24 variants¹⁶),
6. *Yarman-24/31d* (which is an algebraically calibrated version of the above having the same scales¹⁷),

words, “*Maqam*” – at least to me – is more universal compared to the more recent “*Makam*”, which is restricted to the Turkish/Turkic world of especially the past century.

¹² www.ozanyarman.com/files/searchfortheoptimaltone-system.zip, also available as <http://nemo-online.org/wp-content/uploads/2020/10/searchfortheoptimaltone-system.zip>. (This Zip file contains the relevant MS Excel files, featuring two prepared with some essential help from Uğur Keçecioglu and Anthony Prechtl that greatly facilitated tedious calculations in this manuscript, and which can be freely used for any future study on assessing matches between tunings and histogram peaks.)

¹³ Concerning which, arithmetically speaking, *any* interval can be approximated, even to the smallest fraction of a cent, as the ratio of two integers.

¹⁴ [Bozkurt et al., 2009].

¹⁵ [Yarman, 2016, p. 428–462].

¹⁶ [Yarman, 2014b]. This was an invited talk to Istanbul University State Conservatory (7 April, Kadıköy campus) & to Istanbul Technical University Turkish Music State Conservatory-hosted CompMusic Seminar: “Culture specific approaches in music technology” (11 June, Maçka campus). (Also cf. “Annotated Bowed Tanbur fretted to Yarman-24 tone-system”: <https://www.youtube.com/watch?v=bQJVVaVndyg>; “Microtones and makam music on TouchKeys”: <https://www.youtube.com/watch?v=-QcYgslHq9k>; “Rast Seyir – Fixed Fret Microtonal Guitar in Yarman-24c”: <https://www.youtube.com/watch?v=qZXA8GyHQg>.)

¹⁷ [Yarman, 2014c] (Also cf. <http://www.ozanyarman.com/files/hesap-kitap-hazinesi.zip>).

While the 79-tone *Qanun* tuning's size can be rather unmanageable as such, the “*bulk versus peak-matching performance*” (with this also to be elaborated on further below) of 72-tET, 65-tET and 60-tET – even with their relatively low voluminousness – are still comparable to 79 MOS 159-tET. Even so, their over the top percentages in said measure as shown under PANORAMA B speak more in their favor and against 79 MOS 159-tET. This measure also constitutes a neat way of portraying the tipping point in the balance between a tuning's useful pitch population and its unwieldiness among a group of tunings – as exemplified by the archetypal 72-tET being at or very near said tipping point! Be that as it may, the somewhat better manageability of these three rival resolutions deprives them of overall pitch accuracy when pitted against the 79-tone *Qanun* tuning; so much so that the slight benefits gained do not really seem to be worth the downsizing in this author's opinion.

In contradistinction, any Yarman-24 *a-b-c-d* variant (as a direct replacement for the notorious “Arel-Ezgi-Uzdilek” – or AEU for short – through reliance on the exact same palette of accidentals) does, in spite of being about thrice as sparse, deviate from the measured peak values only by “a comma” at most while performing fairly reasonably. To put things in perspective, the array of efficiency-scaled *and* complexity-weighted grand averages of the mean of maximum differences *or* of the average of differences from histogram peaks (*i.e.*, the so-called “*bulk vs. peak-matching performance*” panorama, or PANORAMA B) is much more satisfactory than for AEU or even its 53-tET encapsulation under *Mus2okur*. The critical question therefore is this: “Why triple the size of the tuning only to gain half a comma finer detail which would still remain vulgar?”. Or one may ask in a similar fashion: “Why double the number of conventional tones while not succeeding to overcome the need for commatic alterations in the construction of relatively simple and straightforward *makam* scales?”

At any rate, while 72-tET appears as the definitive benchmark in PANORAMA B – with 65-tET and 60-tET in close pursuit, a nominal Just-Noticeable Difference (JND) of (as promised) 7-8 c limen²⁷ in the case of 79 MOS 159-tET is arguably much more favorable in terms

of authenticity the way I demarcated it in PANORAMA A. Otherwise, if one wishes to secure a modest level of intonational accuracy with minimal damage to *makams* while permitting no excess to accustomed pitches, the lesser-sized tolerable alternatives such as Yarman-24 and Yarman-36 that perform as good as or even better than AEU can be considered. There are evidently even more solutions in-between – such as the lightweight 34-tET and 41-tET also investigated as part of this study,²⁸ which boast higher moderate degrees of success.

Eventually, the whole ordeal could boil down to my long-standing argumentation that the optimal tuning actually depends on, and is inseparable from, the kind of pitch detail demanded by the *makam* musician; hence my persistence on *not* choosing one single tone-system for *makams* for more than a decade. Is this statement too shocking, after all, when one notices the continuance of the barebones situation with the fret placement on Folk *Bağlamas* as compared to the highly-elaborate yet still unsystematized confounded situation with the long necks of *Tanburs*?

Therefore, if one is hardpressed to establish which tuning is more optimal in the long run for Turkish Classical/Art/Folk music, this can only be soundly achieved through a direct comparison with master pitch histograms generated from the superposition of many audio measurements. Bear in mind that such an excursion yet places no significance on the transposition/modulation or potential polyphonization capabilities of any given theoretical model that might give it an upper edge in the final stage of evaluations. Notwithstanding, nothing less than a quantitative weighing of empirical data will suffice in order to reach a satisfactory conclusion about the *makam*-faithfulness and tractability of a tone-system. Such an up-to-date statistical analysis shall verily be attempted in this manuscript, whereby a FINAL PANORAMA (Table 1:83) serves to showcase the 7 best tunings per size from highest to lowest pitch detail.

The finesse of this study can be improved if (i) the autopeak algorithms are developed further to detect peaks that are visible to the naked eye but anyhow missed during computations, (ii) each *perde* of a given

²⁷ cf. [Long, 2014].

²⁸ cf. aforementioned [Yarman, 2008].

tuning is scaled according to the frequency of occurrence of its autopeak counterpart during weighing and averaging operations, (iii) possible classification errors with given *makams* (e.g., when certain *Hicaz* pieces turn out to be in *Uzzal* instead) and non-stylistic performers (e.g., when early 20th Century non-Turkish musicians get mixed up with 21st Century Turkish musicians) are amended for truer histogram collation.

METHODOLOGY

For this paper too, sample collation was based on the automatic tonic frequency identification method developed by Bozkurt²⁹, whereby the pitch histograms of all the pieces in a certain *makam* were superposed to yield a master pitch histogram. Afterwards, two types of peaks were extracted from these master histograms dubbed “Envelope” and “Average” – against which the corresponding theorized *makam* scales of the tone-systems were pitted. Details can be read in the aforementioned [Bozkurt et al., 2009] wherefrom a synopsis is reproduced in Appendix A.

Given the relative pitches I_{ai} computed from the data automatically and the theorized scale tones I_{ti} , the maximum distance M and the average distance D between the two values for a given *makam* had been calculated as

$$M = \max\{|I_{ai} - I_{ti}|\}, i = 1, 2, 3 \dots N_x,$$

$$D = \frac{1}{N_x} \sum_{i=1}^{N_x} |I_{ai} - I_{ti}|,$$

where N_x is the total number of scale tones (albeit only being valid within a 2.5 Holderian comma, or HC, vicinity for the older analyzed batch, and within a 2 HC = 45.3 c vicinity for the newer analyzed batch that I consider hereunder) for a given *makam* that correspond to a measured relative pitch.

In addition to the distance, an efficiency measure, E , had been provided, which is the ratio, in percentage, of the number of theorized scale tones within a 2.5 HC (or, for the newer analysis hereunder, 2 HC) vicinity of the measured relative pitches, N_x to the number of tones of the *makam* scale defined in the tuning, N_z .

$$E = (N_x / N_z) \times 100$$

To portray the complexity of a given scale in respect to its tuning, one last measure had been provided: C , which is the ratio, normalized to a percentage, of the number of unused scale tones (i.e., “amount of peak-matching relative pitches” minus the “total number of tones in the tuning”), $N_z - N_x$, to the total number of tones in the tuning, N_z .

$$C = (1 - N_x / N_z) \times 100$$

Notice, M , D , E and C were calculated for *envelope* and *average* histogram peaks separately – but their means will be brought together at the final stage. Thus, the mean of the entire set of maximum differences and the mean of the entire set of averages of differences will also be computed for each tone-system. Last but not least, further manipulations shall yield complexity and/or efficiency scaled grand averages, as well as one final machination which I call the FINAL PANORAMA that showcases the best players. All these are tabulated in Appendix C.

Scaling via the complexity measure is different in this paper in comparison to the preceding³⁰ study. Because a direct multiplication by any complexity percentage results in the diminishing of all cent offsets, the solution is to choose the lowest complexity percentage in the list as the basis for the following upscaling operation:

$$\{(Current\ complexity\ percentage/100) + (1 - [smallest\ among\ the\ list\ of\ complexity\ percentages/100])\} \times error\ in\ c$$

The left-hand-side thus gives sensible coefficients for a fair portrayal of complexity-weighted cent errors. When all is said and done, efficiency upscaling can then be introduced to brutally curb down advantageous tunings due to their finer granularity. Since multiplying with any full efficiency would preserve the error while multiplying with half the efficiency would just decrease the error, the correct approach is to divide an input value by the corresponding efficiency percentage so as to arrive at PANORAMA B and then the FINAL PANORAMA.

²⁹ [Bozkurt, 2008].

³⁰ [Bozkurt et al., 2009].

METHODOLOGICAL CAVEATS

Now, one may inquire as to what happens when the analyzed pitches constitute vibratos or portamentos. To this I respond as follows... The histogram peaks are already extracted from audio recordings that include such features by master performers; if the inflexions and microtonal ornamentations were amiss, then we would observe narrow spikes. This is yet not an issue with the current contribution. In the case of even more vibratos and portamentos, the autopeaks would ordinarily be less pronounced (their kurtosis would decrease – *i.e.*, the skirts of such elevations would horizontally spread). Since these are all normalized to 1 (*i.e.*, highest amount of occurrence), and because they are the result of collations of many recordings deemed to be in a given *makam*, their heights or positions on the pitch space would not change by much, if at all.

So how do these aspects actually reflect in the computations? Are the contours and shades surrounding the immediately perceived pitch (such as attack culminations or minute inflexions of the melodic curve) taken substantially into account? Well, yes! These subtleties of pitch – depending on the style, mannerisms, artistic skill and technical capability – are part of the natural performance by the masters on their instruments that is under scrutiny. The pitch measurement and autopeak generation method aptly takes into consideration this reality of the audio recordings, because any characteristic inflexion, if prevalent enough, already contributes to the rise of an histogram peak or makes a bump in one of the valleys of the histogram. The expected results are then outlined in the previous paragraph.

Yet, I did not quite delineate what would happen if other recordings were included in the search... In reality, it depends. If the analyzed historical epoch and class of artists had conspicuous variance in terms of style, mannerisms or instrumentation; that is to say if a group of Maghribi or Iranian performers were brought

into the mix with Turkish performers, then one would most likely expect to see wild results in the histograms – such as with “*perde segâh*” having many distinct peaks in a *makam* that shouldn’t have it in the classical Turkish understanding, for instance. Likewise, if *twelvulated polyphonalist executants* of Turkey were included along with traditional Turkish musicians, one might falsely conclude that “*perde segâh*” in – say – *Hüseyni makam* is actually closer to a tempered whole-tone above its tonic, for instance.

To do plausible objections in this regard any justice, one has to restrict the sample set to only the class of musicians that autochthonously belong to the genre that is the topic of research. In such a case, while earlier or later periods may reveal some deviations in the peak heights and positions on the pitch space, ordinarily one would not expect it to be by too much (*e.g.*, if “tradition” means anything!)³¹. This is especially so when the sample set includes many collations in given *makams*. As more of the same class of performers and *makams* are thrown into the mix, the result should be similar to what is already presented in [Bozkurt et al., 2009] as well as in the current paper. In other words, with the available dataset, one already may be entitled to speak of a “homogenized autopeak panorama” for the *makams* of concern.

NEWLY ANALYZED TUNINGS

Because of the lack of any formally defined *makam* scales under 72-tone Equal Temperament (72-tET), the closest matching degrees to the histogram autopeaks – in just the same way as for 29-tET, 34-tET, 41-tET and 60-tET – were handpicked. This “6-fold detailed 12-tET” resolution is particularly applied to Turkish *Qanuns* due to the prevalent usage in Turkey of electronic tuners imported from abroad of late (the way I

³¹ As underwhelming as it may sound, the occasionality (the way pointed out by Amine Beyhom in [Beyhom, 2014]) of the septimal tetrachord $15/14 \times 7/6 \times 16/15$ (as alluded to by Rauf Yekta further down in the text) – in being one continued variant of the *Hicaz genus* across decades (if not centuries) of classical performance – finds its almost perfect counterpart within Yekta-Arel-Ezgi-Uzdilek and naturally its 53-tET encasing, too. When overlaid with $12/11 \times 7/6 \times 22/21$ (also alluded to by Rauf Yekta further down in the text), one might expect either a single median peak, or separate peaks for the

second degree of the *Hicaz* scale in a given histogram. Yet, in FHT 11:105 (for “Figure Hors Texte” – or “Plate” – no. 11, p. 105), the auto-peak algorithm is just not sensitive enough to differentiate the minutiae of the second degree of *Hicaz* if there indeed are such *genera* variations. Even so, the location of any tell-tale peaks is not off by too much in just the way required of an established branch of persisting tradition.

had explained right at the onset³² of my doctorate dissertation³³— whereby the halftone *mandal* is situated at an equal semitone, and the remaining space to the nut *mandal* is divided into 6 equidistant parts³⁴. This resolution, being a multiple of 12-tET, also incorporates 24-tET and 36-tET as rigorous subsets; the former of which is the notorious Arabic quarter-tone scale³⁵, and the latter of which was (sort of) a preliminary proposal in my master’s thesis³⁶. Suffice it to say, one may manipulate the pertinent MS Excel spreadsheet³⁷ to fiddle around with these and other tuning proposals not considered as part of this study.

Coming next, Mehmet Yektay, grandson of the famed theorist Rauf Yekta (1871-1935), sometimes gave a whole-tone or a major-third moved scales without any mention, and sometimes failed to correctly identify the optimal *makam* scale pitches from his 65-tET proposal,³⁸ leading to conspicuous divergences from the histogram peaks. His original scales are tabulated in another MS Excel document³⁹ accompanying the one just mentioned. These shortcomings have been compensated herein by taking separately the best available 65-tET degree matches to the measured peaks. Such a high resolution was anyway proposed by Yektay as the “true sixer-*mandal* system”⁴⁰ in place of 72-tET following in the Pythagorean footsteps of 53-tET.

A similar situation arose in the case of the “formally defined” *makam* scales under my 79 MOS 159-tET, as well as under Yarman-36; with the best-matching subsets being hence proposed besides for the sake of

fairness. Note that 79 MOS 159-tET *makam* scales were all transposed on C4 = 262 Hz because of my trust in the mathematical symmetry and completeness of the system (cf. Appendix B). Thence, moving the scales on any other degree should more or less yield the same results to all intents and purposes.

As a side note, the rather unpropitious juxtaposition of the “formal scale pitches” of these tunings with the histogram autopeaks may evince my ineptitude, as a Western Classical music acclimatized Pianist, of recognizing the proper traditional or modern application of *makams* (which happens to be just as bothersome a situation for Yektay and Yavuzoğlu!), or my penchant to capture an even truer authenticity the way I professionally envision (such as, for instance, concerning my ongoing personal belief in the historical *Nihavend* being a 5-limit Just Intonation minor and the historical *Buselik* being instead a characteristically 3-limit Pythagorean minor or even a supraminor).⁴¹

Owing to the fact that Durgun60 is the same 60-tET resolution as that initially defended by Yavuzoğlu⁴² – which he seemingly abandoned during the course of time in favor of 48-tET⁴³ – and seeing as different *makam* scales can be later extrapolated to add to the confusion, I have once more preferred to adopt only the best correlations with histogram average and envelope peaks.

Moving on, my Yarman-24 series of tunings operate within a maximum of “one comma inflexion margin” for any given pitch just as I have claimed for years,

for approximating simple superpartient and epimoric 7-limit intervals like 7:4, 10:7, 7:5, 9:7 and 7:6 that take place in *Segah*, *Hicaz* and *Saba genera* and scales all over – with respective absolute errors of 8.826 c, 8.26 c, 8.26 c, 7.993 c and 8.41 c, which are altogether quite unfavorable, inasmuch as adversely impacting, among other things, particularly the *Hicaz* genus in my opinion.

⁴¹ For readers not familiar with the mathematical terminology, *n-limit* denotes the highest prime number (or sometimes just the odd number) obtained through the factorization of both the numerator and denominator of a given ratio or set of ratios in order to demarcate complexity; whereas *Pythagorean* means that the ratio is arrived at through the concatenation of some pure fifths (iterative multiplications by 3:2 or 2:3) or pure fourths (iterative multiplications by 4:3 or 3:4), usually followed by octave normalization.

⁴² In [Yavuzoğlu, 1991].

⁴³ [Yavuzoğlu, 2008], which had been identified in the aforementioned precursor to this study [Bozkurt et al., 2009] as having the lowest overall rank among the five competing tone-system candidates.

³² [Yarman, 2006].

³³ [Yarman, 2016].

³⁴ cf. <http://ozanyarman.com/wpress/2013/03/119> under [Yarman et al., 2019]. Also cf. Ozan Yarman’s presentation at the DR. İBRAHİM ÜZÜMCÜ stage whose video was uploaded to <https://youtu.be/Ro5b8CIE8> and his Power Point slideshow the video of which was uploaded to <https://youtu.be/R0DnAdS05I>; for a correctly typesetted PDF document, visit http://www.ozanyarman.com/files/DrOz_perde-seyirV14-ENSON.pdf and for additional genuine information about Eurogenous *mandal* placement practically yielding 72-tET on quotidian Turkish *Qaruns*, see particularly <http://ozanyarman.com/wpress/2013/03/119>.

³⁵ [Touma, 2003].

³⁶ [Yarman, 2002, p. 44–56].

³⁷ Downloadable within www.ozanyarman.com/files/searchfortheoptimaltonal-system.zip.

³⁸ [Yektay, 2012].

³⁹ *MehmetYektay-TheoryPractice-65tET-Makamlar.xls*.

⁴⁰ Which I happened to contest in a private e-mail to Yektay dated 13 May 2009 for being one of the worst tunings of such great size

and as evidenced by the data, too. In any case, all Yarman-24 variants perform comparably better than AEU. To keep track of which variant was brought forward and when, another MS Excel document named above as *Chronicles_Yarman24.xls* is included in the aforementioned complementary ZIP file. Appendix B also provides additional information in this regard.

Again, be mindful that the results of this paper say nothing about the transposition/modulation or prospective polyphonic capabilities of any given tone-system, or, for that matter, unique bonus features such as the 12-tone cyclic subset or AEU imitation subset availability in the case of my 79-tone *Qanun* tuning the way I particularize under Appendix B. Additional measures may need to be devised to weigh such capabilities against a theoretical model's ultimate representational success.

Numbers are in Appendix C. *Rast scale*⁴⁴ distributions of the theoretical models contra autopeaks are given in THT 8:100⁴⁵, and mismatches against 16 collated pitch-histograms of *RAST* are plotted in FHT 6:100⁴⁶; *Nihavend scale* distributions of the theoretical models contra autopeaks are given in THT 9:101, and mismatches against 12 collated pitch-histograms of *NIHAVEND* are plotted in FHT 7:101; *Kürdilihiczkar scale* distributions of the theoretical models contra autopeaks are given in THT 10:102, and mismatches against 17 collated pitch-histograms of *KÜRDILI-HICAZKAR* are plotted in FHT 8:102; *Uşşak scale* distributions of the theoretical models contra autopeaks are given in THT 11:103, and mismatches against 11 collated pitch-histograms of *UŞŞAK* are plotted in FHT 9:103; *Hüseyni scale* distributions of the theoretical models contra autopeaks are given in THT 12:104, and mismatches against 15 collated pitch-histograms of *HÜSEYNI* are plotted in FHT 10:104; *Hicaz scale* distributions of the theoretical models contra autopeaks are given in THT 13:105, and mismatches against 17 collated pitch-histograms of *HİCAZ* are plotted in FHT 11:105; *Saba scale* distributions of the theoretical models contra autopeaks are given in THT 14:106, and mismatches against 11 collated pitch-histograms of *SABA* are plotted in FHT

12:106; *Segah scale* distributions of the theoretical models contra autopeaks are given in THT 15:107 and mismatches against 16 collated pitch-histograms of *SEGAH* are plotted in FHT 13:107; lastly, *Hüzzam scale* distributions of the theoretical models contra autopeaks are given in THT 16:108, and mismatches against 13 collated pitch-histograms of *HÜZZAM* are plotted in FHT 14:108.

“PANORAMA A” and “PANORAMA B” grand averages are presented in THT 17 and THT 18:109 respectively. Table 1:83⁴⁷ features the “FINAL PANORAMA” where 7 different tone-systems especially rise to the forefront.

CODE AND DATA

The MS Excel spreadsheet document named as *WeighingAgainstHistograms-newbatch2020.xls* referred to in this study⁴⁸ employs specially crafted formulas to facilitate the computation of the rightmost values (the last four columns) throughout Tables 1-9 after a simple copy-pasting of tabulated quantities; wherefrom the rest of the averaging and complexity and/or efficiency weighing can be accomplished straightforwardly. To begin with, in the *HÜZZAM* sheet for instance, the formula in cell C24

```
=IF(D4>0,IF(ABS(C4-C$19)<ABS(D4-C$19), ABS(C4-C$19),ABS(D4-C$19)),ABS(C4-C$19))
```

automatically looks at two neighboring cells containing the scale tones for “*perde çargâh*” and picks the one that is the closest match to the histogram autopeak value so as to take its absolute difference from the peak's cent. All the way to the end of the row under consideration operates in the same fashion until one stumbles upon the end of the table, which necessitates the formula in cell Q24

```
=IF(Q$19<>P$19,ABS(Q4-Q$19), IF(P24=0,ABS(Q4-Q$19),0))
```

that conditionally computes the absolute difference between the scale tone of the last column with the nearest

⁴⁴ Here, lowercase names refer to *makam* scales only. Sometimes I fully capitalize the *makam* name, as I have done here, for visual emphasis. Otherwise, when the *makam* name is entirely uncapitalized, including the first letter, that denotes a synonymous *perde* name instead.

⁴⁵ For “Tableau Hors Texte” no. 8, p. 100.

⁴⁶ For “Figure Hors Texte” – or “Plate” – no. 6, p. 100.

⁴⁷ Which is inserted at the end of the discussion of the results in the main text.

⁴⁸ See footnote 37:79.

of the two final neighboring autopeak values in said row.

After the differences are calculated as such, the expression

```
=SUMPRODUCT(MAX((C24:Z24 < 45.3)*C24:Z24))
```

finds the maximum difference lower than 45.3 c (2 *Holderian commas*) throughout the given row, and

```
=SUMIF(C24:Z24,"< 45.3",C24:Z24) /  
ROUND(SUMPRODUCT(--(C4:Z4 < > "")) *  
(C$19:Z$19 < > "")) /  
COUNTIF(C$19:Z$19,C$19:Z$19&""),0)
```

returns the average of the differences in said row based on the number of scale tone matches to the histogram peaks as the divisor. The procedure up to this point is then repeated for the other type of autopeak.

Once the formula bit for the number of scale tone matches to the number of peaks

```
=ROUND(SUMPRODUCT(--(C4:Z4 < > "")) *  
(C$19:Z$19 < > "")) / COUNTIF  
(C$19:Z$20,C$19:Z$19&""),0)
```

is divided by another formula, *i.e.*,

```
=SUMPRODUCT((C4:Z4 < > "")) /  
COUNTIF(C4:Z4,C4:Z4&""))
```

that establishes the total number of suggested tones in the theoretical model for that *makam*, we get the efficiency measure – which can be multiplied by 100 to display it in percentage.

For the complexity measure, remember that one multiplies by 100 the ratio of the unused scale tones to the total number of tones in the tuning. The second longest and rounded formula bit above already gives the number of unused tones if we subtract the known number of pitches per octave from it (in this case, 79-9=70) – wherefore, dividing this last part by the known number of pitches per octave and multiplying by 100 yields the complexity (*e.g.*, $[70/79]*100 = 88.6\%$).

Proper scaling by this complexity was already explained under the Methodology section. Additional up-scaling by efficiency is simply done via dividing the complexity-weighted result by the efficiency percentage value as previously mentioned.

And that's basically it.

As stated in the previous section, the treasure trove of data computed by these formulae is reproduced below in Appendix C.

I may now proceed to discussing them in the next and final section.

DISCUSSION OF RESULTS

Going forward on a *makam-by-makam* basis across all the Tables and Figures (*cf.* Appendix C), we see that 79 MOS 159-tET (hereinafter the “peak-matching version”) is among the few models that represents *RAST* best when the divergences are unweighted (*cf.* THT 8:100 & FHT 6:100). This, and the case with other *makams* also, is on par with my more than a decade long perseverance to not force upon people what *makam* scales should be.

When divergences are complexity-weighted, though, Yarman-24b comes out on top; here the proximity of Yarman-24b and Yarman-24/31c to *RAST* is quite noticeable (*cf.* THT 8:100 & FHT 6:100).

For *NIHAVEND*, 72-tET and 79 MOS 159-tET just surpass Sait Durgun's 60-tET, insofar as sharing the pedestal when the divergences are unweighted. The situation is similar when they are complexity-weighted, too (*cf.* FHT 7:101 & FHT 7:101).

Same with *KÜRDILHICAZKAR*; save that 79 MOS 159-tET excels over the rest when the divergences are complexity-weighted (*cf.* THT 10:102 & FHT 8:102).

Unweighted *UŞŞAK* is still better represented by 79 MOS 159-tET, and complexity-weighted *UŞŞAK* is much more neatly represented by 72-tET (*cf.* THT 11:103 & FHT 9:103). Of particular note for this *makam* are Yarman-24/42e's comparatively small average deviations from the peaks.

Sait Durgun's 60-tET is the winner for *HÜSEYİNİ* in both venues (*cf.* THT 12:104 & FHT 10:104), with 79 MOS 159-tET followed by 72-tET and 65-tET in close pursuit.

79 MOS 159-tET is the winner for *HICAZ* in both venues (*cf.* THT 13:105 & FHT 11:105), while 41-tET competes admirably.

SABA too is the undisputed domain of 79 MOS 159-tET in both venues (*cf.* THT 14:106 & FHT 12:106),

whereas 65-tET, 72-tET, 41-tET, 34-tET and even 29-tET in turn exhibit a worthwhile credibility for this *makam*.

60-tET and 72-tET compete for dominance over *SEGAH* in both venues (cf. THT 15:107 & FHT 13:107), with 79 MOS 159-tET and 65-tET and even Yarman-24/42e just barely shy of them.

Mehmet Yektay's 65-tET is the "king of *Hüzzam*" in both venues (cf. THT 16:108 & FHT 14:108). Be that as it may, the 79-tone tuning, 72-tET, 60-tET and Yarman-24/42e are perceptibly runners-up; with 72-tET and 60-tET overshadowing the rest (except 65-tET) when the divergences are complexity-weighted.

In THT 17:109, where the 79-tone *Qarun* tuning is the penultimate champion, PANORAMA A shows how intelligently increasing the number of pitches in an octave can expedite a well-crafted temperament to outclass small contenders as well as to overshadow rival biggies. The situation with 72-tET, 65-tET and 60-tET coming in second place demonstrates this clearly.

Yet, PANORAMA B in THT 18:109 communicates instead that, if one keeps increasing pitches after a certain point, it will not be in that tone-system's favor anymore. In other words, for the present study, one comes to settle on 72-tET as the benchmark at a score of 100% with regards to the entirety of efficiency-up-scaled grand averages of weighted maximums and differences: It boasts the lowest up-scaled cent values across the board – with 65-tET and 60-tET just on its heels.

Here, out of the entire list of given tunings, 72-tET thence seems to be more or less the tipping point

(e.g., *bulk vs. peak-matching performance benchmark*) before things start to get worse for ever finer divisions of the octave. Among the given list, too few pitches don't seem to work well in terms of *makam*-fidelity either.

This panorama also reveals that music theorists bungle a lot when trying to impose their formal scales on traditional and modal art forms. Just look at the formalisms of particularly Karadeniz, Yektay and Yavuzoğlu...⁴⁹ Furthermore, the mediocre performances of several cherished middle-ground tunings such as 53-tET and Yarman-36 are indeed disappointing.

To recapitulate, I wish to draw attention to the FINAL PANORAMA in Table 12, where one may especially notice how Yarman-24/42e falls behind 34-tET of an equivalent milieu, and Yarman-24/31c falls behind 29-tET of the same league, and how *Mus2okur*'s 53-tET cannot compete against the earliest Yarman-24 variants ("a" and "b") less than half its size. Once again, this panorama either demonstrates unforgivable blunders of music theorists in their *makam* scale formalism, or hints at an insidious shift in the modern Turkish intonation soundscape in accordance with what I some years ago christened as *temperialism*: "Conscious or inadvertent equal temperament infusion through cultural imperialism".⁵⁰

On the other hand, I did not anticipate how useless a pursuit Yarman-24/42e would prove to be with respect to the ever-so-delicate prevalence of 41-tET over it. Apparently, even with considerable transpositional sacrifices resulting in much irregularity, one should find it very hard to compete against suitable equal temperaments of identical caliber.

⁴⁹ This incidentally reminds me of a couple of thought-provoking past comments by my detractors that goes like: "This *Qarun* has no educational significance!" or "First you will learn Turkish music and only then speak on Turkish music!" or "...Ekrem Karadeniz, who is the only other system-possessing music theorist!", etc...

⁵⁰ I suspect the generation preceding – but also including the prime years of – Necdet Yaşar, Niyazi Sayın and Nevzat Sümer had little to no qualms about what I refer to as "temperialism", as evidenced by modern pitch measurements showing how these venerable masters more or less upheld tradition. It likely affects the succeeding generations that are more susceptible to the electro-mechanized society norms of highly advanced technological development coupled with the decadence of the masses, and especially those who must work alongside popular music groups in studios, concert venues, and public spaces. Even so, *caveat emptor*. In contrast to the befuddled "orthodoxy nostalgia" or "tradition romanticism" the way exemplified by Okan Murat Öztürk (cf. [Öztürk, 2019a;

2019b] – against whom my recent criticisms in the comments section of the given websites went unanswered by the way – a pioneering study by Amine Beyhom [2014] hints at the necessity to question what "*makam* tradition" should actually stand for in the face of Beyhom's disclosure of a detectable intonation shift in the *makam* performances by the aforementioned masters throughout a 30-year span. While "*Arelization*" more than "*temperialism*" could have played a role in such a shift, still, if one is to talk of an observant branch of praxis throughout the past century despite all political and theoretical revolutions and setbacks, one might perhaps do well to consider such revealed changes as part of a more general "oscillation" or "perturbation" belonging to the "body of tradition" itself (e.g., "*Hafızlık Ekoli/Tavrı*" vs. "*Fasıl*" vs. "*Aşıklık Gelenegi*" – cf. especially [Beyhom, 2019]).

What was rather unexpected for me was the slight worsening in discrepancies under Yarman-24/31c (cf. PANORAMA A under THT 17:109) as compared to the earlier Yarman-24 variants. While I knew that the “d” variant did not resonate so well digitally, I still expected the “c” variant to be an improvement over the “a” and “b” variants. Could it be that the overpowering climate of *temperialism* is adversely affecting this author also?

Much more can be said about the numbers in the FINAL PANORAMA as well as PANORAMA B. What I found particularly surprising is how 34-tET performed better than 41-tET on the whole or even singularly with respect to some “crunchy”⁵¹ *makams* like *Uşşak* and *Saba*.

But may the reader look at just how good 29-tET performs in comparison to AEU or even its 53-tET encapsulation under Mus2! Such an outcome is definitely surprising. In addition to these, PANORAMA A divergences for 29-tET and 53-tET are very much comparable, too (cf. THT 17:109).

With respect to the Yarman-24 variants, the “near-Pythagorean” 29 equal division of the octave does not require a notational paradigm shift either. In other words, the habitual AEU accidentals symbolism can be applied to it right away.

One then only wonders why this resolution was not chosen a century ago as the barebones container of *makams*. Given the current theoretical mess, it seems a pity indeed...

The results especially reflect how there is still no well-performing middle-ground division of the octave between the resolutions of 34 pitches to the octave and 60 pitches to the octave. This is significant if one wishes to compete against the bulwark success of voluminous tone-systems surpassing 53-tET.

⁵¹ What I mean by it is “intonation-wise sticking out by liberally bent *perdes*”. In *SABA* and *HICAZ* in particular, whose characteristically variegated supple *perde* corresponds to the *makam*’s name (for instance, *SABA* gets its name from “*perde saba*” or vice versa – which, on the *Ney*, is the same hole for “*perde hicaz*” of *HICAZ*), one may see Maghribis play it “semitonally” above *perde çargâh* in both cases, and Turks as well as Iranians “sesqui-semitonally” in *SABA* and “semitonally” or even “quarter-tonally” in *HICAZ* – forming thus a justly intoned major third versus either an acute major third for *SABA* or a neutral third for *GARIP HICAZ* above the tonic respectively.

Ultimately, the FINAL PANORAMA (Table 1) can be said to reveal the predominance of (1) 79 MOS 159-tET over all else, followed by (2) 72-tET, followed by (3) 65-tET, followed by (4) 60-tET, followed by (5) 34-tET, followed by (6) 29-tET, and at last followed by (7) Yarman-24a.

FINAL PANORAMA	Final Average of maximums		Final Average of mean diff.	
79 tone-formal (79 per 159 tET)	31.7	85%	13.5	42%
79 tone-matching (nr.1)	11.2	100%	5.8	98%
Yarman-24a (nr.7)	18	62%	7.2	79%
Yarman-24b	19.5	58%	7.5	76%
Yarman24/31c	20.8	54%	7.5	75%
Yarman24/31d	20.9	54%	7.8	73%
Yarman24/42e	15.5	72%	7.8	72%
Yarman36a-formal	23.9	47%	12.4	46%
Yarman36a-matching	23	49%	9.7	58%
Yektay65-formal (in 65 tET)	27.6	41%	11	51%
65 tET-matching (nr.3)	12.2	92%	5.8	97%
60 tET-matching (nr.4)	12.3	91%	6.2	91%
72 tET-matching (nr.2)	11.8	95%	5.7	100%
41 tET-matching	15.6	72%	7.5	75%
34 tET-matching (nr.5)	15.6	72%	7.3	77%
29 tET-matching (nr.6)	16.9	67%	8	70%
YAEU (24 per 53-tET)	24.5	46%	9.1	62%
Mus2 (53 tET-formal)	23.3	48%	10.1	56%
Töre-Karadeniz (41 per 106 tET)	30.5	37%	12	47%
Old Yarman-24a	19.6	57%	7.4	77%
Yavuzoğlu-48 (in 48 tET)	28.9	39%	14.2	40%

Table 1 FINAL PANORAMA – with the bottom 5 rows drawn from [Bozkurt et al., 2009] – where the mean of M_{\circ} , GWM and the mean of CEM, GEM are averaged to yield *final average of maximums*, while the mean of D_{\circ} , GWD and the mean of CED, GED are averaged to yield *final average of mean differences*.⁵²

*
* *

⁵² Please refer to the explanations in the captions to THT 17 & THT 18:109 for M_{\circ} , GWM, CEM, GEM, D_{\circ} , GWD, CED and GED. Likewise to the procedure explained in the caption to THT 18:109, percentages are found according to the formula (*smallest value in column two or four*) / (*current value in column two or four*). This panorama highlights 7 tunings above the rest with 79 MOS 159-tET (peak-matching version) staying in the lead once more. Best values are highlighted and in bold, while worst values are striped in red. Smaller values corresponding to greater percentages are always better.

APPENDIX A

A summary of the frequency analysis procedure used in this research

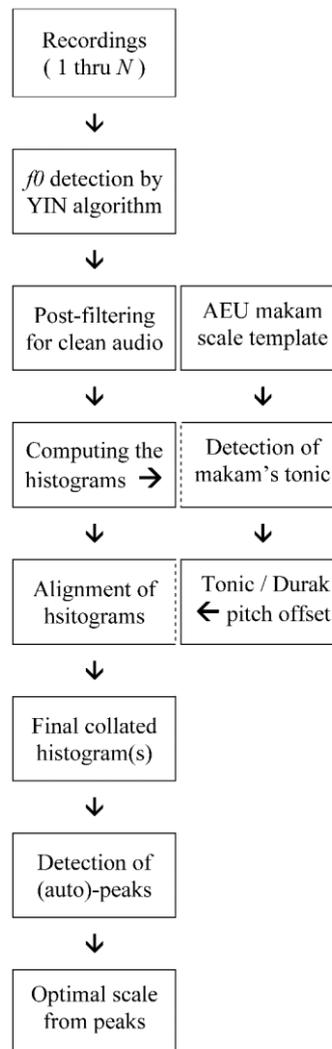
A summary of the frequency analysis procedure pertaining to both the older [Bozkurt et al., 2009] paper and the current contribution is presented in FHT 1. The addition of a peak detection algorithm to the earlier set of signal processing tools developed by Bozkurt [2008] for traditional Turkish music has allowed the straightforward extraction of the “optimal musical scale” from any digitized audio input against which to compare a theory. The entire algorithm was coded under MatLab by Bozkurt and is named as “*The MakamToolBox*”.

The sample set upon which Bozkurt’s batch operations were executed is, to reiterate, the same for either the [Bozkurt et al., 2009] paper and this contribution. In other words, the *makam* categories were and still are *RAST* (16 collated samples), *NİHAVEND* (12 collated samples), *KÜRDİLİHİCAZKAR* (17 collated samples), *UŞŞAK* (11 collated samples), *HÜSEYİNİ* (15 collated samples), *HİCAZ* (17 collated samples) *SABA* (11 collated samples), *SEGAH* (16 collated samples) and *HÜZZAM* (13 collated samples), constituting a total of 128 audio files that led to the production of 9 distinct histogram plots. The dataset in question comprises performances with highly characteristic microtonal inflexions by Tanburi Cemil (*tanbur*, *kemençe*, violoncello), Mesut Cemil (*tanbur*, violoncello), Ercüment Batanay (*tanbur*), Fahrettin Çimenli (*tanbur*), Udi Hrant (violin), Yorgo Bacanos (*ud*), Aka Gündüz Kutbay (*ney*), Kani Karaca (vocal), Bekir Sidki Sezgin (vocal), Necdet Yaşar (*tanbur*), İhsan Özgen (*kemençe*) and Niyazi Sayin (*ney*); thus spanning a historical period from 1910 to 2001.

In FHT 1, I illustrated the automatic procedure used by Bozkurt’s *The MakamToolBox* when analyzing a group of digitized audio files.

After feeding a given monophonic audio file into the code, one first finds the fundamental frequency f_0 and the rest of the pitches using the popular YIN pitch detection algorithm. One then sees that the f_0 raw data must be re-processed to fix the “mistakes” of YIN, such as correcting for the doubling/halving of octaves in this algorithm’s mishandling of the Turkish *makam* zeitgeist, as well as to remove unwanted noise. Said post-filter too had been developed by Bozkurt [2008].

After the post-filter is complete, one sees that the corresponding histogram gets generated and is then calibrated in alignment with the best match to an Arel-Ezgi-Uzdilek *makam* scale template in order that the tonic of the performance is established for later collation with alike histograms.



FHT 1 Flowchart of the signal processing and histogram generation procedure that Bozkurt’s *The MakamToolBox* operates on.

Here, the pitch histogram of concern is just a 2D drawing where the data table of detected frequencies gets dumped onto a graph representation based on their related incidences. Put in other terms, the histogram is basically a “90-degree hour-glassed melogram”. Thus, the one-to-one correlation for the final plot is that where the f_0 values are categorized under bins according to the formula

$$Hf_0[n] = \sum_{k=1}^K m_k ,$$

with $m_k = 1, f_n \leq f_0[k] < f_{n+1}$

or $m_k = 0, \text{otherwise};$

where the minima and maxima (f_n, f_{n+1}) represent boundary values that define the f_0 range for the n^{th} bin of our histogram representation.

The choice of the bin-width ($f_{n+1} - f_n$) – that is to say, the width of each category – demarcates the resolution of the histogram. For our purposes, it was, and for this contribution still is, desirable to use uniform sampling of the whole f_0 range. Through trial and error, the proper bin-width was established to be 1 degree of 159-tET (1/3rd the Holderian comma, or *HC*, equaling 7.55 c), which is thought to optimize between the appearance of spurious peaks due to ultrafine discreteness and the undesirable loss of essential peaks on account of choosing a coarser grid.

One caveat must be mentioned at this point: All histogram graphics in the previous study⁵³ were originally drawn at $53 \times 12 = 636\text{-tET}$ resolution as the lowest best-fit workable grid for the adequate representation of the whole of the evaluated theoretical models. This constrained misrepresentation to a maximum of less than 1 cent absolute error concerning any pitch of any theoretical model considered therein. Thus, all pitch histograms were 4-fold upsampled for merging. Since I am not re-drawing histograms for my new analysis, it is not relevant here. It would be relevant if I or someone else decided to draw them based on the statistical findings hereunder.

Even so, the figures in Appendix C feature – for better or for worse – such 636-tET resolution plots from the previous study for visual comparison (albeit vertically squashed due to lack of publication space).

Another caveat is that, the MatLab code *The MakamToolBox* that was initially deployed by Bozkurt in our preparation of the original 2009 publication in the *Journal of New Music Theory* operated within the 0.33 Holderian comma (HC) sensitivity of the pitch measurement device. That is to say, for a scale tone at, say, 5 HC, all the frequency possibilities up to $\pm 0.17 \text{ HC}$ ⁵⁴ around that value collapsed to 5 HC. All this goes without saying

how the histogram auto-peaks would minutely diverge due to systematic machine errors if a separate pitch measurement run were to be conducted.

Nevertheless, the outcome would at any rate – and I stress this part – only diminutively differ from earlier pitch measurement runs, and would not affect the previous or current conclusions in any significant way.

After the histograms are aligned based on the *makam's* tonic as per [Bozkurt, 2008], simple averaging of the histograms, where they are summed up and divided by their amount, as well as the normalization of the result according to the highest pitch incidence equaling “1”, leads to the first of the two final histograms called the “average histogram”. The second of the two final histograms uses, prior to normalization, the maximum function leading to what is called the “envelope histogram”, that is otherwise the direct superposition of all histograms. A three-tap moving average filter then smoothens the ragged edges and allows for the robust detection of local maxima in terms of relative frequencies (*i.e.*, the so-called “autopeak-ave.” and “autopeak-env.”). These final histograms are presented together – albeit in a squashed way – on top of all the figures in Appendix C as I stated above for visual comparison against the findings of the current contribution.

Last, but not the least, mismatches between the two types of auto-peaks and the suggested scale tones of a theoretical model in any intervallic unit (such as *HC* or *cents*) can be shown. Knowing the relative frequencies I_{ai} of the autopeaks computed from the data automatically and the theorized scale tones I_{ti} of a tone-system, the maximum distance M and the average distance D between the two values for a given *makam* can be computed as

$$M = \max \left\{ |I_{ai} - I_{ti}|, i = 1, 2, 3 \dots N_x, \right.$$

$$D = \frac{1}{N_x} \sum_{i=1}^{N_x} |I_{ai} - I_{ti}|,$$

where N_x is the total number of scale tones for a given *makam* out of all the pitches of the tuning that match a measured relative pitch. Everything else from this point onward regarding data evaluation is detailed under the Methodology and Code and Data sections of the present paper.

⁵³ [Bozkurt et al., 2009].

⁵⁴ Approx. 4 cents.

APPENDIX B

A new mandal layout plan by Günalçin against the 79-tone tuning and Weiss's rational "Q9" qanun

Serkan Günalçin recently spotlighted in his doctorate dissertation⁵⁵ a novel Just Intonation (JI) approach to installing *mandals* on the Turkish *Qanun* according to pitch measurements he meticulously gathered from 72 solo performances of Tanburi Cemil Bey. In the same spirit, Günalçin had previously defended⁵⁶ the abandonment of any equal tempered solution for this instrument after making a comparison with the electroacoustic assessments by Karl Signell⁵⁷ of idiosyncratic intervals between the frets of the late Necdet Yaşar's *Tanbur*. Yet, Günalçin too – like many others – incessantly keeps portraying my 79-tone strategy as a structure with entirely equal intervals⁵⁸. I now wish to critique Günalçin's project in the light of the superior points of my 79-tone tuning and Stefan Pohlit's earlier doctoral work on the late Julien Jalaladdin Weiss's rational *Qanun* christened "Q9"⁵⁹. (See for example the picture of my *qanun* in FHT 2.)



FHT 2 The author's *qanun* (bird's eye view).

In his exceptionally well-articulated doctorate study, Günalçin identifies the following crucial elements:

1. The *Qanun* has remained, even up-to-this-day according to some, a *nâ-kâmil* (under-developed) instrument that is incapable of correctly producing the genuine *perdes* of Turkish *Makam* music – unless when in the hands of legendary performers like Kanuni Hacı Arif Bey, who successfully

determined accented pitches with the pressure of their thumb nail or finger pinches on the string courses; (See an example of a *qanun* without *mandals* in FHT 3.)



FHT 3 "Kanun, and mode of playing it".⁶⁰ No *mandals* are to be seen on this instrument the way it had been depicted in mid-19th century.

2. Following the introduction of the advantageous *mandal* mechanism by the late 19th Century⁶¹, the number of *mandals* per course increased dramatically throughout the decades (see for example the *mandals* on my *qanun* in FHT 4:87) – but even so, some renowned musicians shied away from the *Qanun* for its dearth of desired intonation at the initial stage;
3. Modern *Qanuns* today are mostly prepared in accordance with a voluminous and haphazard subset of sixfold stacked twelve-tone equal temperament resolution (for which Günalçin unfortunately still does not accord to me due credit in being the first person who drew attention, and with necessary technical detail, to the fact that *Qanun*-makers affix the semitone *mandal* at 100 cents owing to the prevalent usage of Eurogenously manufactured electronic tuners, only to visually apportion the remaining distance

⁵⁵ [Günalçin, 2019]. (Also cf. TÜMAÇ BSE No. 12: "Perde Anlayışı ve Kanun Mandallama Modelleri", live-streamed webinar on 4 July 2020).

⁵⁶ [Günalçin, 2013].

⁵⁷ [Signell, 1977, p. 37–47, 151–161]

⁵⁸ [Günalçin, 2019, p. 11–12].

⁵⁹ [Pohlit, 2011; 2012].

⁶⁰ Retrieved from [Anon. "Datei:Kanun, and mode of playing it"], which refers to the original as [Thomson, 1859, p. 577].

⁶¹ On the regular diatonically tuned *Qanun*, *mandal* technology was first implemented, according to Turkish musicologist Rauf Yekta, some 30 years prior to his submission of his invited monograph on Turkish Music to the 1922 edition of Albert Lavignac's *Encyclopédie de la Musique et Dictionnaire du Conservatoire* (cf. [Yekta, 1986, p. 92–93], and also cf. [Yarman et al., 2019]).

to the nut to basically 6 equidistant portions to arrive at virtually 72-tET⁶²; ⁶³



FHT 4 The *mandals* on the author's *qanun*, as installed by the late Ejder Güleç, in accordance with the 79-tone system.

4. Because 72-tET does not approximate 53-tET degrees well – which, in turn, exceptionally houses Yekta-Arel-Ezgi-Uzdilek with only under 1 cent maximum absolute error at any degree⁶⁴ – and discrepancies as much as half a comma thereby arise, alternative approaches surfaced some decades ago, such as the 53-tET *mandal* scheme by Ethem Ruhi Üngör and the hybrid Pythagorean + equipartitioned *mandal* scheme by İsmail Baha Süreksan, although they have mostly fallen out of notice in general when confronted with modern 12-tET nucleated *mandal* installation suggestions, such as by Sait Durgun (who defends 60-tET that I presently analyze in this study) and by Nail Yavuzoğlu (who previously defended 60-tET⁶⁵, but now defends 48-tET⁶⁶ – yet without giving any due

⁶² This is to the extent that Günelçin's rather perfunctory statement in his webinar presentation (see fn. 55:86) that the microtones other than the *temam perdeha* (unaccented notes or the naturals) are indeterminate is baseless in the face of all my elucidations since more than a whole decade.

⁶³ cf. [Yarman, 2006; 2016; Yarman et al., 2019]. (Also cf. <http://www.ozanyarman.com/79toneqanun.html>.)

⁶⁴ [Yarman, 2010b, p. 22, 128, 130-31, 159].

⁶⁵ [Yavuzoğlu, 1991].

⁶⁶ [Yavuzoğlu, 2008].

⁶⁷ “*Mujannabāt*” (Pl. of *Mujannab* in Arabic): “The ones who are situated next to...”, as had been first coined in extant Islamic music theory literature by al-Fārābī in his *Great Book of Music* (see [Beyhom, 2010, p. 205]), and later on picked up by Yalçın Tura as *mücenneb bölgesi* or the *mujannab zone* [Tura 1981], are a group of “semitonal to sesquisemitonal” fingerboard positions (being at least four in total, with all of them christened “*mujannab-i sabbaba*”) bridgeward the open string on the *Oud* (while Amine Beyhom holds that frets or ligatures on the fingerboard of the medieval *Oud* might have solely been preferred for theoretical demonstrations and/or teaching purposes – cf. [Beyhom and Makhlof, 2009]), corresponding to the pressure by the index finger at an anterior location

mention to his predecessor Edward J. Hines – whereby 48-tET had already been debunked in [Bozkurt et al., 2009]);

5. Tanburi Cemil Bey is judged to be a ubiquitously-agreed-upon reference to pinpoint genuine Turkish *Makam* music intonation (although he is taken as the sole exemplar by Günelçin in contrast to the 12 distinct masters taken into consideration under the present study);
6. Praxis seems to involve the blend of two well-defined structures: (i) A Pythagorean plane for transpositions and modulations that must eventually be limited in scope because exact 3-limit intervals never conjoin at the octave, (ii) a greater prime-limit Just Intonation plane for capturing the *mujannabāt*⁶⁷ alongside special tetrachordal *genera* over certain degrees (regarding which the reader might wish to refer to [Yarman and Karaosmanoğlu, 2014] that I analyze herein as a clever attempt to bridge the commatic world with the quarter-tonal);
7. Rauf Yekta and Suphi Ezgi acknowledge the existence of these *mujannabāt*, whereas Hüseyin Saadettin Arel completely ignores them later on (which is somewhat of a false statement by Günelçin, because both Yekta and Ezgi specifically indicate that the “unsystematized” *mujannab* ratios of old are quite adequately superseded by the 24-tone Pythagorean tuning they espouse⁶⁸;

compared to the standard whole tone location by the same finger (i.e., *sabbaba*) (cf. [Sina, 2004, p. 109–112], [Kutluğ, 2000, p. 31–33], [Farmer, 1957, p. 456–464] and [Forster, 2010, p. 610–787]). They delineate a “microtonal continuum” in the pitch-space (with such a quotidian interpretation yet possibly amounting to merely an anachronism!), where especially the fractions 256/243 (90 c), 18/17 (99 c), 162/149 (145 c) and 54/49 (168 c) are associated with the feel of a “*mujannab* interval” (and where the latter two ratios, along with the addition of the Farabian 12/11 (151 c), are nearer to the contemporary sesquisemitonal understanding of this interval type).

⁶⁸ [Yekta, 2008, p. 13], [Ezgi, 1933, v. I, p. 57–57, 139; 1940, v. IV, p. 210–211]. (Also cf. <https://islamansiklopedisi.org.tr/rauf-yekta-bey>.) The reader is encouraged to consult the concomitantly cited references, where Yekta – for his prioritization of *Tahkiki* (well-determined – i.e., *Pythagorean*) ratios instead of *Takribi* (approximate) ratios – plainly dismisses to notate 12/11 (his so-called “*nakıs biyyük mücenneb*”, or diminished large middle second), while Ezgi openly rejects even the possibility of 11/10 (let alone 12/11) in *Uşşak* and *Saba*. Needless to say, I was probably the first person to academically highlight the (politically calculated?) disregard of

8. Owing to the confluence of these facts, and despite the *Makam* music pitch-space being rather “unquantized” in practice, it is necessary to abandon 53-tET and combine a cornucopia of just intervals with Pythagorean ratios for especially the *Qanun*;
9. The intermarriage of Pythagoreanism with just intervals would restore the time-honored hint & clue relationship between praxis and theory, even with regards to previously available transpositions (such as Kâni Karaca’s famous *Saba* modulation over *perde saba* while executing an ordinary *Saba*, as mentioned by Günelçin) whose historical links had been severed due to the draconian hemiolic limitations imposed by Arel (although the responsibility for such a rupture is actually shared by Yekta and Ezgi too the way I delineated in my doctorate thesis under the heading “*Rise of the ‘Yekta-Arel-Ezgi School’*”)⁶⁹;
10. Such an intermarriage seems already implied in the tractates of Urmavi⁷⁰, where Urmavi casually maps his Jl^{71} or highly complex rational *genera* to extended transpositions over his archetypal 17-tone Pythagorean grid – to the extent that one would then appear to find the need to shift frets on demand⁷² (as happens to be just the subject I frequently communicated to colleagues like Prof. Arslan since more than a decade⁷³), thus cementing the notion that the traditional Turkish music tone-system is open-ended instead of closed-ended (although this is pretty much obvious so

long as one is deprived of taking means geometrically or logarithmically!)⁷⁴;

11. Since transpositions are necessarily(!) Pythagorean⁷⁵ and plausible just intervals so numerous at any natural⁷⁶ degree, there is no way to avoid the emergence of an overwhelming mass of extra pitches in this open-ended system – whereby one must increase the *mandal* space while condoning some sacrifices in pitch exactness to gain the ability to transpose *makams* over the common *Ney Ahenks*⁷⁷;
12. Thusly, with occasional *mandal* revisions as much as 4.1 cents on the original “Model 1” proposal, one gains the ability to exceed the commonplace *Bolahenk Nisfiye*, *Kız* and *Mansur Ahenk* restrictions to achieve concert pitch additions such as *Müstahsen*, *Sipürde* and *Davud* (but not *Şah?*) – whereby, with the inclusion of double-sharp *mandals* (going all the way up to 23 *mandals* per course(!) compared to the 79-tone *Qanun*’s maximum of 19), one then has 10+9(+5) *mandals* for *G*’s, 10+9 *mandals* for *A*’s, 10+6 *mandals* for *B*’s, identical 10+9(+5) *mandals* for *C*’s and *D*’s, selfsame 10+9 *mandals* for *E*’s, and homologous 10+6 *mandals* for *F*[#]’s (while, surprisingly enough, Günelçin does not exploit the opportunity to take here an *F* as the “natural” the way I had done) as space permits throughout A_2 - E_5 , resulting in a total of at least 91 distinct pitches per octave! – *i.e.*, 17 Pythagorean plus 74 just ratios⁷⁸;

such “acknowledged” out-of-the-ordinary macrotones by Yekta and Ezgi in my doctoral defense dated June 2008 (cf. [Yarman, 2016, p. 421]).

⁶⁹ [Yarman, 2016, p. 15–24].

⁷⁰ cf. [Arslan, 2007b; 2007a].

⁷¹ “Just Intonation”.

⁷² On instruments such as the *Tanbur*.

⁷³ cf. [Yarman, 2007b, p. 3–4], redacted April 2011.

⁷⁴ It is indeed regrettable that, although Günelçin on the one hand commends Yalçın Tura as having tackled the matter “in the best way” – *e.g.*, in terms of Tura’s interpretation of Urmavi’s 17-tone Pythagorean division as 17-tET at a pre-logarithmic era no less! – he keeps going on about the necessity for an open-ended tone-system for Classical Turkish music. While such a route might have been justified in the face of the Early Republican regime’s targeting of “quarter-tones” as “Byzantine” and “Arabic” with an agenda to promote solely Western equal-temperament norms under the slogan of “Universal Music”, why should there anymore be a *sine qua*

non to forego Modern Age mathematical tools for the decent fractional exponentiation of a consonant interval to make things more regular and widely transposable? Günelçin’s argumentation is clearly an outmoded ideological device under the post-logarithmic present day circumstances (especially after Michael Stifel’s “*Arithmetica Integra*” [1544]).

⁷⁵ Because of his Pythagorean Major scale on the “natural” *mandals* tuned by pure fifths, alongside an AEU-like extension over 3-limit sharps and flats.

⁷⁶ *i.e.*, unaccidental.

⁷⁷ “Concert Pitches” like *Bolahenk* with *perde rast* (second partial blown from all fingerholes of the *Ney* closed) at *D*; *Davud* with *rast* at *E*; *Şah* with *rast* at *F*; *Mansur* with *rast* at *G*; *Kız* with *rast* at *A*; *Müstahsen* with *rast* at *B*; and *Sipürde* with *rast* at *C*. Observe, that *perde rast* can be made to correspond to any tone of Western common-practice music, including all the half-tones in-between the naturals.

⁷⁸ [Günelçin, 2019, p. 238–251].

13. “Enharmonic respellings” may then allow for transpositions at *Bolahenk-Sipürde mabeyni* (perde *rast* at $C^\# / D^b$) and *Şah-Mansur mabeyni* (perde *rast* at $F^\# / G^b$), as well as other far-off keys (which Günelçin baselessly claims is a novelty not thought of or considered before – although my 79-tone *Qanun* tuning recipe⁷⁹ based on enharmonic equivalences that he himself outlined⁸⁰ is a stark refutation of such a claim);
14. Given the “purity and authenticity of intonation” Günelçin purportedly achieves through his ponderous method, which he personally implemented on a *Qanun* whose mainbody was manufactured by Mustafa Sağlam (that involves some incomprehensible latent *mandal* additions and revisions under his “Model 2”⁸¹), other implementations such as my 79-tone *Qanun* do not, according to him, reflect practice just as well (despite the fact that Günelçin verbally⁸² admits 79 MOS 159-tET as very closely verging on *all* of his Pythagorean and “natural” ratios)⁸³;

In a broad sweep, the weaknesses of Günelçin’s point of departure are as follows...

He presumes his solitary exemplar (Tanburi Cemil Bey) is authoritatively representative of all of Turkish Classical/Art/Folk music – such as regarding the supposed absence, in praxis, of the 256/243 *leimma* amounting to an interval size of 90 c (except when one goes up some fifths and plays at a different key, or for completing a tetrachord) that he interprets is Cemil Bey’s escape attempt from Pythagoreanism. Yet, were he to include

other masters who, in particular, perform on different instruments – as is done under the present study – Günelçin would probably have witnessed the happenstance of such a *leimma* regularly, as well as the execution of tetrachords and pentachords in his list of “proper genera” over many more tones than he gives license⁸⁴.

He dismisses the merits of other theoretical models without investigating their success in matching the pitch measurements from his chosen exemplar. In other words, he does not weigh the body of historical *mujannabât* ratios⁸⁵ and tetrachordal divisions that agree with his pitch measurements against the thus-far implemented *Qanun mandal* configurations of Üngör, Sürelesan, Durgun, Weiss and Yarman, to say nothing of the “*piyasa Kanun’u*” (12-tET nucleated “marketplace *Qanun*”). Out of all of these, the intonational success of especially 72-tET as well as the Weiss and Yarman implementations are not at all properly scrutinized – even though Günelçin particularly states that the 79-tone tuning very closely approximates the “natural” intervals that are under his focus⁸⁶.

It would seem here that Günelçin wants to give the impression that Yekta and Ezgi actually condoned the usage of *mujannabât* outside the bounds of their 24-tone Pythagorean cast – and hence, extant tetrachordal *genera* featuring such “middle seconds” – while Arel supposedly unilaterally forbade them altogether. Not only is this an inadmissible anachronism, but it is plainly wrong; and so is Günelçin’s assertion that Yekta actually expressed the applicability of Greek-Islamic *genera* to quotidian praxis instead of seeing them confined to dusty books and shelves⁸⁷.

⁷⁹ [Yarman, 2016] & [Yarman, 2010a, p. 60]. (Also cf. [Moriarty, 2014].)

⁸⁰ [Günelçin, 2019, p. 12].

⁸¹ [Günelçin, 2019, p. 247–251].

⁸² In his webinar cited under footnote 55:86.

⁸³ Regrettably once more, Günelçin asserts that one is obliged to explain the tone-system of Classical Turkish music by either dividing the octave “equally” (why?!), or by limiting the number of ratios, or by sanctioning an excess of Pythagorean and just *mandals* for extended transpositions. Yet, as it so happens, 79 MOS 159-tET is not an entirely equal construct (e.g., it partitions 4/3 instead into 33 equal portions) while still permitting regularized and tolerable transpositions over *all* degrees. This only goes to show that the prevailing mindset is inexcusably “pre-logarithmic” or “12-tET nucleated”, seeing as Turkish *Qanuns* are, for the most part, still being prepared in accordance with multiples of twelve-tone equal temperament the way I had first described, or “traditionalist academic alternatives” are, almost without exception, inclined toward an

arithmetic historicism of fractional interval usage or an equipartitioning of the 100 c “equal semi-tone” as referred to Eurogenuous electronic tuners or popular score engraver computer programs.

⁸⁴ cf. [Günelçin, 2019, p. 176, 182, 193, 215].

⁸⁵ cf. [Arslan, 2007b; 2007a, p. 336]

⁸⁶ cf. the webinar link in footnote 55:86.

⁸⁷ On page 63 of his aforementioned monograph (see notably [Yekta, 1986, p. 60–63]), Yekta contrariwise writes (English translation and emphases are mine): “It may thence be asked of us ‘How many harmonious tetrachords have been obtained (by Hellenistic and Islamic music theorists) after such tiresome labors? To this we reply, and with some embarrassment, ONLY FOUR (i.e., A. 9/8 x 9/8 x 256/243, B. 9/8 x 10/9 x 16/15, C. 15/14 x 7/6 x 16/15, D. 12/11 x 7/6 x 22/21) that have been judged as consonant. The others have been relegated to remain in tractates; yet, even so, after so many centuries, they have muddled the minds of European theorists wanting to apply them in unproductive works whilst desiring to demystify the enigma of *genera* in Greek music!’”

Günelçin similarly misrepresents Tanburi Cemil Bey when he quotes him as allegedly saying “*Tanbur* is a fretless instrument”; whereas Cemil Bey rather states (English translation is mine):

“... These frets are not fixed upon the neck as is the case with Mandolin and Guitar, and are oiled in such a way as to be able to be moved either way while there is enough space on the neck to allow for this and that any desired fret may be added to the *Tanbur*. The *Tanbur* thence possesses the means of expression unique to fretless instruments as such.”⁸⁸

In other words, contrary to what Günelçin asserts, the re-positioning and/or increase of frets serves to “microtonalize” the *Tanbur*, but not really to make it “fretless per se”; as is also the case with the *Qanun* via minutiae granted by a multiplicity of fixed *mandals*. So, Günelçin does not truly answer the question: “why exceed Cemil Bey’s more-or-less-predetermined 36 *Tanbur* frets per two octaves⁸⁹ if one is ultimately limiting oneself in terms of a few transpositions and modulations over a few *Ahenks*?”

Günelçin hence assumes transpositions and modulations must eventually be limited on the pretext that an infinite number (*sic*) of “natural” ratios can be advanced and that the traditional Turkish music tone-system should be open-ended (*i.e.*, not be “cyclic”, and not therefore be based on tempered perfect fifths). Yet, he does not seem to realize that such a presupposition rests solely on the premise of totally neglecting tolerable geometric and logarithmic divisions when equipartitioning simple epimoric consonant intervals like 2/1 or 3/2. Given that the danger of getting the tradition branded as “Arabic” or “Byzantine” with an intent to cast it out of society no longer exists, Günelçin has no visible recluse to freeze the transpositional and modulational development of *Makam* music at late 19th and early 20th Centuries so as to extol an itinerary of pure arithmeticism in music theory compared to higher mathematical devices as in taking roots or taking logarithms, which are well considered to be beneficial worldwide in music-making and toward the advancement of music in general.⁹⁰

He thus opines, and without any basis whatsoever, the precedence of a pre-logarithmic mindset to a post-logarithmic mindset in *Makam* music; imagining moreover that post-logarithmic options solely constitute “equal divisions of the octave”. He, just like many of my peers, does not seem to understand the structure and function of especially the “hybrid modified meantone cores” of my 24-tone and 36-tone tuning suggestions.⁹¹

Furthermore, Günelçin does not appear to genuinely exploit “enharmonic equivalences” when he affixes as much as 23 *mandals* per course. It only suffices to visually compare his scheme (he unfortunately does not yet provide a complete list of his ratios and/or temperings in an octave) with the nominal 19 *mandals* per course on the 79-tone *Qanun* (with my last 4 *mandals* serving as double-sharps). Surely, any criticism as to “unplayability” in the case of the 79-tone *Qanun* applies with even greater force against Günelçin’s “Model 1” or “Model 2” given his minimum of 91 pitches per octave!

When all is said and done, Günelçin’s smallest occurring interval between any two neighboring *mandals* is an impracticably tight-packed 7.71 c⁹². For people criticizing how the 79-tone *Qanun*’s smallest interval (15.1 c) in comparison to 72-tET’s smallest (16.7 c) is troubling from the viewpoint of musical performance, half of what I propose at already the very limits of *mandal* installation for the register A_2-E_5 is without any doubt much more unfeasible.

Despite so much detail, Günelçin’s configuration – due to the curtailed Pythagorean tuning at its core – cannot let the sharps and flats meet and overlap circularly (*e.g.*, through a cycle-of-fifths) should the need arise (such as in cases of chromaticism or in accompaniment with Western-style ensembles and orchestras). In contradistinction, the 79-tone tuning permits this⁹³: For example, mode 6 7 7 6 7 6 7 6 7 7 6 7 of 79 MOS 159-tET, equaling 91 + 106 + 106 + 91 + 106 + 91 + 113 + 91 + 106 + 106 + 91 + 106 consecutive cents, extracts a workable 12-tone cyclic subset – which is one of several alike possibilities – and contains only one “wolf fifth” that may very well be considered tame. (In addition, it

⁸⁸ [Cemil Bey, 1993, p. 22].

⁸⁹ [Günelçin, 2019, p. 134-137].

⁹⁰ (Note from the Editors:) NEMO-Online does not concur with such a statement, but accepts the author’s point of view on this matter.

⁹¹ And even though all my labors are accessible through my personal website (<http://www.ozanyarman.com>) and YouTube channel (<https://www.youtube.com/user/DrOzanYarman>) for at least a decade.

⁹² [Günelçin, 2019, p. 243-246].

⁹³ [Yarman, 2016, p. 115–116].

is conceivable to satisfactorily encapsulate Arel-Ezgi-Uzdilek as mode 6 1 5 1 7 1 4 2 4 2 6 1 5 1 6 1 5 1 7 1 4 2 4 2 under 79 MOS 159-tET, which thus equals $1 + 15 + 76 + 15 + 106 + 15 + 61 + 30 + 61 + 30 + 91 + 15 + 76 + 21 + 91 + 15 + 76 + 15 + 106 + 15 + 61 + 30 + 61 + 31$ consecutive cents.)⁹⁴

And while 79 MOS 159-tET can approximate every one of Günelçin's list of *Djemilian* tetrachords (i.e., derived from Tanburi Cemil Bey) in the Tables 4.80 & 4.81 of his doctorate dissertation⁹⁵ with a maximum of 7-8 cents absolute error at any given degree⁹⁶, the added bonus of unlimited transpositions cannot be matched with his "Model 2" – let alone his "Model 1".

Finally, Günelçin acquiesces to adopt the inconsistent Arel-Ezgi-Uzdilek notation (i.e., the Turkish Classical/Art music accidentals symbolism in effect) for his irregular megalithic edifice⁹⁷. However, by doing so, he pulverizes any venue for executing advanced or experimental techniques that might involve calculated xenharmony⁹⁸ on his *Qanun*. In such a way, Günelçin prevents his *Qanun* from becoming an instrument that may serve to expand and cosmopolitanize microtonal musical expression while preserving tradition – especially in the face of institutional and constitutional modern education requirements. In contrast, the 79-tone *Qanun* is accompanied by a re-purposed complementary "Sagittal Notation" originally developed by David Keenan and the late George Secor, which can hence serve as a gateway to future "makam polyphony" while being backwards-compatible with 65-tET and 72-tET⁹⁹.

I now propose to compare Günelçin's *rast-çargâh* tetrachordal layout with Weiss' commensurate "Q9" tetrachordal layout. (See THT 1:93.)

Shaded cells are either out of range or unavailable. For instance, the 225 c, 242 c and 257 c *mandals* are omitted on both "Q8" and "Q9" to expedite "flexibility and

ease of modulation"¹⁰⁰, but they nevertheless remain relevant theoretically and are described at any rate. Likewise, there are no correspondences in Günelçin (according to his nominal *Bolahenk* starting on D_4) for the 46/45, 32/32 and 91/87 *mandals* found on "Q9" (according to the nominal *Sipürde Ahenk* starting on C_4), and I disregarded to evaluate them for the sake of fairness.

Julien Weiss' "Q9", just like his previous "Q8" implementation (with inconsequential differences in regards to some convergent intra-*mandal* ratios), contains a standard of 14 *mandals* per course throughout (except the aforesaid omissions under some string courses), and Stephen Pohlit¹⁰¹ gives the particulars of this rational layout in one octave as both fractions and cents. What is relevant here for our purposes is the tetrachordal span starting on *perde rast* (C_4).

By comparison, I was able to extract the tuning information out of what Günelçin dubs "*mandal sets 1-3*"¹⁰² through considerable difficulty and via checking and re-checking his online presentation. These correspond to *Fa/do* (C_4/G_4) for set 1, *Sol/ré* (D_4/A_4) for set 2, and *La/Si/mi* ($E_4/F^{\#}_4/B_4$) for set 3. Extended revisions (constituting his "Model 2") lead to $E_4/F^{\#}_4/B_4$ being assigned to the "modified set 1" (now having 23 *mandals* instead of the previous 18!), C_4/G_4 being assigned to the "modified set 2" (now having 19 *mandals* instead of the previous 15 or 16), and D_4/A_4 being assigned to the "modified set 3" (now having 16 *mandals* instead of the previous 15).

Closest matches of "Q9" ratios (in bold) have thus been juxtaposed against Günelçin's ratios that I extracted unto THT 1:93. Notice that the largest absolute difference (marked with red) in-between them for any *perde* occurrence is less than 8 cents (while any kind of average of the modulus of differences is about 3 to 6 cents) – just as in the case of the approximation capabilities of my 79-tone *Qanun* tuning. Such is, to all intents and purposes, near or at the "acoustic limen"¹⁰³ for the entirety of the pragmatic ambitus of the *Qanun*.

⁹⁴ cf. <https://www.youtube.com/watch?v=gaE2x-dQtBQ> (Dr. Oz. @ Anadolu Üniversitesi Math. Dept. - 7 November 2014).

⁹⁵ [Günelçin, 2019, p. 193, 215].

⁹⁶ [Yarman, 2016, p. 95-100].

⁹⁷ [Günelçin, 2019, p. 239, 257].

⁹⁸ The term "xenharmonic music", the way originally coined by Ivor Darreg [see https://en.wikipedia.org/wiki/Xenharmonic_music], entails provocative non-12 (*detwevulated*) harmonies such as found under 17-tET or 19-tET, or perhaps more appropriately yet under 5-tET, 7-tET, 11-tET, 13-tET, etc... It is almost the same as saying "microtonal polyphony", except that one leaves open the door for

more courageous "dissonant-consonant adventures"; which happens to connote a field ripe for exploration when one is faced with so many rich tuning choices under *Makam / Maqam / Mugham / Muqam* music by and large.

⁹⁹ [Yarman, 2016, p. 106-109].

¹⁰⁰ [Pohlit, 2011, p. 76-77].

¹⁰¹ [2011, p. 262-264].

¹⁰² [Günelçin, 2019, p. 243-251] & webinar link.

¹⁰³ [Long, 2014, p. 81-127]. pp. 81-127: The acoustic limen is just about 7 cents on average throughout the common musical range

This basically signifies that the whole enterprise by Gūnalçin – despite his painstaking efforts to uphold *makam* fidelity – practically amounts to what Weiss had already accomplished with even lesser *mandals* (at yet the expense of the lack of double-sharps as well as the 28/27 approach to the natural of the lower course when all *mandals* of the upper course are lowered) – aside from the fact that either choice can be much more advantageously substituted with 79 MOS 159-tET. This is especially true for the latter’s ability to approximate – and I cannot stress this part enough – any given ratio from either former case at any level of transposition with only a maximum of 7-8 cents absolute error; not to mention the 79-tone tuning’s avoidance of reckless schismatic aberrations – such as the 500 cent 10935/8192 ratio in both former cases not being exactly enharmonically equivalent to the 498 cent 4/3 ratio at their upper courses.

Mind that Gūnalçin moreover appears to have altered his doctoral scheme for the upended “*mandal set 2*” corresponding to the G&C courses¹⁰⁴ in order to squeeze in one more *mandal* at only 5.76 c away from its nearest neighbor! I highlighted its location in yellow in THT 1:93.

To wrap up this sub-section, I wish to point out the instructional video titled “*Tuning Theory 3: Moment of Symmetry ("Microtonal" Theory) -- John Moriarty*” by John Moriarty from the “Xenharmonic Alliance” in order to better illuminate the concept of “Moment-of-Symmetry” (“MOS”, as had been first coined and articulated by Ervin Wilson), since it happens to be an intrinsic and essential feature of the 79-tone tuning¹⁰⁵; which owes its mathematical integrity and transpositional regularity as such to the presence of just two (one large “L” and one small “S”) types of commas derived from a single generator interval (e.g., seventy-eight instances of 15.1 c and a single final instance of about 22 c occurring throughout *yegah-neva* coincident to *Sipürde Ahenk* at G_3 - G_4).

For a recapitulation of the unique aspects of the 79-tone *Qanun* tuning, I outline in THT 2:94 the octave structure and reasonably adequate fractional approximation possibilities under 79 MOS 159-tET:

The 79-tone *Qanun* tuning thus distinctively embodies the following intertwined assets:

1. A theoretically proper *Rast* “ascending scale” can be mapped to a “Just Intonation C Major” without breaking the chain of fifths via using two different kinds of perfect fifths (694 c and 702 c) in the manner F (702 c) C (702 c) G (694 c) D (702 c) A (694 c) E (702 c) B ;
2. Such a *Rast* scale can be transcribed on the staff (even when using the complementary Sagittal Notation) without any accidentals to begin with in compliance to the historical notion of *Rast* being the “mother-of-all-*makams*”¹⁰⁶ – delineating therefore the primacy of *Sipürde Ahenk* as the gravitational center of all transpositions (instead of *Bolahenk*) where *perde hüseyini* corresponds to $A_4 = 440$ Hz;
3. Moreover, a theoretically proper *Mahur* “ascending scale” can similarly be mapped to a “Pythagorean C Major” instead without again breaking the generator chain of fifths – via relying on three different kinds of perfect fifths this time (694 c, 702 c and 709 c) in the manner F (702 c) C (702 c) G (694 c) D (702 c) A (709 c) E^\sharp (702 c) B^\sharp , where such an unbroken modulation follows from the direct alteration of *segâh-eviç* to *buselik-mahur* (I hesitate regarding the “*Arelian*” *mahur*, think it to be 1 degree lower at *eviç*, and its fifth to be *segâhçe*);
4. Likewise, *dügâh-hüseyini* can be altered up by one *mandal* each to facilitate yet another Major scale without breaking the chain of fifths;
5. Even once more, the *buselik-mahur* perdes can be altered up by yet another *mandal* each to facilitate a “Super-Pythagorean C Major”;
6. This described feature can be repeated over several keys, where – in agreement with traditional guidelines – *buselik* and *mahur* become accidented pitches (*nim perdeler*) and are notated as such;
7. One can also turn to a few distinct options to extract a cyclic subset for chromaticism – where, in particular, mode 6 7 7 6 7 6 7 6 7 7 6 7 out of 79 MOS 159-tET, equalling $91 + 106 + 106 + 91 +$

for a moderately audible volume as given in Table 3.4 of the cited source. {Here, the issue is not the ability of the dilettante to discern if something is awry with a singular interval in suspense; the issue is rather his/her propensity to tolerate tuning errors (i.e., “temperings”) in musical flow. Also cf. <https://www.sciencedirect.com/topics/engineering/just-noticeable-difference>.}

¹⁰⁴ [Gūnalçin, 2019, p.] & webinar link.

¹⁰⁵ cf. [Yarman, 2010a, p. 32–63] and www.ozanyarman.com/files/searchfortheoptimaltonessystem.zip. (Also cf. [Moriarty, 2014] on “MOS”).

¹⁰⁶ cf. [Levendoğlu, 2003].

106 + 91 + 113 + 91 + 106 + 106 + 91 + 106 consecutive cents, extracts a workable 12-tone cyclic subset (e.g., with overlapping “sharps” and “flats”) which contains only one “wolf fifth” that can very well be considered tame;

8. In addition, it is conceivable to adequately encapsulate Arel-Ezgi-Uzdilek too as mode 6 1 5 1 7 1 4 2 4 2 6 1 5 1 6 1 5 1 7 1 4 2 4 2 under 79 MOS 159-tET, which thus equals 91 + 15 + 76 + 15 + 106 + 15 + 61 + 30 + 61 + 30 + 91 + 15 + 76 + 21 + 91 + 15 + 76 + 15 + 106 + 15 + 61 + 30 + 61 + 31 consecutive cents (where “sharps” and “flats” do not any more overlap);
9. Lastly, the overarching Sagittal Notation¹⁰⁷ consistently maps the quarter-tone to 3 steps (/ \ , \ /), the *leimma* to 6 steps (#, b), the *apotome* to 7 steps (/ # , \ b), etc. – wherefore xenharmony and *makam* polyphony is encouraged, since all kinds of

intervals (and especially the *mujannabāt*) can be situated at any level of transposition, be they inside or outside tetrachordal or pentachordal genera.

In the light of the foregoing theoretical and physical drawbacks for Gūnalçın, and especially with regards to such an inordinate *mandal* inflation gaining us fundamentally next to nothing, which moreover ought to render the *Qarun* quasi-functional and inoperable in practice, it is apparent to me that Gūnalçın’s project falls short of its goals in comparison to the quotidian alternatives at hand. I henceforth ignore it in this study.

* * *

<i>çargah</i>	8192/6561	512/405	80/63	448/351	104/81	128/99	176/135	21/16	320/243	<i>4/3</i> <i>G4</i>	27/20	121/96	467/416	191/176	217/192	491/448	41/32	759/720	847/800		Maximum absolute diff.: 7.71 cents (c) Average of abs. diffs. = 150/58 = 2.74 c Root-mean-square ≈ (760/58) = 3.78 c Harmonic mean of abs. diffs. = 5.81 c Balanced sumtotal average = -0.89333 c				
CENTS	384	406	414	422	433	445	459	471	477	<i>4/3</i>	498	528	547	556	567	577	588	597	607						
<i>çargah</i>	8192/6561	512/405	448/351	2816/2187	4096/3159	952/729	320/243			<i>4/3</i>															
CENTS	384	406	422	438	450	462	477			<i>4/3</i>															
DIFF.	0	0	8	0	-5	-5	-3	-6	0	0															
<i>buselik</i>	7/6	32/27	6/5	135/112	63/52	39/32	27/22	99/80	5103/4096	<i>81/64</i> <i>F#4</i>	6561/5120	295245/229376	137781/106496	85293/65536	59049/45056	216513/163840	10935/8192	355143/34072	19683/2576	53927/22728	326576/288720	3914844/16277216	960452/40960	4836467/29260128	
CENTS	267	294	316	323	332	342	355	369	381	<i>4/3</i>	429	437	446	456	468	483	500	510	520	532	542	552	562	572	
<i>buselik</i>	7/6	32/27	6/5	63/52	11/9	16/13	119/96	5/4		<i>81/64</i>	1664/1280	137781/106496	2895/2048	2187/1664	86751/65536	10935/8192	377347/34072								
CENTS	267	294	316	332	347	359	372	386		<i>4/3</i>	429	440	449	473	486	500	510	520	532	542	552	562	572	582	
DIFF.	-2	0	0	7	0	-5	-4	-3	-5	0	0	8	0	-5	-5	-3	0	0	0	0	0	0	0	0	
<i>düğah</i>	28/27	256/243	16/15	14/13	14/13	12/11	12/11	11/10	567/512	<i>9/8</i> <i>E4</i>	729/640	32805/28672	15309/13312	9477/8192	6561/5632	24057/20480	1215/1024	19683/16384	2187/1792	5103/4096	164025/131072	2657205/2097152	6561/5120	4782969/3670016	
CENTS	63	90	112	119	128	139	151	165	177	<i>2/3</i>	225	233	242	252	264	279	296	318	345	381	388	410	429	459	
<i>düğah</i>	28/27	256/243	16/15	14/13	88/81	128/117	119/108	10/9		<i>9/8</i>	225/640	15309/13312	207/256	243/208	9639/8192	1215/1024	19683/16367								
CENTS	63	90	112	128	143	156	168	182		<i>2/3</i>	225	242	257	269	282	296	319	319	345	381	388	410	429	461	
DIFF.	2	0	0	7	0	-4	-5	-3	-5	0	0	8	0	-5	-5	-3	0	-1	-2	-5	2	2	0	-2	
<i>rast</i>	28/27	256/243	12/11	12/11	12/11	12/11	12/11	12/11	12/11	<i>5/4</i>	64/63			28/27	25/24		135/128	16/15	243/224						
CENTS	63	90	92	94	96	98	100	102	104	<i>5/4</i>	0	27		63	71		92	112	141						
<i>rast</i>	28/27	256/243								<i>5/4</i>	81/80	46/45	33/32	27/26		91/87	135/128	2187/2048							
CENTS	63	90								<i>5/4</i>	22	38	53	65	78	92	114								
DIFF.										0	5			-2	6		0	-2	-2						

THT 1 Comparison of the *rast-çargah* *mandal* area between Gūnalçın’s “Model 2” and Weiss’ commensurate “Q9” rational *Qarun* (in bold).

¹⁰⁷ (Note from the Editors): For readers not familiar with this notation, references [Keenan, 2004; Secor and Keenan, 2006; Xenharmonic Wiki Contributors, 2020] provide useful and comprehensive information.

Degree	Integer Cents	159-tET subset	17 "traditional" perde zones	Simplified Frequencies	Cents	Frequencies (A4=440Hz)	Cents	Consecutive intervals	Approximated ratios with at most 7.5 cents error
0:	0	0	Rast - C	262	0.000	261.911	0.000	(with prev.)	1/1 (Do)
1:	15	2	<i>dik rast</i>	264 1/2	16.441	264.204	15.094	15.094	126/125,100/99,81/80
2:	30	4	(<i>sarp rast</i>)	266 3/4	31.106	266.518	30.189	15.095	64/63,3125/3072,55/54
3:	45	6	(<i>rast+ırha</i>)	269	45.647	268.852	45.283	15.094	128/125,36/35,33/32
4:	60	8	(<i>alt şüri</i>)	271 1/4	60.068	271.206	60.377	15.094	729/704,28/27,27/26
5:	75	10	<i>şüri</i>	273 3/4	75.951	273.581	75.472	15.095	25/24,117/112,22/21
6:	91	12	<i>nim zengüle</i>	276 1/4	91.689	275.977	90.566	15.094	20/19,256/243,135/128
7:	106	14		278 1/2	105.733	278.394	105.660	15.094	17/16,16/15,2187/2048
8:	121	16		281	121.204	280.832	120.755	15.095	15/14,14/13
9:	136	18	<i>zengüle cluster</i>	283 1/2	136.538	283.291	135.849	15.094	14/13,27/25,13/12
10:	151	20		286	151.738	285.771	150.943	15.094	88/81,12/11,35/32
11:	166	22		288 1/2	166.805	288.274	166.038	15.095	11/10,54/49
12:	181	24	<i>dik zengüle</i>	291	181.743	290.798	181.132	15.094	65536/59049,10/9
13:	196	26	Dügâh - D	293 2/3	197.535	293.345	196.226	15.094	28/25,9/8 (Re)
14:	211	28	<i>dik dügâh</i>	296	211.236	295.914	211.321	15.095	9/8,26/23
15:	226	30	(<i>sarp dügâh</i>)	298 3/4	227.246	298.505	226.415	15.094	256/225,8/7
16:	242	32	<i>nim kürdi</i>	301 1/2	243.109	301.119	241.509	15.094	144/125
17:	257	34	(<i>nim nihâvend</i>)	304	257.405	303.756	256.604	15.095	37/32,81/70,125/108
18:	272	36	<i>alt kürdi</i>	306 3/4	272.996	306.416	271.698	15.094	7/6
19:	287	38	<i>kürdi</i>	309 1/4	287.048	309.099	286.792	15.094	33/28,13/11,32/27
20:	302	40	<i>dik kürdi</i>	312	302.375	311.806	301.887	15.095	32/27,25/21,81/68
21:	317	42	<i>nihâvend</i>	314 3/4	317.567	314.536	316.981	15.094	6/5,19683/16384
22:	332	44	<i>hicâzî segâh</i>	317 1/2	332.628	317.291	332.075	15.094	63/52,40/33,17/14
23:	347	46	<i>uşşâkî segâh</i>	320 1/4	347.558	320.069	347.170	15.095	39/32,11/9,27/22
24:	362	48	<i>sâbâî segâh</i>	323	362.361	322.872	362.264	15.094	16/13,100/81,21/17
25:	377	50	<i>Segâhçe (Segâh swap?)</i>	326	378.366	325.699	377.358	15.094	31/25,41/33,46/37,5/4
26:	392	52	Segâh(çe?) - E	328 3/4	392.909	328.552	392.453	15.095	(Mi) 5/4,64/51,59/47
27:	408	54	<i>büşelik (E#)</i>	331 3/4	408.636	331.429	407.547	15.094	81/64,19/15,33/26
28:	423	56	<i>nişâbü</i>	334 1/2	422.927	334.331	422.642	15.095	14/11,23/18,32/25
29:	438	58	(<i>dik nişâbü</i>)	337 1/2	438.385	337.259	437.736	15.094	9/7
30:	453	60	(<i>büşelik+ırha</i>)	340 1/2	453.706	340.212	452.830	15.094	35/27,13/10
31:	468	62	(<i>nişâbü+ırha</i>)	343 1/2	468.892	343.191	467.925	15.095	38/29,21/16
32:	483	64	<i>alt çargâh</i>	346 1/2	483.946	346.197	483.019	15.094	33/25,37/28
33:	498	66	Çargâh - F	349 1/3	498.045	349.228	498.113	15.094	4/3 (Fa)
34:	513	68	<i>dik çargâh</i>	352 1/2	513.668	352.287	513.208	15.095	39/29,35/26,27/20
35:	528	70	(<i>sarp çargâh</i>)	355 3/4	529.556	355.371	528.302	15.094	19/14,49/36
36:	543	72	<i>nim (garîp) hicaz</i>	358 3/4	544.094	358.483	543.396	15.094	26/19,48/35,11/8
37:	558	74	(<i>nim sâbâ</i>)	362	559.707	361.623	558.491	15.095	11/8,29/21
38:	574	76	<i>alt hicaz</i>	365	573.996	364.789	573.585	15.094	25/18,32/23,39/28
39:	589	78	<i>hicaz</i>	368 1/4	589.342	367.984	588.679	15.094	7/5,1024/729,45/32
40:	604	80	<i>uzzâl</i>	371 1/2	604.554	371.206	603.774	15.095	24/17,17/12
41:	619	82	<i>sâbâ</i>	374 3/4	619.634	374.457	618.868	15.094	10/7
42:	634	84		378	634.583	377.736	633.962	15.094	23/16,36/25,49/34
43:	649	86	<i>sâbâ-bestenigâr cluster</i>	381 1/4	649.405	381.044	649.057	15.095	16/11,8192/5625,35/24
44:	664	88		384 3/4	665.225	384.381	664.151	15.094	22/15,69/47,72/49
45:	679	90		388	679.788	387.746	679.245	15.094	37/25,40/27
46:	702	93	Nevâ - G	393	701.955	392.851	701.887	22.642	3/2 (Sol)
47:	717	95	<i>dik nevâ</i>	396 1/4	716.213	396.291	716.981	15.094	53/35,50/33,1024/675
48:	732	97	(<i>sarp nevâ</i>)	400	732.520	399.761	732.075	15.094	32/21,29/19,75/49
49:	747	99	(<i>nevâ+ırha</i>)	403 1/2	747.602	403.262	747.170	15.095	192/125,20/13,54/35
50:	762	101	(<i>alt bayâtî</i>)	407	762.554	406.793	762.264	15.094	45/29,59/38,14/9
51:	777	103	<i>bayâtî</i>	410 1/2	777.738	410.356	777.358	15.094	25/16,47/30,11/7
52:	792	105	<i>nim hisar</i>	414	792.077	413.949	792.453	15.095	30/19,128/81,19/12
53:	808	107		417 1/2	806.651	417.574	807.547	15.094	43/27,8/5,6561/4096
54:	823	109		421 1/4	822.132	421.231	822.642	15.095	37/23
55:	838	111	<i>hisar/hüzzam cluster</i>	425	837.475	424.919	837.736	15.094	34/21,81/50,13/8
56:	853	113		428 3/4	852.684	428.640	852.830	15.094	44/27,18/11,105/64
57:	868	115		432 1/2	867.760	432.394	867.925	15.095	28/17,33/20
58:	883	117	<i>dik hisar (hisârek)</i>	436 1/4	882.706	436.180	883.019	15.094	32768/19683,5/3
59:	898	119	Hüseynî - A4	440	897.524	440.000	898.113	15.094	5/3,42/25,27/16 (La)
60:	913	121	<i>dik hüseyinî</i>	444	913.191	443.853	913.208	15.095	27/16,39/23,17/10
61:	928	123	(<i>sarp hüseyinî</i>)	447 3/4	927.752	447.740	928.302	15.094	128/75,41/24,12/7
62:	943	125	<i>nim acem</i>	452	944.107	451.661	943.396	15.094	50/29,216/125,64/37
63:	958	127	(<i>nim dik acem</i>)	455 3/4	958.411	455.616	958.491	15.095	125/72,40/23,47/27
64:	974	129	<i>alt acem</i>	459 3/4	973.539	459.606	973.585	15.094	7/4,225/128
65:	989	131	<i>acem</i>	463 3/4	988.537	463.630	988.679	15.094	23/13,16/9
66:	1004	133	<i>dik acem</i>	467 2/3	1003.097	467.691	1003.774	15.095	16/9,25/14
67:	1019	135	<i>sarp acem</i>	472	1019.604	471.786	1018.868	15.094	9/5,59049/32768
68:	1034	137		476	1033.674	475.917	1033.962	15.094	29/16,20/11
69:	1049	139	<i>evîç/arazbar cluster</i>	480 1/4	1049.063	480.085	1049.057	15.095	11/6
70:	1064	141		484 1/2	1064.316	484.289	1064.151	15.094	37/20,50/27,13/7
71:	1079	143	<i>alt evîç (Eviç instead?)</i>	488 1/2	1078.550	488.530	1079.245	15.094	28/15
72:	1094	145	Eviç (Mâhur swap?) - B	492 3/4	1093.547	492.808	1094.340	15.095	(Si) 15/8,32/17,17/9
73:	1109	147	(<i>dik(?) mâhur (B#)</i>)	497 1/4	1109.285	497.124	1109.434	15.094	256/135,243/128,40/21
74:	1125	149	<i>dik(çe?) mâhur</i>	501 1/2	1124.019	501.477	1124.528	15.094	21/11,23/12,48/25
75:	1140	151	(<i>mâhurek</i>)	506	1139.485	505.868	1139.623	15.095	27/14,29/15,31/16
76:	1155	153	(<i>dik mâhurek</i>)	510 1/4	1153.965	510.298	1154.717	15.094	37/19,39/20,125/64
77:	1170	155	(<i>sarp mâhurek</i>)	514 3/4	1169.166	514.767	1169.811	15.094	49/25,55/28,6144/3125
78:	1185	157	<i>alt gerdâniye</i>	519 1/4	1184.235	519.275	1184.906	15.095	2025/1024,105/53
79:	1200	159	Gerdâniye - C	524	1200.000	523.822	1200.000	15.094	2/1 (Do)

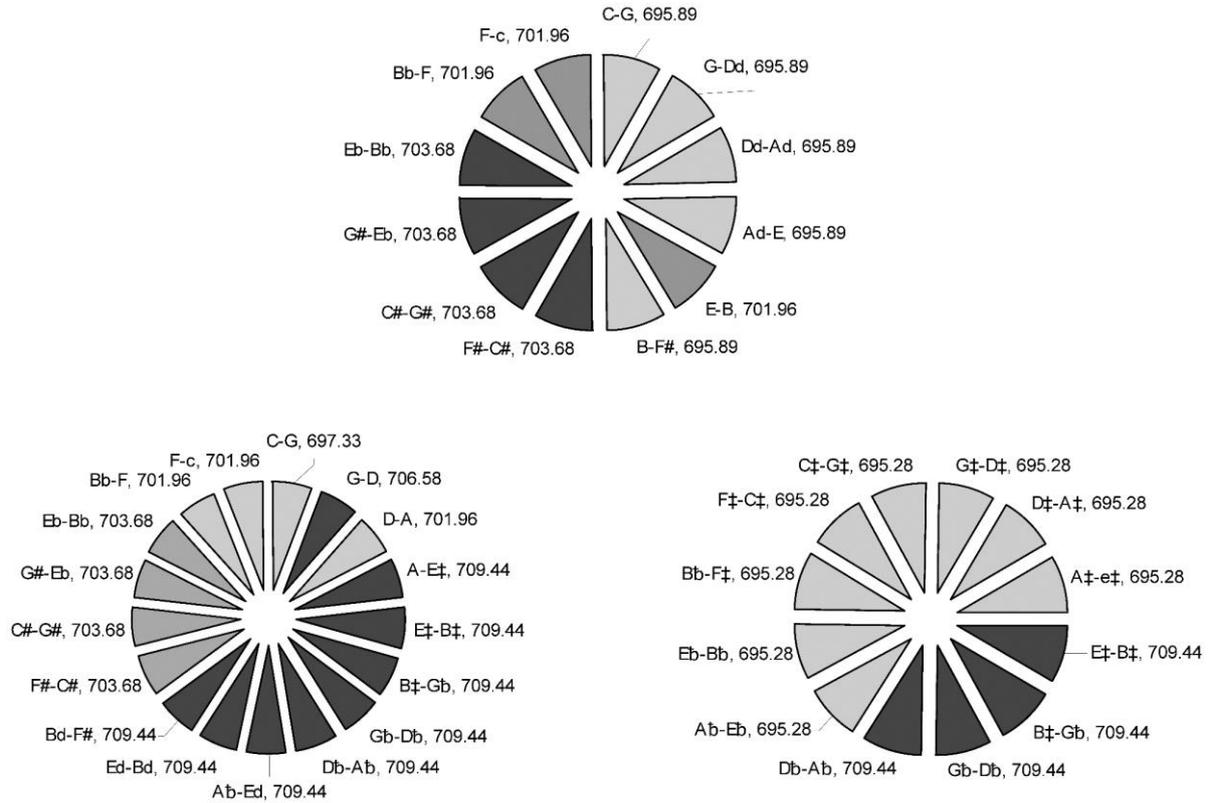
THT 2 rast-gerdaniye octave detail of 79 MOS 159-tET in the proposed standard of *Sipirde Ahenk*.

Perde names & note	Yarman-24a	consecutive intervals	Yarman-24c	consecutive intervals	Diffs.	AEU53tET
RAST (C)	1/1 (0 cents)	(with previous in ϵ)	1/1 (0 cents)	(with previous in ϵ)	0	0 (k. çargah)
nim-zengule / şuri	84.36 cents	84.36	85.06 cents	85.06	-0.7	4 commas
zengule	38/25 (142.32)	58.01	143.62 cents	58.56	-1.3	5 "
dik-zengule	192.18 cents	49.81	191.77 cents	48.15	0.41	8 "
DÜGAH (D)	9/8 (203.91)	11.73	9/8 (203.91)	12.14	0	9 "
kürdi / nihavend	292.18 cents	88.27	292.41 cents	88.50	-0.23	13 "
dik-kürdi / uşşak	17/14 (336.13)	43.95	348.34 cents	55.93	-12.21	14 "
segah (d)	16/13 (359.47)	23.34	362.5 cents	14.16	-3.03	14 "
SEGAHÇE (E)	5/4 (386.31)	26.84	156/125 (383.54)	21.04	2.77	17 "
buselik / nişabur (+)	19/15 (409.24)	22.93	415.3 cents	31.76	-6.06	18 "
ÇARGAH (F)	4/3 (498.04)	88.80	4/3 (498.04)	82.74	0	22/23 "
nim-hicaz / uzal	584.08 cents	86.03	581.38 cents	83.34	2.7	26 "
hicaz / saba	36/25 (631.28)	47.20	634.18 cents	52.80	-2.9	27/28 "
dik-hicaz / bestenigar	696.09 cents	64.81 (in favor of this)	16/11 (648.68)	61.70 (relate to 36/25)	47.41	28/31 "
NEVA (G)	3/2 (701.96)	5.87 (maybe forego it)	187/125 (697.33)	6.070	4.63	31 "
nim-hisar / bayati	788.27 cents	86.31	788.74 cents	86.78	-0.47	35 "
hisar / hüzzam	18/11 (852.59)	64.32	853.06 cents	64.33	-0.47	36 "
dik-hisar / hisarek	888.27 cents	35.68	887.66 cents	34.59	0.61	39 "
HÜSEYNİ (A)	27/16 (905.87)	17.60	27/16 (905.87)	18.21	0	40 "
acem / nevrüz	16/9 (996.09)	90.22	16/9 (996.09)	90.22	0	44 "
dik-acem / arazbar	20/11 (1035)	38.91	1043.62 cents	47.53	-8.62	45 "
evc (d)	13/7 (1071.7)	36.71	1071.94 cents	28.32	-0.24	48 "
MAHUR (B)	15/8 (1088.27)	16.57	234/125 (1085.5)	13.55	2.77	48 "
dik-mahur (+)	21/11 (1119.46)	31.19	1124.74 cents	39.25	-5.28	49/52 "
GERDANIYE (c)	2/1 (1200)	80.54	2/1 (1200)	75.26	0	52/53 "

THT 3 Octave detail of Yarman-24a versus Yarman-24c in the proposed standard of Sipirde Ahenk.

Perde names & note	Arel-Ezgi-Uzdilek ratios and c	cons. intervals	53-tET subset	Yarman-24/31c	cons. intervals	Diffs.
RAST (G)	1/1 (0 cents)	(with previous)	0 (rast on C)	1/1 (0 cents)	(with previous)	0
---			1-2	34.18 cents	34.18	---
nim-zirgule	256/243 (90.22)	90.22	4	85.06 cents	50.88	5.16
zirgule	2187/2048 (113.69)	23.46	5-6-7	143.62 cents	58.56	-29.93
dik-zirgule	65536/59049 (180.45)	66.76	8	191.77 cents	48.15	-11.32
DÜGAH (A)	9/8 (203.91)	23.46	9	9/8 (203.91)	12.14	0
---			10	224.74 cents	20.83	---
kürdi	32/27 (294.13)	90.22	13	292.41 cents	67.67	1.72
dik-kürdi	19683/16384 (317.60)	23.46	14-15	348.34 cents	55.93	-30.74
---			16-17	362.5 cents	14.16	---
segah (d)	8192/6561 (384.60)	66.76	17	156/125 (383.54)	21.04	1.06
BUSELİK (B)	81/64 (407.82)	23.46	18	415.3 cents	31.76	-7.48
dik-buselik (d)	2097152/1594323 (474.58)	66.76	21	477 cents	61.70	-2.42
ÇARGAH (C)	4/3 (498.04)	23.46	22	4/3 (498.04)	21.04	0
---			23-24	538.9 cents	40.86	---
nim-hicaz	1024/729 (588.27)	90.22	26	581.38 cents	42.48	6.89
hicaz	729/512 (611.73)	23.46	27-28	634.18 cents	52.80	-22.45
dik-hicaz	262144/177147 (678.49)	66.76	29-30	16/11 (648.68)	14.50	29.81
NEVA (D)	3/2 [440 Hz] (701.96)	23.46	31	187/125 (697.33)	48.65	4.63
---			32	729.46 cents	32.13	---
nim-hisar	128/81 (792.18)	90.22	35	788.74 cents	59.27	3.44
hisar	6561/4096 (815.64)	23.46	36-37-38	853.06 cents	64.33	-37.42
dik-hisar	32768/19683 (882.40)	66.76	39	887.66 cents	34.59	-5.26
HÜSEYNİ (E)	27/16 (905.87)	23.46	40	27/16 (905.87) 440 Hz	18.21	0
---			41	920.02 cents	14.16	---
ACEM (F)	16/9 (996.09)	90.22	44	16/9 (996.09)	76.07	0
dik-acem	59049/32768 (1019.55)	23.46	45-46	1043.62 cents	47.53	-24.07
---			47	1071.94 cents	28.32	---
evic (#)	4096/2187 (1086.31)	66.76	48	234/125 (1085.5)	13.55	0.81
mahur	243/128 (1109.78)	23.46	49-50	1124.74 cents	39.25	-14.96
dik-mahur (d)	1048576/531441 (1176.54)	66.76	52	1186.45 cents	61.70	-9.91
GERDANIYE (g)	2/1 (1200)	23.46	53	2/1 (1200)	13.55	0

THT 4 Octave detail of AEU versus the extension to Yarman-24c called Yarman-24/31c in the proposed standard of Sipirde Ahenk.



FHT 5 Yarman-24/31c cycles of fifths (left: 17-tone cycle on C; middle: 12-tone "core" cycle on C; right: 12-tone cycle on E comma sharp).

Fikret Karakaya's perde name and its 8th	Ozan Yarman's interpretation	Yarman-24/42e notes & cent values	Fikret Karakaya's perde name and its 8th	Ozan Yarman's interpretation	Yarman-24/42e notes & cent values
YEGĀH – NEVĀ	YEGĀH – NEVĀ	7-RE 190.709 cents	DÜĠĀH – MUHAYYER	DÜĠĀH 440 – MUHAYYER	31-LA 900.000 cents
---	—Dik Yegāh—Dik Nevā	8-Re \sharp 225.183 cents	Dilārā – Tiz dilārā	Dik Dügāh – Dik Muhayyer	32-La \sharp 920.537 cents
---	Pest bayāti – Bayāti	9-Re \flat 265.526 cents	Dik dilārā – Tiz dik dilārā	Alt kürdi – Alt sümbüle	33-La \flat 967.481 cents
Pest bayāti – Bayāti	Pest nim hisar – Nim hisar	Re # / Mi b 289.731 cents	Kürdi – Nim sümbüle	Kürdi (nihävend) – Sümbüle	34-La # / Si b 993.888 cents
Pest hisar – Hisar	Pest hisârek – Hisârek	11-Mi \flat 320.537 cents	Dik Kürdi – Sümbüle	Dik kürdi – Dik sümbüle	35-Si \flat 1029.828 cents
Pest hüzzam – Hüzzam	Pest hisar/hüzzam – Hisar/hüzzam	12-Mi b 348.410 cents	Nim uşşak – Tiz nim uşşak	---	--- tempered to below
Pest arazbar – Arazbar	Pest arazbar – Arazbar	13-Mi d 362.347 cents	Uşşak – Tiz uşşak	Uşşak – Tiz uşşak	36-Si b 1043.765 cents
			Nim segāh – Tiz nim segāh	Segāhçe – Tiz segāhçe	37-Si d (1057.701 cents)
Pest dik hisar – Dik hisar	PEST DİK HİSAR – DİK HİSAR	14-Mİ 381.418 cents	Segāh – Tiz segāh	SEGĀH – TİZ SEGĀH	38-Sİ 1076.772 cents
İÜSEYNİ-AŞİRAN – İÜSEYNİ	(İüseyini-)Aşiran – İüseyini	15-Mi \sharp 401.955 cents	BUSELİK – TİZ BUSELİK	Büselik – Tiz büselik	39-Si \sharp 1111.246 cents
Pest dilāviz – Dilāviz	Dik (h.) aşiran – Dik hüseyini	16-Mi \flat [415.892 cents]	Dik buselik – Tiz dik buselik	Dik büselik – Tiz dik büselik	40-Si \flat 1125.183 cents
Pest dik dilāviz – Dik dilāviz	Alt Acemaşiran – Alt Acem	17-Fa d [476.772 cents]	Dilkeş – Tiz dilkeş	Alt Çargāh – Tiz alt Çargāh	41-Do d [1186.063 cents]
ACEM-AŞİRAN – ACEM	ACEMAŞİRAN – ACEM	18-FA 4/3 498.045 cents	ÇĀRGĀH – TİZ ÇĀRGĀH	ÇĀRGĀH – TİZ ÇĀRGĀH	0 \rightarrow 42-DO 0, 1200 cents
Dik acem-aşiran – Dik acem	Dik Acemaşiran – Dik Acem	19-Fa \sharp 539.119 cents	Dik çargāh – Tiz dik çargāh	Dik Çargāh – Tiz dik Çargāh	1-Do \sharp 34.474 cents
Pest nevrüz – Nevruz	Pest nevrüz – Nevruz	20-Fa \flat [566.992 cents]	Nim hicaz – Tiz nim hicaz	Nim uzzāl – Tiz nim uzzāl	2-Do \flat 62.347 cents
Irak – Evc	Irak – Eviç	Fa # / Sol b 580.929 cents	Hicaz – Tiz hicaz	Nim hicaz – Tiz nim hicaz	3-Do # / Re b 76.284 cents
Geveşt – Mahur	Geveşt/rehavi – Mahur	Fa \equiv / Sol b 620.537 cents	Dik hicaz – Tiz dik hicaz Sabā	Uzzāl – Tiz uzzāl	4-Re \flat 115.892 cents
Dik geveşt – Dik mahur	Alt Rast – Alt Gerdāniye	23-Sol d [648.410 cents]	— Tiz sabā	Hicaz/sabā – Tiz hicaz/sabā	5-Re b 129.828 cents
			Bestenigār – Tiz bestenigār	(Dik hicaz) – Tiz bestenigār	6-Re d [143.765 cents]
RAST – Gerdāniye	RAST – Gerdāniye	24-SOL 695.354 cents	NEVĀ – TİZ NEVĀ	NEVĀ – TİZ NEVĀ	7-RE 190.709 cents
---	—Dik Rast—Dik Gerdāniye	25-Sol \sharp 729.828 cents			
---	—Şürî—Tiz şürî	26-Sol \flat 763.571 cents			
Nim zengüle – Nim şehnaz	Nim zengüle – Nim şehnaz	Sol # / La b 780.440 cents			
Zengüle – Şehnaz	Alt zengüle – Tiz alt şehnaz	28-La \flat 811.246 cents			
Dik zengüle –	Zengüle (şeddīsabā) – Şehnaz	29-La b 839.119 cents			
— Dik şehnaz	Dik zengüle – Dik şehnaz	30-La d (886.063 cents)			
DÜĠĀH – MUHAYYER	DÜĠĀH [440 Hz] – MUHAYYER	31-LA 900.000 cents			

THT 5 Two octaves detail of Yarman-24/42e as derived from the perde designations of Fikret Karakaya.

Derivation of the triple 12-tone bike-chain construct named “Yarman-36”

When coming face to face with the universal penchant to eschew 53-tET (despite its unparalleled success in housing Yekta-Arel-Ezgi-Uzdilek with less than 1 cent absolute error at any degree [cf. Yarman 2007a]) in favor of 72-tET or similarly complex divisions of the octave in the praxis of Turkish *Makam* music, one can easily come to understand that critical “middle seconds” associated with the historical *mujannabāt* are not befittingly captured by the “Holderian comma system”.

Therefore, if – in prioritizing a minimalistic approach when confronted with the inadequacy of 53-tET – one should consign to represent the relevant “middle seconds” in terms of merely two interval classes (e.g., a minor wholetone and a neutral second) in practically the same vein as the Yarman-24 framework built upon a 12-tone temperament ordinaire core, one arrives at the triplex modified meantone solution dubbed *Yarman-36*

[Yarman and Karaosmanoğlu, 2014] which has the advantage of being entirely tunable by ear contingent upon solely counting simple (i.e., 0, 1, 2) integer beats starting from a preordained reference frequency. (cf. *Yarman36_ahenkler-PB-beats.xls* in www.ozanyarman.com/files/searchfortheoptimaltonesystem.zip.)

The triplex structure of *Yarman-36*, thusly involving a triple bike-chain (i.e., three independent cycles) of 12-tone modified meantone temperaments for suitable *makam* sonority at *Sipürde*, *Bolahenk*, *Davud*, *Mansur* and *Kız Ahenks*, is shown in THT 6 below.

In concluding this appendix, the reader is directed to scrutinize THT 6:99 regarding the *perde* nomenclature under *Mus2okur* with respect to the official AEU notation (cf. [Yarman and Karaosmanoğlu, 2009]) and other voluminous equal divisions of the octave.

*
* *

LAYER I	C4-C5 Hertz	5th beat per sec.	LAYER II	C#4-C#5 Hertz	5th beat per sec.	LAYER III	C#4-C#5 Hertz	5th beat per sec.
+Eb	311.2375227	-2	Eb	307.3580471	-1	-Eb	301.8454475	-1
+Bb => Bb	465.8562841 / 2	-1	Bb => Bb	460.5370707 / 2	0 (via +C# 5.3)	-Bb => Bb	452.2681712 / 2	0
+F	348.8922131	-2	F	345.402803	0	-F	339.2011284	0
+c => C	522.3383196 / 2	-1	c => C	518.1042046 / 2	-2	-c => C	508.8016926 / 2	-1
+G => G	391.2537397 / 2	-1	G => G	387.5781534 / 2	-1	-G => G	381.1012695 / 2	-1
+D	292.9403048	-2	D	290.183615	-1	-D	285.3259521	-1
+A => A	438.4104572 / 2	-1	A => A	434.7754226 / 2	-1	-A => A	427.4889281 / 2	-1
+E	328.3078429	-2	E	325.5815669	-2	-E	320.1166961	-2 (via +G 9:11)
+B => B	491.4617643 / 2	-1	B => B	487.3723504 / 2	-1	-B => B	479.1750442 / 2	-1
+F#	368.0963232	1	F#	365.0292628	-1	-F#	358.8812831	-2
+c# => C#	552.6444848 / 2	1	c# => C#	547.0438942 / 2	-1	-c# => C#	537.3219247 / 2	-1
+G# => G#	414.9833636 / 2	0 (pure)	G# => G#	409.7829206 / 2	0.0417132905	-G# => G#	402.4914435 / 2	-0.0462703165
+Eb	311.2375227	(-2 to Bb)	Eb	307.3580471	(-1 to Bb)	-Eb	301.8454475	(-1 to Bb)

THT 6 Derivation of *Yarman-36* by listening to integer beats, starting from a special reference frequency to get a pure fifth between $G^\#-E^b$.

53-tET deg. & c	AEU subset	Mus2okur	Perde name	72-tET	65-tET	60-tET	41-tET	34-tET	29-tET	
0	0.00	C Dbb		KABA ÇÂRGÂH	0	0	0	0	0	
1	22.64		C† Db=		16.7, 33.3	18.5, 36.9	20	29.3	35.3	41.4
2	45.28		#2		33.3, 50	36.9, 55.4	40	58.5	35.3	41.4
3	67.92		#3		66.7	73.8	60	58.5	70.6	82.8
4	90.57	C# Db		Kaba Nîm Hicâz	83.3	92.3	80, 100	87.8	70.6, 105.9	82.8
5	113.21	C= Db		Kaba Hicâz	100, 116.7	110.8	120	117.1	105.9	124.1
6	135.85		d3		133.3	129.2, 147.7	140	146.3	141.2	124.1
7	158.49		d2		150, 166.7	147.7, 166.2	160	146.3	141.2	165.5
8	181.13	C## Dd		Kaba Dik Hicâz	183.3	184.6	180	175.6	176.5	165.5
9	203.77	D Ebb		YEGÂH (220 Hz)	200	203.1	200	204.9	211.8	206.9
10	226.42		D† Eb=		216.7, 233.3	221.5	220	234.1	211.8, 247.1	206.9, 248.3
11	249.06		#2		233.3, 250	240, 258.5	240	234.1, 263.4	247.1	248.3
12	271.70		#3		266.7	276.9	260	263.4	282.4	289.7
13	294.34	D# Eb		Kaba Nîm Hisâr	283.3, 300	295.4	280, 300	292.7	282.4	289.7
14	316.98	D= Eb		Kaba Hisâr	316.7	313.8	320	322.0	317.6	331.0
15	339.62		d3		333.3	332.3	340	351.2	317.6, 352.9	331.0
16	362.26		d2		350, 366.7	350.8, 369.2	360	351.2	352.9	372.4
17	384.91	D## Ed		Kaba Dik Hisâr	383.3	387.7	380	380.5	388.2	372.4
18	407.55	E Dx		HÜSEYNÎ AŞİRÂN	400	406.2	400	409.8	423.5	413.8
19	430.19		E†		416.7, 433.3	424.6	420, 440	439.0	423.5	413.8, 455.2
20	452.83		d2		450	443.1, 461.5	460	468.3	458.8	455.2
21	475.47		Fd		466.7, 483.3	461.5, 480	480	468.3	458.8	455.2
22	498.11	F Gbb		ACEM AŞİRÂN	500	498.5	500	497.6	494.1	496.6
23	520.75	F† Gb=		Dik Acem Aşîrân	516.7, 533.3	516.9	520	526.8	529.4	537.9
24	543.40		#2		533.3, 550	535.4, 553.8	540	556.1	529.4, 564.7	537.9
25	566.04		#3		566.7	553.8, 572.3	560	556.1	564.7	579.3
26	588.68	F# Gb		Irak	583.3, 600	590.8	580	585.4	600	579.3
27	611.32	F= Gb		Geveşt	600, 616.7	609.2	600, 620	614.6	600	620.7
28	633.96		d3		633.3	627.7	640	643.9	635.3	620.7
29	656.60		d2		650, 666.7	646.2, 664.6	660	643.9	635.3, 670.6	662.1
30	679.25	F## Gd		Dik Geveşt	683.3	683.1	680	673.2	670.6	662.1
31	701.89	G Abb		RÂST	700	701.5	700	702.4	705.9	703.4
32	724.53		G† Ab=		716.7, 733.3	720	720	731.7	705.9, 741.2	703.4, 744.8
33	747.17		#2		733.3, 750	738.5, 756.9	740	761.0	741.2	744.8
34	769.81		#3		766.7	775.4	760, 780	761.0	776.5	786.2
35	792.45	G# Ab		Nîm Zirgüle	783.3, 800	793.8	800	790.2	776.5, 811.8	786.2
36	815.09	G= Ab		Zirgüle	816.7	812.3	820	819.5	811.8	827.6
37	837.74		d3		833.3	830.8	840	848.8	847.1	827.6
38	860.38		d2		850, 866.7	849.2, 867.7	860	848.8	847.1	869.0
39	883.02	G## Ad		Dik Zirgüle	883.3	886.2	880	878.0	882.4	869.0
40	905.66	A Bbb		DÜGÂH	900	904.6	900	907.3	917.6	910.3
41	928.30		A† Bb=		916.7, 933.3	923.1	920	936.6	917.6	910.3, 951.7
42	950.94		#2		950	941.5, 960	940, 960	936.6, 965.9	952.9	951.7
43	973.58		#3		966.7, 983.3	978.5	980	965.9	952.9, 988.2	951.7
44	996.23	A# Bb		Kürdî	1000	996.9	1000	995.1	988.2	993.1
45	1018.87	A= Bb		Dik Kürdî	1016.7	1015.4	1020	1024.4	1023.5	1034.5
46	1041.51		d3		1033.3, 1050	1033.8, 1052.3	1040	1053.7	1058.8	1034.5
47	1064.15		d2		1066.7	1070.8	1060	1053.7	1058.8	1075.9
48	1086.79	A## Bd		Segâh	1083.3	1089.2	1080	1082.9	1094.1	1075.9
49	1109.43	B Ax		BÜSELİK	1100, 1116.7	1107.7	1100, 1120	1112.2	1129.4	1117.2
50	1132.08		B†		1116.7, 1133.3	1126.2	1120, 1140	1141.5	1129.4	1117.2, 1158.6
51	1154.72		d2		1150, 1066.7	1144.6, 1163.1	1160	1141.5	1164.7	1158.6
52	1177.36	Cd		Dik Büselik	1066.7, 1083.3	1181.5	1180	1170.7	1164.7	1158.6
53	1200.00	C Dbb		ÇÂRGÂH	1200	1200	1200	1200	1200	1200

THT 7 Mus2okur's 53-tET compliant *perde* and accidental usage with respect to the AEU notation, and its relation to other high-resolution equal divisions of the octave evaluated under the present study.

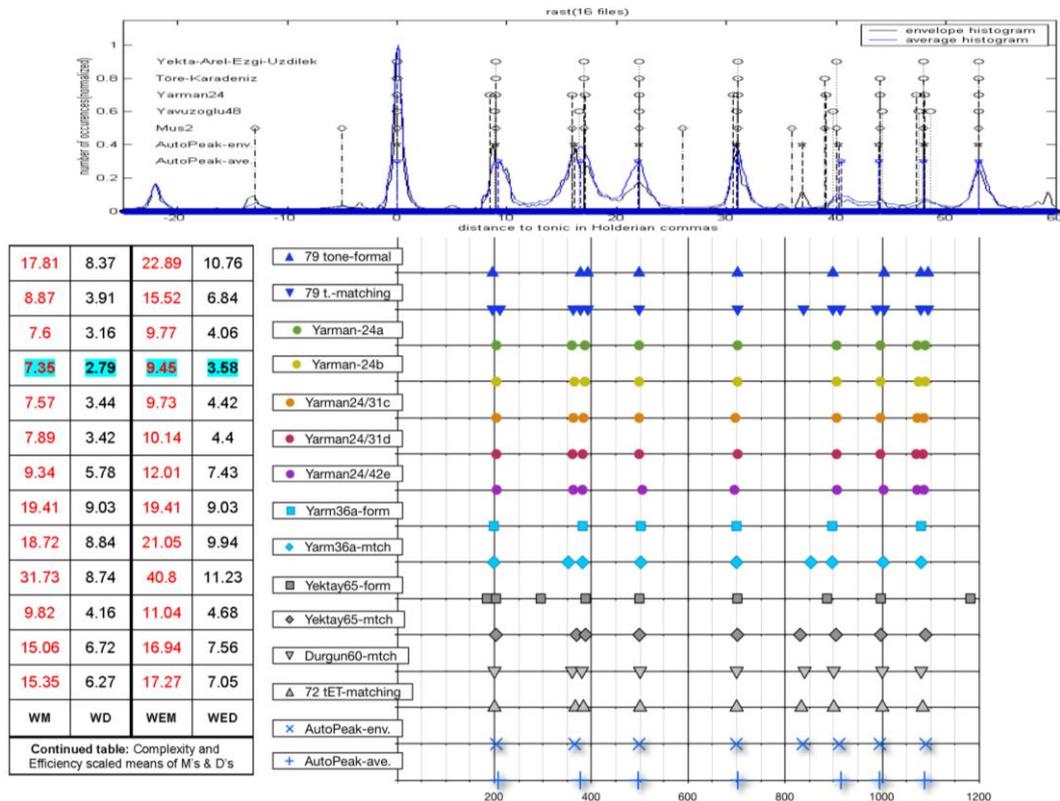
APPENDIX C

RAST	Distance to tonic in cents												M _e	D _e	M _a	D _a	E	C		
79 tone-formal	196.2			377.3	392.4	498	702		898.2			1003.8	1079.3	1094.4	12.9	7.04	16.7	6.87	77.8	91.1
79 t.-matching	196.2	211.3	362.2	377.3	392.4	498	702	837.8	898.2	913.2	988.7	1003.8	1079.3	1094.4	7.5	3.52	7.4	3.04	57.1	89.9
Yarman-24a		203.9	359.5	386.3		498	702			905.9	996.1		1071.7	1088.3	5.7	2.33	9.5	3.99	77.8	75.9
Yarman-24b		203.9	364.7	386.3		498	702			905.9	996.1		1074.6	1088.3	5.2	1.59	9.5	3.99	77.8	75.9
Yarman24/31c		203.9	362.5	383.5		498	697.3			905.9	996.1		1071.9	1085.5	5.2	2.17	9	4.29	77.8	77.4
Yarman24/31d		203.9	360.8	381.7		498	702			905.9	996.1		1069.9	1083.7	5.8	2.8	9	3.61	77.8	77.4
Yarman24/42e		204.6	362.3	381.4		504.6	695.4			906.6		1002.7	1071.6	1085.6	7.8	4.34	8.8	5.93	77.8	83.3
Yarm36a-form	198.7			381.6		501.4	699.7		896.8				1080		16.4	8.22	18.1	7.83	100	83.3
Yarm36a-mtch	198.7		352.3	381.6		501.4	699.7	853.1	896.8			1001.9	1080		16.9	8.71	18.1	7.81	88.9	77.8
Yektay65-form	184.6	203.1	295.4	387.7		498.5	683.1		886.2		996.9			1181.5	24.9	7.57	28.7	7.19	77.8	89.2
Yektay65-mtch		203.1	369.2	387.7		498.5	701.5	830.8		904.6	996.9			1089.2	6.5	2.73	10.3	4.4	88.9	87.7
Durgun60-mtch		200	360	380		500	700	840		900		1000	1080		11.1	5.18	14.9	6.43	88.9	88.9
72 tET-matching		200	366.7	383.3		500	700	833.3		900		1000	1083.3		11.1	4.19	14.9	6.43	77.8	91.1
41 tET-matching		204.9	351.2	380.5		497.6	702.4	848.8		907.3	995.1		1082.9		14	5.22	7.6	2.99	88.9	80.5
34 tET-matching		211.8	352.9	388.2		494.1	705.9	847.1		917.6	988.2		1094.1		12.3	7.44	11.4	5.24	88.9	76.5
29 tET-matching		206.9		372.4		496.6	703.4	827.6		910.3	993.1		1075.9		13.6	5.07	11.1	3.4	100	72.4
AutoPeak-env.	203.8		365.2			497.9	699.2	836.2	911.1		994.9		1089.5							
AutoPeak-ave.	207.6		376.8			495.8	702.3		914.9		994.2		1087.0							

Continued table: Complexity-weighted (WM, WD) and Efficiency-scaled (WEM, WED) means of M's & D's

41 tET-matching	WM:	11.84	WD:	4.5	WEM:	13.32	WED:	5.06
34 tET-matching	WM:	12.52	WD:	6.7	WEM:	14.08	WED:	7.53
29 tET-matching	WM:	12.55	WD:	4.3	WEM:	12.55	WED:	4.3

THT 8 Mismatches in cents of the scale tones of various tunings with RAST auto-peaks (16 collated histograms) and the resultant efficiency (E) and complexity (C) percentages. “M” denotes the maximum difference and “D” denotes the mean of differences, with subscript “e” delineating values in reference to *Auto-Peak envelope* datapoints and subscript “a” delineating values in reference to *Auto-Peak average* datapoints, where best values are highlighted and in bold (while red, blue and purple text colors are cosmetic). Higher E and lower C are better.



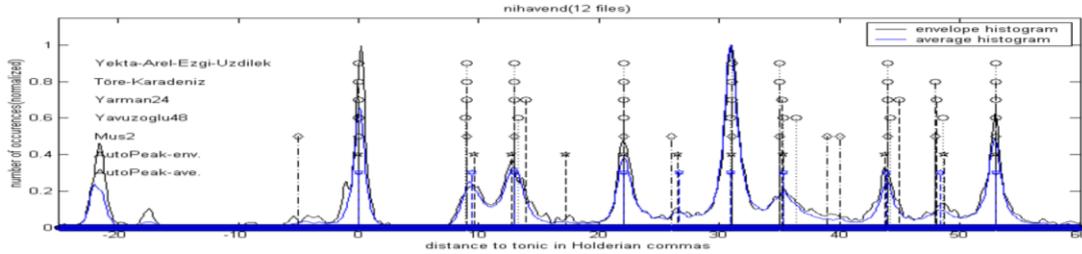
FHT 6 Plotting the data of THT 8 in comparison with the relevant histogram graphic in [Bozkurt et al., 2009].

NIHAVEND	Distance to tonic in cents										M _e	D _e	M _a	D _a	E	C							
	196.2	211.3	286.8	301.8	316.9	392.4	498	603.7	702	807.6							822.7	988.7	1003.8	1079.3	1094.4		
79 tone-formal	196.2				316.9			498		702		822.7		1003.8	1079.3	1094.4	28.4	13.17	24.8	10.93	87.5	91.1	
79 t.-matching	196.2	211.3	286.8	301.8	316.9	392.4	498	603.7	702	807.6	822.7	988.7	1003.8	1079.3	1094.4		7.2	3.56	8.1	3.06	60	88.6	
Yarman-24a	203.9		292.2				498		702	788.4		996.1		1088.3			13	6.84	11.1	4.34	100	70.8	
Yarman-24b	203.9		292.2				498		702	788.3		996.1		1088.3			13	6.86	11.2	4.36	100	70.8	
Yarman24/31c	203.9		292.4				498		697.3	788.7		996.1		1085.5			15.6	7.23	10.8	4.73	100	77.4	
Yarman24/31d	203.9		291.8				498		702	787.6		996.1		1083.7			17.4	7.56	11.9	5.14	100	77.4	
Yarman24/42e	204.6		298.5				504.6		695.4	794.4			1002.7	1085.6			15.5	9.43	9.3	6.67	100	83.3	
Yarm36a-form	198.7			303.6			501.4		699.7	801.7			1001.9		1094.5		18.2	7.87	13.7	5.37	100	80.6	
Yarm36a-mtch	198.7		281.9	303.6		396.1	501.4		699.7	801.7			1001.9	1080	1094.5		18.2	6.49	13.7	5.19	80	77.8	
Yektay65-form	203.1		295.4				498.5		701.5	793.8	867.7	886.2	996.9	1089.2			13.8	6.6	9.3	3.99	77.8	89.2	
Yektay65-mtch	203.1	221.5	295.4			387.7	498.5	609.2	701.5	793.8		996.9		1089.2	1107.7		9.7	4.94	9.1	4.1	81.8	86.2	
Durgun60-mtch	200	220	280	300		400	500	600	700	800			1000				1100	9.2	3.68	7.8	3.92	81.8	85
72 tET-matching	200	216.7	283.3	300		400	500	600	700	800			1000				9.2	2.99	7.9	3.51	81.8	87.5	
41 tET-matching		204.9	292.7			380.5	497.6	614.6	702.4	790.2		995.1		1082.9	1112.2		15.1	7.68	12	5.47	90	78	
34 tET-matching		211.8	282.4			388.2	494.1	600	705.9		811.8	988.2		1094.1			11.4	5.11	12.3	5.61	100	73.5	
29 tET-matching		206.9	289.7			372.4	496.6	620.7	703.4	786.2		993.1		1075.9	1117.2		21.2	9.7	19	8.04	90		
AutoPeak-env.	216.9		288.5			390.8	499.9	599.5	701.9	800.4		991.7		1101.1									
AutoPeak-ave.	212.4		292.1			399.7	499.7	604.1	700.8	799.5		994.9		1094.9									

Continued table: Complexity-weighted (WM, WD) and Efficiency-scaled (WEM, WED) means of M's & D's

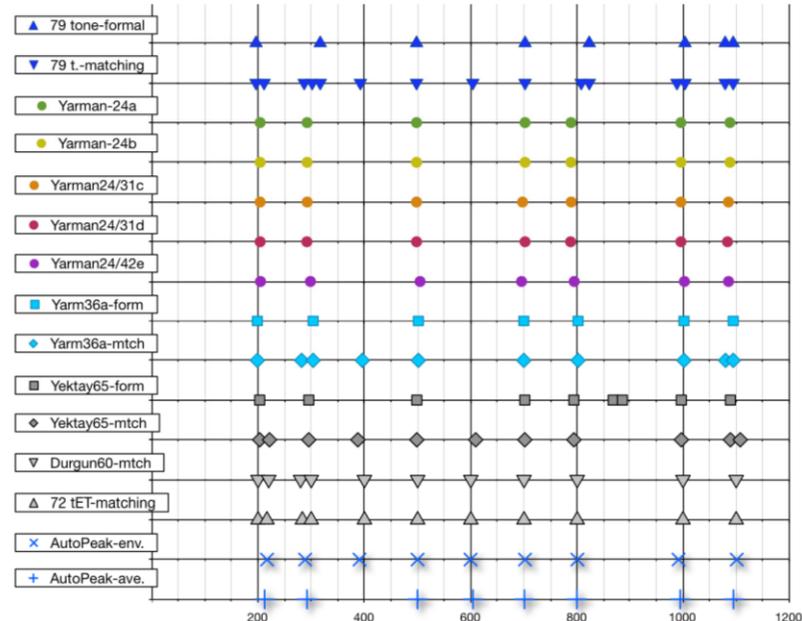
	WM:	WD:	WEM:	WED:
41 tET-matching	14.78	7.17	16.42	7.97
34 tET-matching	12.39	5.61	12.39	5.61
29 tET-matching	20.1	8.87	22.33	9.85

THT 9 Mismatches in cents of the scale tones of various tunings with *NIHAVEND* auto-peaks (12 collated histograms) and the resultant *efficiency* (E) and *complexity* (C) percentages. “M” denotes the maximum difference and “D” denotes the mean of differences, with subscript “e” delineating values in reference to *Auto-Peak envelope* datapoints and subscript “a” delineating values in reference to *Auto-Peak average* datapoints, where best values are highlighted and in bold (while red, blue and purple text colors are cosmetic). Higher E and lower C are better.



32.5	14.72	37.14	16.83
9.15	3.96	15.25	6.6
12.28	5.7	12.28	5.7
12.33	5.71	12.33	5.71
14.32	7.01	14.32	7.01
15.89	6.89	15.89	6.89
14.18	9.21	14.18	9.21
17.8	7.39	17.8	7.39
17.36	6.35	21.69	7.94
13.89	6.37	17.86	8.18
11.02	5.3	13.46	6.48
9.92	4.41	12.13	5.39
10.13	3.85	12.39	4.71
WM	WD	WEM	WED

Continued table: Complexity and Efficiency scaled means of M's & D's



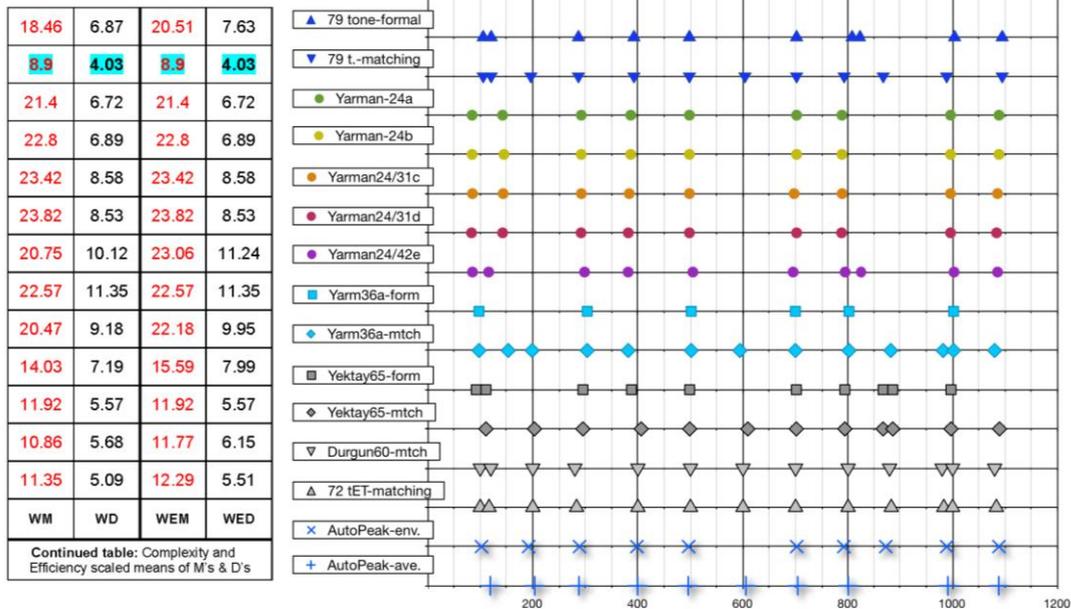
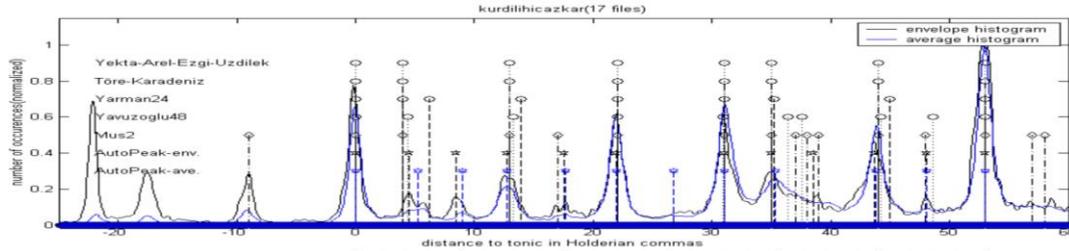
FHT 7 Plotting the data of THT 9 in comparison with the relevant histogram graphic in [Bozkurt et al., 2009].

K.HICAZKAR	Distance to tonic in cents												M _a	D _a	M _e	D _e	E	C		
79 tone-formal	105.6	120.7		286.8	392.4	498		702	807.6	822.7			1003.8	1094.4	15.6	5.51	12.8	5.06	90	88.6
79 t.-matching	105.6	120.7	196.2	286.8	392.4	498	603.7	702	792.5		868		988.7	1094.4	6.2	2.38	7.9	4	100	84.8
Yarman-24a	84.4	142.4		292.2	386.3	498		702	788.3				996.1	1088.3	17.9	5.09	23.3	7.84	100	62.5
Yarman-24b	84.4	145.1		292.2	386.3	498		702	788.3				996.1	1088.3	17.9	5.09	26	8.18	100	62.5
Yarman24/31c	85.1	143.6		292.4	383.5	498		697.3	788.7				996.1	1085.5	17.2	6.11	24.5	9.16	100	71
Yarman24/31d	83.3	142.5		291.8	381.7	498		702	787.6				996.1	1083.7	19	6.24	23.4	8.94	100	71
Yarman24/42e	85.1	115.9		298.5	381.4	504.6		695.4	794.4	825.2			1002.7	1085.6	16.6	8.19	18	8.68	90	78.6
Yarm36a-form	97.6			303.6		501.4		699.7	801.7				1001.9		14.7	8.28	21.5	9.93	100	83.3
Yarm36a-mtch	97.6	153.2	198.7	303.6	381.6	501.4	594.1	699.7	801.7		882.3	982	1001.9	1080	16.4	7.02	21.5	9.98	92.3	66.7
Yektay65-form	92.3	110.8		295.4	387.7	498.5		701.5	793.8		867.7	886.2	996.9		10.3	4.79	11.7	6.49	90	86.2
Yektay65-mtch		110.8	203.1	295.4	406.2	498.5	609.2	701.5	793.8		867.7	886.2	996.9	1089.2	11.1	4.42	8.3	4.63	100	81.5
Durgun60-mtch	100	120	200	280	400	500	600	700	800		880	980	1000	1080	8.9	4.93	9	4.42	92.3	80
72 tET-matching	100	116.7	200	283.3	400	500	600	700	800		883.3	983.3	1000	1083.3	10.5	4.38	7.7	3.78	92.3	83.3
41 tET-matching	87.8	117.1	204.9	292.7	409.8	497.6	614.6	702.4	790.2		878	995.1	1082.9		14.5	5.23	10.4	5.04	100	70.7
34 tET-matching	105.9		211.8	282.4	388.2	494.1	600	705.9		811.8	882.4	988.2	1094.1		19.8	7.42	13.2	6.71	100	67.6
29 tET-matching	82.8	124.1	206.9	289.7	413.8	496.6	620.7	703.4	786.2		869	993.1	1075.9		19.5	6.53	15.27	6.95	100	66.8
AutoPeak-env.	102.3		192	288.9	398.0	496.5		702.3	792	872.8		988.8	1088.2							
AutoPeak-ave.	119.1		203.8	287.8	399.4	495.8	605.434	704.1509	800.4			991	1087.9							

Continued table: Complexity-weighted (WM, WD) and Efficiency-scaled (WEM, WED) means of M's & D's

41 tET-matching	WM: 13.96	WD: 5.76	WEM: 13.96	WED: 5.76
34 tET-matching	WM: 17.99	WD: 7.7	WEM: 17.99	WED: 7.7
29 tET-matching	WM: 17.38	WD: 6.74	WEM: 17.38	WED: 6.74

THT 10 Mismatches in cents of the scale tones of various tunings with *KÜRDILIHICAZKAR* auto-peaks (17 collated histograms) and the resultant *efficiency* (E) and *complexity* (C) percentages. “M” denotes the maximum difference and “D” denotes the mean of differences, with subscript “e” delineating values in reference to *Auto-Peak envelope* datapoints and subscript “a” delineating values in reference to *Auto-Peak average* datapoints, where best values are highlighted and in bold (while red, etc... text colors are cosmetic). Higher E and lower C are better.



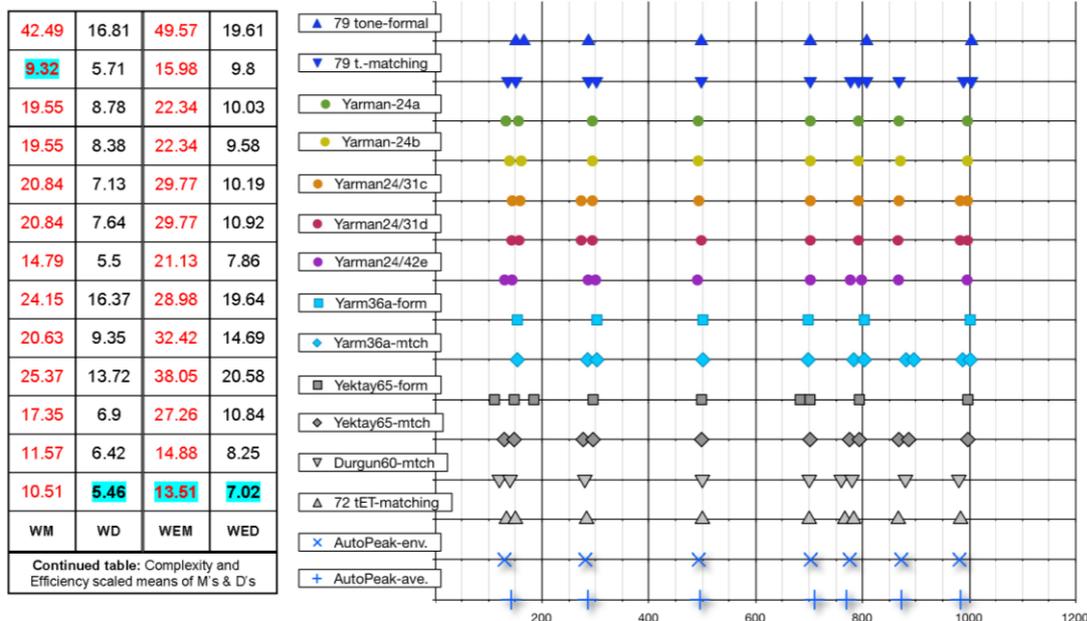
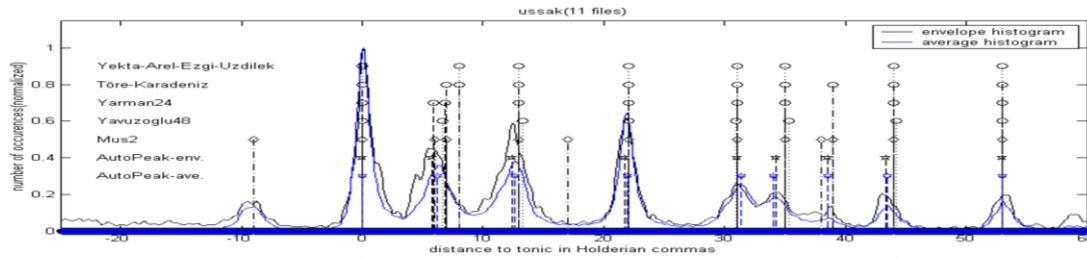
FHT 8 Plotting the data of THT 10 in comparison with the relevant histogram graphic in [Bozkurt et al., 2009].

UŞŞAK	Distance to tonic in cents											M _e	D _e	M _a	D _a	E	C				
79 tone-formal	150.9	166		286.8		498		702		807.6			1003.8	31.9	14.53	38	13.12	85.7	92.4		
79 t.-matching	135.8	150.9		286.8	301.8	498		702	777.4	792.5	807.6	868	988.7	1003.8	7.5	4.43	5	5.07	58.3	91.1	
Yarman-24a	132.2	155.6			294.1	492.2		702		792.2		867.8		996.1	16.5	7.59	22.6	9.97	87.5	93.8	
Yarman-24b	139	160.8			294.1	492.2		702		792.2		870.6		996.1	16.5	8.16	22.6	8.6	87.5	93.8	
Yarman24/31c	144.1	158.6		273.1	294.1	493.4		702		792.2		868	982.5	996.1	16.5	6.49	22.6	6.9	70	77.4	
Yarman24/31d	143.1	156.9		273.2	294.1	498		702		792.2		866	982.4	996.1	16.5	7.26	22.6	7.09	70	77.4	
Yarman24/42e	129.8	143.8		286.1	300	490.7		702	776.8		798	867		995.4	14.2	4.13	12.1	5.66	70	83.3	
Yarm36a-form		153.6			302.6	501		698			803.1			1001.3	23.9	15.66	18	12.74	83.3	86.1	
Yarm36a-mtch		153.6		285.2	302.6	501		698		783.3	803.1	881.3	895.8	987.2	1001.3	23.9	9.07	13.7	7.97	63.6	80.6
Yektay65-form	110.8	147.7	184.6		295.4	498.5	683.1	701.5		793.8				996.9	18.1	12.15	24.2	10.73	66.7	90.8	
Yektay65-mtch	129.2	147.7		276.9	295.4	498.5		701.5	775.4	793.8		867.7	886.2	996.9	15.7	4.54	13.6	7.11	63.6	89.2	
Durgun60-mtch	120	140		280		500		700	760	780		880	980		9.7	4.81	10	6.11	77.8	88.3	
72 tET-matching	133.3	150		283.3		500		700	766.7	783.3		866.7	983.3		7.6	4.4	10	4.74	77.8	90.3	
41 tET-matching	117.1	146.3		292.7		497.6		702.4	761	790.2		878		995.1	14.5	10.57	11.8	7.78	66.7	85.4	
34 tET-matching		141.2		282.4		494.1		705.9	776.5				882.4	988.2	11.5	5.83	10	5.28	85.7	82.4	
29 tET-matching	124.1	165.5		289.7		496.6		703.4		786.2		869		993.1	11.9	7.33	18.1	9.92	75	79.3	
AutoPeak-env.	129.7			281	493.1		702.8		775.7			872.2	981.2								
AutoPeak-ave.	142.2			285.7	495.6		710.0		769.6			872.4	983.3								

Continued table: Complexity-weighted (WM, WD) and Efficiency-scaled (WEM, WED) means of M's & D's

41 tET-matching	WM:	15.06	WD:	10.51	WEM:	22.59	WED:	15.76
34 tET-matching	WM:	11.99	WD:	6.2	WEM:	13.99	WED:	7.23
29 tET-matching	WM:	16.27	WD:	9.36	WEM:	21.7	WED:	12.47

THT 11 Mismatches in cents of the scale tones of various tunings with UŞŞAK auto-peaks (11 collated histograms) and the resultant efficiency (E) and complexity (C) percentages. “M” denotes the maximum difference and “D” denotes the mean of differences, with subscript “e” delineating values in reference to Auto-Peak envelope datapoints and subscript “a” delineating values in reference to Auto-Peak average datapoints, where best values are highlighted and in bold (while red, blue and purple text colors are cosmetic). Higher E and lower C are better.



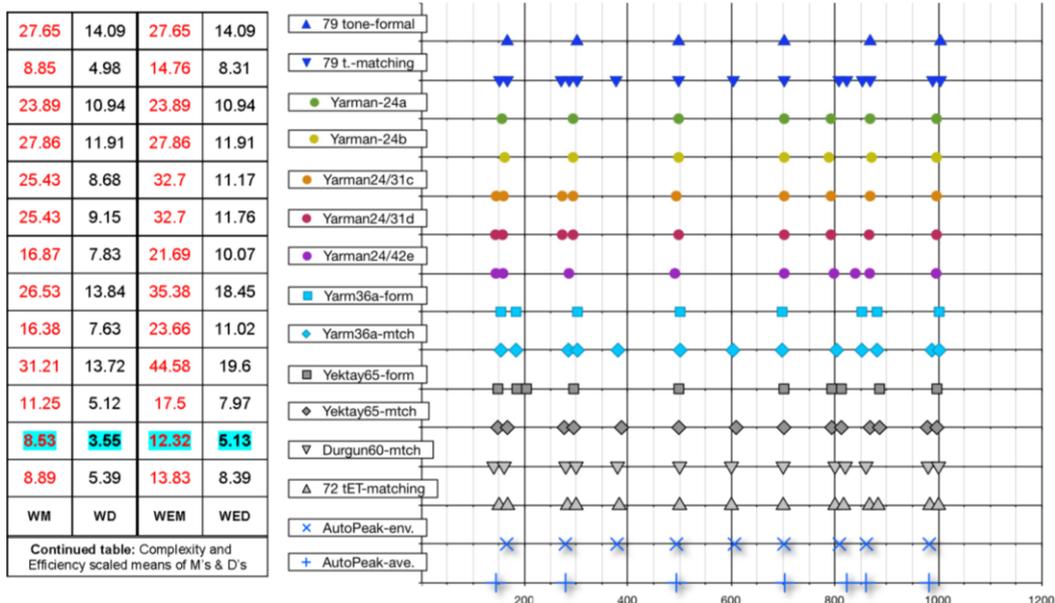
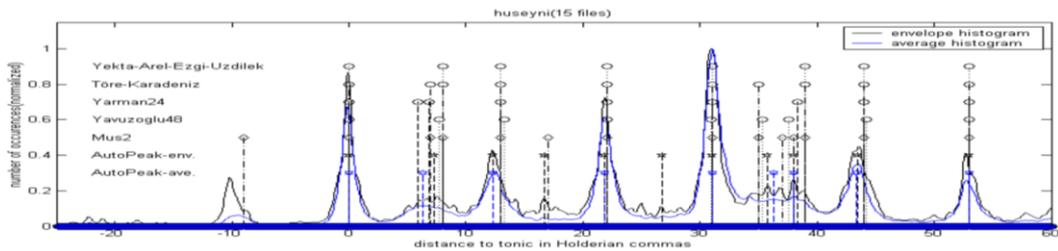
FHT 9 Plotting the data of THT 11 in comparison with the relevant histogram graphic in [Bozkurt et al., 2009].

HÜSEYİNİ	Distance to tonic in cents												M _e	D _e	M _a	D _a	E	C				
79 tone-formal		166		301.8			498		702			868		1003.8	22.6	9.6	22.2	13.23	100	92.4		
79 t.-matching	150.9	166	271.1	286.8	301.8	377.3	498	603.7	702	807.6	822.7	852.9	868	988.7	1003.8	7.6	3.59	7.2	4.74	60	88.6	
Yarman-24a	155.6			294.1			498		702	792.2		867.8		996.1		16.3	9.47	30.6	12	100	70.8	
Yarman-24b		160.8		294.1			498		702	788.3		870.6		996.1		20.2	9.69	34.5	13.7	100	70.8	
Yarman24/31c	144.4	158.6	273.1	294.1			493.4		702	792.2		868		996.1		16.3	7.27	30.6	8.74	77.8	77.4	
Yarman24/31d	143.1	156.9	273.2	294.1			498		702	792.2		866		996.1		16.3	7.76	30.6	9.11	77.8	77.4	
Yarman24/42e	143.8	157.7		286.1			490.7		702	798	839.1	867		995.4		13.2	6.83	16.3	6.87	77.8	83.3	
Yarm36a-form	153.6	182.9		302.6			501		698			851.9	881.3	1001.3		23.4	12.17	23	12.03	75	83.3	
Yarm36a-mtch	153.6	182.9		285.2	302.6	380.9	501	602.9	698	803.1		851.9	881.3	987.2	1001.3	11.2	5.76	19.7	8.63	69.2	75	
Yektay65-form	147.7	184.6	203.1	295.4			498.5		701.5	793.8	812.3		866.2		996.9	25.6	11.74	26.3	11.07	70	89.2	
Yektay65-mtch	147.7	166.2	276.9	295.4		387.7	498.5	609.2	701.5	793.8	812.3	867.7	866.2	978.5	996.9	8.7	3.9	10.5	4.84	64.3	86.2	
Durgun60-mtch	140	160	280	300		380	500	600	700	800	820	860		980	1000	8.5	3.49	6.7	2.63	69.2	85	
72 tET-matching	150	166.7	283.3	300		383.3	500	600	700	800	816.7	866.7	883.3	983.3	1000	8.2	4.36	6.8	4.74	64.3	87.5	
41 tET-matching	146.3	175.6		292.7		380.5	497.6	614.6	702.4		819.5	878		995.1		17.4	8.96	18.1	7.77	90	78	
34 tET-matching	141.2	176.5	282.4			388.2	494.1	600	705.9		811.8	847.1		988.2		13.5	6.4	12.8	5.61	90	73.5	
29 tET-matching		165.5		289.7		372.4	496.6	620.7	703.4		827.6	869		993.1		19.1	8.42	21.3	8.56	100		
AutoPeak-env.	164.8		279.2			379	493.8	605.9	701.4	808.5		860.6		982.2								
AutoPeak-ave.	144.2		279.6				493.8		703	822.8		859.9		981.7								

Continued table: Complexity-weighted (WM, WD) and Efficiency-scaled (WEM, WED) means of M's & D's

41 tET-matching	WM: 19.36	WD: 9.12	WEM: 21.51	WED: 10.14
34 tET-matching	WM: 13.75	WD: 6.28	WEM: 15.28	WED: 6.98
29 tET-matching	WM: 20.2	WD: 8.49	WEM: 20.2	WED: 8.49

THT 12 Mismatches in cents of the scale tones of various tunings with HÜSEYİNİ auto-peaks (15 collated histograms) and the resultant efficiency (E) and complexity (C) percentages. “M” denotes the maximum difference and “D” denotes the mean of differences, with subscript “e” delineating values in reference to Auto-Peak envelope datapoints and subscript “a” delineating values in reference to Auto-Peak average datapoints, where best values are highlighted and in bold (while red, blue and purple text colors are cosmetic). Higher E and lower C are better.



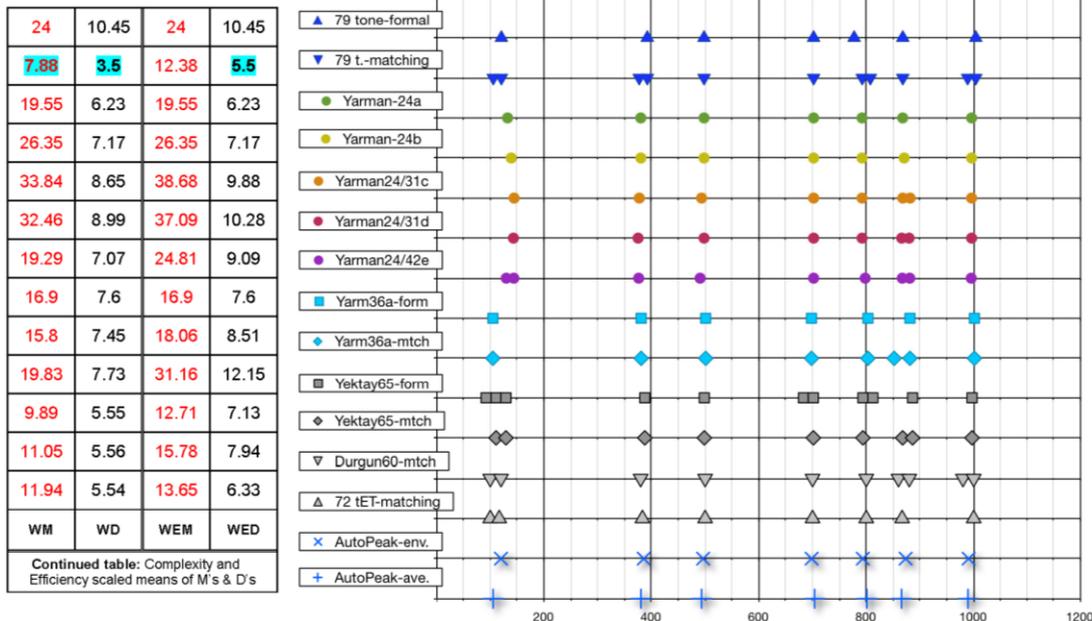
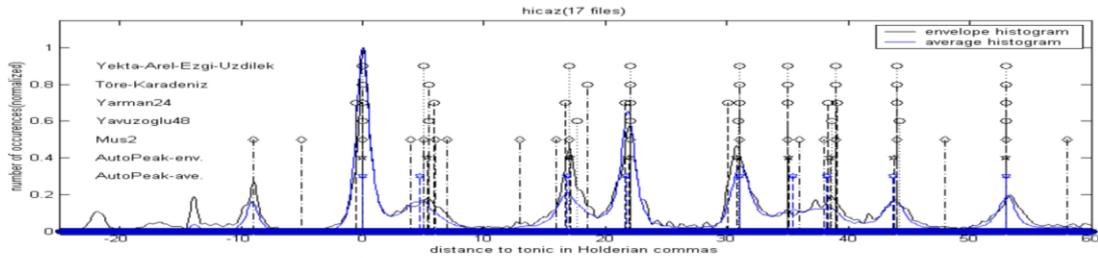
FHT 10 Plotting the data of THT 12 in comparison with the relevant histogram graphic in [Bozkurt et al., 2009].

HICAZ	Distance to tonic in cents										M _a	D _a	M _e	D _e	E	C				
79 tone-formal			120.7		392.4	498		702	777.4		868			1003.8	16.2	6.77	23.7	10.6	100	91.1
79 t.-matching	105.6	120.7	377.3	392.4	498		702	792.5	807.6	868		988.7	1003.8	6.6	3	6.5	2.81	63.6	91.1	
Yarman-24a		132.2	380.2		498		702	792.2		867.8		996.1		12.2	5.09	26.9	7.37	100	88.3	
Yarman-24b		139	380.4		498		702	792.2		870.6		996.1		19	5.63	33.7	8.71	100	88.3	
Yarman24/31c		144.4	377.5		493.4		702	792.2		868	881.6	996.1		24.4	7.36	39.1	8.87	87.5	77.4	
Yarman24/31d		143.1	375.2		498		702	792.2		866	879.7	996.1		23.1	7.49	37.8	9.39	87.5	77.4	
Yarman24/42e	129.8	143.8	376.3		490.7		702	798		867	880.9	995.4		9.8	6.3	24.5	6.27	77.8	83.3	
Yarm36a-form	104.9		380.9		501		698		803.1		881.3		1001.3	15.1	7.6	15.7	6.26	100	80.6	
Yarm36a-mtch	104.9		380.9		501		698		803.1	851.9	881.3		1001.3	15.1	7.6	13.7	5.97	87.5	80.6	
Yektay65-form	92.3	110.8	129.2		387.7	498.5	683.1	701.5	793.8	812.3		886.2	996.9	12.9	5.13	20.6	7.93	63.6	89.2	
Yektay65-mtch	110.8	129.2			387.7	498.5		701.5	793.8		867.7	886.2	996.9	9.2	4.09	7.5	5.29	77.8	89.2	
Durgun60-mtch	100	120	380		500		700		800	860	880	980	1000	9.4	4.81	9.4	4.64	70	88.3	
72 tET-matching	100	116.7			383.3	500		700		800	866.7		1000	9.4	4.8	10.6	4.47	87.5	90.3	
41 tET-matching		117.1	380.5		497.6		702.4	790.2			878	995.1		5.3	4.37	12.4	7.77	85.7	85.4	
34 tET-matching	105.9				388.2	494.1		705.9		811.8	847.1	882.4	988.2	18.2	9.33	16.8	6.6	75	82.4	
29 tET-matching		124.1	372.4		496.6		703.4	786.2		869		993.1		13.4	6.18	18.8	8.78	85.7	79.3	
AutoPeak-env.	120		385.8		496.3		698.3	793.6		873.3		990.6								
AutoPeak-ave.	105.3		380.6		493.4		703.9	801.1		865.6		989.4								

Continued table: Complexity-weighted (WM, WD) and Efficiency-scaled (WEM, WED) means of M's & D's

41 tET-matching	WM: 10.14	WD: 6.95	WEM: 11.83	WED: 8.11
34 tET-matching	WM: 19.52	WD: 8.88	WEM: 26.02	WED: 11.85
29 tET-matching	WM: 17.46	WD: 8.12	WEM: 20.38	WED: 9.47

THT 13 Mismatches in cents of the scale tones of various tunings with HICAZ auto-peaks (17 collated histograms) and the resultant efficiency (E) and complexity (C) percentages. “M” denotes the maximum difference and “D” denotes the mean of differences, with subscript “e” delineating values in reference to Auto-Peak envelope datapoints and subscript “a” delineating values in reference to Auto-Peak average datapoints, where best values are highlighted and in bold (while red, blue and purple text colors are cosmetic). Higher E and lower C are better.



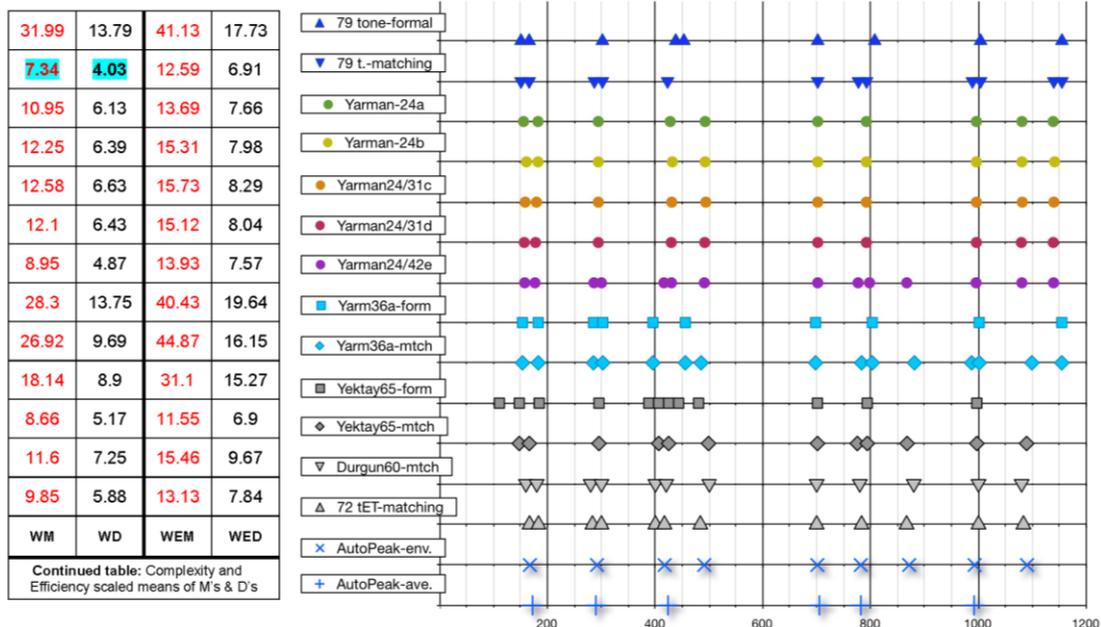
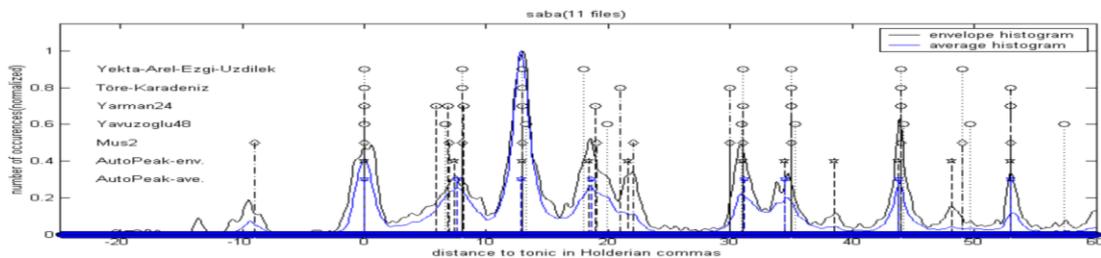
FHT 11 Plotting the data of THT 13 in comparison with the relevant histogram graphic in [Bozkurt et al., 2009].

SABA	Distance to tonic in cents											M _e	D _e	M _a	D _a	E	C					
79 tone-formal	150.9	166		301.8	437.7	452.8		702		807.6		1003.8		1154.7	25.8	9.93	25.6	12.23	77.8	91.1		
79 t.-matching	150.9	166	286.8	301.8	422.6			702	777.4	792.5		988.7	1003.8	1139.6	1154.7	5.5	3.01	6.3	3.47	58.3	91.1	
Yarman-24a	155.6	182.4		294.1	427.4			492.2	702	792.2			996.1	1080.5	1138.4	11.7	6.24	10.2	6.02	80	80	
Yarman-24b	160.8	182.4		294.1	431.4			492.2	702	792.2			996.1	1080.5	1141.2	14.3	6.09	10.2	6.68	80	80	
Yarman24/31c	158.6	179.6		294.1	430.3			493.4	702	792.2			996.1	1081.1	1139.7	13.2	6.3	10.2	6.03	80	74.2	
Yarman24/31d	156.9	177.8		294.1	429.4			491.5	702	792.2			996.1	1079.4	1138.6	12.3	6.38	10.2	5.58	80	74.2	
Yarman24/42e	157.7	176.8	286.1	300	415.9	429.8		490.7	702	776.8	798	867	995.4	1080.4	1139.1	9.6	4.33	6.4	4.37	64.3	78.6	
Yarm36a-form	153.6	182.9	285.2	302.6	395.4	455.5			698		803.1		1001.3		1154.4	21.7	10.71	28	13.43	70	80.6	
Yarm36a-mtch	153.6	182.9	285.2	302.6	395.4	455.5		484.7	698	783.3	803.1	881.3	987.2	1001.3	1098.9	21.7	8.54	28	9.35	60	75	
Yektay65-form	110.8	147.7	184.6	295.4	387.7	406.2	424.6	443.1	480	701.5				996.9		17.3	7.91	12.3	6.62	58.3	89.2	
Yektay65-mtch	147.7	166.2		295.4	406.2	424.6		498.5	701.5	775.4	793.8	867.7		996.9	1089.2	7.9	3.94	6.6	4.72	75	86.2	
Durgun60-mtch	160	180	280	300	400	420		500	700	780		880		1000	1080	10	6.28	9.6	5.98	75	85	
72 tET-matching	166.7	183.3	283.3	300	400	416.7		483.3	700	783.3		866.7		1000	1083.3	8.2	4.21	8.1	5.52	75	87.5	
41 tET-matching	146.3	175.6		292.7	409.8		439	497.6	702.4		790.2	878		995.1	1082.9	8.4	5.44	13.6	5.68	81.8	78	
34 tET-matching	141.2	176.5	282.4			423.5		494.1	705.9	776.5		882.4	988.2		1094.1	10.9	6.46	7.2	3.58	90	73.5	
29 tET-matching	165.5		289.7		413.8			496.6	703.4	786.2		869		993.1	1075.9	14.1	4.08	9.6	3.93	100	69	
AutoPeak-env.		167.3		291.8		417.1		490.6	701.2	781.8		871.5		992.8		1090						
AutoPeak-ave.		172.3		289.6		423.4			705.1	782.0					991.9							

Continued table: Complexity-weighted (WM, WD) and Efficiency-scaled (WEM, WED) means of M's & D's

41 tET-matching	WM: 12.25	WD: 6.2	WEM: 14.97	WED: 7.57
34 tET-matching	WM: 9.67	WD: 5.36	WEM: 10.75	WED: 5.96
29 tET-matching	WM: 12.12	WD: 4.1	WEM: 12.12	WED: 4.1

THT 14 Mismatches in cents of the scale tones of various tunings with SABA auto-peaks (11 collated histograms) and the resultant efficiency (E) and complexity (C) percentages. "M" denotes the maximum difference and "D" denotes the mean of differences, with subscript "e" delineating values in reference to Auto-Peak envelope datapoints and subscript "a" delineating values in reference to Auto-Peak average datapoints, where best values are highlighted and in bold (while red, blue and purple text colors are cosmetic). Higher E and lower C are better.



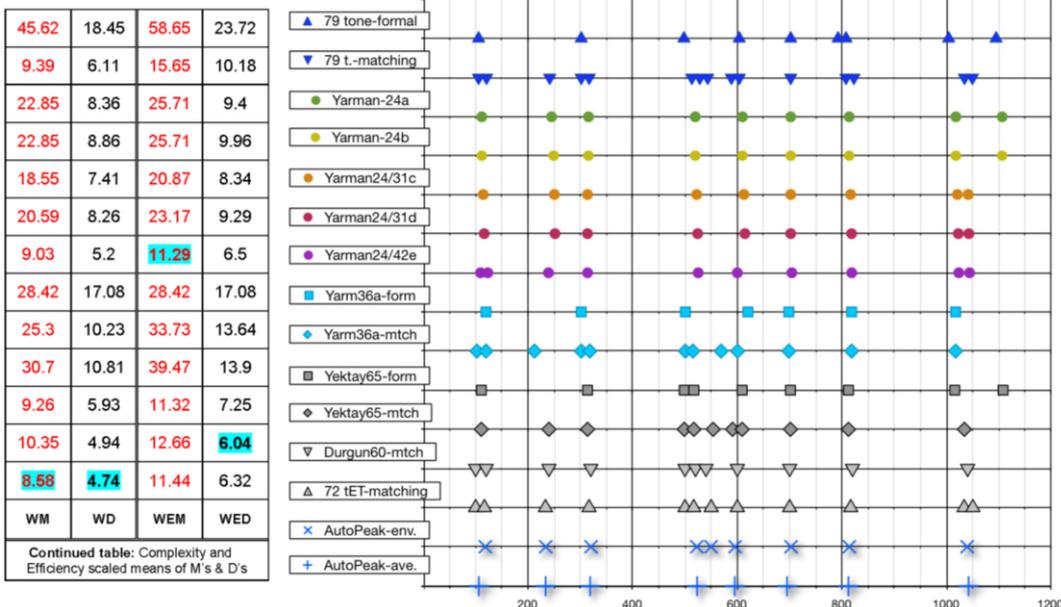
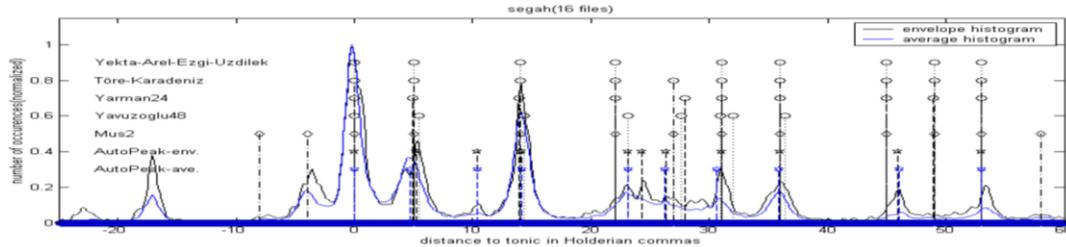
FHT 12 Plotting the data of THT 14 in comparison with the relevant histogram graphic in [Bozkurt et al., 2009].

SEGAH	Distance to tonic in cents													M _a	D _a	M _s	D _s	E	C		
79 tone-formal	105.6			301.8		498			603.7	702	792.5	807.6	1003.8	1094.4	35.4	15.2	37.9	14.44	77.8	91.1	
79 t-matching	105.6	120.7	241.5	301.8	316.9	513.1	528.2	543.3	588.6	603.7	702	807.6	822.7	1034	1049.1	7.6	4.97	7.8	5.05	60	88.6
Yarman-24a	111.7		245		315.6		519.6			609.8	702		813.7	1017.6	1105.9	21.6	7.77	24.1	8.94	88.9	88.7
Yarman-24b	111.7		249		315.6		519.6			609.8	702		813.7	1017.6	1105.9	21.6	8.27	24.1	9.44	88.9	88.7
Yarman24/31c		114.5	250.6		313.8		522.3			612.5	702		816.5	1020.4	1041.2	16.8	6.18	17.7	7.61	88.9	74.2
Yarman24/31d		116.3	251.6		313.7		524.2			614.4	702		818.3	1022.2	1042.5	18.7	6.87	19.6	8.49	88.9	74.2
Yarman24/42e	109.3	123.2	239.1		313.9		525.2		600		704.2		818.6	1023.2	1043.8	6.5	4.27	9.3	4.83	80	81
Yarm36a-form		119.7		301.8		500.7				620.2	698.4		818.4	1017.1		24.5	13.86	25.4	16.13	100	80.6
Yarm36a-mtch	102.3	119.7	212.5	301.8	318.1	500.7	515.1	569	600.4		698.4		818.4	1017.1		22.1	9.69	24.6	9.2	75	75.0
Yektay65-form	110.8				313.8	498.5	516.9			609.2	701.5		812.3	1015.4	1107.7	23.8	8.57	26.3	9.07	77.8	89.2
Yektay65-mtch	110.8		240		313.8	498.5	516.9	553.8	590.8	609.2	701.5		812.3	1033.8		7.6	4.8	7.9	5.13	81.8	86.2
Durgun60-mtch	100	120	240		320	500	520	540	600		700		820	1040		9.7	3.79	7.8	4.56	81.8	85
72 tET-matching	100	116.7	233.3		316.7	500	516.7	550	600		700		816.7	1033.3	1050	5.8	3.08	8.3	4.76	75	87.5
41 tET-matching		117.1	234.1		322	497.6	526.8	556.1	585.4	614.6	702.4		819.5	1024.4		14.8	4.94	17.3	7.47	81.8	78
34 tET-matching	105.9		247.1		317.6	494.1	529.4	564.7	600		705.9		811.8		1058.8	19.6	8.86	17.1	6.83	90	73.5
29 tET-matching		124.1	248.3		331	496.6	537.9	537.9	579.3	620.7	703.4		827.6	1034.5		16.4	10.37	18.1	13.28	90	69
AutoPeak-env.	118.4	233.9	320.4		522.6	549.7		595.7	702.6		814		1039.2								
AutoPeak-ave.	106	233.7	318.8		523.2			594.8	694.9		812.2		1041.7								

Continued table: Complexity-weighted (WM, WD) and Efficiency-scaled (WEM, WED) means of M's & D's

41 tET-matching	WM:	17.88	WD:	6.92	WEM:	21.85	WED:	8.45
34 tET-matching	WM:	19.61	WD:	8.38	WEM:	21.79	WED:	9.31
29 tET-matching	WM:	17.65	WD:	12.09	WEM:	19.61	WED:	13.44

THT 15 Mismatches in cents of the scale tones of various tunings with *SEGAH* auto-peaks (16 collated histograms) and the resultant efficiency (E) and complexity (C) percentages. "M" denotes the maximum difference and "D" denotes the mean of differences, with subscript "e" delineating values in reference to *Auto-Peak envelope* datapoints and subscript "a" delineating values in reference to *Auto-Peak average* datapoints, where best values are highlighted and in bold (while red, blue and purple text colors are cosmetic). Higher E and lower C are better.



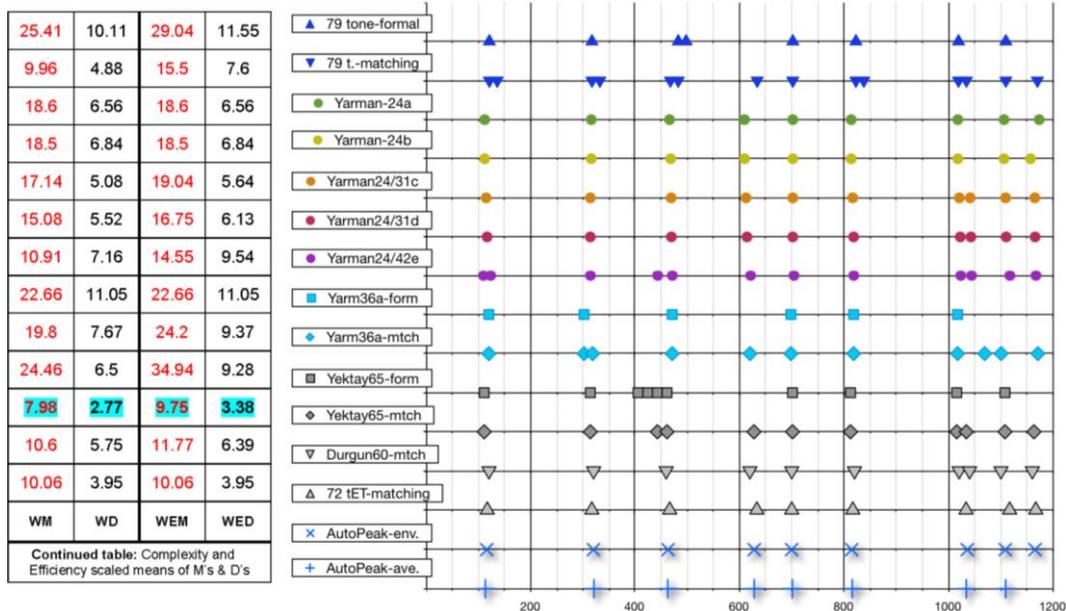
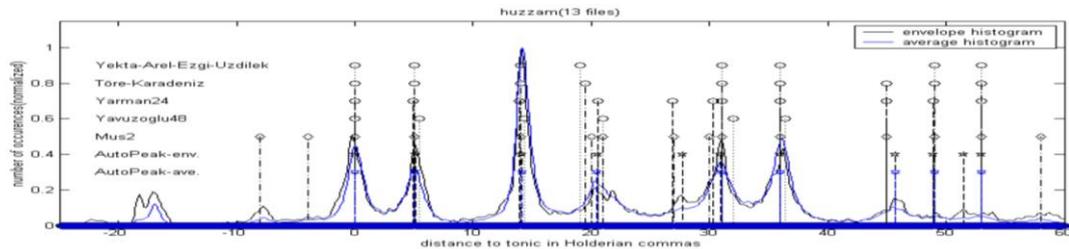
FHT 13 Plotting the data of THT 15 in comparison with the relevant histogram graphic in [Bozkurt et al., 2009].

HÜZZAM	Distance to tonic in cents												M _e	D _e	M _a	D _a	E	C				
79 tone-formal	120.7		316.9			483	498		702	822.7		1018.9		1109.4		19.5	7.91	20	7.8	87.5	91.1	
79 t.-matching	120.7	135.8	316.9	332.0		467.9	483	633.9	702	822.7	837.8	1018.9	1034	1109.4	1169.8	8.1	3.94	7.7	3.8	64.3	88.6	
Yarman-24 a	111.7		315.6			466.3		609.7	702	813.7		1017.6		1105.9	1173.2	18.6	6.79	18.6	6.32	100	87.3	
Yarman-24 b	111.7		315.6			468.6		609.8	702	813.7		1017.6		1105.9	1156.6	18.5	7.08	18.5	6.6	100	87.3	
Yarman24/31c	114.5		313.8			469.5		612.5	702	816.5		1020.4	1041.2	1108.9	1164.8	15.8	4.39	15.8	4.97	90	71	
Yarman24/31d	116.3		313.7			469.9		614.4	702	818.3		1022.2	1042.5	1110.1	1165.3	13.9	4.63	13.9	5.54	90	71	
Yarman24/42e	109.3	123.2	313.9			443.8	471.6	621.3	704.2	818.6		1023.2	1043.8	1117.1	1167	8.8	6.07	10	6.26	75	78.6	
Yarm36a-form	119.7		301.8			471.4		698.4	818.4			1017.1				18.5	8.92	19	9.37	100	83.3	
Yarm36a-mtch	119.7		301.8	318.1		471.4		620.2	698.4	818.4		1017.1	1068.9	1100.3	1170.7	18.5	6.54	16.7	7.09	81.8	75	
Yektay65-form	110.8		313.8	406.2	424.6	443.1	461.5		701.5	812.3		1015.4		1107.7		20.2	5.37	18.4	4.89	70	89.2	
Yektay65-mtch	110.8		313.8			443.1	461.5	627.7	701.5	812.3		1015.4	1033.8	1107.7	1163.1	5.9	2.42	7	2.05	81.8	86.2	
Durgun60-mtch	120		320			460		620	700	820		1020	1040	1100	1160	8.3	4.42	9	4.96	90	85	
72 tET-matching	116.7		316.7			466.7		633.3	700	816.7		1033.3		1116.7	1166.7	8.4	2.98	7.7	3.35	100	87.5	
41 tET-matching	117.1		322			468.3		614.6	702.4	819.5		1024.4		1112.2	1170.7	13.7	5.6	13.7	5.22	100	78	
34 tET-matching	105.9		317.6			458.8		635.3	705.9	811.8		1023.5	1058.8	1094.1	1164.7	14.2	6.58	14.9	6.92	90	73.5	
29 tET-matching		124.1		331		455.2		620.7	703.4		827.6	1034.5		1117.2	1158.6	13	7.63	11.8	7.45	100	69	
AutoPeak-env.	115.7		319.7			463.5		628.3	699.8	814.6		1035.6		1108.3	1165.1							
AutoPeak-ave.	113		320.8			463		628.3	701.2	815.8		1033.8		1109								

Continued table: Complexity-weighted (WM, WD) and Efficiency-scaled (WEM, WED) means of M's & D's

41 tET-matching	WM:	15.83	WD:	6.25	WEM:	15.83	WED:	6.25
34 tET-matching	WM:	16.15	WD:	7.5	WEM:	17.95	WED:	8.33
29 tET-matching	WM:	13.2	WD:	8.03	WEM:	13.2	WED:	8.03

THT 16 Mismatches in cents of the scale tones of various tunings with HÜZZAM auto-peaks (13 collated histograms) and the resultant efficiency (E) and complexity (C) percentages. “M” denotes the maximum difference and “D” denotes the mean of differences, with subscript “e” delineating values in reference to Auto-Peak envelope datapoints and subscript “a” delineating values in reference to Auto-Peak average datapoints, where best values are highlighted and in bold (while red, blue and purple text colors are cosmetic). Higher E and lower C are better.



FHT 14 Plotting the data of THT 16 comparison with the relevant histogram graphic in [Bozkurt et al., 2009].

PANORAMA A	Mem	Dem	Mam	Dam	Em	Cm	Mm	Dm	M _c	D _c	GWM	GWD
79 tone-formal (79 per 159 tET)	23.1	10	24.6	10.5	87.1	91.1	23.9	10.2	29.4	12.6	29.5	12.6
79 tone-matching	7.1	3.6	7.4	3.9	64.6	89.2	7.3	3.7	8.8	4.5	8.9	4.6
Yarman-24a	14.8	6.4	19.7	7.4	92.7	98.1	17.2	6.9	17.2	6.9	17.4	7
Yarman-24b	16.2	6.5	21.1	7.8	92.7	98.1	18.7	7.2	18.7	7.2	18.9	7.2
Yarman24/31c	15.7	6	20	6.8	85.8	75.3	17.9	6.4	19.1	6.9	19.3	7
Yarman24/31d	15.9	6.3	19.9	7	85.8	75.3	17.9	6.7	19.2	7.1	19.3	7.2
Yarman24/42c	11.3	6	12.7	6.2	79.2	81.5	12	6.1	13.7	6.9	13.8	7
Yarman36a-formal	19.6	10.4	20.3	10.3	92	82.4	19.9	10.4	22.8	11.8	23	11.9
Yarman36a-matching	18.2	7.7	18.9	7.9	77.6	75.9	18.5	7.8	20	8.4	20.2	8.5
Yektay65-formal (in 65 tET)	18.5	7.8	19.8	7.6	72.4	89.1	19.2	7.7	23.2	9.3	23.3	9.3
Yektay65-matching (in 65 tET)	9.1	4	9	4.7	79.4	86.5	9.1	4.3	10.7	5.1	10.8	5.2
Durgun60-matching (in 60 tET)	9.4	4.6	9.3	4.9	80.8	85.4	9.4	4.7	11	5.5	11.1	5.6
72 tET-matching	8.7	3.9	9.1	4.6	82.5	87.8	8.9	4.3	10.7	5.1	10.7	5.1
41 tET-matching	13.1	6.4	13	6.1	87.2	79.1	13	6.3	14.5	7	14.6	7
34 tET-matching	14.6	7	12.9	5.8	90	75.2	13.7	6.4	14.7	6.9	14.8	7
29 tET-matching	15.8	7.3	15.9	7.8	93.4	70.5	15.8	7.5	16.2	7.7	16.3	7.8
YAEU (24 per 53-tET)	22.5	8	23.3	9.1	98.4	74.1	22.9	8.6	24.3	9.1	24.4	9.1
Mus2 (53 tET-formal)	16.9	7.3	16.7	7.3	73.5	85.5	16.8	7.3	19.7	8.6	19.8	8.6
Töre-Karadeniz (41 per 106 tET)	23	8.7	28.8	11.6	95.8	83.5	25.9	10.2	29.9	11.7	29.9	11.7
Old Yarman-24a	18.4	7	19.4	7.2	92.7	68.1	18.9	7.1	18.9	7.1	18.9	7.1
Yavuzoğlu-48 (in 48 tET)	23.9	11.2	23.7	12.2	95.6	86.3	23.8	11.7	28.2	13.8	28.3	13.9

THT 17 Grand averages of all mismatches in cents of the scale tones of various tunings with auto-peaks, and the resultant mean efficiency (E) and mean complexity (C) percentages (constituting altogether PANORAMA A – with the bottom 5 rows drawn from [Bozkurt et al., 2009]). “M” denotes the maximum difference and “D” denotes the average of differences; with subscript “em” delineating mean values in reference to *Auto-Peak envelope* datapoints, subscript “am” delineating mean values in reference to *Auto-Peak average* datapoints, subscript “m” delineating the average of em’s and am’s as well as all preceding E’s and C’s, and subscript “c” delineating the complexity scaling (similar to for GWM: *Grand average of complexity-weighted maximums* and GWD: *Grand average of complexity-weighted average of differences* pulled out of continued THT 8 to THT 16), where best values are highlighted and in bold (while red, blue, purple, green and turquoise text colors are cosmetic). As it so happens, 79 MOS 159-tET (the peak-matching version) outclasses its competition in this panorama even after complexity upscaling under the rightmost four columns. Higher E and lower C are better, while smaller deviations in all other measures are always better.

PANORAMA B (Bulk vs. Peak-matching Performance)	Pre-normalized upscaled c				Normalized to percentages				Average of performance maximums	Average of performance mean diffs.
	CEM Perf.	CED Perf.	GEM Perf.	GED Perf.	CEM Perf. %	CED Perf. %	GEM Perf. %	GED Perf. %		
79 tone-formal (79 per 159 tET)	33.75	14.44	33.92	14.50	38%	43%	38%	43%	38%	43%
79 tone-matching	13.61	7.02	13.7	7.07	95%	88%	95%	88%	95%	88%
Yarman-24a	18.61	7.43	18.78	7.5	70%	83%	69%	83%	69%	83%
Yarman-24b	20.17	7.71	20.36	7.78	64%	80%	64%	80%	64%	80%
Yarman24/31c	22.31	8.04	22.5	8.11	58%	77%	58%	77%	58%	77%
Yarman24/31d	22.36	8.32	22.55	8.4	58%	74%	58%	74%	58%	74%
Yarman24/42e	17.25	8.71	17.42	8.8	75%	71%	75%	71%	75%	71%
Yarman36a-formal	24.77	12.86	24.96	12.97	52%	48%	52%	48%	52%	48%
Yarman36a-matching	25.77	10.86	25.97	10.94	50%	57%	50%	57%	50%	57%
Yektay65-formal (in 65 tET)	31.99	12.79	32.11	12.84	40%	48%	41%	48%	40%	48%
Yektay65-matching (in 65 tET)	13.51	6.46	13.58	6.5	96%	96%	96%	96%	96%	96%
Durgun60-matching (in 60 tET)	13.61	6.86	13.69	6.92	95%	90%	95%	90%	95%	90%
72 tET-matching	12.94	6.18	13.02	6.22	100%	100%	100%	100%	100%	100%
41 tET-matching	16.6	8.01	16.7	8.08	78%	77%	78%	77%	78%	77%
34 tET-matching	16.35	7.66	16.5	7.73	79%	81%	79%	80%	79%	81%
29 tET-matching	17.38	8.26	17.48	8.34	74%	75%	74%	75%	74%	75%
YAEU (24 per 53-tET)	24.67	9.22	24.79	9.21	52%	67%	53%	68%	52%	67%
Mus2 (53 tET-formal)	26.61	11.65	26.88	11.67	48%	53%	48%	53%	48%	53%
Töre-Karadeniz (41 per 106 tET)	31.19	12.23	31.15	12.21	41%	51%	42%	51%	42%	51%
Old Yarman-24a	20.38	7.65	20.38	7.65	64%	81%	64%	81%	64%	81%
Yavuzoğlu-48 (in 48 tET)	29.45	14.45	29.56	14.51	44%	43%	44%	43%	44%	43%

THT 18 Efficiency-upscaled M_c , D_c and GWM, GWD; designated as CEM, CED and GEM, GED respectively – with resultant c values converted to percentages via taking as basis the smallest numbers each in the first four columns under the “Pre-normalized” heading. Please note that CEM & CED are the Complexity-weighted AND Efficiency-upscaled Maximums (or the mean of the average of Differences), while GEM & GED are the Grand-averaged version of complexity-weighted AND Efficiency-upscaled Maximums (or the mean of the average of Differences), with smaller values being always better. The operation uses the formula $\% = 100 \times [(\text{smallest among the list of } [\text{complexity-weighted } c / \text{corresponding efficiencies}]) / (\text{complexity-weighted } c / \text{current efficiency})]$. Rightmost two columns feature the average of CEM, GEM & the average of CED, GED correspondingly. In this “bulk vs. peak-matching performance” panorama that I dub PANORAMA B – with the bottom 5 rows drawn from [Bozkurt et al., 2009] – all inefficient players are aggressively taken down to the effect that 72-tET comes out on top, followed by 65-tET, 60-tET and 79 MOS 159-tET (e.g., the peak-matching version). Best values are highlighted and in bold, while worst values are striped in red.

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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 enigma) 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

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¹ [Kiesewetter, 1858, p. 32]: partly translated and quoted in [Gilman, 1892, p. 57].

² [During, 1985, p. 7]. My heartfelt thanks to Jean During and Richard Dumbrell who reviewed this dossier and proposed numerous improvements.

³ [Adamson, 2011].

⁴ [Beyhom, 2016], more specifically the section on “Musicological Orientalism” p. 158-163.

“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

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,⁸ 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 *‘ūd*, 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”,⁹

or further widened such as in Poché’s assertion in the *New Grove*:

“The neck [of the *‘ūd*] rarely has frets (*dasāīn*), but some are found on the Tunisian *‘ūd* of Khumayyis Tamān”,¹⁰

which is all that Christian Poché had to say on the matter,¹¹ while we can read in the same dictionary:

“The *‘ūd* still **survives** over all the Arab world, where it is used as a solo instrument and for accompanying song,¹² though it no longer has frets”.¹³

While this myth has already been invalidated elsewhere¹⁴ 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 Orientalists musicologists – merely copied their theory from their predecessors, and their music would have further “regressed” being influenced by Persian (or other) music(s)¹⁵, *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 heirs” 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 praxis¹⁶ at that time are deemed insignificant or simply avoided – as with Neubauer for the latter process –, the role of ditonism is amplified and Zalzalian¹⁷ 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 Byzantinologists¹⁸ – but for opposite purposes¹⁹, the alleged fretting of the *‘ūd* served as the main vector of the historical forgery of music history, mostly in the 19th and – mainly the first half

⁸ [Beyhom, 2016] and [Beyhom, 2003; 2004; 2010a; Beyhom, 2017].

⁹ [Chabrier et al., 2000], entry “*‘ūd*” (to which Farmer contributed originally).

¹⁰ [Poché, 2001, p. 27], entry “*‘ūd*”: 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 *‘ūd* of Khumayyis Tamān.

¹¹ 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 *‘ūd* today as it is included in both large orchestras and small formations (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.)

¹⁴ See [Beyhom, 2010b, v. 1, p. 324–363; Beyhom and Makhoulouf, 2009].

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 *zalzalism* are used after Maṣūūr Zalzal a-ḡ-Ḍārib, an 8th-9th-centuries *‘ūd* 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 *‘ūd*. 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 music²⁰ culminating with the Western Classical music of the common-practice period²¹.

“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?²²

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 Ages²³. 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.²⁴

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 since²⁵ – 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.



Fig. 1 Boethius’ tomb in San Pietro in Ciel d’Oro, Pavia.²⁶

As I already wrote in “The ‘fretting’ of the Arabian *‘ūd* – or Sequencing Musicological Orientalism”²⁷, as long as the main threat comes from the theories of the scale, and while early Arabian writings about music theory²⁸ 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 “fretting” 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 Palisca), 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.



Fig. 2 The Carolingian Empire at its peak.²⁹

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, Ya‘qūb Ibn Ishāq al-Kindī (“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-Ṣafīyy-a-d-Dīn 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 fī-l-Luḥūn wa-n-Nagham* – in which the description of the “frets” is given – was dedicated the son of Caliph al-Mu‘taṣim (833-842), Aḥmad ibn al-Mu‘taṣim – an amateur musician – and was meant as an informative

²⁹ Source: https://3.bp.blogspot.com/-tn4kVZWdXos/Ulfqyedi_wI/AAAAAAAAInY/W29gY0Powto/w1200-h630-p-k-no-nu/Carolingian-Dynasty.gif.

³⁰ As explained in [Beyhom, 2010b, v. 1, p. 183-276 (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

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 Sīnā.³⁰
- 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 Muḥammad ibn al-Ḥasan ibn a-ṭ-Ṭaḥḥān’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

dastān (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.

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* musicology³⁴ against all factual data³⁵.

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’s³⁶ division(s) of the fingerboard of the *‘ūd*. 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 diatonicism³⁷). This division is present in Arabian specialized literature from the very beginnings,³⁸ and is rooted in music practice since the Forerunners³⁹. It was the main representation of the scale in the Golden Age of the Arabian Civilization from (al-) Fārābī (9th Century) to (al-) Urmawī (13th Century).
- Part II is a reflection about the theoretical use of the Arabian *‘ūd*, 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 *‘ūd* in his article “*Der Bau der Laute und ihre Besaitung nach arabischen, persischen und türkischen Quellen des 9. bis 15. Jahrhunderts*”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 *‘ūd*, its components and its proportions”) is a reminder about the proportions of the *‘ūd* 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 *‘ūd*.
 - Appendix C reviews the contents of *The Risāla fī-l-Mūsīqā* by (al-) Munajjim (856-912) and shows that the Pythagorean division attributed to this author cannot be sustained.

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

³⁵ In fact, a converging array of evidence contradicting the thesis of the “fretted” *‘ūd*.

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

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

³⁸ Although not explicitly in the case of Kindī.

³⁹ The term comes from my proposed (in [Beyhom, 2010b]) division of the history of *maqām* music (theory): 1. *The Forerunners*: mostly (al-) Kindī (9th century) and (al-) Munajjim (9th and beginning of the 10th centuries); 2. *The Golden Age*: from (al-) Fārābī (Latinized “Alfarabius” – 10th century) to ibn Zayla (d. 1048), not forgetting the mentor of the latter, ibn Sīnā – or Avicenna – (980-1037); 3. *The Systematists*: beginning with (al-) Urmawī (13th century), with followers such as (al-) Lādhiqī or (al-) Marāghī; 4. *The Intermediate Period*: with writings such as the Anonymous *A-sh-Shajara dhāt al-Akmām* [published as [Anonyme, 1983]], or from [Ṣaydāwī (a-ṣ-), XV^e 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 Mashāqa (19th century) and his mentor Farīd-a-d-Dīn al-‘Attār and ending with the 1960s (not forgetting [Khulāī (al-), 1904]); 6. *The Contemporary Period*: roughly since the 1970s and the predominance of the Conservatoires 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 *Jāhiliyya* [“the time of ignorance”] till Early Islam (death of ‘Alī, 661); 2) *Assimilation period*, from the Umayyad dynasty till the First Abbasid cycle (circa 830); 3) *Period of Fulfilment 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 18th century; 5) *Renaissance*: from the *Nahḍa* [hence the term “Renaissance”] in the 19th century, beginning with the expedition of Bonaparte in Egypt end of the 18th century, until the [C]ongrès du Caire (1932)”.

⁴⁰ [Neubauer, 1993], which is, as a matter of fact, a dossier of nearly 80 pages.

Tetrachordal divisions (Ancient Greek theories) - A -									
Theoretician	Archytas			Eratosthenos			Didymus		
Type	enharmonic	chromatic	diatonic	enharmonic	chromatic	diatonic	enharmonic	chromatic	diatonic
1 st ratio	4/5	27/32	8/9	15/19	5/6	8/9	4/5	5/6	8/9
in cents	386	294	204	409	316	204	386	316	204
2 nd ratio	35/36	224/243	7/8	38/39	18/19	8/9	30/31	24/25	9/10
in cents	49	141	231	45	94	204	57	71	182
3 rd ratio	27/28	27/28	27/28	39/40	19/20	243/256	31/32	15/16	15/16
in cents	63	63	63	44	89	90	55	112	112
sum	498	498	498	498	498	498	498	498	498
Equivalences	Fārābi (4/5, 27/28, 35/36), Sīnā (35/36, 4/5, 27/28)	missing	Fārābi, Sīnā (7/8, 8/9, 27/28)	missing	Fārābi (last 2 inverted), Sīnā (inverted)	Fārābi and Sīnā	Fārābi and Sīnā (4/5, 31/32, 30/31)	Fārābi (last 2 inverted), Sīnā	Fārābi, Sīnā (9/10, 8/9, 15/16)

Tetrachordal divisions (Ancient Greek theories) - B -									
Theoretician	Ptolemaeos								
Type	enharmonic	soft chromatic	tense chromatic	soft diatonic	middle or tonic diatonic	ditonic diatonic	tense or syntonic diatonic	equal diatonic	enharmonic 2 nd form
1 st ratio	4/5	5/6	6/7	7/8	8/9	8/9	9/10	9/10	4/5
in cents	386	316	267	231	204	204	182	182	386
2 nd ratio	23/24	14/15	11/12	9/10	7/8	8/9	8/9	10/11	21/22
in cents	74	119	151	182	231	204	204	165	81
3 rd ratio	45/46	27/28	21/22	20/21	27/28	243/256	15/16	11/12	55/56
in cents	38	63	81	84	63	90	112	151	31
sum	498	498	498	498	498	498	498	498	498
Equivalences	Fārābi	Fārābi and Sīnā	Fārābi and Sīnā	Fārābi and Sīnā	Fārābi (7/8, 8/9, 27/28), Sīnā	Fārābi and Sīnā	Fārābi (first 2 inverted), Sīnā	Fārābi	(Erlanger)

Fig. 3 Ancient Greek tetrachords with equivalents in the writings of (al-) Fārābi (9th-10th centuries – see [Wright, 2001a]) and (ibn) Sīnā (10th-11th centuries – see [Wright, 2001b]), the two major Arabian music theoreticians of the Golden Age. Arabian tetrachords are taken from [Fārābi (al-), 1930; Fārābi (al-) et al., 1935; Yūsuf, 1956; 1998, أبو نصر محمد بن محمد بن ترخان الفارابي, 1967 الفارابي]; Greek tetrachords 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].

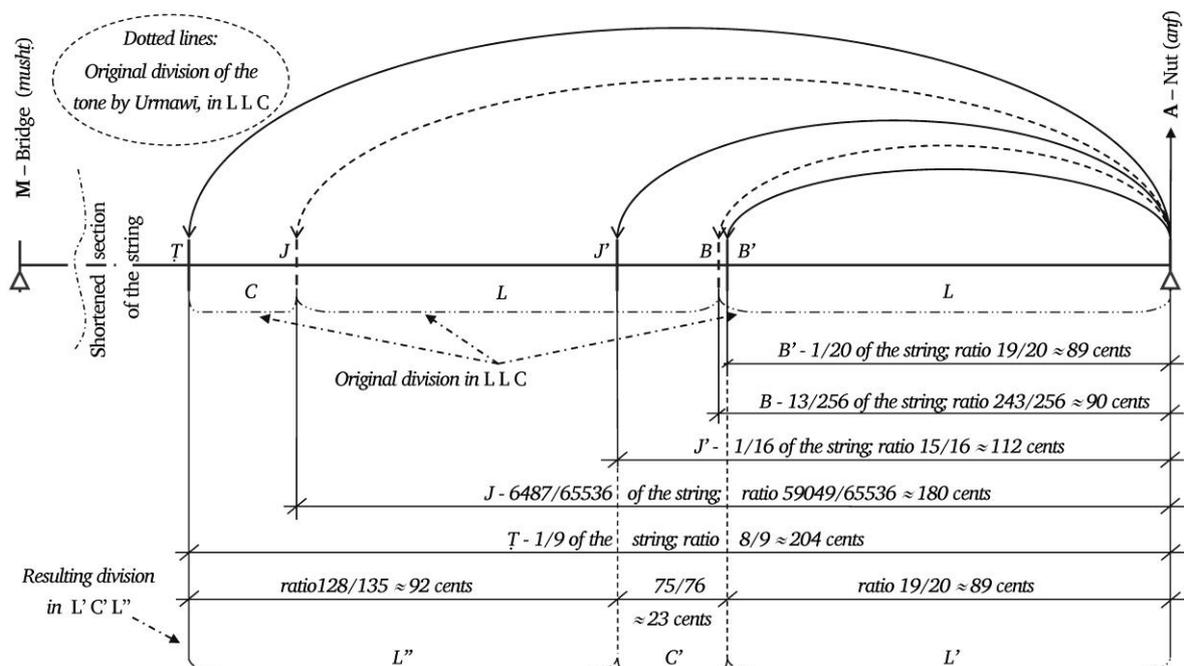


Fig. 4 Urmawī's two divisions of the tone (L L C and alternative L' C' L' – from right to left, top to bottom, in the figure) in the *Kitāb al-Adwār* [Urmawī (d. 1294), 2001] and corresponding ratios and intervals in cents.

- Appendix D (“Original texts”) is a collection of the original texts the translation of which is proposed in the main text.⁴¹
- The two complementary videos were published with the article on the ‘ūd – in French – by the author with Hamdi Makhoulouf⁴², with subtitles by Beyhom:
 - The first video is entitled *Fretting of the ‘ūd according to (al-) Kindī*,⁴³ 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-ṭ-Ṭahḥān*⁴⁴ and shows the same procedure but with one set of strings described by (ibn a-ṭ-) Ṭahḥān.

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 13th century and on the article published with Hamdi Makhoulouf⁴⁵, new data is provided in this dossier which complements my earlier writings on the subject.⁴⁶

*
* *

⁴¹ This is for clarity of the main text, while philological differences impose the reproduction of the original texts for verification purposes.

⁴² [Beyhom and Makhoulouf, 2009].

⁴³ Available at https://youtu.be/d7TTlnH_pKM.

⁴⁴ Available at <https://youtu.be/demT-hpcX1s>.

⁴⁵ [Beyhom, 2010b] and aforementioned [Beyhom and Makhoulouf, 2009]. Most of the translated text from [Beyhom, 2010b] is an adapted, emended and shortened version the purpose of which is to expound the results of the research undergone, while more detailed explanations (and translations) are proposed for the alleged fretting of the ‘ūd. Likewise, other (Pythagorean) divisions (such as by Ikhwān a-ṣ-Ṣafā’ and al-Khawārizmī) are not incorporated in the dossier, as Kindī’s and Munajjim’s propositions (expounded further) are a significant enough sample of the theoretical speculations of the “Forerunners”.

⁴⁶ Note that some of the material included in [Beyhom, 2016], mostly from the last section of Chapter I entitled “Greek theories in

A CONCLUSION AS FOREWORD⁴⁷

Between the 7th and the 9th centuries, the expansion of Islam⁴⁸ 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-Shām⁴⁹ being part of the former Roman Empire,⁵⁰ 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.⁵¹ All the writings on music of the period, anterior to (al-) Kindī’s, have been lost. Later chroniclers such as Mas‘ūdī and (ibn) Salma⁵² 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 9th 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).⁵³

Arabian writings”, may be of use for the reader and is cited where deemed necessary.

⁴⁷ 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.

⁴⁸ Both religion and civilization.

⁴⁹ Syria and Lebanon and, by extension, Jordan and Palestine.

⁵⁰ Then of the Byzantine Empire (or the Eastern Roman Empire).

⁵¹ 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.

⁵² See [Mas‘ūdī, 1987 ; Salma (a-n-Naḥawī al-Lughawī), 1984], and [Khalidi and Mas‘ūdī, 1974] for the importance of Mas‘ūdī as a historian.

⁵³ 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 Islam⁵⁴, 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”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.)

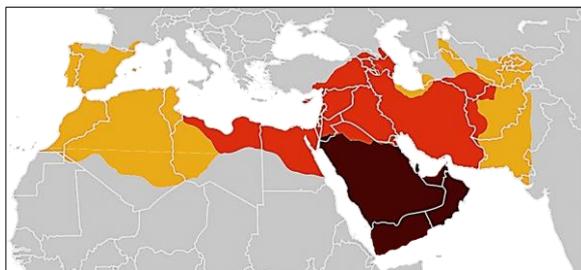


Fig. 5 Expansion of the Caliphate until 750: ■ → Expansion under the Prophet Muḥammad, 622-632; ■ → Expansion during the Patriarchal Caliphate (Rāshidūn), 632-661; ■ → Expansion during the Umayyad Caliphate, 661-750. (From [DieBuche, 2010] based on [Anon. “Age_of_Caliphs.png (Image PNG, 684 × 347 pixels)”]: conquered territories included all or part of the Levant, Mesopotamia, Persia, North Africa, Iberia, Gaul, Transoxania, Sindh and Caucasus – see also [Wikipedia Contributors, 2017b].)

It is important to remember that the first “theoreticians” of the Arabian Empire⁵⁶ 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,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*”) *fi-l-Luḥūn wa-n-Naḡham*, changes radically with (al-) Fārābī⁵⁸ 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 a-ṣ-Ṣinā’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-temperalism), from the theorization of Arabian (*maqām*) music; this context is explicitly scrutinized in the following pages.

Let us note that the already signaled (al-) Kindī⁵⁹ – surnamed the “Philosopher of the Arabs” – seems to have well earned his surname in music theory⁶⁰ 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”).

⁶⁰ Unlike 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.

⁵⁴ The civilization, here differentiated from the religion.

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

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).

⁵⁷ See [Grunebaum, 1944].

⁵⁸ The “Second Master” (to Aristotle).

⁵⁹ For a comprehensive reviews of Arabian sources, see [Farmer, 1965; Shiloah, 1979] – a second volume of RISM by Shiloah, 2003,

secondary importance.⁶¹ Let us also note that Kindi was more of a translator than a “transmitter” of Ancient Greek tradition.⁶² He was however the first to describe the Arabian musical system through the division of the fingerboard of the ‘ūd, even if we do not know for certain if his use of the ditonic division of the fourth corresponds at all to praxis⁶³ at that time. The ditonic division, which is probably justified by Kindi’s pretense in his epistle *fi-l-Luḥūn wa-n-Nagham*⁶⁴ to a “simplicity” of music – as a “science” and inherited from Platonic interpretations – contradicts somewhat the description of the *genē* in his epistle *fi Khubr Šinā‘at a-t-Ta’lif* which includes, notably, an enharmonic *genos* with two quarter-tones.⁶⁵

Whenever the question of the adequacy of the simplistic ditonic division with the music of that time is clearly raised by Kindi’s description of praxis (singing – *ghinā’* – as opposed to “musical science”) in the *Risāla fi-l-Luḥūn 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,⁶⁶ several of Kindi’s successors – such

as Ikhwān a-ṣ-Ṣafā’ and (al-) Khawārizmī – 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 Kindi avoided⁶⁷ introducing new ratios to describe the Zalzalīan intervals used in praxis, (al-) Fārābī and later (ibn) Sīnā and (al-) Urmawī⁶⁸, while keeping the ditonic norm imposed by their predecessor(s),⁶⁹ integrated new and old divisions based on string-length equal-divisions, or recalling non-ditonic ratios used by these predecessors.⁷⁰

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

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

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]).

⁶³ Or to the extent of this practice.

⁶⁴ Reviewed further.

⁶⁵ Knowing that the translation of Ancient Greek sources was an ongoing process in the time of Kindi, 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.

⁶⁶ See footnote no. 57:120 above.

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 Kindi 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 *Risāla fi-l-Luḥūn wa-n-Nagham*, intended as a manual for the son of the Caliph (see further), Kindi had to resolve the obvious discrepancies between (Greek) theory and (Arabian) praxis, which he did by signaling approximate positions for Zalzalīan (Arabian) notes between the notes of the Canonical (ditonic, Pythagorean) division – as is explained further.

⁶⁸ Although Ṣafīyy-a-d-Dīn al-Urmawī used a refined Pythagorean adaptation of zalzalism in his *Early Book of Cycles* [Urmawī (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 *Risāla a-sh-Sharafiyya* [Urmawī (d. 1294) and [Jurjāni (al-), 1938].

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 Kindi and his group of translators?).

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

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 Kindi’s writings and neglects comparisons with praxis with (al-) Fārābī and others, a steady attitude with re-orientalizing musicologists of the *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) –⁷² 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 ruffians and prostitutes of both sexes scattered in such disparate regions as the Arabian Rab‘ al-Khālī, 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,⁷³ while the main question can still not be answered definitely as sources on the subject are unavailable, or maybe never existed.⁷⁴

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.⁷⁵ 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 Kindī and extending to the late Systematists.

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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 Kindī’s time, the large-scale translation of Ancient Greek texts was still in its infancy.⁷⁶ 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 ‘ūd,⁷⁷ mostly limited for each string to its first acoustical characteristic interval, the fourth.⁷⁸ While music was assimilated by these philosophers to a theoretical science,⁷⁹ and whenever the ‘ūd was the main (and very versatile) instrument for performance, it

⁷² This has been determined for Arabian music in [Beyhom, 2010b], beginning with the first Arabian Philosopher (and theoretician), (al-) Kindī, 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 *tunbūr Baḡhdādī* – see [Beyhom, 2010b, v. 1, p. 311, 320]) – which are not conclusive.

⁷⁵ Sources are scarce or unavailable for the period before Kindī, 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 musics 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 Caliphate in Baghdad and, by extension and impregnation, in other population segments and other regions of the Arabian empire. {Richard Dumbrell 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

Kindī 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 Kindī. 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 Aṣḡahānī – a music chronicler who gives no indications about the composition of the Arabian scale – and to Iṣḥāq al-Mawṣilī – 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].)

⁷⁷ A review of the main divisions of the fingerboard of the ‘ūd is proposed in [Beyhom, 2016, p. 79–80], in the section entitled “The ‘ūd as the ‘Monochord’ of the Arabs”.

⁷⁸ 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.)

⁷⁹ And “singing” (*ghinā’*) being ascribed to music practice – see for example [Farmer, 2011].

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 Plato⁸⁰ – 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.

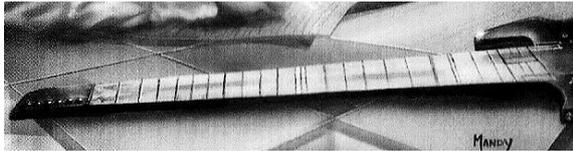


Fig. 6 An artist's view of a futuristic guitar.⁸¹

* * *

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 Ishāq ibn a-ṣ-Ṣabbāh ibn Ismā‘īl ibn al-Ash‘ath ibn Qays al-Kindī, whose father Ishāq was the Governor of Kūfā⁸³ under the reign of Abbasid Caliphs al-Mahdī (775-785) and a-r-Rashīd

⁸⁰ And probably Ptolemaeos – See footnote 89:124.

⁸¹ From the cover of [Sterling and Bear, 1996].

⁸² The dates of birth and death of Kindī are taken from [Guettat, 2004, p. 116]; these dates are controversial, as Farmer gives for example other dates (see fn. 84 below), [Ehwany (EL-), 1966, p. 421] approximates them as (c. 185/801-c. 260/873) and Yūsuf, in [Kindī (al-), 1962a, p. 6], advocates for the approximate (801-866) as with the *Encyclopaedia of Islam* (see https://referenceworks.brillonline.com/entries/encyclopaedia-of-islam-2/al-kindī-SIM_4380?s.num=0&s.f.s2_parent=s.f.book.encyclopaedia-of-islam-2&s.q=al+kindī). [Adamson, 2011] (in the *Stanford Encyclopedia of Philosophy*) states: “We know that al-Kindī died after 866 CE, and his death date is usually placed in the early 870s. His birth date is harder to pin down, but he is said to have served as a scholar under caliph al-Ma‘mūn, whose reign ended in 833, and he was certainly associated with the court of the next caliph, al-Mu‘taṣim (reigned 833–842). He is thus usually reckoned to have been born around 800 CE”. {See also [Qiftī (Ibn al-), Müller, and Lippert, 1903, p. 366–378].} The *Fihrist* of (ibn a-n-) Nadīm [s.d., p. 315] confirms the surname and mentions 7 writings on music by this philosopher. {About the importance of (ibn a-n-) Nadīm and his *Fihrist* see [Neubauer, 2001a; Stewart, 2007].}

⁸³ Which is the probable birthplace of Kindī.

⁸⁴ [Ehwany (EL-), 1966, p. 421] and [Wright, 2001c]. For [Farmer, 1929, p. 127], Kindī would be born in “al-Bāṣra” (Basra – Iraq) c. 790 and died in 874. Yūsuf, in [Kindī (al-), 1962b, p. 7], mentions

(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‘mūn⁸⁶ and of al-Mu‘taṣim⁸⁷, then fell in disgrace in 848⁸⁸. 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‘lim*) 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 Aristotle 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 Muḥammad ibn Mūsā al-Khawārizmī (محمد بن موسى الخوارزمي c. 780 – c. 850). The latter, whose name was Latinized as *Algoritmi* – 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, [Siddiqi, 1966] – a domain which, however and according to [Colebrooke, 1817, p. lxxix–lxxx] 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 Arabian musics at that time (and after), and cross-influence.}

⁸⁵ See also the re-evaluation of Kindī’s connection with the Mutazilites (adepts of a school of Islamic theology) in [Ivry, 1976], but also [Walzer, 1957, p. 15 sq.].

⁸⁶ Abbasid Caliph (813-833).

⁸⁷ Abbasid Caliph (833-842).

⁸⁸ Under the reign of al-Mutawakkil (847-861) because of a conspiracy due to the jealousy of two of the Banū Mūsā, the brothers Aḥmad and Muḥammad – according to [Ehwany (EL-), 1966, p. 422] citing (ibn abī) Uṣaybi‘a (*Ṭabaqāt al-Aṭibbā’*; Cairo, Vol. 1, p. 207 – in fact *Uyūn al-Anbā’ fī Ṭabaqāt al-Aṭibbā’*, with numerous editions of which [Uṣaybi‘a (ibn abī), 1882]). (For Muḥammad ibn Mūsā, see [Hassaan, 2004].)

Peripatetics. Most probably al-Kindi 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’.⁸⁹

It is to be noted, most interestingly, that Kindi was also a translator and a propagator of Ancient Greek writings from Syriac (and perhaps from Ancient Greek) language(s).⁹⁰ Furthermore, he was a theoretician of music and possibly a(n amateur) musician.⁹¹

Most importantly for us, he wrote a few epistles on music – of which four are extant –⁹² 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 Kindi 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),⁹³

- clearly and explicitly described the tuning of the strings of the ‘ūd in successive fourths,⁹⁴
- mentioned some points regarding music practice,⁹⁵
- explained what where the ties used on the neck of the ‘ūd,⁹⁶
- gave a (nearly) complete organological description of the latter instrument, including a detailed description of the material and precise proportions for the strings,⁹⁷
- introduced the fifth (theoretical) string of the ‘ūd,⁹⁸
- considered a sixth hypothetical string while explaining the acoustical and organological reasons conflicting with this addition,⁹⁹
- 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.¹⁰⁰

⁸⁹ [Ehwany (El-), 1966, p. 424].

⁹⁰ [Ehwany (El-), 1966, p. 421].

⁹¹ [Ehwany (El-), 1966, p. 421] mentions an anecdote in (al-) Qifī’s “*Tārīkh [sic] al-Ḥukamā*”, Cairo edition, p. 241”, (the corresponding – and correct – citation would be *Tārīkh al-Ḥukamā* [Qifī (Ibn al-), Müller, and Lippert, 1903, p. 376–377]) relating the healing, by Kindi and through music, of a paralyzed boy. A-t-Tifāshī – a 12th-13th-Centuries author who wrote on music – describes, in the *Faṣl al-khiṭāb fi madārīk al-ḥawāss al-khams li-uli al-albāb* (Manuscript 118-06 Ennajma Ezzahra – Chapter 6; a printed edition [Tifāshī, 2019] is also – recently – available) the hypothetical use by Kindi 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 Khashaba in Egypt [Kātib (al-), 1975, p. 23] – Terpander and Arion becoming “Therpidoros” (?) and “Odeon”, while Lesbos and

Antissa (which Shiloah corrected from “Anusa” or “Anisa” – pleading for Terpander to be born in the previous) become “Laris” (to understand as “Larissa”?) and “Anusa” (possibly “Anisa” – today on the site of Kültepe in Turkey). (I couldn’t get a hold on the original manuscript – copy? – of Kātib’s *Kamāl Adab al-Ghinā* which is supposed to be in Dār al-Kutub in Cairo.) Finally, note in [Kātib, 1973, p. 112] – which is Zakariyyā Yūsuf’s edition – Therpidros” (?) and “Arton” in “Laris” 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.

⁹⁴ Notably in the *Risāla fi-l-Luḥūn wa-n-Naḡham* [Kindi (al-), 1965] examined *infra*.

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 *zīr*” or “lower *zīr*”.

⁹⁹ *cf. infra* the *Risāla fi-l-Luḥūn wa-n-Naḡham*.

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 Kindi’s

To conclude on Munajjim’s “precedence” in Arabian music theory: while Munajjim is presented as “revealing” the theory of Ishāq al-Mawṣilī (767-850)¹⁰¹ and considered to be the First Arabian theoretician of music, this persistent “mistreating” of Kindī the Philosopher¹⁰² (which Munajjim was not)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, chronologically¹⁰⁴ and followed by the name of their dedicatees:

1. *Kitāb al-Muṣawwītāt al-Watariyya min dhāt al-Watar al-Wāḥid ilā dhāt al-‘Ashr[at] Awtār*: to Caliph al-Mu‘taṣim (833-842).¹⁰⁵
2. *Risāla fī l-Luḥūn wa-n-Nagham*: to Aḥmad ibn al-Mu‘taṣim (son of al-Mu‘taṣim).¹⁰⁶
3. *Risāla fī Ajzā’ Khubariyya fī l-Mūsīqā*: as above.¹⁰⁷
4. *Risāla fī Khubr [knowledge] Šinā‘at a-t-Ta’lif*: dedicated to one of Kindī’s late students.¹⁰⁸

Out of these, two, the *Kitāb al-Muṣawwītāt* ... and the *Risāla fī Ajzā’ Khubariyya fī l-Mūsīqā* do not relate directly to the scale of Arabian music. The two other epistles, the *Risāla fī Khubr Šinā‘at a-t-Ta’lif* and the *Risāla fī l-Luḥūn wa-n-Nagham*, are analyzed below.

master epistle, the *Risāla fī l-Luḥūn wa-n-Nagham*, was known in Europe from an incomplete copy only, until the discovery by Zakariyyā Yūsuf of a complete copy in India.

¹⁰¹ Ishāq al-Mawṣilī 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 (*naḍīm*) under every caliph from Hārūn al-Rashīd (786–809) to al-Mutawakkil (847–61). As an upholder of the classical Arab music style, he stood in opposition to the innovator Ibrāhīm ibn al-Mahdī and his followers”. See also the *New Grove* [Wright, Poché, and Shiloah, 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-Mawṣilī’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’ (*thaqīl*) and ‘light’ (*khafīf*) 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-Mawṣilī’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 *Tārīkh-e musīqi-e iran*, vol I. 1994, p. 119-121), Ibrāhīm al-Mawṣilī [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 Javānīyeh, a zoroastrian originating from Abū ‘Alī [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 *wustā*” (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 Shiloah, 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 Shawqī in [Kindī (al-) and Shawqī, 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 Shawqī 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 fī Khubr Ta’lif al-Alḥān*.

THE *RISĀLA FĪ KHUBR ŠINĀ‘AT A-T-TA’LĪF*¹⁰⁹

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 [*ta’lif*], 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 *ūd* is also incomplete. However, it allows for the reproduction of the possible division(s) as shown in Fig. 8:127.¹¹¹

Evidently, different commentators propose different choices among the partitions shown on Fig. 8, where each may be disputable,¹¹² 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).



Fig. 7 First page of the *Risāla fī Khubr Šinā‘at a-t-Ta’lif* by Kindī (as shown in the compendium [Kindī (al-), 1962a, p. 46]. The image is treated for clarity.

While Kindī’s and Munajjim’s divisions of the fingerboard of the *ūd* mostly lack precision, connoisseurs of Arabian music may legitimately wonder about the absence of Zalzalism in these descriptions.

In opposition to these rare descriptions,¹¹³ numerous (later) accounts of praxis exist, notably with chroniclers such as Mas‘ūdī and Aṣfahānī, whose narrations remain, however, mostly anecdotal, or are limited to descriptions of the progress of the performance, or of its socio-logical dimension.¹¹⁴

¹⁰⁹ 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.

¹¹⁰ 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 mu’tamadā*].

¹¹¹ I do not give here details of the multiple, sometimes contradicting interpretations of this division which are explained in [Beyhom, 2010b].

¹¹² Because the choice of some positions and not others will remain arbitrary as long as another, complete copy, is not discovered (if ever).

¹¹³ Very few other theoretical descriptions are extant, for example from Khawārizmī, the Ikhwān a-ṣ-Ṣafā’, Naṣīr a-d-Dīn a-t-Ṭūsī, 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.

¹¹⁴ Note that Aṣfahānī mentions rhythms, and “modes” (*aṣwāt* – sing. *ṣawt*) which correspond to “courses” (as with Munajjim – See

Knowing that later authors such as Fārābī and Sīnā,¹¹⁵ who wrote voluminous books (or book chapters) on this subject and who had a more respectful attitude towards the “people of the Art” (*Ahl a-ṣ-Ṣinā’a* in Arabic), included explicit Zalzalism in their theoretical description, one cannot help but wonder at the fact that, as Wright wrote:

“Al-Munajjim’s¹¹⁶ 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 Is[h]āq al-Maw[š]ili¹¹⁷ himself, and named after him (*wuṣṭā zalzal*)”.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-Nagham* by Kindī which I examine below.

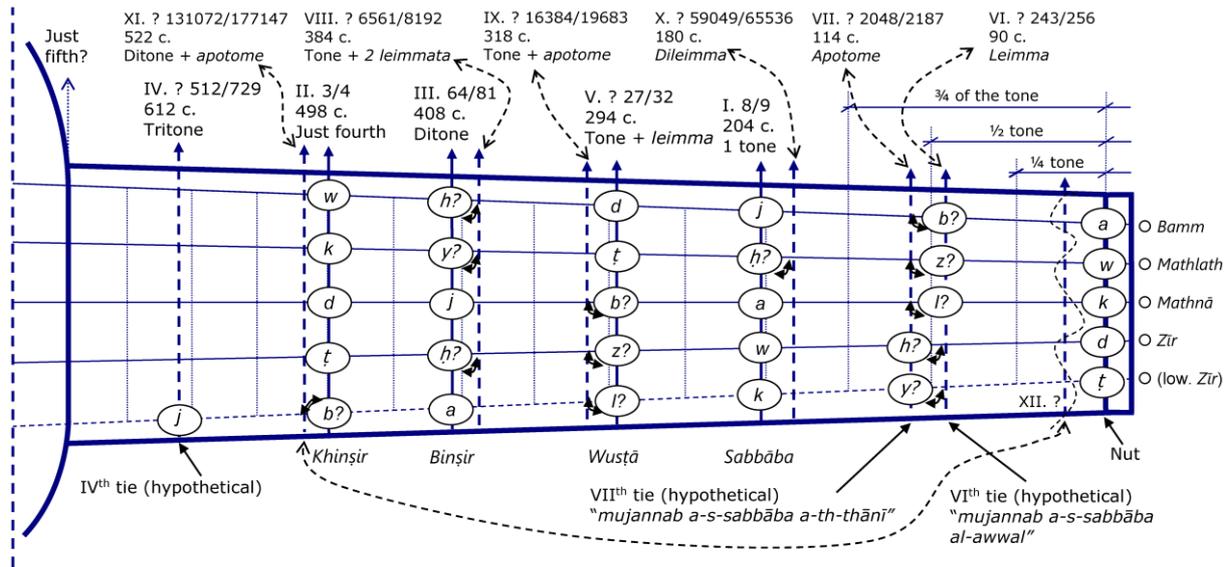


Fig. 8 Division of the (stylized) fingerboard of the ‘ūd in the *Risāla fī Khubr Ṣinā’at a-t-Ta’lif* by Kindī. The “ligatures” (positions of the *dasātīn* – “ties” in the figure) are mostly hypothetical due to the missing information in the epistle, but they are all possible. Positions are identified within the octave by the first 12 *abjad* (Syriac alphabet) letters *a b j d h w z ḥ t y k l*. Kindī mentions a series of correspondences between octaves, fifths and (whole) tones, which explains the presence of numerous alternatives between *leimma* and *apotome* in the division. As a reminder: in the ‘ūd with 4 (ranks of) strings, the string which is lowest acoustically (and placed above on the figure for the instrument performed by a right-hand musician) is called the *bamm*, then consecutively (and respectively higher acoustically, while placed lower on the figure) the *mathlath*, the *mathnā* and the *zīr*. The fifth string (*ḥād* or “low. *zīr*” in the figure) is theoretical. “Ligatures” (vertical markers, “ties” in the figure) are generally attributed positions corresponding to the four fingers (excluding the thumb), beginning with the nut (*a*), then evidently the *sabbāba* (*b* – index), the *wuṣṭā* (*j* – middle finger), the *biṣīr* (*d* – annular) and the *khīṣīr* (*h* – auricular). Notes are thus identified by the string name and by the finger name. This is only practical when the division is limited to four ligatures (vertical markers): in more complex cases (such as with Fārābī – see « Impracticality of the performance with dense division » in Appendix B – Also see Fārābī’s division in FHT 17 in [Beyhom, 2016, p. 188] and, at the end of Part II, FHT 28:181 sq. – For “Figure Hors Texte” or “Plate” 28, p. 181), terms such as “the [first, second] neighbor” (which he named *mujannab* – pl. *mujannabāt*) of the *sabbāba* [or of the *wuṣṭā*]” are used to indicate the position of the vertical marker, although the *wuṣṭā*(s) can be differentiated as “Persian *wuṣṭā*”, “Arabian *wuṣṭā*”, etc.

Appendix C). He also frequently mentions the *wuṣṭā Zalzal*, the so-called “3rd fret” in the quote from Wright below in the text.

¹¹⁵ Which belong to the second period, the “Golden Age”.

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,¹¹⁹ 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,¹²⁰ it becomes difficult to bring their “findings” to the test...

THE RISĀLA FĪ-L-LUḤŪN WA-N-NAGHAM BY KINDĪ

The contents of the epistle (*Risāla*) *fī-l-Luḥūn wa-n-Nagham* are described in details in Appendix A.3 of my (first) book on Arabian music.¹²¹ 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 fī Khubr Šināʿat a-t-Taʿlīf* 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 description¹²² of actual “tie-frets” on the neck of the *ūd*, with precise and detailed explanations about their mounting and proportions.

Note that Kindi mentions three different tunings for the strings, the first (and most used) being successive just fourths,¹²³ while the two other tunings are variations with different resulting notes for the (unstopped) lower (acoustically) string (the *bamm*)¹²⁴ in order to underline particular tonic notes¹²⁵.

“Harmonic” and Pythagorean divisions

As mentioned in Appendix A, in this epistle Kindi provides the dimensions of the *ūd* in “full fingers”¹²⁶ (“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)¹²⁷ 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”.¹²⁸

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”¹²⁹. While this is an indication of Kindi’s practical concerns, tying the “frets” firmly is, however, premature, as further equivalences

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 a-ṭ-Ṭaḥḥān’s description explained below.

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

¹²⁴ [Kindi (al-), 1965, p. 17–18]. In today’s practice, and depending on which mode is used, the *bamm* 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 (“أصابع ممتلئة حسنة اللحم”): “full fingers with good flesh”.

¹²⁷ [Kindi (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 ($[30 \text{ ff}]/9 = 3,3333... \text{ ff}$), the eighth ($[30 \text{ ff}]/8 = 3,75 \text{ ff}$) and the seventh ($[30 \text{ ff}]/7 = 4,2857... \text{ ff}$), while the sixth (5 ff – position of the *wuṣṭā*), the fifth (6 ff – position *biṣīr*), the fourth (7½ ff – position of the *khīṣīr*), 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 [Kindi (al-), 1965, p. 13]).

¹²⁹ [Kindi (al-), 1965, p. 12].

between octaves and fifths mentioned by the author compel to reconsider this initial division.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)¹³¹ equivalent to the division expounded in the *Risāla fī Khubr Šinā‘at a-t-Ta‘līf* 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.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.

Additional notes used by singers

At some point in his epistle after the description of the division of the fingerboard of the ‘ūd, Kindī adds

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

¹³¹ The division in the *Risāla fī Khubr Šinā‘at a-t-Ta‘līf* can be interpreted in multiple ways as explained in Part A.

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.

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.

some explanations about praxis, with regard notably the accompaniment of singers, and provides in the last part an exercise in form of tablature.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 [*dastān*] 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 *sabbāba* [index] to the ligature of the *wustā* [middle finger] or of the *binṣir* [annular]”.¹³⁴

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

1st 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 [*dastān*] of the *khinṣir* by extending the auricular [*khinṣir*]”.¹³⁵

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

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 *mūsīqā* [“music”], the criteria differentiating praxis (“singing”) and theory (“composition on the instrument”) being in this epistle clearly stated.

¹³⁵ Excerpt from the previous quote from Kindī.

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 *Risāla fī-l-Luḥūn wa-n-Naghām* 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 would

does he give its precise position – it should reasonably be situated somewhere between the just fourth (*khinšir*) 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 *wuṣṭā* or of the *binšir* (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 position these additional notes *outside of the fretted zone, after the khinšir* (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 *khinšir* – except that they move the *sabbāba* [index] to the tie-fret of the *wuṣṭā* [middle finger] or of the *binšir* [annular]”.

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 *ūd*.

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 *ūd* technique as it has been for centuries for the European lute. Note also in [Sinā (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 Sinā 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 *khinšir*. With the thumb holding the instrument, the four [other] fingers could move within this fourth [of the string]”. See for example [Spencer, 1975,

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 *khinšir*,
3. with this distance being measured
 - from the *wuṣṭā*,
 - or from the *binšir*.

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 *khinšir*, 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 *wuṣṭā*), or on the *sabbāba* (if the initial starting point is the *binšir* – 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.

p. 352], where images 2 and 4 show the left hand position described by (ibn) Sinā, while images 1 and 3 show the left hand in shift position. Ligatures *a* and *b* are reached by moving the *sabbāba* (the – index – finger) towards the position of the *wuṣṭā* or of the *binšir* (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 *wuṣṭā* 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.

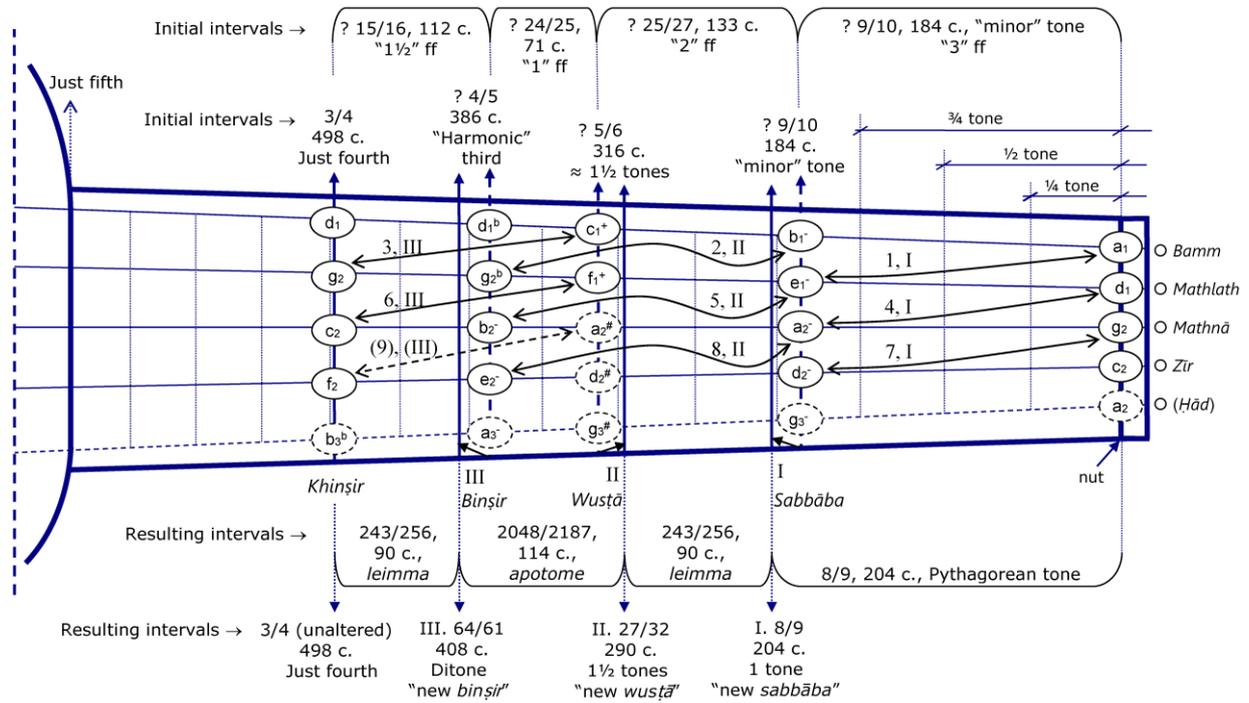


Fig. 11 Correspondences of fifths in the *Risāla fi-l-Luḥūn wa-n-Naḡham* by Kindī – as above.

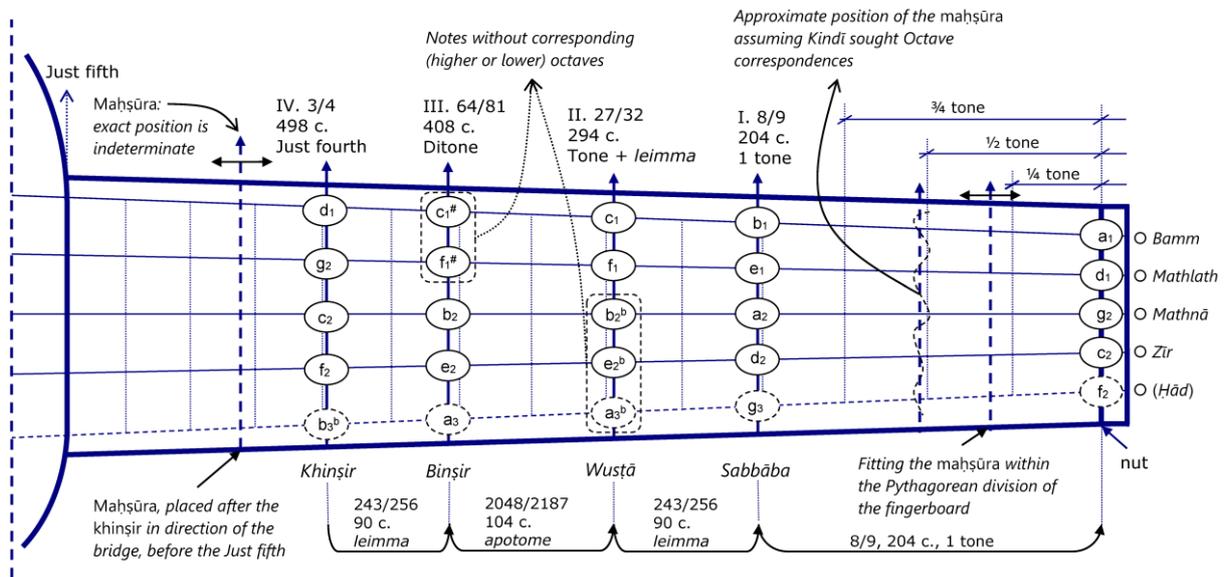


Fig. 12 Estimated inclusion of the *maḡşūra* on the fingerboard, and its placement within the Pythagorean division of the fingerboard of the *‘ūd* in Kindī’s *Risāla fi-l-Luḥūn wa-n-Naḡham*.¹⁴¹

Let’s call the distance between *sabbāba* and *khinşir* L_{s-kh} . It is equal to the fourth of the (total) speaking length of the string (from the nut to the *khinşir* – 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:

$$L_{s-kh} = L_0(1/4 - 1/9) = L_0(9-4)/36 = 5L_0/36$$

(with L_{s-kh} = distance, or string part, between *sabbāba* and *khinşir*, and L_0 = distance between nut and bridge, meaning the total speaking length of the string).

¹⁴¹ The *maḡşūra* is reached by extending the auricular finger towards the bridge.

This distance L_{s-kh} is to be measured towards the bridge from the *wuṣṭā* and the *binṣir* (Fig. 14:134). If we measure it from the *wuṣṭā*, the distance L_{s-kh} should be subtracted from the length of the string between the *wuṣṭā* and the bridge to calculate the resulting distance (let us name it L_{c-a}) from the bridge to the new tie (from this point on ligature “a”). While the distance between *wuṣṭā* and bridge is equal to the corresponding interval ratio multiplied by the string length ($27L_0/32$ – See figure), we can calculate

$$\begin{aligned} L_{c-a} &= L_0(27/32-5/36) \\ &= L_0[(27 \times 36) - (5 \times 32)] / (32 \times 36) \\ &= L_0[(972-160)/1152] \\ &= L_0(812/1152) \end{aligned}$$

or, by reduction,

$$L_{c-a} = 203L_0/288 \approx 0,7049L_0.$$

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 *binṣir* (Fig. 15:135), the same distance d must be subtracted from the string length between the *binṣir* and the bridge in order to find the resulting distance, (which we name $L_{c,b}$) between the bridge and the (second) new tie (“b”), the result of which, with calculations similar to the ones performed for ligature b ,¹⁴² is an interval with a value ≈ 743 cents,¹⁴³ 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 *khinṣir* 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 Kindī describes is in fact more

¹⁴² The distance between the *binṣir* and the bridge being equal to $64L_0/81$ (see Fig. 14), we can calculate $L_{c,b} = L_0(64/81 - 5/36) = L_0[(64 \times 36) - (5 \times 81)] / (81 \times 36) = L_0[(2304 - 405)/2916] = L_0(1899/2916)$ or $L_{c,b} = 211L_0/324 \approx 0,6512L_0$. 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,

complex than the “neat [Pythagorean] 2 x 4 scheme”¹⁴⁴ 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 *maqām* music.

The resulting “Harmonic” division of Kindī (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 *khinṣir* and ligature a , or – after fitting it within the Harmonic division – by the nut and ligature a' .¹⁴⁵

Remains the most important question: was the Early ‘ūd effectively fretted?

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

*
* *

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 *wuṣṭā* and the *binṣir*, which would complement the division of the fingerboard.

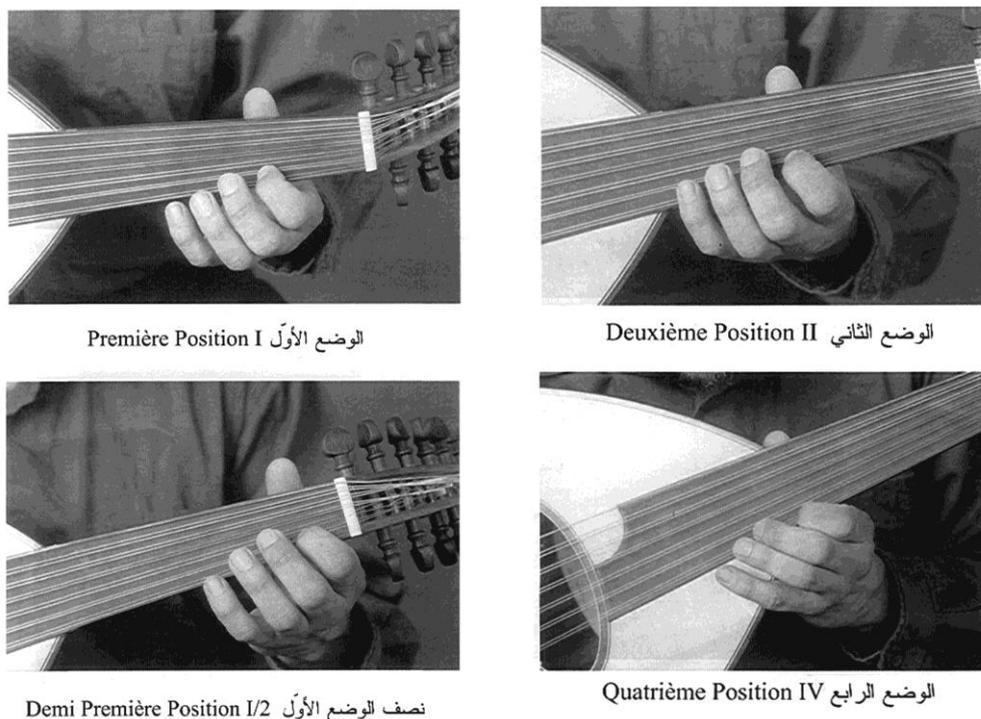


Fig. 13 Positioning of the left hand on contemporary ‘ūd(s) as shown in the opening pages of [Rūhānā and روحنا, 2001]. From top left to right then bottom left to bottom right: 1st position, 2nd position, 1st “half” position and 4th position. The two positions to the left are for traditional performance. The two positions to the right correspond to hand-shifts.

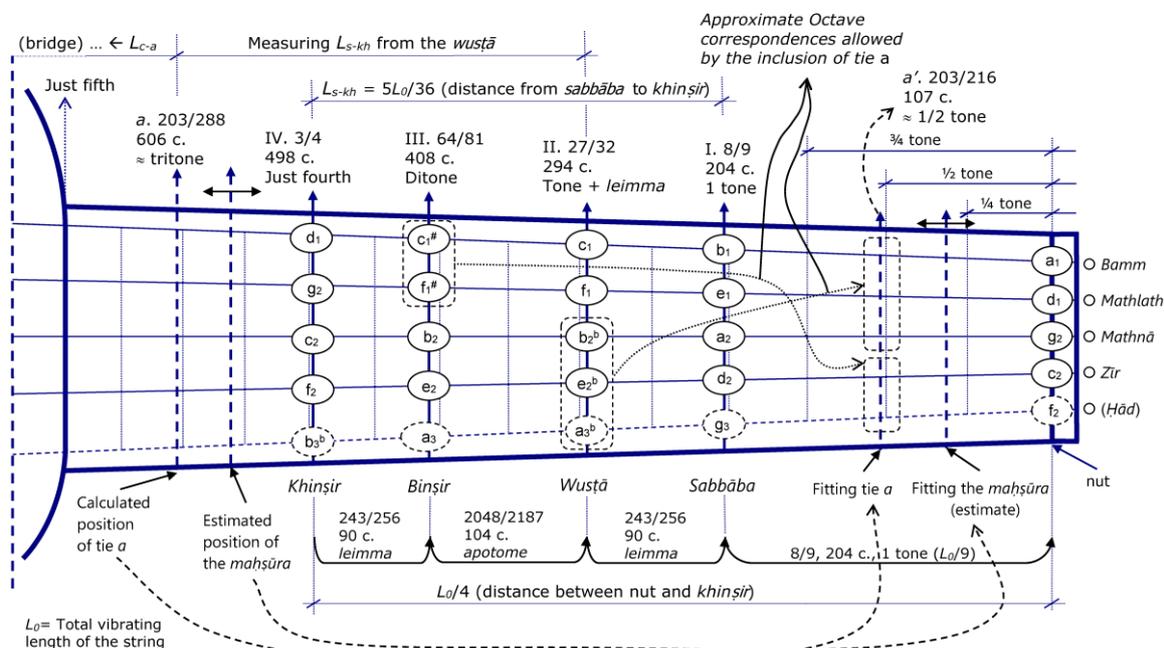


Fig. 14 Calculating the position of ligature *a* and including (then fitting) it in Kindī’s Pythagorean division in the *Risāla fi-l-Luḥūn wa-n-Naḡham*.¹⁴⁶ (“Tie” in the figure = “ligature”).

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 $L_{c-a} = 203L_0/288$ (by subtracting a fourth from the interval delineated by ligature *a*): it suffices then to multiply $203L_0/288$ by $4/3$ (being $812L_0/864$), and to simplify the result by dividing both numerator and denominator by 4, which gives $203L_0/216$.

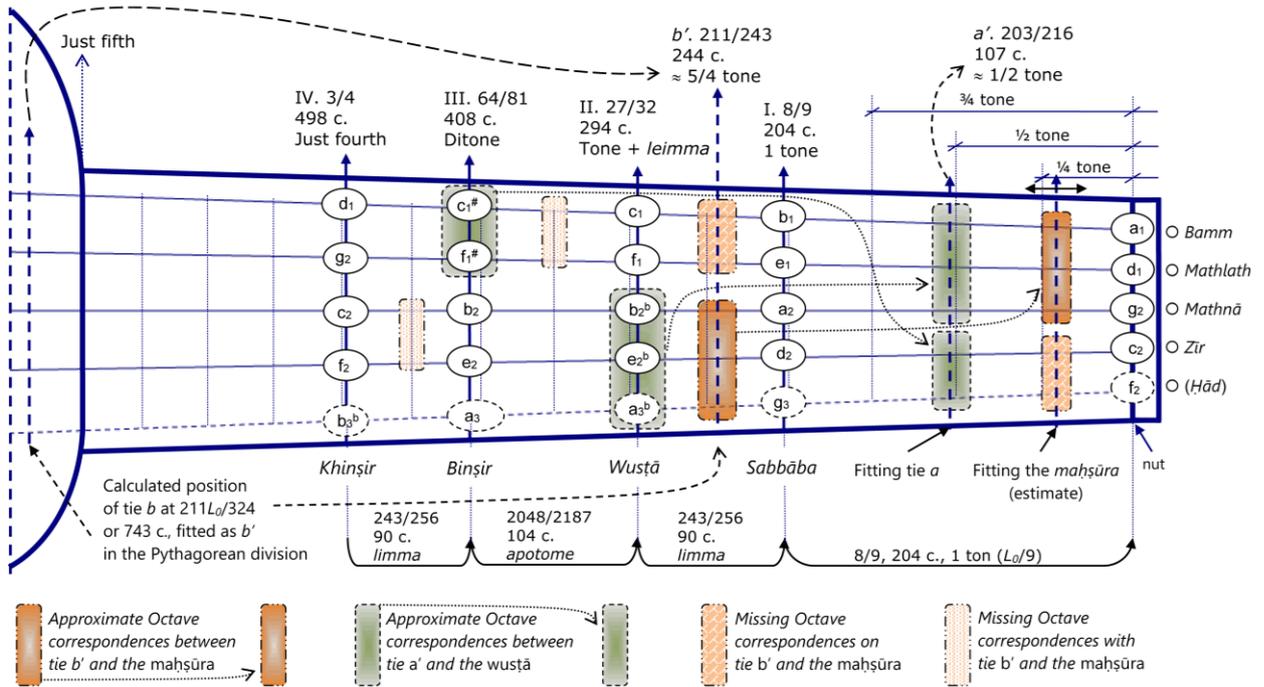


Fig. 15 Positioning ligature *b* with inclusion of the three new “tie-frets” (*a'*, *b'* and *maḥşūra*) within the Pythagorean division of Kindī in the *Risāla fī-l-Luḥūn wa-n-Naḡham*. (“Tie” in the figure = “ligature”).

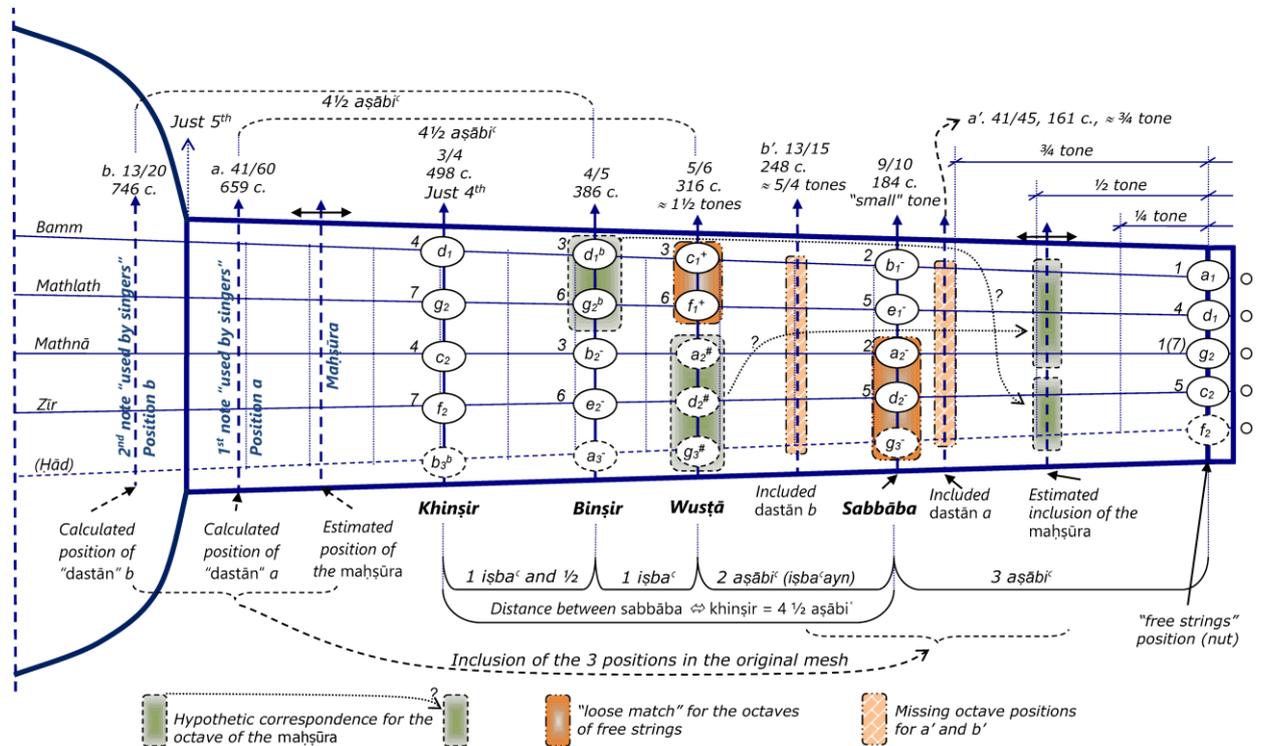


Fig. 16 “Harmonic” division of the fingerboard of the ‘ūd with Kindī’s indications on the “supplementary notes”, an alternative (based on praxis) division described by Kindī and totally overlooked by Orientalist (and re-Orientalist) musicologists – *iṣba‘* (pl. *aṣābī‘*, dual *iṣba‘ayn*) means “finger(s)”, 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.

* * *

Part II is divided in two main sections:

- A. A review of different opinions about the “fretting” thesis
- B. A historical clarification, and conclusions

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.

¹⁴⁹ More precisely not before the publishing of my book [Beyhom, 2010b] (preceded by [Beyhom and Makhlouf, 2009]) in which this question was comprehensively examined and in which I concluded that (tie-)frets were not used unless for teaching or for theoretical purposes. To this day, I have not read, or heard of, a refutation of my demonstration.

¹⁵⁰ Manik uses the term *Lautenbinde* (“Lute-frets”) in German – see also the original text in Appendix D.

¹⁵¹ Once again: whose “Middle Ages”, and is such a time period pertinent even for Western History?

¹⁵² Manik cites here [Berner, 1937, p. 19].

¹⁵³ Manik cites here likewise K. Geiringer’s “Vorgeschichte und Geschichte der europäischen Laute bis zum Beginn der Neuzeit”, *ZMw*, x (1927–28), p. 570 (which I could not find).

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-frets¹⁵⁰ of the ‘*ūd*, which theoreticians of the Middle Ages¹⁵¹ 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’s¹⁵⁷ and settles for the authority of these authors to conclude that “frets” were indeed mounted on ‘*ūd*(s) during the Golden Age¹⁵⁸ (the Western Middle Ages according to Manik).

¹⁵⁴ [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 *dāsātīn* [*sic* – ‘*dasātīn*’], plural of Persian *dast* or ‘hand’, 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”.

¹⁵⁵ Such arguments are totally acceptable *per se*, but the proof of the contrary was not provided either, as I explain further.

¹⁵⁶ [Farmer, 1937, p. 458].

¹⁵⁷ 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).

¹⁵⁸ 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 ‘ūd 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,¹⁵⁹ this interpretation resurfaces regularly in the musicological literature¹⁶⁰ 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 ‘ūd *qadīm* or classical lute of four strings still continued to be favored,¹⁶¹ in spite of the introduction of the ‘ūd *kāmīl* or perfect lute of five strings, which was fretted according to the ‘systematist’ scale”.¹⁶²

In his book, as in the *Encyclopedia of Islam* to which he contributed, Farmer considered the fretting of early – and less early – ‘ūd(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.

*
* *

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 Raasted’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 ‘ūd(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

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 Arabs, supports the thesis of the “fretting” of the ‘ūd at that time, referring in so doing to Farmer. Returning to Farmer’s article,¹⁶³ 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’s¹⁶⁴ opinion about the absence of frets on the early ‘ūd(s), and asked Farmer if proofs of such fretting(s) existed.¹⁶⁵ 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 (‘ūd) 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”.¹⁶⁶

Having stressed, at the end of his introduction, his own intention to prove the existence of frets,¹⁶⁷ and having explained the issue and his own agenda, Farmer

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

starts¹⁶⁸ by analyzing the term *dastān* used in the treatises for the “tie-frets”. He first quotes (al-) Khawārizmī¹⁶⁹ in his *Mafāṭīḥ al-ʿUlūm*.¹⁷⁰

Quote 1: “*dasātīn*¹⁷¹ are the tied places (*ribāṭāt*) upon which the fingers are placed”.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”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,¹⁷⁴ we find that there is no single reference by Khawārizmī to the material from which the *dasātīn* (“ligatures”?) were made, and that the page cited¹⁷⁵ by Farmer contains only the description of the tuning of the *ʿūd* and the positions of the *dasātīn*.

intervals on the *ʿūd* 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 *ʿūd*” in the *Risāla fī-l-Luḥūn wa-n-Naḡham* is explained by Farmer in p. 104 of the aforementioned reference).

¹⁶⁸ [Farmer, 1937, p. 454].

¹⁶⁹ Khawārizmī’s encyclopedia [Khawārizmī (al-), 1895] *Mafāṭīḥ al-ʿUlūm* [*The keys to sciences*] – edited by Van Vloten and which is most probably Farmer’s reference, contains 12 pages [235-246] expounding music, in Chapter VII of Book II. Guettat [Guettat, 2004, p. 115] cites an 1978 edition – I rely here on an edition from Beirut [Khawārizmī (al-), 1991], and on Van Vloten’s for confirmation.

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

¹⁷¹ (Reminder:.) Plural of *dastān*.

¹⁷² [Farmer, 1937, p. 454]. [Khawārizmī (al-), 1991, p. 210] has:

“واحدھا دَسْتَانُ والدَسَاتِينُ هِيَ الرِّبَاطَاتُ الَّتِي تَوْضِعُ الْأَصَابِعُ عَلَيْهَا.”

¹⁷³ This is effectively the first question as the terms “tied places” are a circumvolution for the word “ligature” (in French also “*ligature*”, in German “*Bund*”) which is the correct translation of the Arabic *ribāṭ* (sing. of *ribāṭāt*).

¹⁷⁴ [Khawārizmī (al-), 1991, p. 207–214].

¹⁷⁵ [p. 210] in [Khawārizmī (al-), 1991].

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 *ʿūd* (even less than ties made of gut, as explained in Appendix B).

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

In the second part of his article,¹⁷⁷ Farmer informed the reader that “Frets (*dasātīn*) are frequently mentioned in the *Kitāb al-Aghānī*” by Aṣḡhānī,¹⁷⁸ and further refers to “the Arabic theorists”:

“their treatises **prove conclusively** that the lute (*ʿūd*) as well as the pandore (*tunbūr*) had these frets or *dasātīn* tied around the neck of the instrument”.¹⁷⁹

He also adds that Kindī, speaking of the *dasātīn* of the *ʿūd* in one of his epistles on music,¹⁸⁰ “shows [...] that they must have been frets”.¹⁸¹

We must note here, firstly, that the *tunbūr* and the *ʿūd* are different instruments,¹⁸² this difference lying mainly in the (relative) length¹⁸³ of the neck¹⁸⁴ but also in the playing techniques which, frequently, stem from the fretting, or from the non-fretting of these instruments.¹⁸⁵ Secondly, I have shown elsewhere¹⁸⁶ – and explain further in the following pages – that the *tunbūr*

¹⁷⁷ The remaining section of the first part of the article (§1) consists in a digression by Farmer on the terms *ʿataba* and *dastān* which is not relevant to our discussion (more information on this digression in [Beyhom, 2010b]).

¹⁷⁸ Which, in itself, does not inform us on the material from which these *dasātīn* (Farmer calls them “frets”) were made.

¹⁷⁹ [Farmer, 1937, p. 456]. (Bold type in quotes is mine, unless otherwise stated.)

¹⁸⁰ “British Museum MS. Or. 2361, f^o 165v^o”, see [Kindī (al-), 1962a, p. 51–53].

¹⁸¹ [Farmer, 1937, p. 456].

¹⁸² By equating *ʿūd* and *tunbūr*, and knowing that long-necked lutes are frequently fretted (see next footnotes), Farmer tries to reinforce his thesis for which he has, in fact, no solid arguments as shown further.

¹⁸³ The length is relative to the soundboard: short-necked lutes have (roughly) a neck which is shorter than half of the speaking length of the string, while long-necked lutes have a neck which is longer than half of the speaking length of the string.

¹⁸⁴ The *ʿūd* is short-necked while the *tunbūr* is long-necked.

¹⁸⁵ Long-necked lutes are mostly fretted (with exceptions, notably for some African long-necked lutes – see for example [Charry, 1996, p. 5–6]) while short-necked lutes are not fretted – with one notable exception, the European lute. In the latter case, however, it may be argued that frets (in fact “tie-frets”) were mounted to make the performance easier, notably for polyphonic purposes or to make it easier for non-professionals – for example nobles or high-classes representatives who wished to play easily on the instruments.

¹⁸⁶ See Appendix A.2 in [Beyhom, 2010b] for the descriptions of the *tunbūr* by Fārābī and Kātib.

(here “of Baghdād”) 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^o), 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*¹⁸⁷ of the *anḡhām* (notes) on the fingerboard of the ‘ūd, and mentions three times a *dastān* which coincides with one or another of these locations, while failing to inform us if these *dasātīn*, that he had not previously defined,¹⁸⁸ do exist physically.¹⁸⁹

Farmer continues his argumentation citing Munajjim¹⁹⁰ who explains:

Quote 2: “the place of every note (*naghma*) upon every fret (*dastān*)”,¹⁹¹

then Fārābī who, while describing the ‘ūd, would have written¹⁹²:

Quote 3: “that the *dasātīn* (frets) were tied (*shadda*) on the neck (*mul[s]tadaqq*) of the instrument, and that they were fixed parallel with the bridge-tailpiece”,¹⁹³

which corresponds to the original.¹⁹⁴

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) Mas‘ūdī:

Quote 4: “the *dastān* next to the nut (*anf*) was to be placed (*mawḡūṯ*) on the fingerboard at one-ninth of the vibrating string-length”.¹⁹⁵

Mas‘ūdī, however, wrote in the Arabic version:

Quote 5: “*wa-d-dastabān*¹⁹⁶ *al-ladhī yalī al-anf mawḡūṯ* ‘*alā khaṭṭ a-t-tusūṯ min jumlat al-watar*”,¹⁹⁷

which can be translated as:

Quote 6: “the *dastān* 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-ṣ-Ṣafā’, (ibn) Sinā, (ibn) Zayla¹⁹⁸ and Ṣafīyy-a-d-Dīn al-Urmawī and others,

Quote 7: “**all confirm** the view that *dasātīn* were gut or string frets tied on the neck of the lute”,¹⁹⁹

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-ṣ-Ṣafā’) do mention,²⁰⁰ in their fifth epistle entitled *On Music (Fī-l-Mūsīqā)*, *dasātīn* which would be tied (*tushadd* تُشَدُّ) on the neck of the ‘ūd although they do not mention the

¹⁸⁷ 8 mentions at least of the words *mawḡaṯ* (“location”) or *mawāḡīṯ* (plural of *mawḡaṯ*).

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^o”, 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 *dastān*; note also that Farmer insists heavily on the word “fret” in his quotes. In the original [Munajjim (al-), 1976, p. 189] we find “*mawḡaṯ kull naghma min kull dastān*”:

“[...] موضع كل نغمة من كل دستان [...]”

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]:

“وُشَدَّ عَلَى الْمَكَانِ الْمَسْتَدَقِّ مِنْهَا دَسَاتِينَ تَحْتَ الْأُوتَارِ تَحَدَّدَ أَقْسَامَهَا الَّتِي تُسْمَعُ مِنْهَا النِّغْمَ فَتَقُومُ لَهَا تِلْكَ مَقَامِ حَوَامِلِ الْأُوتَارِ، وَتَجْعَلُ مَوَازِيَةً لِقَاعِدَةِ الْأَلَّةِ، الَّتِي تَسْمَى الْمُنْشَطَ.”

¹⁹⁵ In a footnote (no. 2) on this page, Farmer gives as a reference for this description *Les prairies d’or*, viii, 99, which is flawed because Mas‘ūdī is otherwise not referenced in his article... I could nevertheless find the corresponding Arabic quote which is reproduced below.

¹⁹⁶ Mas‘ūdī uses the word *dastabān* in place of *dastān*. The editor of the Arabic version mentions (cf. fn. 1 in the reference of the next footnote) another version still of this term in one of the manuscripts he consulted for his edition, which is *rasān*.

¹⁹⁷ [Mas‘ūdī, 1987, p. 225]:

“والدستيان الذي يلي الأنف موضوع على خط التسع من جملة الوتر.”

¹⁹⁸ (Ibn) Zayla studied under the supervision of (ibn) Sinā – see more in [Beyhom, 2010b] and [Wright, 2001d].

¹⁹⁹ Still [p. 457].

²⁰⁰ [Ikhwān a-ṣ-Ṣafā’, 1983, v. 1, p. 203–204].

material from which these are made. (Ibn) Sinā does mention,²⁰¹ in the second part²⁰² 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 Ṣafiyy-a-d-Dīn al-Urmawī, and while not knowing²⁰⁷ which of his two treatises was read by Farmer, I read both the *Kitāb al-Adwār* and the *Sharafīyya* looking for the *dasātīn*. At the very beginning of the 2nd chapter of the *Kitāb al-Adwār*, Urmawī 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 *Sharafīyya*, in the fourth discourse (in which the division of the fingerboard of the *ūd* is explained), Urmawī likewise writes:

²⁰¹ In *a-ṣ-Ṣhifā*, an encyclopedic work the 13th chapter of which is dedicated to music and was translated in French by Rodolphe d’Erlanger, cf. [Fārābī (al-) and Sinā (Ibn) or Avicenna (980?-1037), 2001, v. 2, p. 234–235] and Chapter II in [Beyhom, 2010b].

²⁰² Dedicated to musical instruments.

²⁰³ [Sinā (Ibn) or Avicenna (980?-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 (*mashdūda*) at the locations of the notes, such as the *ūd* and the *tumbūr*”:

“منها: ذوات أوتار ودساتين مشدودة على مواضع النغم، لتنتقل الأصابع عليها في اتخاذ النغم، كالعود والطنبور.”

²⁰⁵ [Sinā (Ibn) or Avicenna (980?-1037), 1956, p. 144].

²⁰⁶ In the description of the two authors, the musician must perform a hand shift on the *zīr* (see for example Fig. 15:135) to reach the two notes g_3 and a_3 – these have correspondences on the theoretical string *hād*, but Sinā and Zayla are describing here the praxis – which means that, at least for the a_3 , the location of the “tie-fret” 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 *ūd* have a slender body at the junction with the neck, which is unlikely because Kindī’s and Ṭaḥḥān’s descriptions of the *ūd* (see Appendix A and [Beyhom, 2010b]) do not confirm such a shape.

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 Lādhiqī: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, Urmawī’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

²⁰⁷ Which also applies to Ikhwān a-ṣ-Ṣafāʿ, (ibn) Sinā and (ibn) Zayla but, for these authors, I could find corresponding editions in Arabic; as for Urmawī, here is the reference provided by Farmer: “British Museum MS. Or. 136, f^o 235v^o”.

²⁰⁸ [Urmawī (d. 1294), 1986, p. 93]:

“الدساتين هي علامات توضع على سواعد الآلات ذوات الأوتار على نسب مخصوصة ليُستدل بها على مخارج النغم من أجزاء الوتر.”

²⁰⁹ [Urmawī (d. 1294), 1984, p. 141]:

“والدساتين هي علامات توضع على سواعد الآلات ذوات الأوتار ليستدل بها على مخارج نغم معلومة في أماكن مخصوصة ليستعان بها على التأليف الملائم.”

²¹⁰ See [Wright, 2001e] for more details on this author.

²¹¹ [Shirwānī (al-), 1986, p. 70] (French version available in [Shirwānī (al-) and Lādhiqī (al-), 1939, v. 4, p. 70]):

“فهذه سائر أمكنة الدساتين وهي علامات توضع على سواعد الآلات ذوات الأوتار ليستدل بها على مخارج النغم من أجزاء الوتر.”

²¹² See [Wright, 2001f] for more details on this author.

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

“دساتين في بعض الآلات وهي علامات توضع على سواعد آلات ذوات الأوتار ليستدل بها على مخارج نغم مدار الالحان.”

flawed, his next argument²¹⁴ seems to be more consistent:

Quote 12: “If further proof were necessary one might quote from the *H[ā]wī al-funūn wa salwat al-mahzūn* of Abū-l-Ḥ[usay]n Muḥammad ibn al-Ḥasan, better known as Ibn al-Ṭaḥ[ḥ]ān²¹⁵ (fourteenth century?)²¹⁶, the only copy of which is in the Dār al-kutub at Cairo.²¹⁷ Ibn al-Ṭaḥ[ḥ]ān,²¹⁸ himself a musician, recommends the use of a pair of compasses²¹⁹ 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”.²²⁰

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 ‘ūd.
2. These ligatures are not of common usage, as (ibn a-ṭ-) Ṭaḥḥān does not use them.

²¹⁴ [Farmer, 1937, p. 457]; this description reminds of Kindī’s description in the *Risāla fi-l-Luḥūn wa-n-Naḡham*, reviewed further for the mounting of the *dasātīn*.

²¹⁵ “Ṭaḥḥān” means “miller” (see [Beg, 2000]); see also [Wright, 2001g] about Abū-l-Ḥusayn Muḥammad ibn al-Ḥasan ibn a-ṭ-Ṭaḥḥān al-Mūsīqī, and more about his and Kātib’s books (mentioned in the following quote) in [Wright, 1999, p. 545], notably: “Together with the *kamāl adab al-ghinā’* {by (al-) Kātib, available in French as [Kātib (al-), 1972] and in Arabic as [Kātib (al-), 1973; 1975] – also examined in [Beyhom, 2010b]} Ibn al-Ṭaḥḥān’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 Ṣafī al-Dīn al-Urmawī 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-ṭ-Ṭaḥḥān living in the 14th century, while it is here tempered by a question mark. All of a-r-Rajab (cited in Yūsuf’s edition of Ṭaḥḥān’s *Hāwī al-Funūn wa Salwat al-Mahzūn* [Ṭaḥḥān (ibn a-ṭ- al-Mūsīqī), 1976, p. 2, fn. 5]), Neubauer (in

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 Urmawī and other early authors, we may add two supplementary inferences:

1. Ligatures, whether 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 *tunbūr* and the iconography of the ‘ūd (First and Second Interlude thereafter).

both his edition of the same [Ṭaḥḥān (ibn a-ṭ- al-Mūsīqī), 1990, p. iii] and in his article [Neubauer, 1993, p. 285] and [Wright, 2001g] place Ṭaḥḥān’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 *maqām*, Poché, in the entry ‘ūd of the *New Grove* [Poché, 2001, p. 27], mentions Ṭaḥḥān 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 Ṭaḥḥān’s *Hāwī al-Funūn wa Salwat al-Mahzūn* in Dār al-Kutub at Cairo: (1) Funūn Jamīla 32, and (2) Ṭal’at 84 while the Funūn Jamīla 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 Jamīla 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 [Ṭaḥḥān (ibn a-ṭ- al-Mūsīqī), 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 (*‘ūd*) as well as the pandore (*ṭunbūr*) had these frets or *dasātīn* 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 *‘ūd*, while Fārābī specifies:

“It is possible that an uneven placement of the *dasātīn* 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 *‘ūd*”^{223, 224}

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 *dasātīn* of the ‘Pagan times’²²⁶. They use the part of the fingerboard below *dastān* S-^ʿA and make of it the [new] *sabbāba* [index]. They put the *binšīr* [annular] below it in the direction of J, and follow up with the *khinšīr* [auricular]. They place their *khanāšīr* [pl. of *khinšīr* = auricular] farthest just

above the fourth of the length of the total string. As for the *wasatīyyāt* [pl. of *wustā* = middle finger], they make them between S-^ʿA and the locations of their *banāšīr* [pl. of *binšīr* = annular]. Most of them make the distances between their fingers equal, or close to the distances between the *dasātīn* except for the *sabbāba*, for which they use the last *dastān* of the *Jāhiliyya* which is *dastān* S-^ʿA”²²⁷

Therefore, and according to the greatest theoretician of the Arabian Golden Age, the *‘ūd* and the *ṭunbūr* had *dasātīn* (“ligatures”). However, these *dasātīn* 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 *‘ūd* was the lack of iconographical evidence. Farmer himself acknowledges this fact²²⁹ and mentions “hundreds of illustrations of the lute which reveal no trace of frets”, while reproducing²³⁰, as a contribution to his thesis, an illustration credited to Riḏ[ḏ]ā ‘Abbāsī and dated from the 1630s.

²²¹ Italics in the quote are mine.

²²² See the description of the *dasātīn* 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 Urmawī does not even mention the *ṭunbūr* in his *Risāla a-sh-Sharafīyya* but mentions, in a very concise paragraph [Urmawī

(d. 1294) and [Jurjānī (al-), 1938, v. 3, p. 110] “two-stringed instruments” and refers to his *Kitāb al-Adwār* ([Urmawī (d. 1294), 1984, p. 44–45] or [Urmawī (d. 1294), 1986, p. 229–230]) in which Chapter 7 (in fact a long paragraph) is dedicated to stringed instruments, and where “ligatures” (*dasātīn*) are mentioned but not described. Likewise the “Brethren of Purity” mention [Ikhwān a-Ṣafā’, 1983, v. 1, p. 202] the *ṭunbūr* among a dozen other instruments but restrict themselves, in the following pages, to a description of the *‘ūd* 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.)”.

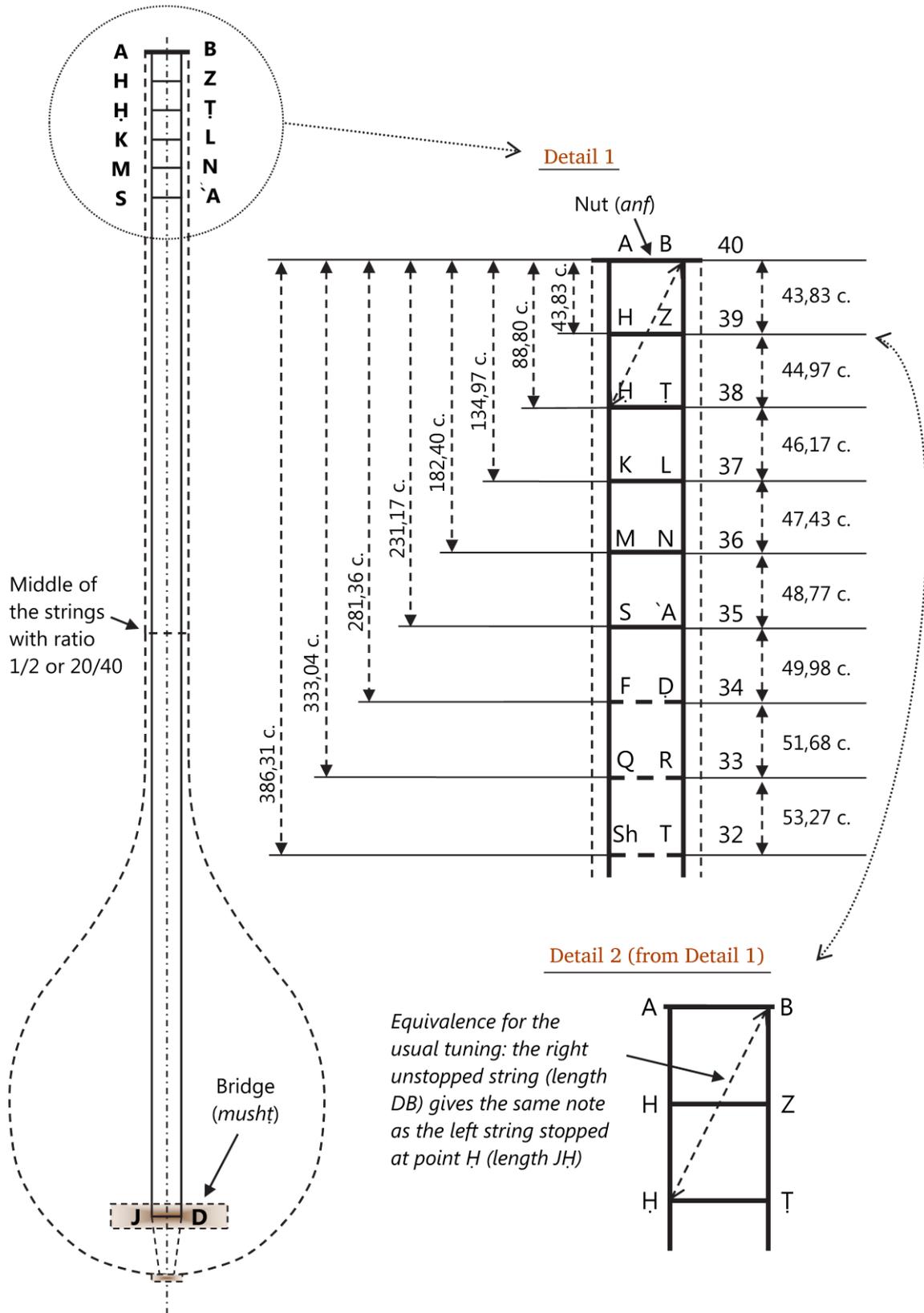


Fig. 17 The system of the *tunbūr of Baghdad* as explained by Fārābī.

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



Fig. 18 “A Lute Player at the Court of Shāh Ṣafī (1629-1642), by Rizā ‘Abbāsī (?)”.²³²

Farmer was, there is no doubt about this, one of the best-placed Orientalists to dissert on the iconography of the *ūd*, 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 Erlanger²³⁴), did not bother to consult Farmer’s aforementioned book²³⁵ 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 fī-l-Luḥūn wa-n-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.

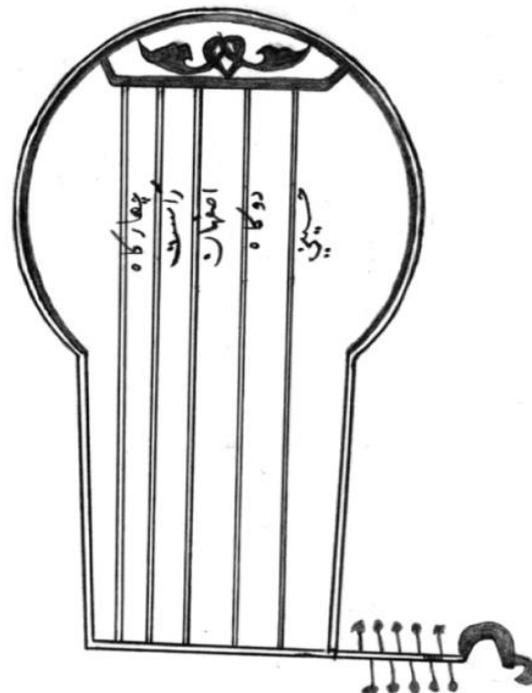


Fig. 19 Sketch of a *ūd* (duplicate from the original) from a Turkish manuscript from the Bibliothèque Nationale de France (BNF).²³⁸

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

²³¹ And, this is no early *ūd*.

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.

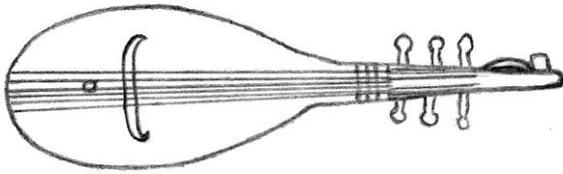


Fig. 20 Lute-type *vīnā* found in representations from Amaravati, Nāgārjunakoṇḍa and Pawaya (India – Gupta period²³⁹),²⁴⁰

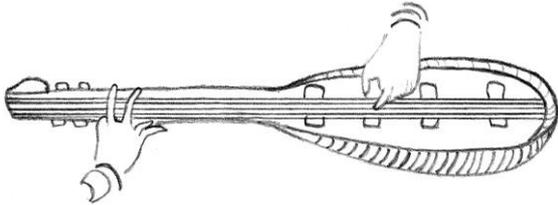


Fig. 21 Lute-type *vīnā* – Pattaḍakkal (India, c 700 CE).²⁴¹



Fig. 22 Lute player and 6-stringed non-fretted *vīd*-type lute, Nāgārjunakoṇḍa. (India, 2nd-3rd centuries, bas-relief.)²⁴²

“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”.²⁴³

* *

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 *vīd*-type lute that I could identify, taken from the booklet of [Zakir Hussain and Brij

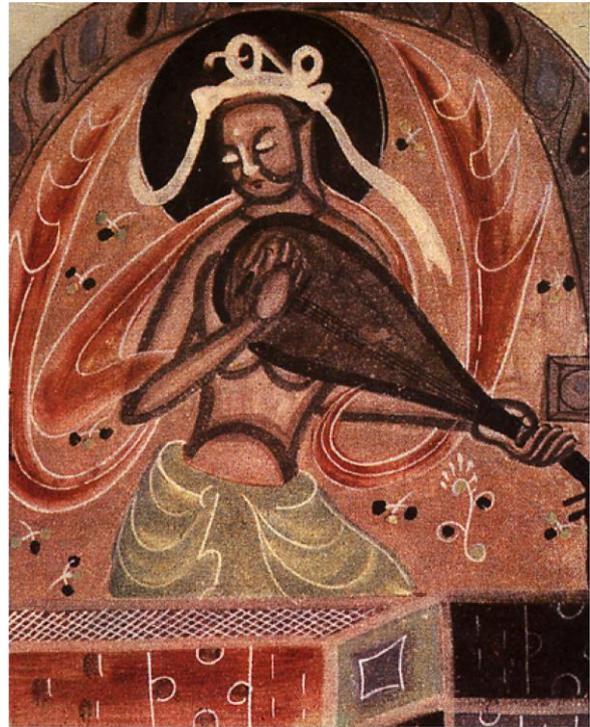


Fig. 23 Pipa-type 4-strings lute, mural painting no. 288 in the Mogao grottos (today in the Cansu province – China), North-Wei epoch (北魏), 4th century.²⁴⁴

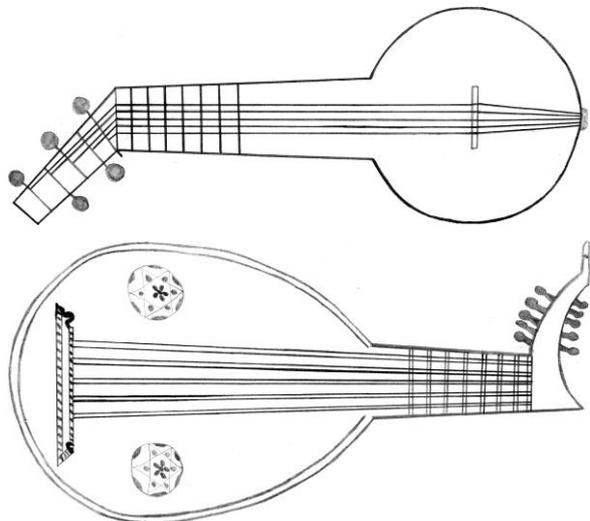


Fig. 24 Two sketches (duplicates from the originals) of so-called “fretted” *vīd*(s), allegedly with gut (or silk) strings tied around the neck.²⁴⁵

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-LUḤŪN WA-N-NAGHAM*

In the *Risāla fī-l-Luḥūn wa-n-Nagham*, unlike in other references cited by Farmer,²⁴⁶ 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 epistle²⁴⁷ which, as he writes in a later article,²⁴⁸ he had consulted in 1926, and mentioned that the first folios were missing.²⁴⁹

The missing folios happen to be those where Kindī describes the tie-frets.²⁵⁰ 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) wound twice around the neck (Fig. 25). It is firmly tied²⁵¹ to avoid lateral displacements.²⁵²

The *bamm* string is made of four strands of homogeneous gut of constant cross section thoroughly twisted together (Fig. 26 and Fig. 27).²⁵³

The second tie-fret, the *wuṣṭā* (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 wound 1 ff apart from the *wuṣṭā*, with a *mathnā* string made of twisted silk strands (Fig. 27) the section of which is equal to the section of two gut strands.²⁵⁴

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.

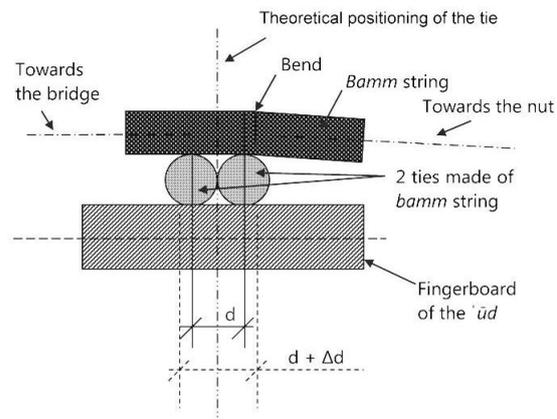


Fig. 25 The first (*sabbāba*) tie-fret (“tie” in the figure) described by Kindī and tangency point (“Bend”) with the *bamm* string. This is a side view (length section) in which d is the diameter of the *bamm* string, Δd is (twice) the undetermined error estimation – due to the elasticity of the composing 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 wound 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 ‘ūd, contradicting thus Urmawī’s indications (Quote 8:140 and Quote 9:140) while confirming (*a priori*) the description of Ṭaḥḥān (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

Such sketches (above Fig. 84 in [Farmer et al., 1966] – taken from *Kanz a-t-Tuḥaf*, unknown author, Iran, mid-14th century, British Museum MS. Or. 2361, f^o 260v^o; below Fig. 81 in [Farmer et al., 1966] – from the *Kitāb al-Adwār* by Ṣafīyy-a-d-Dīn al-Urmawī, Bodleian Library Oxford, MS. Marsh 521, f^o 157v^o, 1333-1334) served as “proof” that ‘ūd(s) from the Early Islamic Era were, like Occidental lutes in the Baroque and Renaissance periods, “fretted”.

²⁴⁶ Except for (ibn a-ṭ-) Ṭaḥḥān.

²⁴⁷ Which probably corresponds to the Berlin MS. Ahlwardt, 5530, f^o 25r^o – 31r^o, published as the fifth epistle in [Kindī (al-), 1962a].

²⁴⁸ [Farmer, 1939b].

²⁴⁹ [Farmer, 1939b, p. 43, fn. 2].

²⁵⁰ 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.

²⁵¹ This contradicts Kindī’s further indications for octaves and fifths correspondences as the knots would have to be undone and done repeatedly.

²⁵² [Kindī (al-), 1965, p. 12]: the other tie-frets are described on this page and the following.

²⁵³ [Kindī (al-), 1965] [p. 15]: descriptions for the material of other strings are given on this page.

²⁵⁴ The reasons invoked by Kindī [p. 16] for this change of material are firstly that the sound of silk strings is “purer” 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.

tie-fret of the *khinšir* (auricular) and the bridge, maybe even on the soundboard of the instrument.²⁵⁵

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.

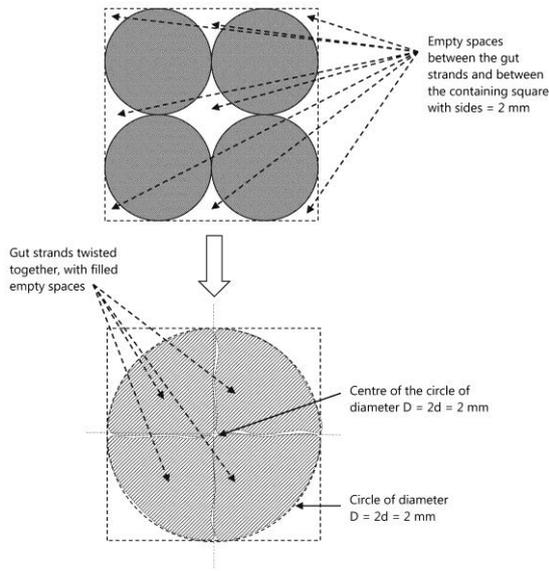


Fig. 26 Result of the (thorough) twisting of the 4 gut strands to make the *bamm* string on the ‘ūd (the figure shows cross sections

²⁵⁵ As seen in Part I.B of this dossier.

²⁵⁶ Given d_1 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 $\Pi \times (d_1)^2$. 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 d_2 . 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. $\Pi \times (d_2)^2 = 4 \times \Pi \times (d_1)^2$ which, after simplification and reduction, gives $d_2 = 2 \times d_1$. 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 d_2 will be smaller than $2 \times d_1$. 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 d_1 of the strands, in which case, it is better to assume that the final cross-section will be less than $2 \times d_1$. 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 thor-

oughly 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 guts during the twisting process; h) were the guts split prior to twisting. Many other factors such as hygrometry 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.

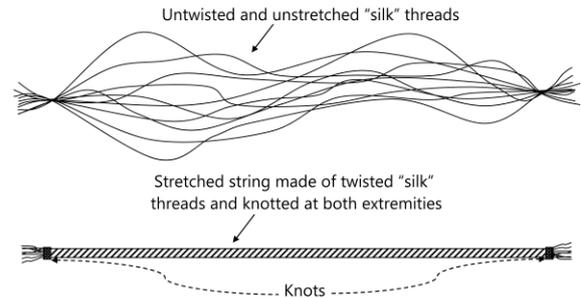


Fig. 27 Twisting and knotting of the silk threads which make the *zīr* in Kindī’s *Risāla ft-l-Luḥūn wa-n-Naḡham*. Above: bunch of untwisted and unstretched “silk” threads. Below: stretched string made of twisted silk threads and knotted at the two ends.²⁵⁷

REFERENCES TO LIGATURES (*DASĀTĪN*) IN FĀRĀBĪ’S *KITĀB AL-MŪSĪQĪ AL-KABĪR* AND (IBN) SĪNĀ’S *KITĀB A-SH-SHIFĀ’*

The *Kitāb al-Mūsīqī al-Kabīr* of Fārābī is considered to be the most complete work on Arabian music of the Golden Age of Islam.²⁵⁸ It is therefore somewhat disturbing that this author was not more quoted by Farmer with regard to “frets” on the neck of the ‘ūd; note that the *Kitāb al-Mūsīqī al-Kabīr* as well as (ibn) Sīnā’s book-chapter on music were already translated at the time Farmer wrote his article.²⁵⁹ The excerpt which was indirectly quoted by Farmer (Quote 3: 139) contains (in the

oughly 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 guts during the twisting process; h) were the guts split prior to twisting. Many other factors such as hygrometry 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 Sīnā (Ibn) or Avicenna (980?-1037), 1935].

original version) the phrase “these *dasātīn* 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,²⁶⁰ 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’.²⁶¹

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 *dasātīn*. 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 (*dasātīn*) and others below the ligature of the *khūnsīr* [auricular]²⁶² while others [still] are found over the ligature of the *sabbāba* (index).²⁶³ These notes are used to enrich the melody. If somebody wishes to determine these notes, he must search for the corresponding **location** on the *dasātīn* or between them”.²⁶⁴

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

Quote 15: “Concerning the *tawṣīlāt*²⁶⁵ [pl. of *tawṣīla* – “link, connection”] – these are of the same type as the ‘mixtures’, or

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

²⁶¹ [Fārābī (al-), 1967, p. 580–583]. French translation in [Fārābī (al-), 1930, v. 1, p. 201].

²⁶² Between the ligature of the auricular and the bridge.

²⁶³ Between the ligature of the index and the nut.

²⁶⁴ [Fārābī (al-), 1967, p. 516], and [Fārābī (al-), 1930, v. 1, p. 174] for the French translation.

²⁶⁵ Otherwise called “portamentos”.

²⁶⁶ [Sīnā (Ibn) or Avicenna (980?-1037), 1956, p. 140], and [Fārābī (al-) and Sīnā (Ibn) or Avicenna (980?-1037), 1935, v. 2, p. 231] for the French translation.

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”.²⁶⁶

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 Ṭaḥḥān.

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 Ṭaḥḥān copied him without experimenting with tie-frets on the neck of the instrument)²⁶⁷ 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.

*
* *

NEUBAUER’S “BAU DER LAUTE...”

In “*Der Bau der Laute und ihre Besaitung nach arabischen, persischen und türkischen Quellen des 9. bis 15. Jahrhunderts*”,²⁶⁸ Neubauer examines the problematic of the “*Bünde*” (“frets”) on the fingerboard of the ‘ūd

²⁶⁷ Let us remind ourselves about the well-known anecdote (based on Nicomachus and) mentioned in [Chailley, 1985, p. 7–14], in the chapter entitled “The Harmonious Blacksmith”, which explains how an error stemming from a “fanciful experience [...] that five minutes and a piece of string would have been enough to rectify”, lasted 22 centuries in the musicological literature. To the like of the story of the Silesian child of Rousseau, or to the tale of the fish of King James (see the quote and corresponding footnote at the beginning of Chapter III in [Beyhom, 2016]), the desire to enhance one’s writings is often enough to lose one’s critical sense.

²⁶⁸ [Neubauer, 1993] – “The construction of the lute and its stringing according to Arabian, Persian and Turkish sources from the 9th to the 15th centuries”.

within four pages²⁶⁹ supported by various quotes in the second part of his article. He states from the outset²⁷⁰ that Farmer’s 1937 article²⁷¹ – 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”²⁷² 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)²⁷³:

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-alḥān*] 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 11:140²⁷⁶, while restricted to either “modern performers” or to the ‘ūd *al-akmal*. Knowing that in the 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-Tuḥaf*²⁷⁷:

Quote 17: “The *dasātīn* consist in a series of marks (*nešānī-ye čand*)²⁷⁸ affixed (*waḍ‘ karde*) on the necks (*sawā‘ed*)²⁷⁹ of stringed instruments (*ālāt-e dawāt-e outār*) for a firm and precise positioning (*tašaddod*) of the fingers on the string and for the production of the notes (*esteḥrāg-e naḡamāt*) on it”.²⁸⁰

In itself, this quote confirms that the *dasātīn* were marks²⁸¹ “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 “*Sawā‘ūd*” in Arabic transliteration.

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 Hälsen [...] anzubringen 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 (*ribāṭāt*) 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 restate here [between brackets] the phrase at the beginning: “[And

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]”.²⁸⁶

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 14:148²⁸⁷ 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(!).²⁸⁸

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]’”.²⁸⁹

Here is the complete translation of the excerpt:²⁹⁰

Quote 18: “in this tuning [to the fifth between the *bamm* and the following string], the notes produced by the three strings below the first string [the *bamm*] 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 original²⁹¹ that the notes, if they are not found on one of the *dasātīn* (pl. of *dastān*) of the previous tuning, could still be performed

this instrument is one in which the notes are emitted according to the division of the strings with which it is strung]. And ligatures are wound on the neck of the instrument under the strings and delineate on each of them the string-parts from which the notes are sounded, and as a result they play the role of a string-holder and are placed parallel to the bridge”.

²⁸⁶ Translated from [Neubauer, 1993, p. 329].

²⁸⁷ [Fārābī (al-), 1967, p. 516], reproduced here for convenience: “It is however useless to multiply the *dasātīn*. 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 (*dasātīn*) and others below the ligature of the *khinšir* (auricular) while others [still] are found over the ligature of the *sabbāba* (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 *dasātīn* 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

if the finger stops the string on the corresponding position, although it may not be marked by a *dastān*.²⁹² In other terms, notes on the *ūd* that he describes can be produced whether there *are* ligatures or marks (*dasātīn*) 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-Luḥūn wa-n-Naḡham* and (ibn a-t) Ṭaḥḥān in his *Ḥāwī-l-Funūn wa Salwat al-Maḥzūn*.

Neubauer’s interpretation of Kindī’s *Risāla fi-l-Luḥūn wa-n-Naḡham*

Further quotes from Kindī’s *Risāla fi-l-Luḥūn wa-n-Naḡham* are provided in Neubauer’s article, explaining the tuning, and the mounting and tying of the tie-frets²⁹³, while concluding (see FHT 9:166)²⁹⁴:

“According to the indications [of Kindī] the proportions of the strings from the *zīr* to the *bamm* 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**”.²⁹⁵

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 lutes²⁹⁶ 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 *ūd*.²⁹⁷

mentions performance *between* the ties, which is the most probable reason why Neubauer avoided quoting Fārābī directly.

²⁸⁹ Translated from [Neubauer, 1993, p. 329].

²⁹⁰ In both Erlanger’s translation in [Fārābī (al-), 1930, v. 1, p. 208] and in the Arabic original [Fārābī (al-), 1967, p. 600]. French and Arabic texts are reproduced in Appendix D.

²⁹¹ And in the French translation.

²⁹² In any lute-type instrument a change in tuning compels the performer to adapt his technique to the new positionings of the fingers on the strings – this is common-knowledge among performers.

²⁹³ These descriptions are provided in full in “Annexe II.3” of [Beyhom, 2010b].

²⁹⁴ For “Figure Hors Texte 9, p. 166”.

²⁹⁵ Translated from [Neubauer, 1993, p. 330]: bold type mine.

²⁹⁶ [Abbott and Segerman, 1976, p. 431]: “the grading of frets for fine adjustment of the action made them remarkably thick at low positions (near the nut)”.

²⁹⁷ This supposed unreliability of Kindī is an important element in the following discussion.

However, in the second part²⁹⁸ 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 Bündeln 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).

²⁹⁸ Dedicated to translations of Early authors.

²⁹⁹ [Neubauer, 1993, p. 334–342].

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 صريرا 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* b’ a”.

Neubauer’s interpretation of (ibn a-t) Ṭaḥḥān’s *Hāwī-l-Funūn wa Salwat al-Mahzūn*

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-) Ṭaḥḥān (FHT 11:167) which follow similar proportions to Kindī’s (degressive from the nut).

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

“... ‘There is still a fret which lies between the *ring finger*³⁰⁴ and the *auricular* frets, [but]³⁰⁵ 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*)’.³⁰⁶ 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.”.³⁰⁷

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”³⁰⁸ (in Arabic “لليم أولى وأحق”). Fig. 28:152 shows an excerpt from Ṭaḥḥān’s manuscript edited and published by Neubauer in 1990 with a frame (line below) encompassing the phrase in Arabic “لليم أولى وأحق”.

³⁰⁵ The words between brackets were added by Neubauer.

³⁰⁶ The original Arabic version from the manuscript of Ṭaḥḥān published by Neubauer [Ṭaḥḥān (ibn a-t-~ al-Mūsīqī), 1990, p. 175] is reproduced in Appendix D.

³⁰⁷ Translated from [Neubauer, 1993, p. 331].

³⁰⁸ My translation converges towards Farmer’s narration of Ṭaḥḥān’s manuscript in [Farmer, 1937, p. 457], notably: “Ibn al-Ṭaḥḥān [...] 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”.

The excerpt clearly proves that Neubauer ignored the word “لهم” which means “to them”, or “for them”, excluding thus the possibility for beginners to make a choice between keeping the *dasātīn*, or performing Persian music without them.³⁰⁹ 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.



Fig. 28 Excerpt from f° 89 r° of the manuscript [Ṭaḥḥān (ibn al-ṭ-~ al-Mūsīqī), 1990, p. 175] reproducing lines nine and ten. The 10th line (below in the excerpt) contains the (framed) expression “فتكره لهم أولى واحق” with the possessive term “لهم” meaning “to [or for] them”.

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 (*dasātīn*) without “marking” or tying them on the neck, which is a clear indication that *dasātīn* 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 *dasātīn*.

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 praxis³¹⁰ must henceforth belong to the past”.³¹¹

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 *dasātīn* 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 ‘ūd

In Neubauer’s argumentation on the “fretting” of the Arabian ‘ūd we can single-out one quote from Lādhiqī which gives alternative possibilities for the material of the ties on the neck of the ‘ūd – including simple markings – that may apply, with the latter author, restrictively to some musicians or to one particular type of ‘ūd, the “‘ūd *akmal*”. The ‘ūd *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 ‘ūd.

³¹⁰ The author inserts here a footnote (no. 119): “as still with Theodore Grame, *The Symbolism of the ‘ūd*, 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 ‘ūd 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 ‘ūd, 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 *dasātīn* [*dasātīn*] (hands; 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 ‘ūd, like the *viola da gamba*, was played both with and without frets—the evidence is quite incontrovertible that the present-day traditional ‘ūd 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”.

³¹¹ [Neubauer, 1993, p. 331].

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 Ṭaḥḥān’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 Ṭaḥḥān 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 *Risāla fī-l-Luḥūn wa-n-Naḡham* which, opposed to the voluminous treatises written by Fārābī, (ibn) Sinā and Urmawī, 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 [*rasm*] 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 [*rūmiyya*] 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 a-ṣ-Ṣinā’a*).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

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

Kindī's (and Ṭaḥḥān's)³¹⁸ explanations and the explanations in Fārābī's *Kitāb al-Mūsīqī al-Kabīr* and (ibn) Sinā's *Kitāb a-sh-Shifā'* as well as in the later works of Urmawī, Shirwānī and Lādhiqī, as the latter described techniques and divisions which had a wider, theoretical and practical, scope.

Furthermore, with no indication in the extant literature for Kindī 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.

Kindī'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 markings³¹⁹ on the fingerboard, to ensure a correct pitch for the most frequent notes on the *ūd*,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 Kindī and Ṭaḥḥān) we can oppose multiple assessments by the same, or other authors, clearly showing that the *dasātīn* in question are but –

today or in the Early days of Islam, would contend himself with one type of fretting.

³¹⁸ With both authors, tie-frets are intended for beginners, explicitly with Ṭaḥḥān and implicitly with Kindī. Note that Ṭaḥḥān has probably his source of inspiration from Kindī's – and other writers of which probably the Ikhwān a-ṣ-Ṣafā' and maybe a-s-Sarākhsī – whose works are today lost but which Ṭaḥḥān 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.

musically speaking – vertical markers on the fingerboard of the *ūd*.

Even the pretense to the existence of “tie-frets” for beginners is doubtful as Kindī was such an unconditional admirer of the Pythagorean “science” that he could well have invented these tie-frets for beginners (and Ṭaḥḥān 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”³²¹ – die hard³²² 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.

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-) Tifāshī mentions the “organ” in his 34th chapter of *Mut'at al-Asmā'*... [Tifāshī, 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 music³²³ 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 nakers (*naqqāra*) 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”.³²⁴

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,³²⁵ 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, Ṭaḥḥān), 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.

³²³ 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.

³²⁴ [Wright, Poché, and Shiloah, 2001, p. 805 (Arab music, §I, 3, IV)].

Further descriptions by Fārābī and (ibn) Sinā, 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 Ṭaḥḥān³²⁶ 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-n-Naṣr Muḥammad ibn Muḥammad ibn Tarkhān 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 errors”.³²⁷

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

* * *

³²⁵ Notwithstanding the Byzantine influence on the Eastern – while often changing – border, and its interaction with Arabian influence.

³²⁶ See [Beyhom, 2011 ; Bouterse, 1979].

³²⁷ Translated from [Fārābī (al-), 1930, v. 1, p. 2].

APPENDIX A: THE ‘*ūd*, ITS COMPONENTS AND ITS PROPORTIONS³²⁸

I have explained elsewhere³²⁹ that most, if not all,³³⁰ Early Islamic speculations on music theory used the ‘*ūd* as the main vector for their explanations. In turn, as inheritors of the Greek tradition through the translation enterprise set by Caliph al-Manṣūr 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 ‘*ūd* by Kindī

The first known complete description of the ‘*ūd* and its construction is found in the epistle *Risāla fi-l-Luḥūn wa-n-Nagham* by 9th-century “Philosopher of the Arabs” Ya‘qūb ibn Ishāq al-Kindī.³³¹ Kindī’s description says (FHT 2:158):

“[and the] length [of the ‘*ūd*] will be: thirty-six joint fingers – with good thick [‘full’] fingers³³² – and the total will amount to three *ashbār*.³³³ And its width: fifteen fingers. And its depth seven 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)”.³³⁴

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 ‘*ūd* and the *tunbūr* in [Beyhom, 2010b] and the “First Interlude” in the main text of this dossier.

³³¹ “Abū Yūsuf Ya‘qūb ibn Ishāq 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

Kindī adds complementary information further below in his text:

“Then they adopted (*sayyarū*) 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 ‘*ūd* must be three fingers away from the end of the bridge in the direction of the [‘following the’ – *ilā mā yalī 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-muḥādihāt* = at the proximity of] the place where the strings are plucked, and this because this emplacement [on the ‘*ūd*] 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”.³³⁵

To summarize, Kindī’s proportions for the ‘*ūd* 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: $36 \text{ ff} = L$
- Total width: $15 \text{ ff} = 10L/24 = 5L/12$
- Total depth: $7.5 \text{ ff} = 5L/24$
- Length: $10 \text{ ff} = 5L/18$
- Soundbox length: $26 \text{ ff} = 13L/18$
- Position of the bridge: 6 ff from the lower end = $4L/24 = L/6$
- Total speaking length: $30 \text{ ff} = 20L/24 = 5L/6$
- Speaking length above soundboard: $20 \text{ ff} = 5L/9$
- Optimal plucking point (from the lower end): $9 \text{ ff} = L/4$
- 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*.

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 *shibr* (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 *shibr* 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 Ṭaḥḥān

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-ṭ-Ṭaḥḥān’s (11th century).³³⁸

“The dimensions of the lute should be as follows [see FHT 3:159]: its length should be 40 *aṣābi*;³³⁹ *maḍmūma*.³⁴⁰ Its width should be 16 *aṣābi*; *maḍmūma*. Its depth should be 12 *aṣābi*; *maḍmūma*. The bridge should be placed at about 2 *aṣābi*; [“*iṣba‘ayn*” – the flexion of *iṣba‘* for the dual case] odd from the bottom. The neck should be 1 *shibr* + 1 ‘*aqd*’³⁴¹ in length. The pegs should be eight unless there is a *zīr ḥād* string³⁴² when there will be ten strings,³⁴³ but this is not known in our times”.³⁴⁴

If we compare the proportions of Ṭaḥḥān’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 Khulā‘ī (beginning of the 20th century – FHT 4:160 and FHT 5:161),
- the ‘ūd of the well-known Munir Bashīr (2nd half of the 20th century – FHT 6:162),

³³⁶ And most probably a forerunner of the *barbaṭ*.

³³⁷ In Ṭaḥḥān’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 (ribs) 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 Ṭaḥḥān 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 facture. His work entitled *Ḥāwī al-Funūn wa Salwat al-Maḥzūn* is in two parts, the second of which being about praxis.

³³⁹ Plural of *iṣba‘*, Arabic for “finger”.

³⁴⁰ The verb *ḍammā* means “to join”, *maḍmūm*, or *munḍamm* meaning “joined” or “tightened”. Farmer’s notable 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 ‘*aqd*’ 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 *zīr ḥād* (or simply *ḥād* – “sharp” – or “2nd *zīr*” for some authors) is already cited by Kindī in his *Kitāb al-Muṣawwītāt al-Watariyya min dhāt al-Watar al-Wāhid ilā dhāt al-‘Ashr[at] Awtār* [Kindī (al-), 1962b, p. 78]. As a reminder: the

- the two *Biṭār* ‘ūd(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 Ṭaḥḥān’s, with a resulting quality of sound³⁴⁵ which is probably different, but not necessarily 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



FHT 1 “Padauk/Walnut Body with Cedar top [‘ūd with] Amazing wood in wood inlay (Maker: Farouk Shehata, 1993)”.³⁴⁸

first four strings were called (from the lowest to the highest – acoustically and conventionally) the *bamm*, the *mathlath*, the *mathnā* and the *zīr*. Whenever today’s ‘ūd(s) 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 Ṭaḥḥān, 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 *ḥād* 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 Urmawī’s epistle *A-r-Risāla a-sh-Sharafyya* [Urmawī (d. 1294) and [Jurjānī (al-), 1938, v. 3, p. 110] (reedited as [Urmawī (d. 1294) and [Jurjānī (al-), 2001]), in the 13th century.

³⁴³ In fact, five courses with two identical strings each.

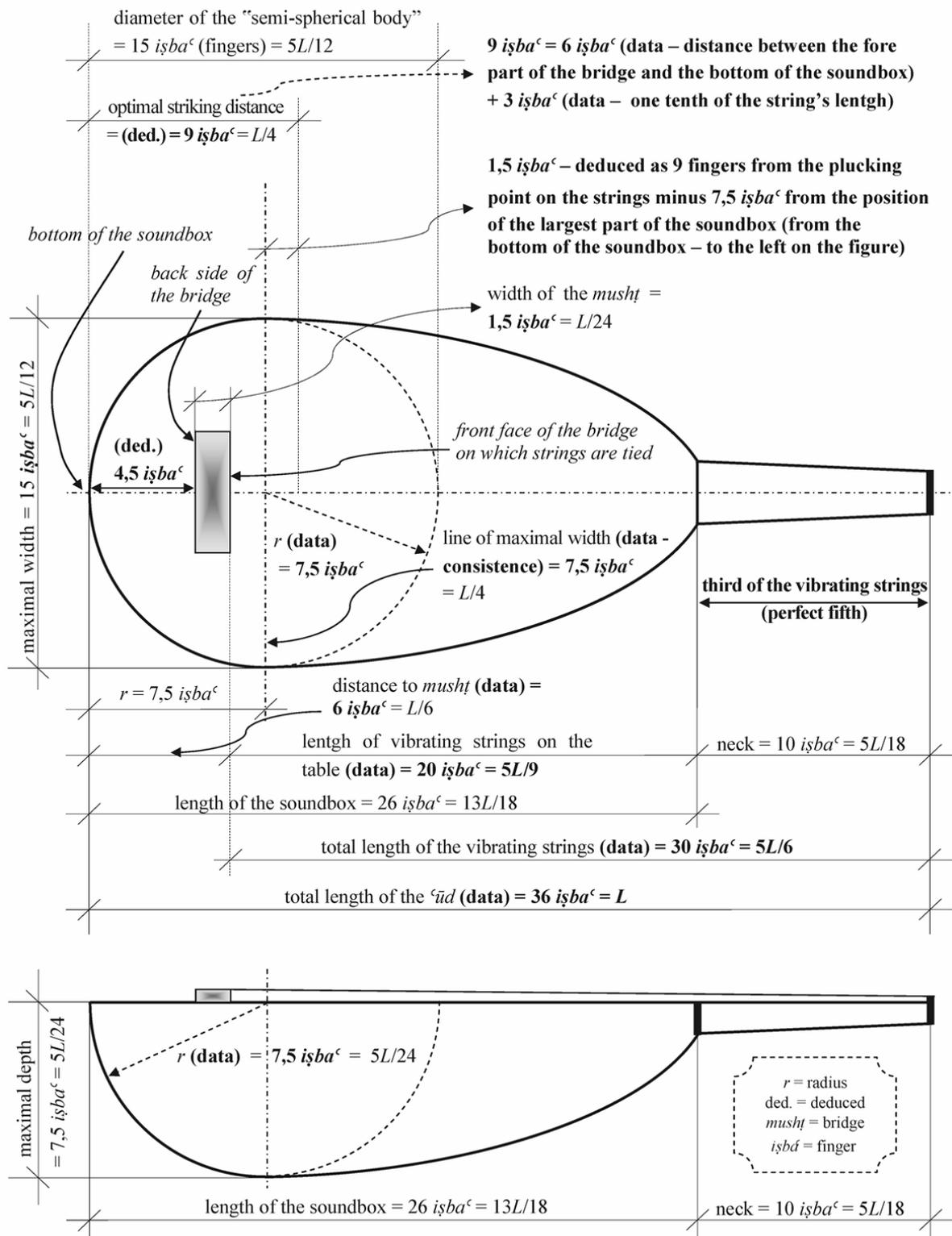
³⁴⁴ [Ṭaḥḥān (ibn a-ṭ- al-Mūsīqī), 1990, p. 172].

³⁴⁵ The tone-color (or timbre) for example, although this characteristic of sound depends on other, organological and environmental factors as well.

³⁴⁶ Mainly in [Beyhom, 2010b], and partly in this dossier.

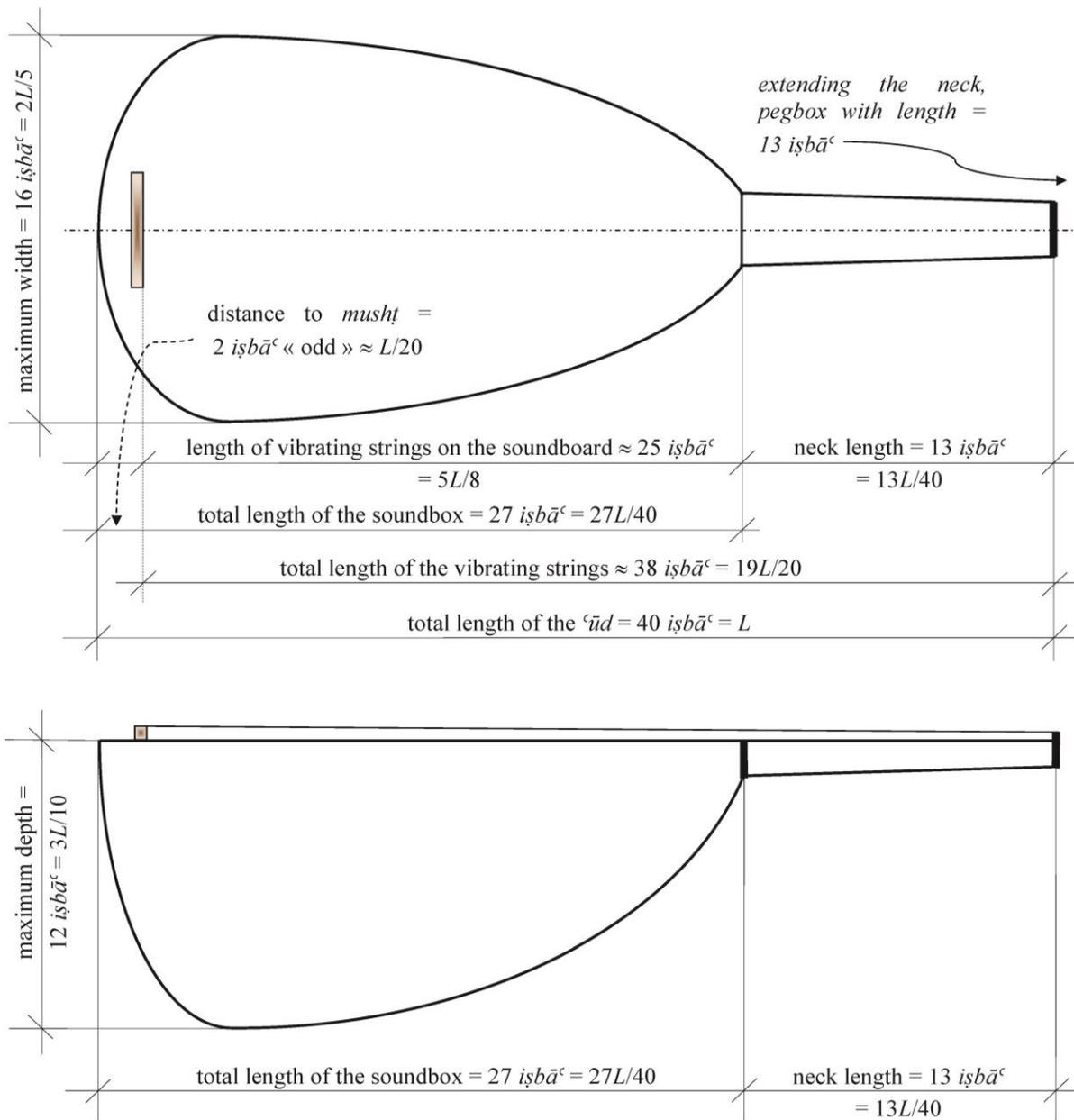
³⁴⁷ See also [Hilarian, 2005] for a comparative study of the Malay-Lutes (*Gambus*) with the Arabian lutes, which gives an insight into the variety of shapes of short-necked lutes together with [Hellwig, 1974] (for Western lutes).

³⁴⁸ Retrieved 20/10/15 from <http://www.mikeouds.com/oudpics.php>.



FHT 2 (Al-) Kindī's description of the ʿūd, in "full finger (iṣba[∘] – pl. aṣābi[∘]) thickness" measurements, and deduced (calculated) proportions.³⁴⁹ The same procedure is used for the "Harmonic division" shown on Fig. 9:131. ("Vibrating string" = speaking length of the string.)

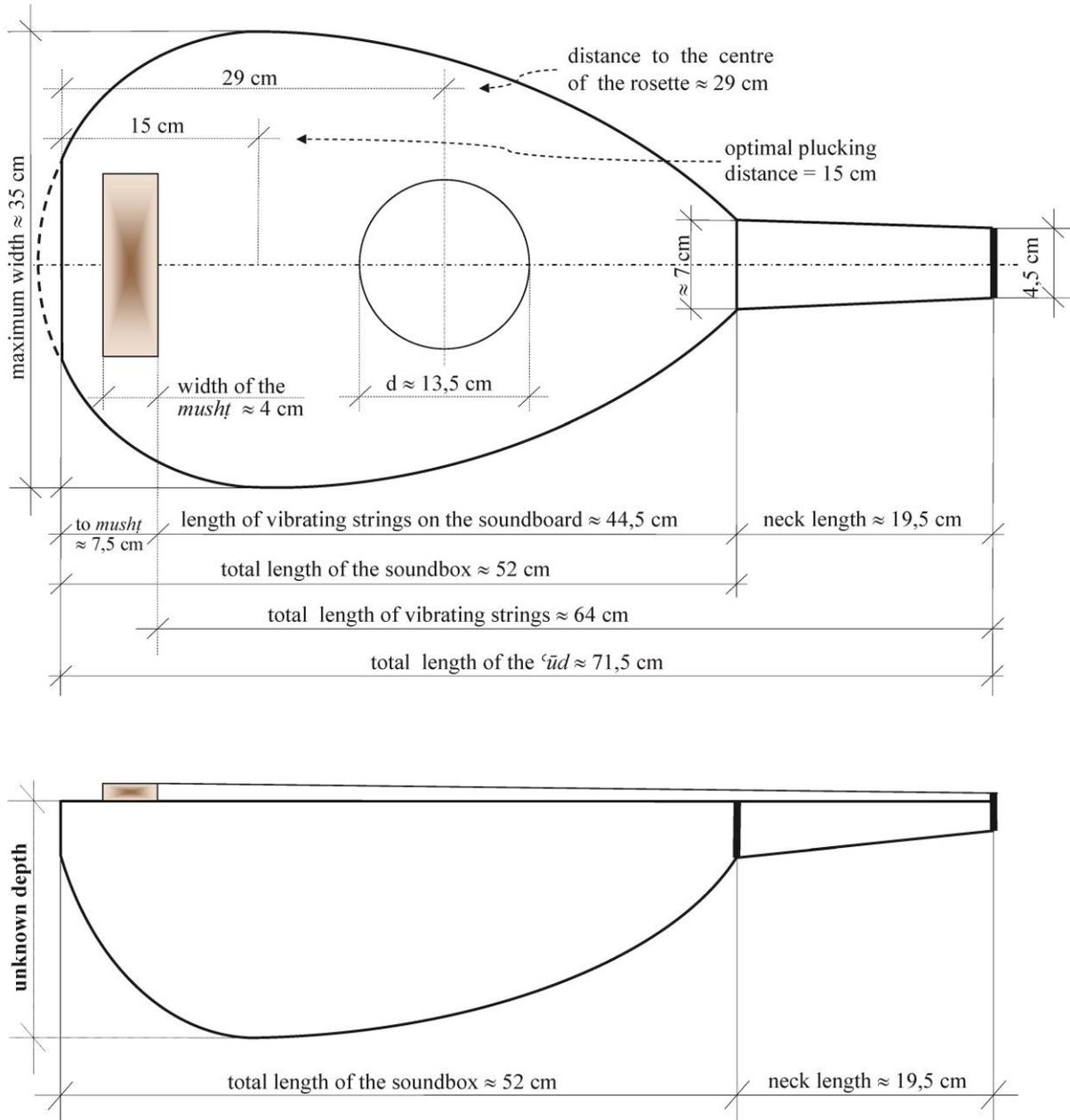
³⁴⁹ First published in [Beyhom, 2011].



FHT 3 Drawing of the ‘ūd described by Ṭaḥḥān.³⁵⁰ (Reminder: “The dimensions [...] should be as follows: its length should be 40 *aṣābi*;³⁵¹ *maḍmūma*. Its width should be 16 *aṣābi*’ *maḍmūma*. Its depth should be 12 *aṣābi*’ *maḍmūma*. The bridge should be placed at about 2 *aṣābi*’ odd from the bottom. The neck should be 1 *shibr* + 1 *‘aqd* in length. The pegs should be eight unless there is a *zīr ḥād* [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.)

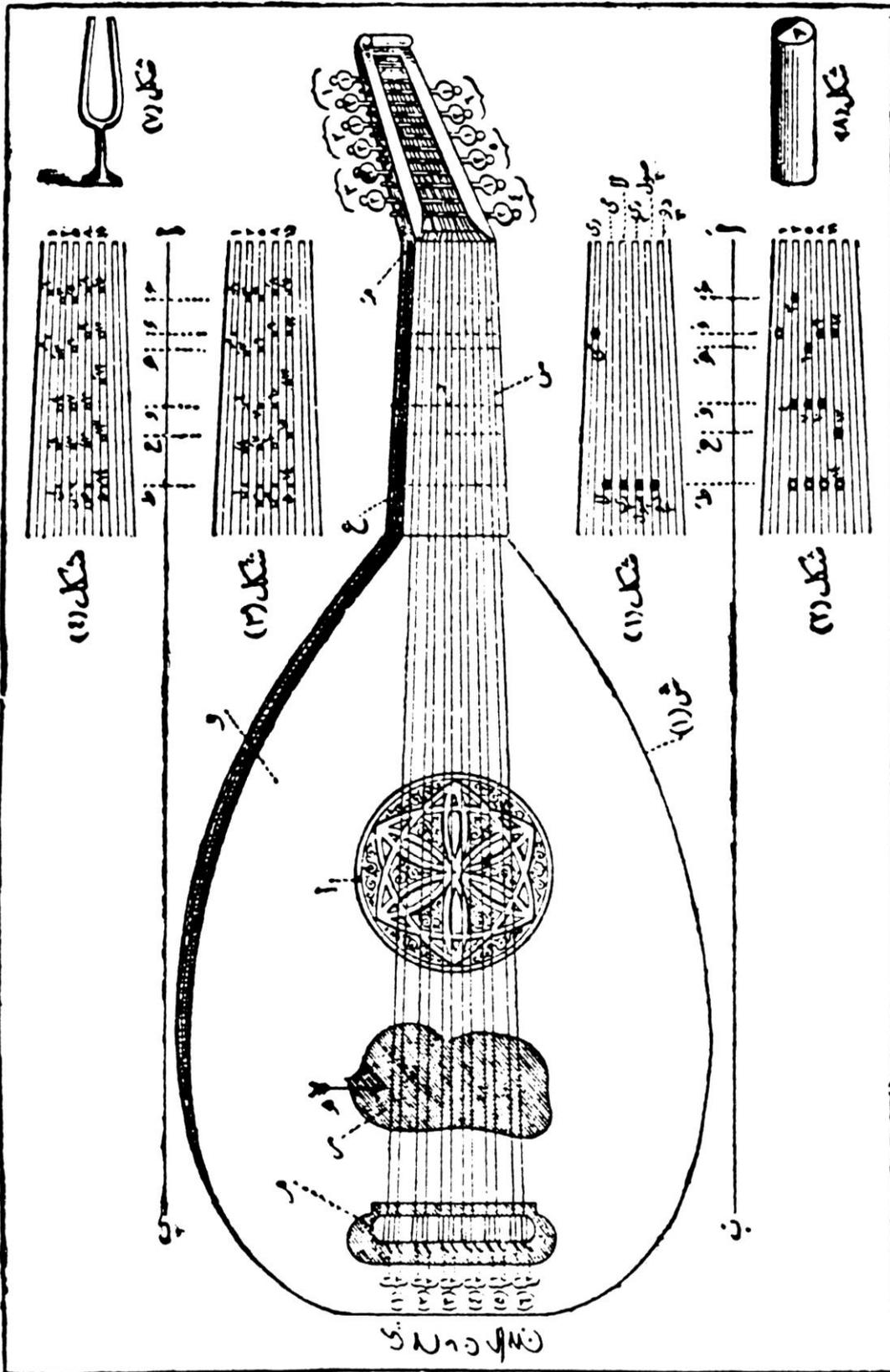
³⁵⁰ First published in [Beyhom, 2011].

³⁵¹ Arabic grammar is complicated: the plural for more than 10 *aṣābi*’ (or anything or anyone) is like the singular form, *iṣbā’*. Hence: 40 *iṣbā’*, 16 *iṣbā’*, 12 *iṣbā’*, etc., but also *imra’a* (a – or one – woman), *imra’atayn* (two women), three (to ten) *nisā’* and 11 (and more) *imra’a!*

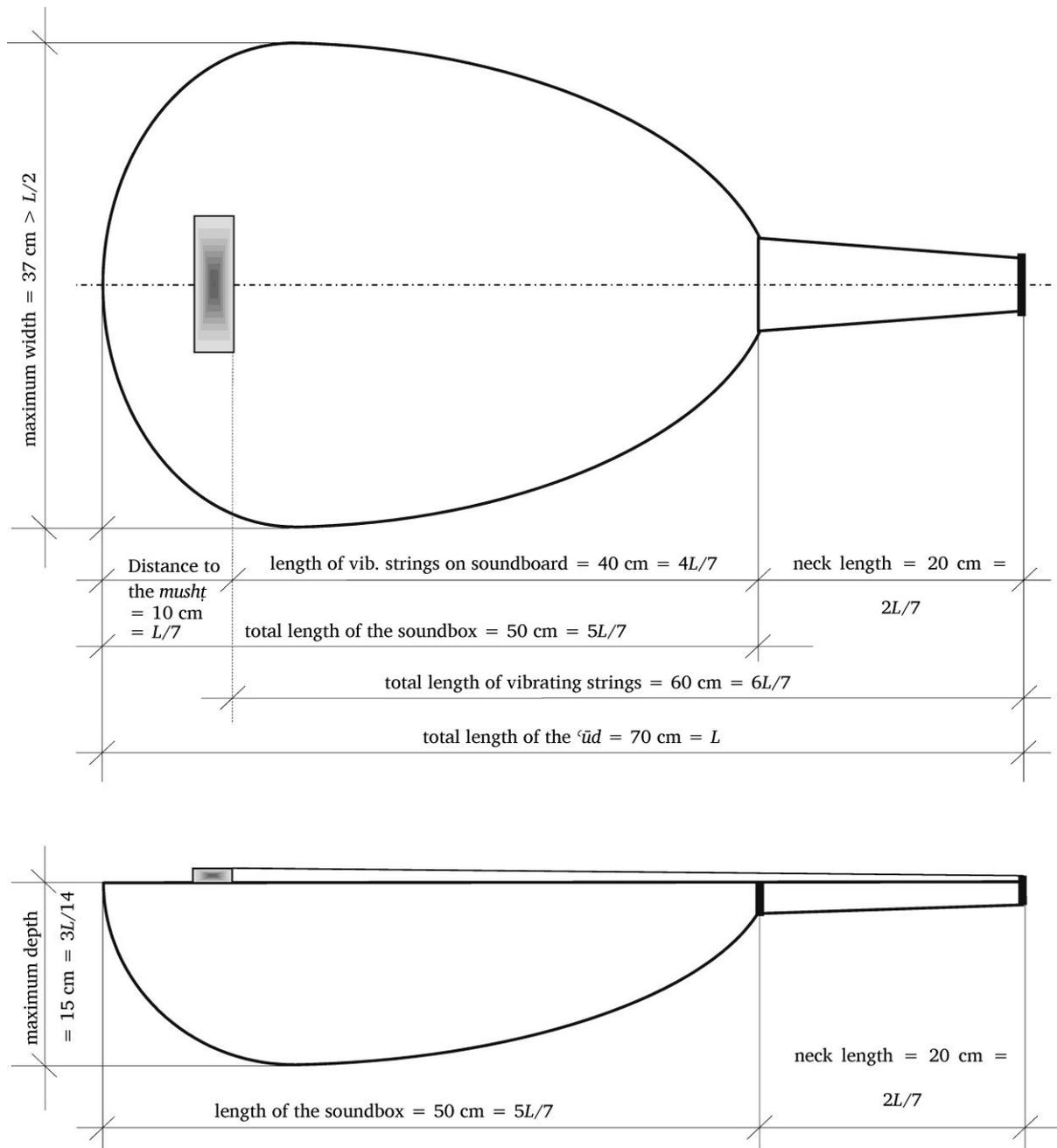


FHT 4 Revision of the 'ūd described by Khula'ī in his *Book of Oriental Music* [Khula'ī (al-), 1904]. The measurements are those taken from the original drawing (next figure).³⁵² ("Vibrating string" = speaking length of the string.)

³⁵² First published in [Beyhom, 2011].



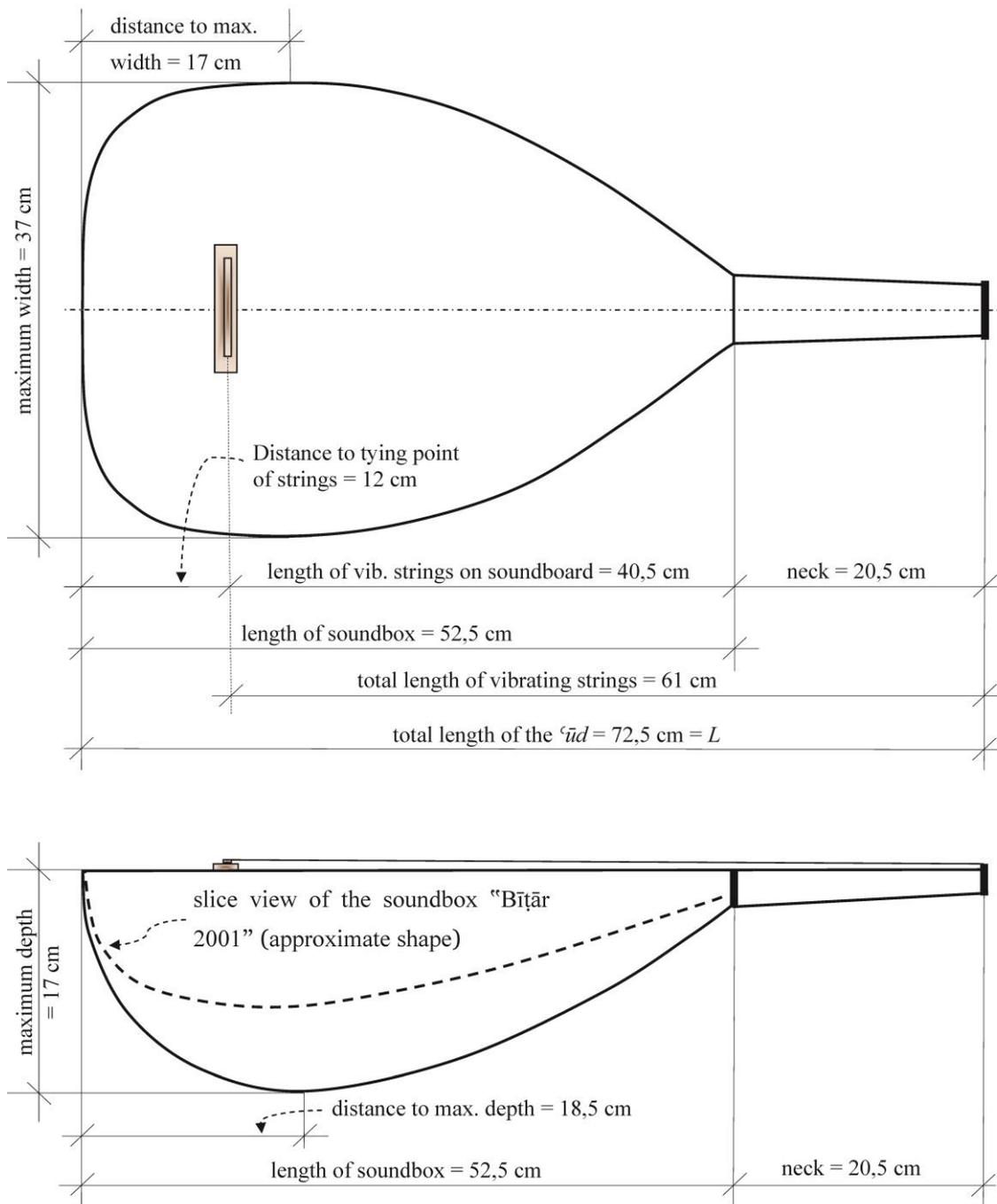
FHT 5 Depiction of a 'ūd in [Khula'ī (al-), 1904, p. 52].



FHT 6 Drawing of the 'ūd of Munir Bashir (1957 – described in [Rashid, 1999]). (“Vibrating string” = speaking length of the string.)



FHT 7 Front and side views of the *Biṭār 2001* electro-acoustic ‘ūd with thin soundbox, engineered and re-designed by the author and crafted by Lebanese *luthier* [string instrument maker] Georges Biṭār in 2001. This instrument is a straightforward adaptation of the physical elements of which the *Biṭār-Saab* ‘ūd (FHT 8) is made. No Pythagorean proportions can be seen were it for this instrument or for Khulaṭī’s in FHT 4 and for Bashīr’s in FHT 6.



FHT 8 Drawing of the *Biṭār-Saab ʿūd*. The original instrument was made by the Lebanese *luthier* Georges Biṭār 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 *Biṭār 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 degressive proportions from the *bamm* – the lowest acoustically – to the *zīr* – 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-Tuḥaf*, the 14th-Century Persian treatise (“epistle”) on music, here translated by Tsuge:

“Chapter Five: concerning the twisting (*fatl*) of the silk strings (*abrišāmīn*) – Distortion and straightforwardness in sound (*āvāz*) depends on goodness and poorness in quality of the strings. Strings of musical instruments may be twisted either from silk (*abrišām*) or gut (*am’ā*) 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 (*mostadīr*). [Raw silk] should be polished (*pardākte*), well spun (*kūb rešte*) 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 *bam* string is spun it should be made from 64 threads of silk, a *maṭlaṭ* string should be from 48 threads, and a *maṭnā* string should be from 32 threads, a *zīr* string should be from 24 threads, and a *ḥād* string should be spun from 16 threads. And silk strings should be gently spun. After that, glue (*serīšom*) should be boiled and mixed with a small amount of saffron (*za’farān*). 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 (*me’āī*) – The wise are agreed that bass strings should be spun from sheep gut. Because its components are rarefied (*taḳalkolī*), the bass strings are called ‘mother of the strings’ (*omm-ol-owtār*), too. In terms of the kinds of gut, that of the ewe (*mīšīne*) is considered better than that of the ram (*bozīne*). Some people might say that gut of the white ewe (*mīšīne-ye sefīd*) is better than [that of] the black ewe, but this notion (*ma’ānā*) is exaggerated. In order to make the bass strings, one should prepare guts that are even throughout in terms of thinness and thickness. The gut should be soaked in poppy juice (*šīrābe*) 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 *bam*; however, if the gut is thick, two-ply will suffice. Some people may spin the *maṭlaṭ* string also from gut, on the condition that the *maṭlaṭ* string is thinner than the *bam* string by single-ply. After that, an old cloth of linen [soaked in] whitewash (*sefidāb*) 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.”³⁵³

If we apply the gradation given by the epistle to the strings made of silk strands, *i.e.* (18)³⁵⁴, 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_1 and d_1 . (Or, simply, s and d as shown in THT 1.³⁵⁵)

Number of threads	64	48	32	24
Division by 8	8	6	4	3
Section	8/3 s	6/3 s	4/3 s	3/3 s
Diameter = 2 x √s/(π)	11/6 s	8/5 s	4/3 s	9/8 s
Diameter (2)	1 5/6	1 3/5	1 1/3	1 1/8

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

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):

$$s = \pi r^2 = \pi \frac{d^2}{4}, \text{ with } d = 2 \times \sqrt{\frac{s}{\pi}}.$$

Proportions for the strings of the ‘ūd were also given by Kindī (FHT 9:166), the Ikhwān A-ṣ-Ṣafā’ (“The Brethren of Purity” – FHT 11 FHT 10:166), and (ibn a-ṭ) Ṭaḥḥān (FHT 11:167), with the latter proposing further proportions by “weight”.

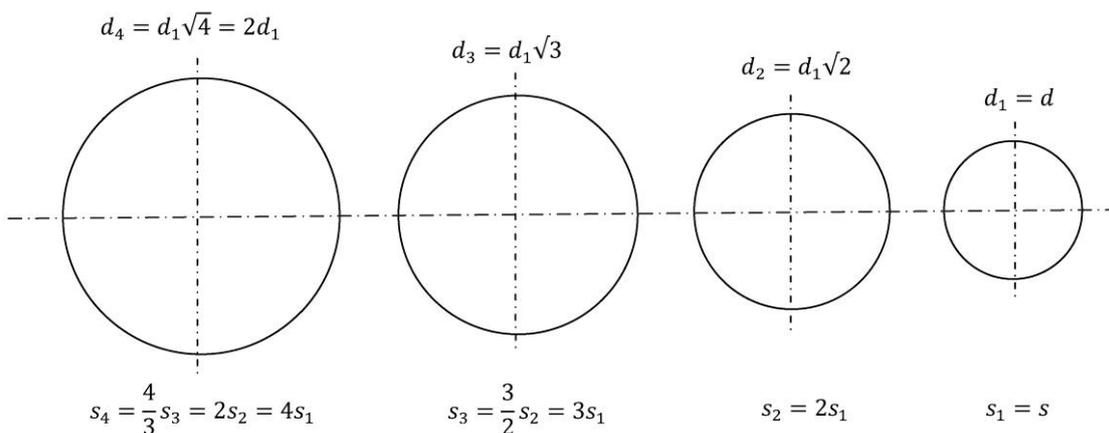
Finally, let’s note that gut strings are very sensitive to hygrometry; in a dry climate, gut tends to become (or remain) well stretched while in Northern Europe, as an opposite example, gut strings (and tie-frets) tend to lose their tension.³⁵⁶ This fact alone pleads for caution when stringing and “fretting” the instrument.

³⁵³ [Tsuge, 2013, p. 178]: See also the interesting comparison established in [Leoni, 1996].

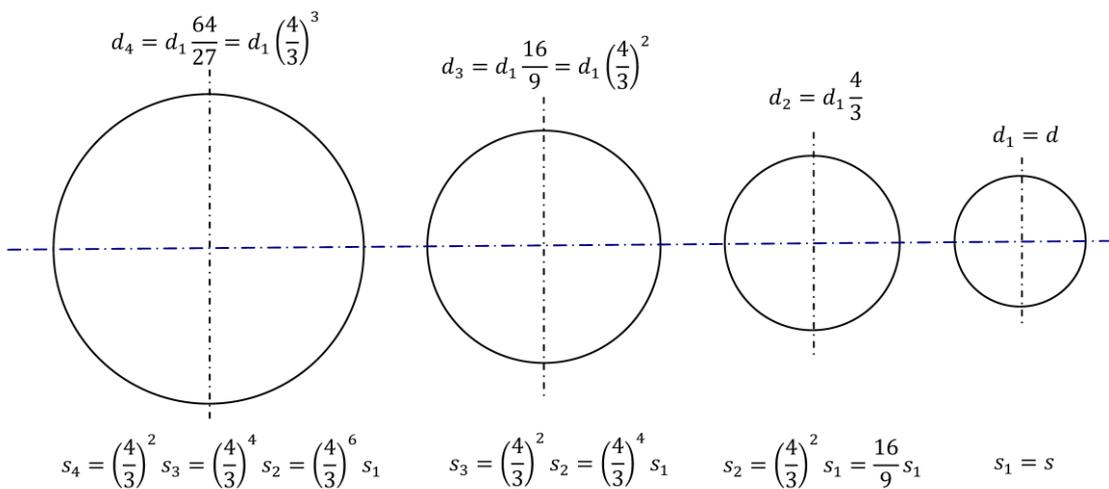
³⁵⁴ We shall not include the last – and thinnest – string (the *ḥād*) in this review, as the other reviewed authors give the proportions for the four strings from *bamm* to *zīr* exclusively.

³⁵⁵ “THT. 1” = “Tableau Hors Texte 1” or “table outside the main text”.

³⁵⁶ 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.



FHT 9 Proportions of the strings of the ‘ūd according to Kindī in the *Risāla fī-l-Luḥūn wa-n-Naḡham*³⁵⁷: s_1 to s_4 are the cross-sections, d_1 to d_4 are the diameters of the strings from *zīr* to *bamm*. The proportions of the sections from *zīr* (right) to *bamm* (left) stand as 1:2:3:4. The intermediate strings are called the *mathlath* (s_3) and the *mathnā* (s_2).³⁵⁸



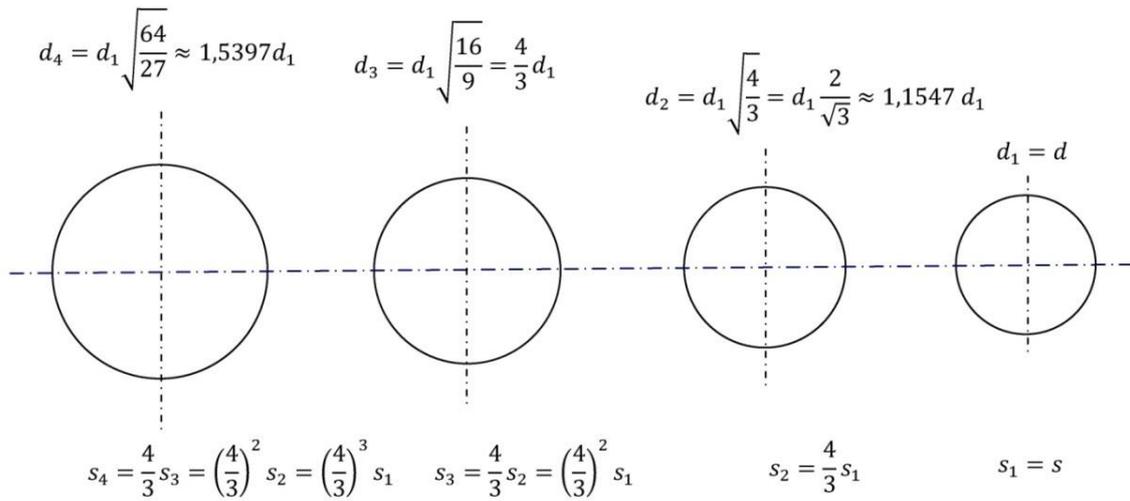
FHT 10 Proportions of the strings of the ‘ūd according to Ikhwān a-ṣ-Ṣafā’ in their Fifth epistle (“On Music”)³⁵⁹: s_1 to s_4 are the cross-sections, d_1 to d_4 are the diameters of the strings from *zīr* to *bamm*. (See figure above for the names of the strings.)³⁶⁰

³⁵⁷ Originally published in [Beyhom and Makhlouf, 2009].

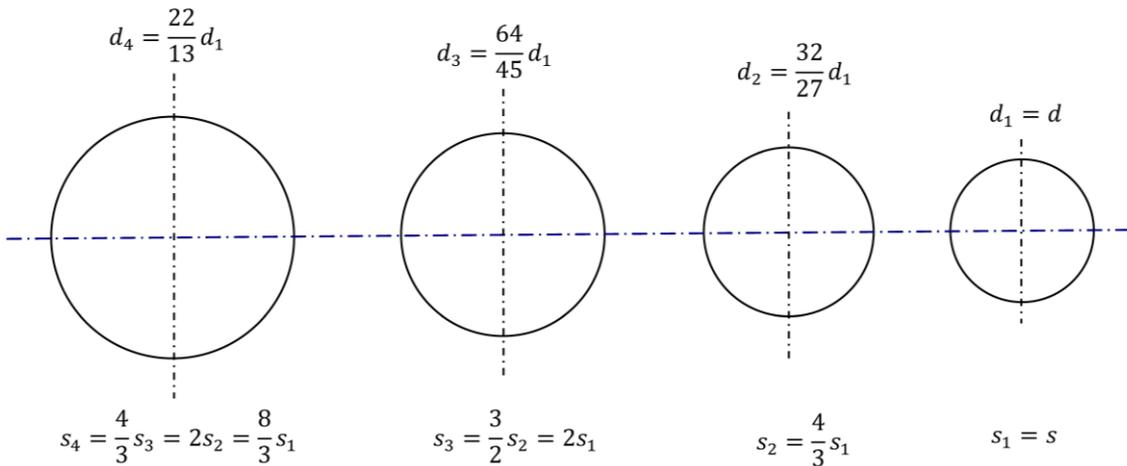
³⁵⁸ Following the hypothesis that the diameters of the twisted strands of guts remain unchanged after the twisting – see Fig. 26:147 and corresponding footnote.

³⁵⁹ See [الصفاء, S.D.] or [Dieterici, إخوان الصفاء, and Iḥwān al-Ṣafā’, 1865, p. 117–118]; for the Ikhwān note [Wright, 2001h]: “A 10th-century group of Islamic encyclopedists of Ismaili tendencies centred on Baṣra, one of whose epistles (*Rasā’il*) deals with music. Unlike most other music theorists of the 10th and 11th centuries, the Ikhwān al-Ṣafā’ 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.”

³⁶⁰ 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.



FHT 11 Proportions of the strings of the ‘ūd according to (ibn a-t-) Ṭaḥḥān’s *Hāwī-l-Funūn wa Salwat al-Maḥzūn*³⁶¹; s_1 to s_4 are the cross-sections, d_1 to d_4 are the diameters of the string from *zīr* to *bamm*. The proportions 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.



FHT 12 Proportions of the (silk) strings of the ‘ūd according to *Kanz a-t-Tuḥaf*; s_1 to s_4 are the cross-sections, d_1 to d_4 are the diameters of the string from *zīr* to *bamm*.³⁶² (Not including the thinnest string – the *ḥād*.)

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 Kindī is examined here.

Fārābī, as well as (ibn) Sinā and his student (ibn) Zayla³⁶³, 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.³⁶⁴

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

“If the *mushṭ* [bridge] – or the *anf* [nut] – is so high that the strings would be far from the fingerboard,³⁶⁵ 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-ṭ-ṭabaqa*] and produces a higher sound³⁶⁶.”³⁶⁷

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 Makhoulf’s ‘ūd with a raised nut in FHT 22:177), we

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.

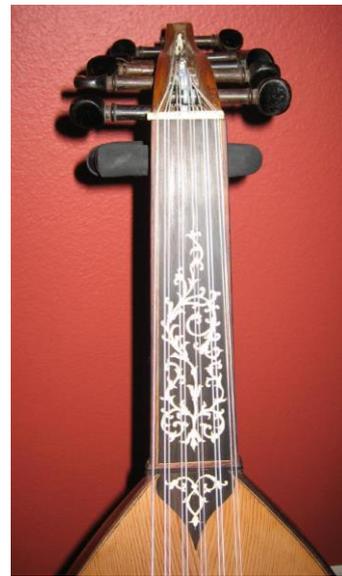
³⁶⁶ Note that a lengthened string, strictly speaking – and theoretically – and with all other variables (except the frequency) being equal, would sound “lower” acoustically as shown by Taylor’s formula expounded further; this would occur only if the tension of the string remains unchanged, in which case 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 Makhoulf for the

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).³⁶⁸

Provided (see FHT 14:169) the total vibrating length of the string is L_0 , and that the string is stopped somewhere on the fingerboard at a contact point dividing it in 2 parts L_{SO} (Length of the – lengthened – string in direction of the nut) and L_{CO} (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_{SO} and L_{CO} (which are the corresponding lengths of L_{SO} and L_{CO} when these are not lengthened).³⁶⁹

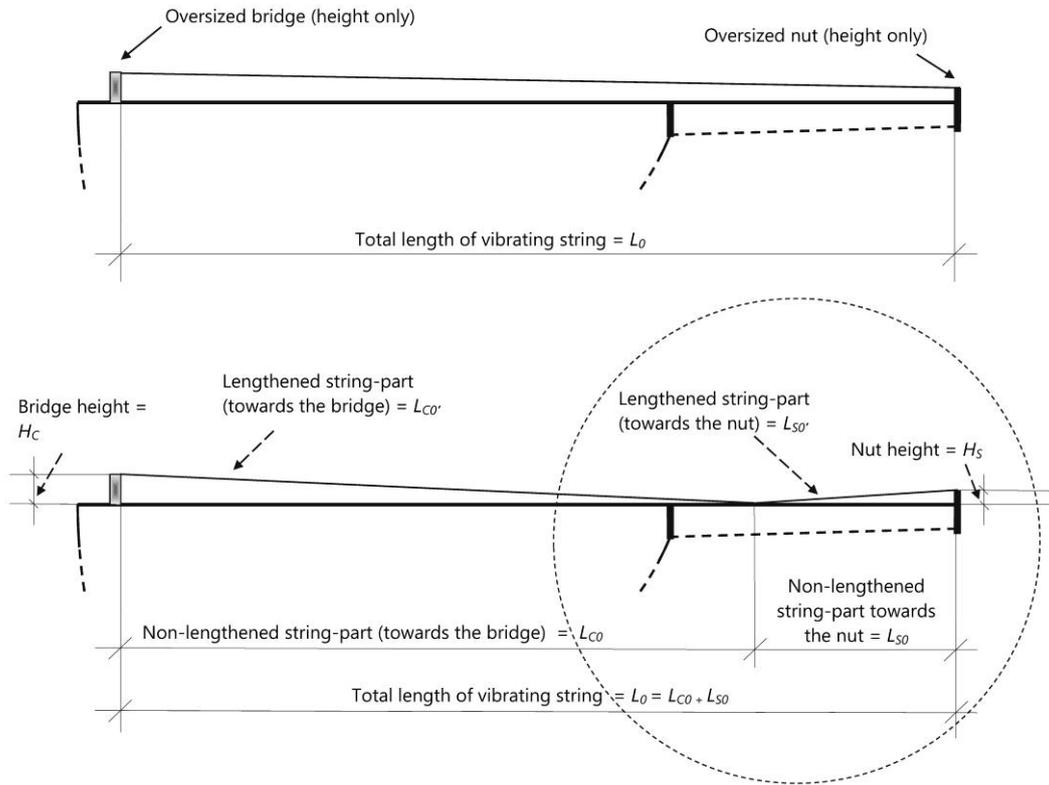


FHT 13 The neck of a Modern ‘ūd³⁷⁰

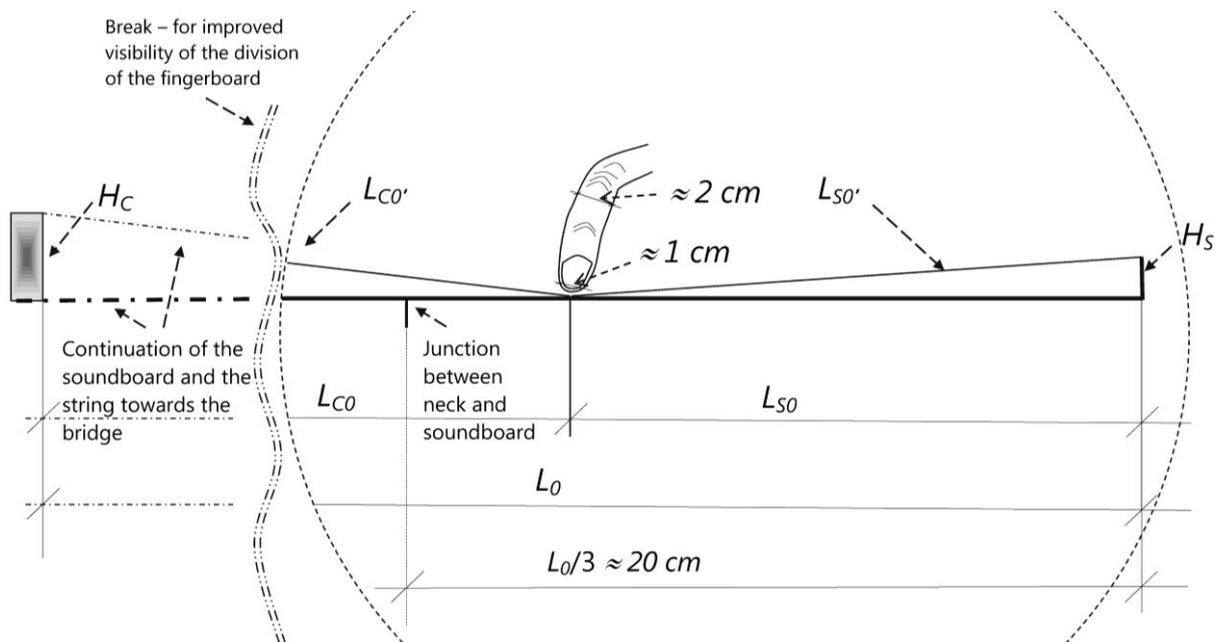
CIM09 were still available (on the 21st of October 2020) at (respectively) <http://www.hamdi-makhoulf.com/cim09/video-1-kindi.mp4> and <http://www.hamdi-makhoulf.com/cim09/video-2-tahhan.mp4> – and referenced as [Makhoulf, 2009a ; 2009b]. Two other copies, subtitled in English by Amine Beyhom, have been 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 Kindī and (ibn a-ṭ-) Ṭaḥḥān, 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_0 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-Hif-nawi. It was owned by Mohamad el-Qasabji [...]”



FHT 14 Lengthening of a ‘ūd string when stopped on the fingerboard. Above: length-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.)



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 ($L_0 = 60$ cm) and of the string-part over the soundboard ($L_{c0} = 2 L_0/3 = 40$ cm) and over the neck ($L_{s0} = L_0/3 = 20$ cm) are coherent with Kindi’s description, and with the proportions of modern ‘ūd(s)

L_{SO} and L_{CO} compose each a triangle with, respectively, the nut and L_{SO} , and with the bridge and L_{CO} , while forming right-angle corners with the nut or the bridge.

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

$$L_{CO'} = \sqrt{L_{SO'}^2 + H_s^2} + \sqrt{L_{CO'}^2 + H_c^2} \quad (1)$$

where H_c and H_s are, respectively, the heights of the bridge and of the nut, and where L_{SO} and L_{CO} are the lengths of the projections of $L_{SO'}$ and $L_{CO'}$ on the finger-board of the *'ūd* (or the lengths of the unshortened string-parts L_{SO} and L_{CO}).

Replacing variables H_c , H_s , L_{SO} and L_{CO} with realistic values, and stopping the string at 1/3 of L_0 ³⁷¹ (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 0,1³⁷² and 0,8 cm, and applying formula (1) we get:

$$\begin{aligned} L_{CO'} &= \sqrt{20^2 + 0,1^2} + \sqrt{40^2 + 0,8^2} \\ &= \sqrt{400,01} + \sqrt{1600,64} \\ &= 20,00025 + 40,0008 \\ &= 60,0015 \text{ (cm)}. \end{aligned}$$

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.

³⁷¹ Which corresponds to a just fifth.

³⁷² 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 *'ūd*(s), 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-*'ūd* shown in FHT 16 sq., with a nut with 1 mm height and the bridge being 8 mm high, the tie-fret of the *sabbāba*, 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 Kindī and (ibn) Ṭaḥḥān with musicologist and *'ūd* player Hamdi Makhlouf from Tunisia (see [Beyhom and Makhlouf, 2009] and FHT 26: 180 sq.), and due to the thickness of the tie-frets described by Kindī and Ṭaḥḥān,

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_c) 3 cm, the resulting length of the stopped string would be:

$$\begin{aligned} L_{CO'} &= \sqrt{20^2 + 0,1^2} + \sqrt{40^2 + 3^2} = \sqrt{400,01} + \sqrt{1609} \\ &= 20,00025 + 40,11234 = 60,11259, \end{aligned}$$

which is approx. one mm lengthening for 60 cm of total length which, when applying the modified Taylor's formula³⁷⁴ $T = 4(mLF)^2$, 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 $H_c=0,8$ 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 ties mounted 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

we had to raise the nut by adding a layer under it (FHT 22: 177 – this solution was suggested by Richard Dumbrell who worked concurrently on the reconstruction of the Silver lyre of Ur), making thus the performance possible.

³⁷³ 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://bizimages.withfloats.com/actual/596c8fb1966b6d0b9005204d.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, 2008].

³⁷⁴ See <http://www.physics.usyd.edu.au/~cross/StringTension.pdf> (last downloaded 08/01/20) and <http://pianomaker.co.uk/technical/string-formulae/> (last visited 08/01/20).

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 Ṭaḥḥān’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: fingertips³⁷⁶ have incompressible thicknesses. When stopping the string directly on the tie the borders of the fingertips will inevitably exceed this point by a few millimeters³⁷⁷ which creates an unpleasant buzzing sound. The best sound is obtained when the string is stopped a few millimeters before the ligature.³⁷⁸ 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,³⁷⁹ the string will effectively be stopped on the tie *below* it.³⁸⁰ In the figure, this would be the *wustā* when pressing the string between the *sabbāba* (index) and the *wustā* (middle finger).³⁸¹

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”.)

* *
* *



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, Orientabteilung).³⁸²

³⁷⁶ Which can be estimated as 1 cm, for an estimated 2 cm for the finger.

³⁷⁷ Due to the thickness of the fingertips.

³⁷⁸ 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 Kindī and Ṭaḥḥān with Hamdi Makhlof.

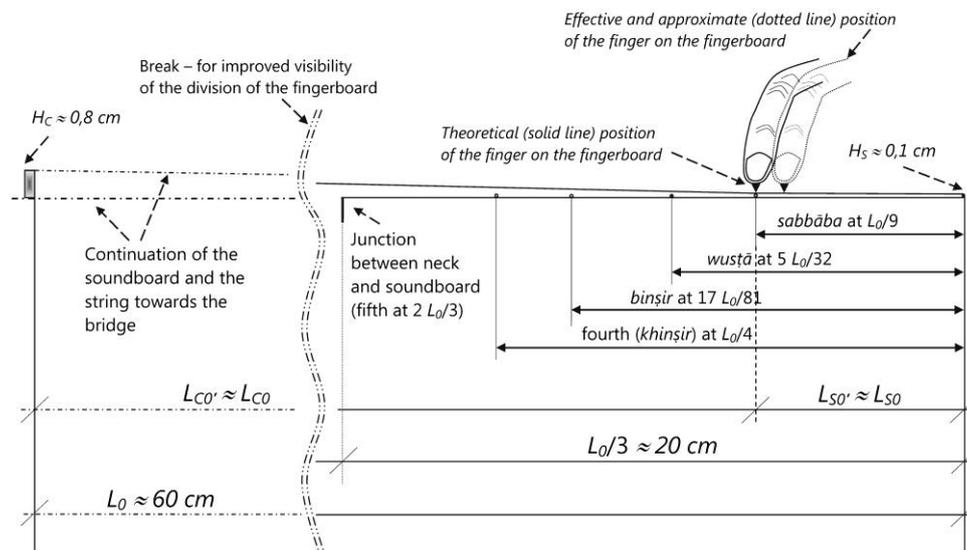
³⁷⁹ Compare this to ties 8 mm thick as the ones advocated by Maalouf for Kindī’s “fretting” in the section of Appendix B below entitled “Impracticality of the performance with dense divisions”.

³⁸⁰ 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*.

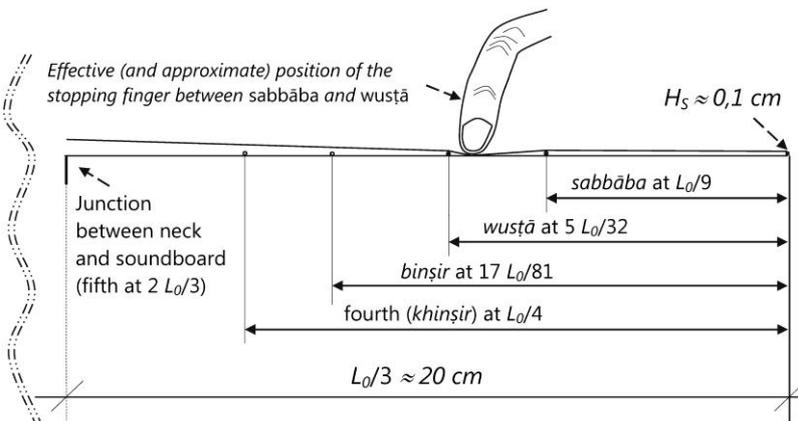
³⁸¹ This is in fact the main reason for mounting frets on a lute, as the performance will be much easier, although limited melodically, because the performer needs no more be (so) precise in his stopping of the string. An approximate stopping precision is enough to emit an acceptable sound. Note also 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).

³⁸² From [Tsuge, 2013, p. 258].

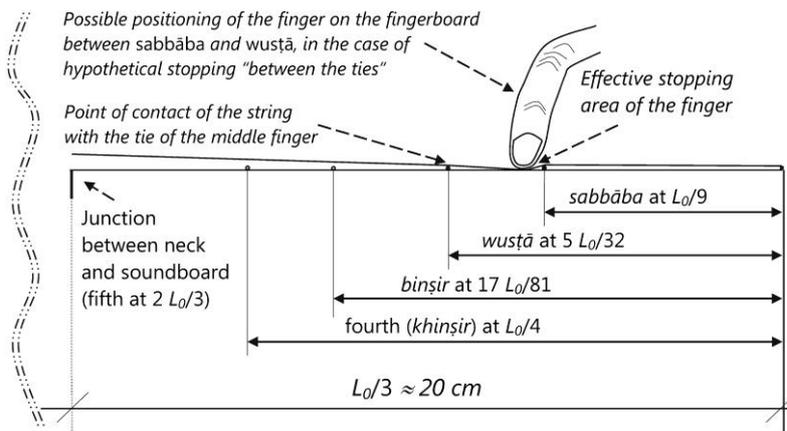


FHT 16 Two positions for the stopping finger on the tie of the *sabāba* (heights of bridge and nut are realistic = correspond loosely to the measurements of ‘ūd(s) nowadays). The 1st position (theoretical and to the left, mentioned by all early authors) is not advised if the ‘ūd is mounted with solid 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 (tie-fret, ligature) is 1 mm.³⁸³

FHT 17 Advised position to make the string sound at the length of the *wustā* (at $27 L_0/32$), 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”).



FHT 18 Not recommended stopping of the string at the length of the *wustā* ($27 L_0/32$), 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*.



³⁸³ The tie-frets are not, in these figures, winded 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: ORGANOLOGICAL CLARIFICATIONS

The fretting of the ‘ūd 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 ‘ūd. 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-t-) Ṭaḥḥān.

Both authors give relatively complete descriptions of ‘ūd 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) Sīnā, known to the West as Avicenna, and nick-named ‘the Commentator’ (of Aristotelēs), and also with other later writers such as Urmawī, 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 ‘ūd fretted according to ancient descriptions.

In Early Arabian writings about music, both theory and practice use the instrument as a common denominator. Recent research³⁸⁴ has also shown the antecedence of the ‘ūd 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 – ‘ūd 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 Ṭaḥḥān?

To answer this question, practical organological questions – notably Sachs’ remark on the shape of the neck of the ‘ūd –³⁸⁵ are examined.

* *

The fretting of the instrument was undertaken in 2008-2009 by Hamdi Makhlof. Two videos³⁸⁶ were produced, showing the making of four different frettings, with two sets of strings (for Kindī and Ṭaḥḥān respectively) and two tunings – Pythagorean and “Harmonic” – described by Kindī in his *Risāla fi-l Luḥūn wa-n-Naḡham*.

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 ‘ūd, demonstrate that the Arabian divisions of the fingerboard were “perfect”.

* *

³⁸⁴ [Beyhom, 2005].

³⁸⁵ See footnote no. 154:136.

³⁸⁶ See footnote no. 368:168 for the two videos made by Hamdi Makhlof for the CIM09. These videos are practical demonstrations of some organological problems raised by the fretting of the ‘ūd.

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 *tār*, *setār* and the *dotār*, exception made for the Turkish *sāz*) 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 ‘ūd.³⁸⁷

Moreover: we have learned from Fārābī that some notes on the ‘ūd are sounded when the strings are stopped *between* the “usual” *dasātīn* (ligatures), while others are sounded when the strings are stopped *on* the ligatures³⁸⁸ – not to mention (ibn) Sinā’s explanations about *portamenti* with the strings of the ‘ūd³⁸⁹.

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) *maqām* musicologists, 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 Kindī, in conjunction with the emplacement of the stopping finger(s).

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 neck³⁹⁰. This implies that:

- The span (ambitus) on a string is generally reduced, in traditional performance, to a just fourth (or fifth).³⁹¹
- This in turn implies that there is not much place for tie-frets – much less as with a *tunbūr* – 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 Kindī’s division in the *Risāla fī Khubr Šinā‘at a-t-Ta’lif* 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.³⁹² (This applies even more when the hygrometry is high.)

³⁸⁷ The tying of the tie-fret is always a delicate operation: see for example the YouTube videos [Zapico, 2015; PaololiutaiopD, 2010; Shepherd, 2016; Carey, 2017; Espinoza, 2015].

³⁸⁸ See Quote 1:138, Quote 2:139, Quote 11:140, Quote 13:148 and Quote 14:148.

³⁸⁹ Quote 15:148.

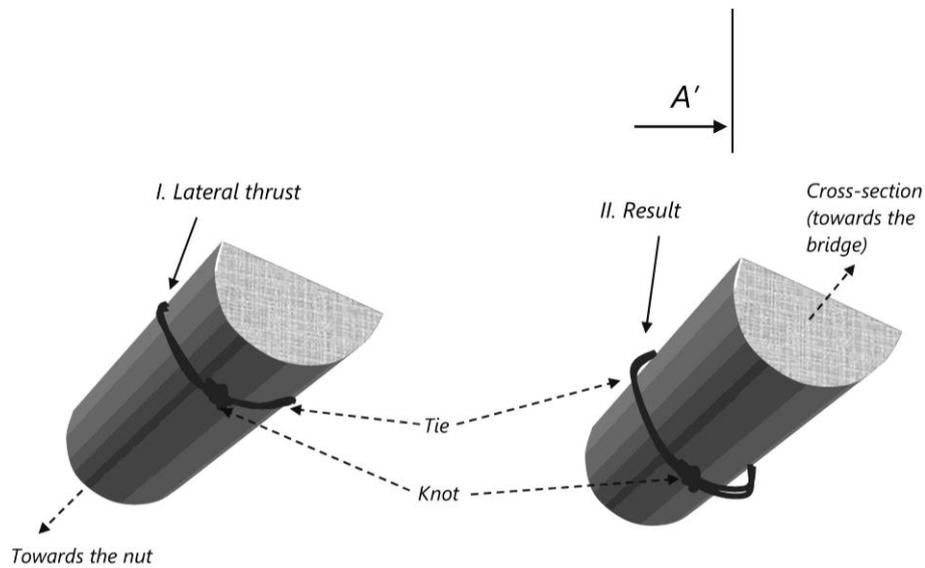
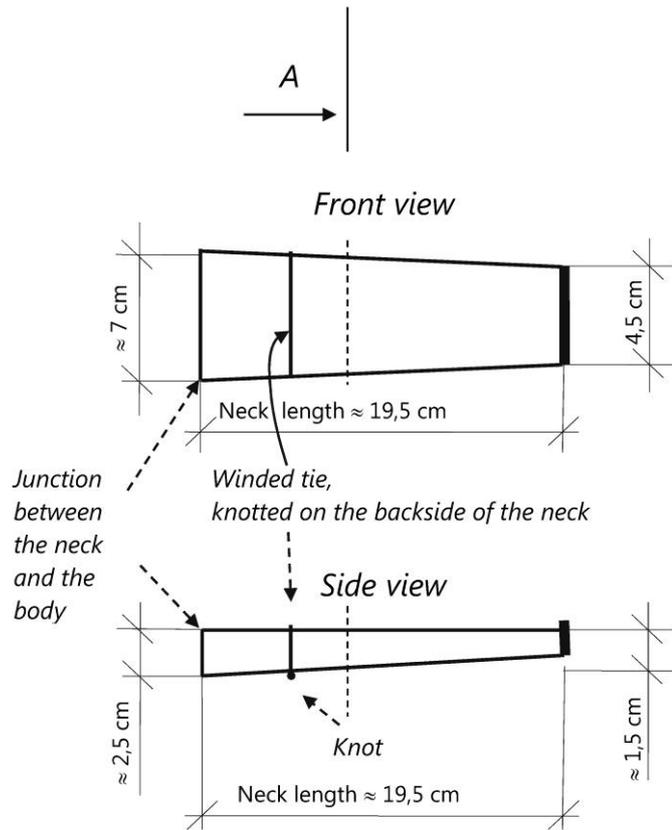
³⁹⁰ Shorter than the neck of the Western lute. Note that while Western lutes have frets, we do not know if this was the case from the beginning (which would be surprising). Moreover, Western lutes have – unlike the ‘ūd – wide, almost (semi-)cylindrical necks, with nearly no sloping of the

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.

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.

³⁹² See for example the Video no. 2 (Ṭaḥḥān – 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 *būṣīr* (third from the right) moves constantly while Hamdi Makhlof tries to play a melody on his fretted instrument.

FHT 19 Neck of a ‘ūd (based on Khulaī’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 20.³⁹³



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 *ʿūd* – AN EXPERIMENT³⁹⁴

Other problems arise when trying to reconstruct the frettings as proposed in the Arabian literature, such as with Kindī and Ṭaḥḥān – a task that no Orientalist (or Re-Orientalist) musicologist seems to have undertaken before our experiment with Hamdi Makhlof in 2009.³⁹⁵ This experiment aimed to recreate (or simply create) the frettings of the two early authors on a modern *ʿūd* – here the instrument of Makhlof 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,³⁹⁶ to the proportions proposed by Kindī and Ṭaḥḥān (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, Makhlof uses the set of strings “Ṭaḥḥān II” (THT 2: – also named “Kindī II”). The *ūd* is strung,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, Makhlof 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 “Ṭaḥḥān I” (THT 3:177).

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-hpcX1s> (for Ṭaḥḥān).

³⁹⁵ By Makhlof with advice from the author. This experiment was part of a wider research undertaken with musicologist and *ūd*(ist) Hamdi Makhlof 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 Makhlof, 2009] and in the aforementioned videos.

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

The two videos are explicit about the whole fretting procedure, and about the difficulties met by Makhlof during this process.



FHT 21 *ūd* used by Hamdi Makhlof to test the frettings.

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 16th-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.

³⁹⁷ And tuned in successive fourths.

String	<i>Bamm</i>	<i>Mathlath</i>	<i>Mathnā</i>	<i>Zīr</i>
Kindī I (section)	$d\sqrt{4}$ (2d)	$d\sqrt{3}$ (1.73d)	$d\sqrt{2}$ (1.41d)	d
Ṭaḥḥān I (weight)	1.54d	1.33d	1.15d	d
Ṭaḥḥān II (diameter) (Kindī II)	2.37d	1.78d	1.33d	d

THT 2 Diameters of the strings expressed as a function of the (weight or the diameter d of the) thinnest string, the *zīr*, as given (as proportions) by Kindī and Ṭaḥḥān. In the second possibility for Ṭaḥḥān (“Ṭaḥḥān II”), diameters of the strings are nearer to those of Kindī I – apart from the *bamm*, clearly thicker in Ṭaḥḥān II. The set of strings “Ṭaḥḥān II” is renamed “Kindī II”.

String	<i>Bamm</i>	<i>Mathlath</i>	<i>Mathnā</i>	<i>Zīr</i>
Ṭaḥḥān I (weight)	0.81 (0.82)	0.71	0.61	0.53
Kindī II (diameter with Ṭaḥḥān)	1.27 (1.26)	0.94	0.71	0.53

THT 3 Closest string-diameters to the strings proportions of Kindī and Ṭaḥḥān with Savarez gut strings, taking the *zīr* string to be 0.53 mm in diameter (equivalent to d). (For the *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.)

One of the difficulties which arose while fretting the instrument was the exaggerated diameters of the *bamm* and *mathnā* strings, mostly for the set “Ṭaḥḥān 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 fingerboard³⁹⁸ is evident when using string thicknesses as advocated by this early author (FHT 26:180), which in turn creates problems.³⁹⁹

Secondly, the thickness of the tie-frets compelled Makhlof to insert a wooden piece beneath the nut (FHT 22:177)⁴⁰⁰ to raise it in such a way as for the strings not to be in permanent contact with the frets.

³⁹⁸ 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.

³⁹⁹ See Video no. 1, beginning 04:33 (mm:ss).

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.



FHT 22 Specific difficulties arise in the process of mounting the ties on the neck of the ‘ūd following the indications of Kindī in the *Risāla fi-l Luḥūn wa-n-Naghām*. Here, the tie-frets do not adhere to the surface of the fingerboard because of undue rigidity (due to the thickness) of the material of the first two tie-frets. (Note the wooden layer beneath the nut piece which was added to raise the strings.)⁴⁰¹

While the second set of strings (“Ṭaḥḥān 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-

⁴⁰⁰ See Video no. 1, 01:40 (mm:ss) to 02:00.

⁴⁰¹ Note that today in Iran the thickest tie is 0.8 mm (diameter) for the *tār* with relatively finer (slimmer) ties towards and after the fifth. In Central Asia, the thicknesses can reach up to 1 mm. (Private communication from Jean During.)

frets – although less accented – during the performance.



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

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.

*
* *

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 Kindī’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

⁴⁰² [Maalouf, 2002].

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 24 Pythagorean division according to Ṭaḥḥān; 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 (“Ṭaḥḥān 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 *wustā*(s) and their octaves. The “simple” *wustā* (at 27/32) and the Persian *wustā* (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:

$$\frac{27L_0}{32} - \frac{68L_0}{81} = \frac{27 \times 81 - 32 \times 68}{32 \times 81} L_0 = \frac{2187 - 2176}{2592} L_0$$

⁴⁰³ [Abou Mrad, 2005].

$$= \frac{11}{2592} L_0 = 0,004244 L_0.$$

Replacing by the typical length of a ‘ūd string L_0 , 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 $17/18 L_0$ and $243/256 L_0$.

This difficulty is increased closer to the nut (for the location of the *Persian wuṣṭā* at $2175/2187 L_0$) 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 fī-l-Luḥūn wa-n-Naḡham*, Maalouf assigns (FHT 29:181) a thickness of 8 mm⁴⁰⁸ to the tie-fret of the *sabbāba* (index) made of two folds of *bamm* 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 *biṣīr* (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, $2 \times 1\text{mm}$ 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 *bamm* string tied twice around the *sabbābat* fret fills an area of 4 mm on each side of the fret [...] The *mathnā* string tied twice around the *biṣīr* 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 *part* 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.



FHT 25 Reconstructed Harmonic division of Kindi in the *Risāla fi-l Luḥūn wa-n-Nagham*, using tie-frets of the set “Kindi II”.

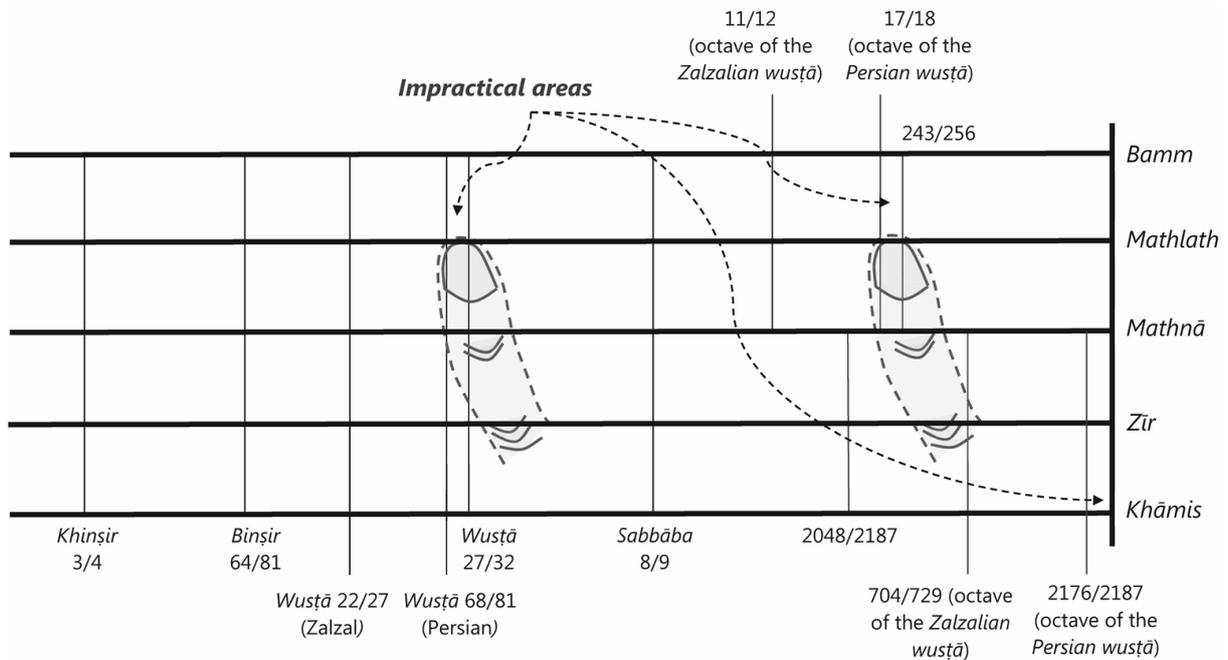


FHT 26 Set of gut strings “Kindi II” used in the reconstruction of the “fretting” of Kindi’s *Risāla fi-l Luḥūn wa-n-Nagham* with diameters, from *zīr* (thinnest string) to *bamm* (thickest string): 0.53 mm, 0.71 mm, 0.94 mm and 1.27 mm.⁴¹²

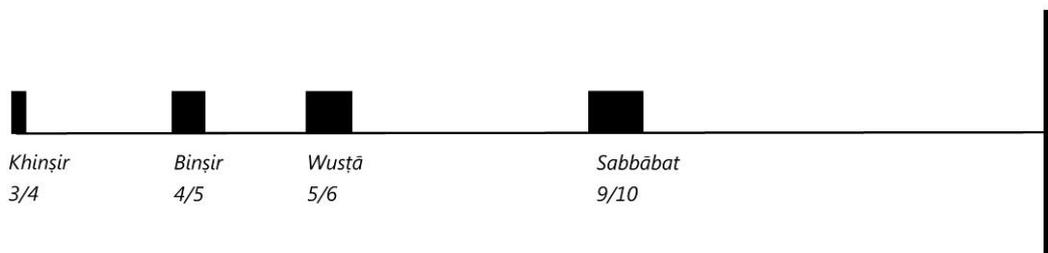


FHT 27 Set of strings “Ṭaḥḥān I” with similar proportions as given by Ṭaḥḥān (proportional weights/sections) with diameters, from *zīr* to *bamm*: 0.53 mm, 0.61 mm, 0.71 mm et 0.81 mm.

⁴¹² Detailed information for the procurement of thicknesses of strings for Kindi’s and Ṭaḥḥān’s ‘ūd(s) is available in [Beyhom and Makhoul, 2009].

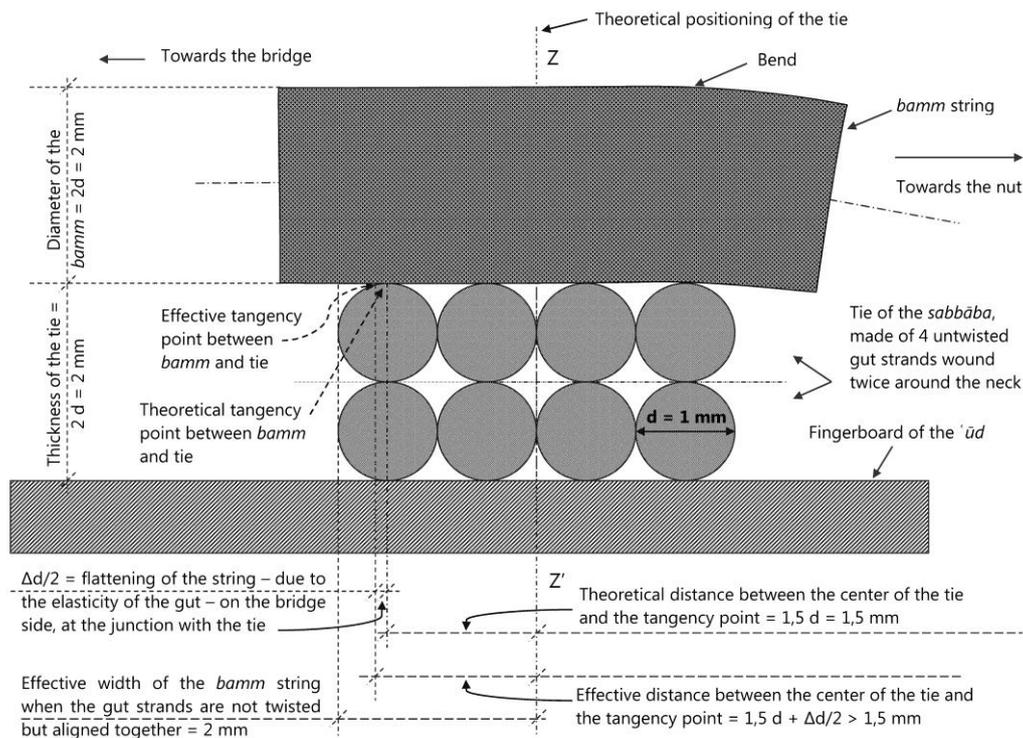


FHT 28 Impractical areas appear when including the octave equivalences for the scale of (al-) Fārābī as described by Maalouf.⁴¹³ This figure is adapted and translated from [Beyhom, 2010c, v. 1, p. 175, 357]: virtual fingers reproduced in the figure are approx. 2 cm wide.

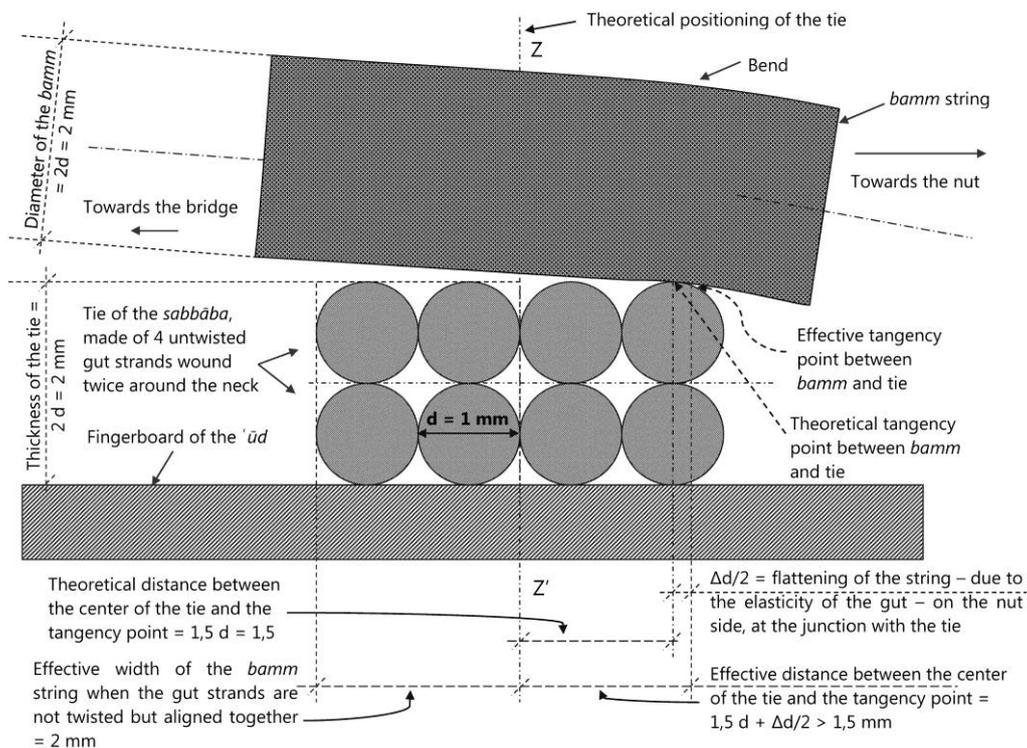


FHT 29 Computer re-created copy of the upper part of figure no. 3.5 in [Maalouf, 2002, p. 94], showing the proposed thicknesses of Kindī’s tie-frets described in the *Risāla fi-l-Luḥūn wa-n-Naḡham*.

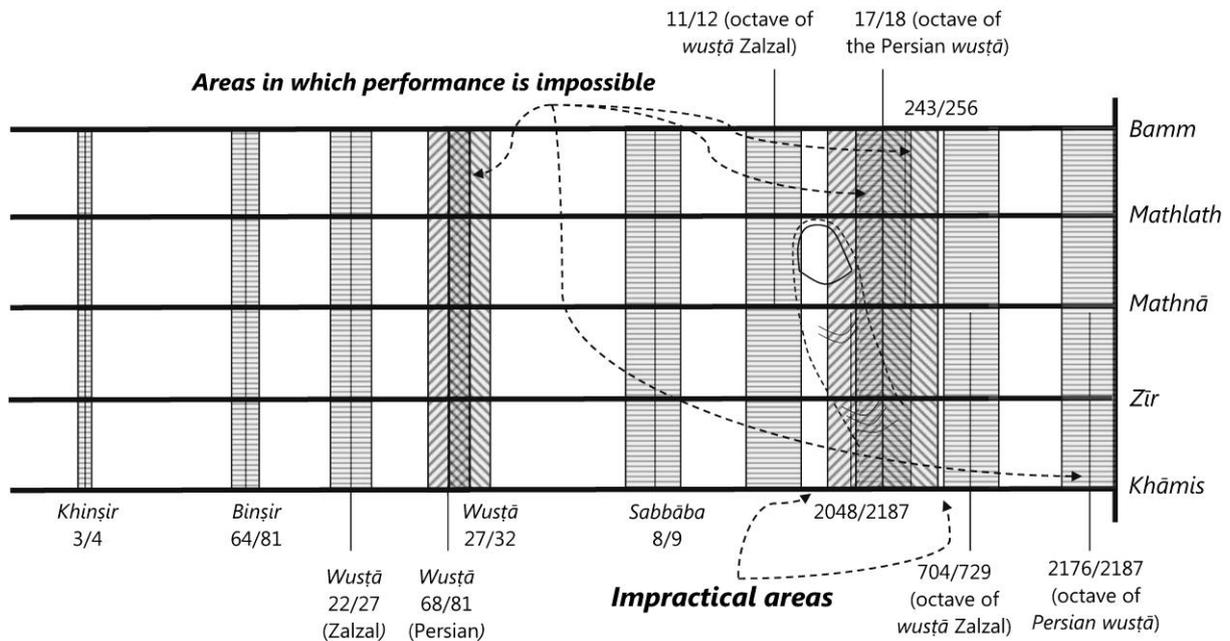
⁴¹³ [Maalouf, 2002, p. 126]. Many musicologists maintain that the Early Arabian ‘ūd was “fretted” notwithstanding the complex divisions described by Arabian theoreticians, and forgetting (or overlooking) the fact that some of the positions for the notes are alternative positionings, as here for the *wustā*(s). 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.



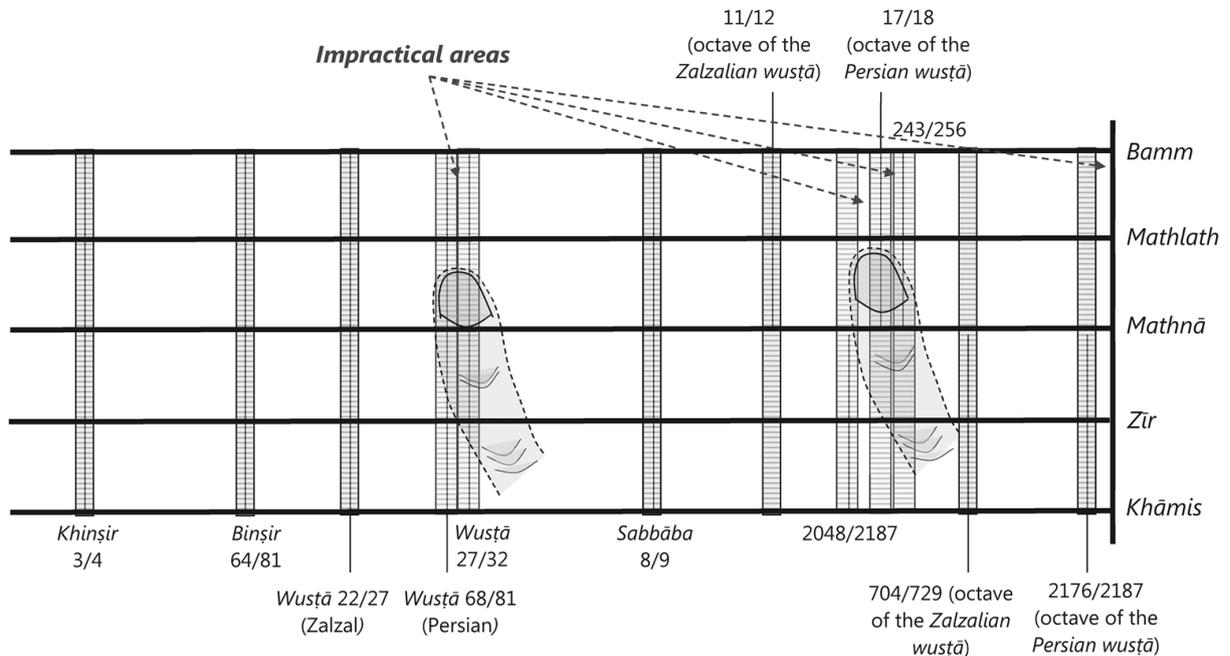
FHT 30 Tangent point of the string with the tie in the case of a lowered bridge, and in the case (as advocated by Maalouf) where gut strands are superposed. (“Tie” in the figure = “tie-fret”); Each gut is considered as homogeneous and cylindrical, in accordance with Maalouf’s indications: Richard Dumbrill – 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”).



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 winded around the neck of the ‘ūd following Kindī'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 $2 \times 1\text{mm}$) 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) wustā(s).⁴¹⁵

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-MŪSĪQĀ* BY (AL-) MUNAJJIM (856-912)

The first extant theoretical (and historical) divisions of the neck of the *ūd* are, as explained in the main text, by Kindī and Munajjim.⁴¹⁶ While previous reviews of Arabian theories assert, with a little haste it seems, that these divisions are Pythagorean and ditonic,⁴¹⁷ and based on the tuning of the strings of the instrument in successive fourths,⁴¹⁸ things do not stand however in such a simple fashion.

The manuscripts of these authors are not explicit about this information and, while Kindī 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.⁴¹⁹

* * *

Yaḥyā ibn ‘Alī ibn Yaḥyā ibn abī Maṣūr al-Munajjim comes from a family of astrologists,⁴²⁰ of poets and of historians. He was close to al-Muwaffaq, the brother of Caliph al-Mu‘tamid (870-892),⁴²¹ and he is known

⁴¹⁶ 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.

⁴¹⁷ This is the Pythagorean ascending-descending division shown in FHT 13 in [Beyhom, 2016, p. 186].

⁴¹⁸ (Reminder:) The *ūd* at that time had 4 strings, named consecutively (from top to bottom – for a *ūd* played by a right-handed performer and seen from the front side – but “lowest” to “highest” acoustically) *bamm*, *mathlath*, *mathnā* and *zīr*; the *ḥād* (an additional string situated lowest – and acoustically “highest”) is cited in Urmawī’s *al-sh-Sharafiyya*, while several earlier authors (including Kindī – who names it the “lower *zīr*” in the *Risāla fī Khubr Sīnā‘at al-Ta‘līf*) mention this 5th string although they specify that its use (fullness) was merely theoretical.

⁴¹⁹ The following section contains a few, simple algebraic formulae for Munajjim’s division of the fingerboard of the *ūd*. An accessible review of algebra is available in [Pratt, 2007].

⁴²⁰ Besides [Beyhom, 2010b], Owen Wright’s articles [1966; 2001i] can be consulted for additional information about Munajjim and his epistle. “Munajjim” (root: *n[aljm]* – “planet”, “celestial body”) in Arabic means “astrologist”.

⁴²¹ [Farmer, 1929, p. 167].

⁴²² [Farmer, 1929, p. 168] and Erlanger in [Fārābī (al-), 1930, v. 1, p. xxii].

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,⁴²³ the *Kitāb al-Aghānī*⁴²⁴ by Abū-l-Faraj ‘Alī al-Aṣḥānī (or Iṣḥānī).⁴²⁵

This epistle brought numerous analyses and interpretations.⁴²⁶ Munajjim claims in the introduction⁴²⁷ that he would explain the teaching of Iṣḥāq al-Mawṣilī,⁴²⁸ but this task is not really fulfilled as not only later (contemporary) commentators would not agree on the structure of the modes mentioned by him, but also because even the structure of his division cannot be proven with the extant data.

The naming system (literal notation) is alphabetic, and uses the same Syriac alphabet as with Kindī (*abjad*) 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.⁴²⁹

Era] of ignorance” – see footnotes no. 45:119 and 226:142) till the 10th century.

⁴²⁴ 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].

⁴²⁵ The title of Yūsuf Shawqī’s 1976 edition, *Risāla’ ibn al-Munajjim fī-l-Mūsīqā wa Kashf Rumūz Kitāb al-Aghānī* [The epistle of ibn al-Munajjim on music and the unveiling of the symbols of Kitāb al-Aghānī], is for example explicit about this matter. Abū-l-Faraj al-Aṣḥānī (or Iṣḥānī, 897–967) a.k.a. Abulfaraj, “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]).

⁴²⁶ For a review of these interpretations, see [Sawa, 1989, p. 74–78].

⁴²⁷ [Munajjim (al-), 1976, p. 189].

⁴²⁸ See footnote no. 101:101.

⁴²⁹ 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 (*majāri* – sing. *majrā*) running through (either of) the *binšir* (annular) or the *wuṣṭā* (middle finger).⁴³⁰

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 ‘ūd 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)⁴³¹, the division becomes Pythagorean (ascending, with one descending tone from the *khinšir*), but there is an infinity (as for infinite steps) of other possible divisions (FHT 36:186 and FHT 34:185), including an infinity of Zalzalian divisions.⁴³² No other indications in the epistle allow for more precision or provide more information about the division.⁴³³

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,⁴³⁴ the interval between the nut and the *sabbāba*⁴³⁵ (X in the drawing, in semi-tones) being equal to the interval between the *sabbāba* and the *binšir* and between the *wuṣṭā* and the *khinšir*. If we name Y the distance between the *binšir* and the *khinšir*, W the distance between the nut and the *wuṣṭā*, Z the distance between the nut and the *khinšir*, and with O being the octave (12 tempered semi-tones), inter-relationships can be deduced in the form of the following algebraic relations:

⁴³⁰ These “courses” in [the ligature (*dastān*) of] the *wuṣṭā* or of the *binšir* correspond to successions of notes composing a modal scale, starting with a particular note and making its way through either the *binšir* or the *wuṣṭā* – 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 *Oktōēchos*. Some features of the Arab system, which likewise consisted of eight modes, are described by al-Munajjim (856–912), who discussed them in terms of the diatonic fretting, to which their names relate, on the two upper strings of the ‘ūd. **Assuming a tuning in perfect 4ths**, 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 *qotome* (A) of 114 cents” – Wright in [Wright, Poché, and Shiloah, 2001, p. 800–801]. (Bold type mine)

$$5X + 2Y = O \text{ (“octave”)},$$

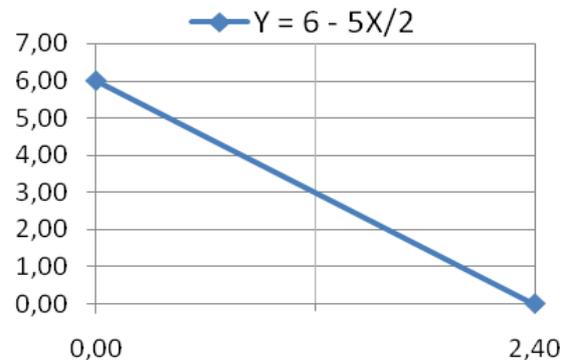
$$\text{with } 0 \text{ (“zero”) } \leq Y \leq X \leq O/2 ; Z = 2X + Y ; W = X + Y$$

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

$$Y = 6 - \frac{5X}{2}, \text{ with } 0 \leq Y \leq X \leq 6;$$

$$X = \frac{12 - 2Y}{5}, \text{ with } 0 \leq Y \leq X \leq 6$$

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), $Y = 0,9$ (*leimma*). This is one out of an infinite number of solutions, which depend on the precision of the measurement of X and Y .



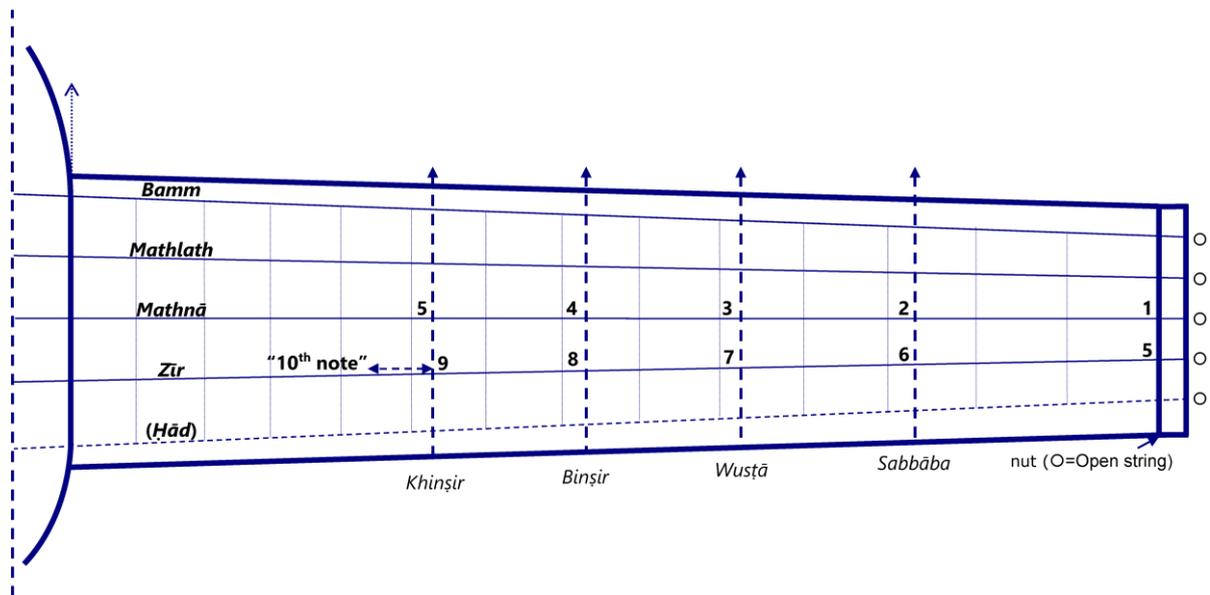
FHT 34 Graphic showing the relation between Y (vertical axis – interval between the *binšir* – annular – and the *khinšir* – auricular) and X (horizontal axis – interval between the nut and the *sabbāba* [index] – and between the *sabbāba* and the *binšir*). When $X = 0$, $Y = 6$ (semi-tones); when $X = 2,4$, $Y = 0$ (or *vice versa*). The general case with boundaries for each interval in shown in FHT 37:187. When $X = 2,04$ (Pythagorean tone), $Y = 0,9$ (*leimma*) and the division becomes Pythagorean (FHT 38:187).

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 ‘ūd in Munajjim’s epistle, in perfect fourths] is corroborated by Al-Khawārizmī (*Maḡātib al-‘Ulūm*, ed. van Vloten, p. 239), speaking specifically of musical practice”.

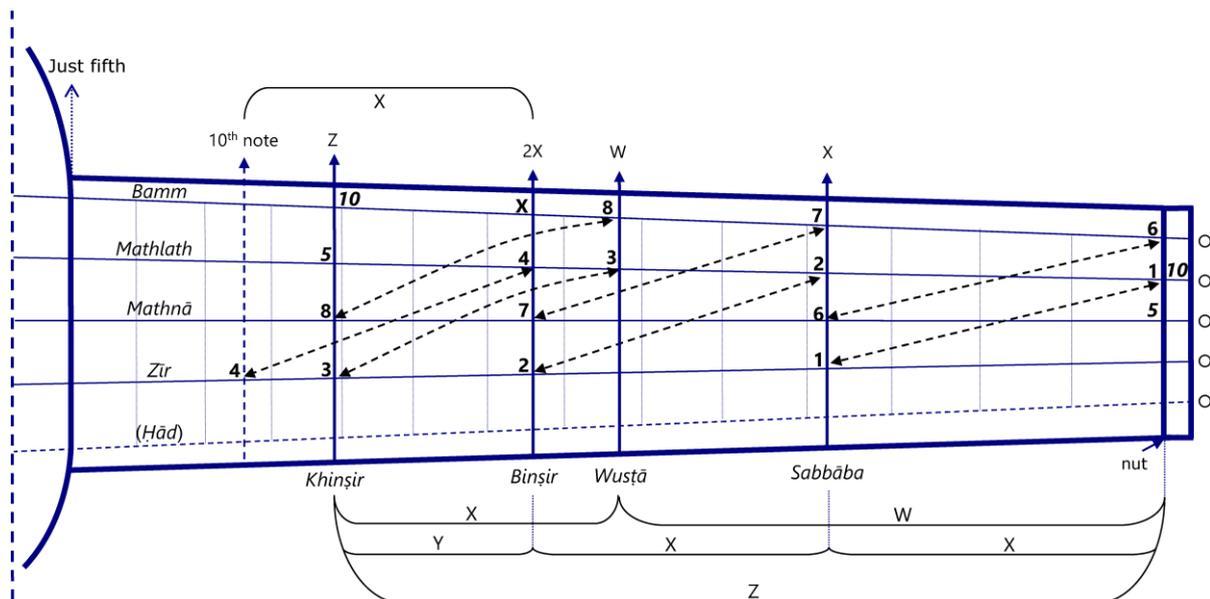
⁴³³ We find in the epistle: “the reason for this disposition of the ligatures is a discussion which exceed the limits of this epistle [*kalām yaḡūl al-kitāb b-istifā’ihī*]” – [Munajjim (al-), 1976, p. 221].

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: *sabbāba* for the index, *wuṣṭā* for the middle finger, *binšir* for the annular and *khinšir* 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-Mūsīqā*. 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 *fī-l-Mūsīqā*. The double sided arrows show (sequentially numbered) equivalences between octaves (bold) or unisons (bold italics).

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 Praxis immer entfernt gehalten haben mussten. Ich meine, [...] dass man demzufolge nicht sagen sollte: die Musik der Chinesen, der Indier, der Araber, der Perser u. s. w., sondern: die musikalischen Systeme (oder Mysterien) der chinesischen, der indischen, arabischen, persischen Philosophen, des Meisters Chrysanthos, u. s. w. – Vielleicht dass es in der Musik der alten Griechen eben auch nicht anders gewesen”.

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

“1) *Période bédouine*, depuis la *djâhilya* jusqu’aux premiers temps de l’Islam (mort d’Ali, 661) ; 2) *Période d’assimilation*, de la dynastie omeyyade au premier cycle Abbasside (vers 830) ; 3) *Période d’épanouissement et de dispersion*, avec le second cycle Abbasside et l’établissement des Omeyyades en Espagne ; 4) *Période de repli*, de la prise de Grenade (1492) à la fin du XVIII^e siècle ; 5) *Renaissance* : la *Nahda*, du XIX^e siècle, à partir de l’expédition de Bonaparte en Égypte, jusqu’au congrès du Caire (1932)”.

[Chabrier, 1982]:

“Avec les Califes Abbassides de l’Iraq, [le *ūd*] 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”.

[Kindī (al-), 1965, p. 19]:

“وقد يستعمل المغنون أيضاً نغمة خارجة من جميع الدساتين يسمونها “المحصورة” وهي خارج من دستان الخنصر يمدون إليها الخنصر، وخلف هذه أيضاً – بمثل مسافة دستان الخنصر – نغمة أخرى، غير أنهم ينقلون السبابة إلى دستان الوسطى أو البنصر”.

[Sinā (Ibn) or Avicenna (980?-1037), 1956, p. 47–48]:

“[...] فلما حاولوا ايداعه اللحنيات [...] ودع ثلاثة أبعاد للسبب الذي ذكرناه. وقد أعان هذا السبب سبب من جهة الآلة وهو: أن الحاجة مسّت

في تقدير النغم إلى الدساتين، واضطرت إلى أن يستعمل عليها الأصابع، وعسر في ابتداء الأمر أن يحرك الكف والأصابع معاً، ففرض على الكف السكون وعلى الأصابع الحركة، وكان القدر الذي يلزمه الكف ساكناً وتتصرف عليه الأصابع متحركة من طول الآلة المعتدلة هوربعه، فشُدَّ على الربع أول الدساتين منسوباً إلى الخنصر، وشغلت الإبهام بالضبط، وبقي للتصرف فيما بين حدّي ذلك الربع أصابع أربعة”.

[Manik, 1969, p. 12]:

“In bezug auf die Lautenbünde, die die mittelalterlichen Musiktheoretiker zur Darstellung ihrer Tonsysteme ausführlich beschrieben haben, 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 beruft sich Berner auf Geiringer, der, nachdem er festgestellt hatte, daß eine Laute mit Bündeln 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”.

[Ṭahhān (ibn a-ṭ- al-Mūsīqī), 1990, p. 175-176 (89–90)]:

“بعض الناس يظنّ أنّ النغم التي في العود مختلفة العدد اختلافاً في شدّة الدساتين ونحن نذكر من ذلك ما يتفق. وهي قانون الغناء المتبع. وتجري مجرى شدّة نفوس الحدّي وهو من أجل هذا الشّأن والدساتين حدود النغم والسنة الاوتار ومنها مخارج النغم من العود ومواضع الحروف من الحلق فإذا خرج حرف من الحلق من موضعه الحقيقي خرج صافياً وكذلك النغمة إذا خرجت على دستان صحيح خرجت صافية وجميع الدساتين التي تُستخرج فيها النغم الطبيعية للانسان وتُستعمل في جميع الالحن سِتّة دساتين أولها دستان المجنّب ودستان السبابة ودستان وسطى الفرس ودستان وسطى العرب ودستان البنصر ودستان الخنصر وبين دستانى وسطى العرب ودستان البنصر دستان آخر يسمى دستان زلزل وأكثر الناس يُهمله ودستان آخر يقع بين دستان البنصر ودستان الخنصر يُهمل أيضاً وهذه الدساتين الخارجة عن العدد الأول فهي ممّا يستعمله الفرس في طرائقهم وأنا أستعمل ذلك وأطرق مواضعه لمعرفتي به بغير دساتين وذلك يصعب على المتعلّمين فتركه لهم أولي وأحقّ. وشُدّ الدساتين يحتاج إلى علم بها. محتاج الذي يريد شدّها على العود أن يأخذ بركاراً فيفتحه فتحاً بقدر ما يريد شدّها ويقبس به قياساً صحيحاً بينها والمطبوع المرتاض العارف المرتاض يعرف أقدارها ومواقعها بلا بركار بل بالحسن ومُقابله بعض النغم ببعض وبالعادة والدربة ثم يشدّها فإذا كملت على ما ذكرناه صحّت النغم وصفت وهذه حملة كافية ولا يحتاج في عرض الدساتين أكثر من أربع طاقات من الاوتار البيض المصارين ويجب أن يكون على تدريج في أن يكون الأوّل غليظاً والثاني دون غلظه والثالث دونه كذا إلى آخرها على هذا المثال وإن لم يعتبر بالعين فليعتبر بالوزن فإنّه أصحّ”.

[Fārābī (al-) and الفارابي, 1967, p. 655]:

”وربما كانت صنعة الآلة صنعة يقتزن منها إلى نغم الدساتين المتفاضلة نغم أو دويّ يُفسد اتّفاقاتها، فيضطرّ الإنسان عند ذلك إلى استعمال الدساتين المتساوية أبعاد ما بينها، على ما قيل فيما أثبت في العود“.

[Fārābī (al-), 1967, p. 663–664]:

”فأما أكثر المجديين من مستعملي هذه الآلة من العرب، فإنهم لا يستعملون الدساتين الجاهلية، لكن يُزلون أصابعهم أسفل من دستان (س.ع)، فيجعلون دستان (س.ع) دستان السبابة، ويضعون البنصر أسفل منه إلى ناحية (ج) ويتلون بالخنصر، وآخر مكان يضعون عليه خناصرهم هو دون ربع جميع الوتر بشيء صالح القدر، ويجعلون وسطياتهم بين (س.ع) وبين أمكنة بناصرهم. وأكثرهم يجعلون أبعاد ما بين أصابعهم متساوية، أو يجعلون مسافات ما بين أصابعهم قريبة من مسافات ما بين دساتين إلا مكان السبابة، فإنهم يستعملون فيه آخر دساتين الجاهلية، وهو دستان (س.ع)“.

[Kindī (al-), 1965, p. 12–16]:

”قسمة الدساتين

أما الدستان الأول الذي تسميه الحكماء "المفتاح" فإنه يلي الأنف وهو الذي تقع عليه الأصبع السبابة، وهو مشترك لجميع الأوتار ولا يقع عليه من الأصابع إلا السبابة فقط، وتركيبه: أن يقدر ثلاثة أصابع من هذين الثلاثين التي هي طول الوتر – ويكون التقدير من رأس العنق الدقيق وهو موضع الأنف – فحيث انتهت الأصابع الثلاث أُدير على ذلك الموضع قطعة من بيم دورين اثنين، ثم يربط على ظهر العنق رباطا شديدا لا يتهيأ له لشدته أن يزول عن موضعه.

ثم يُقَدَّر من هذا الدستان – إلى ما يلي المشط – اصبعين اثنين، ويُشَدَّ

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على الموضع قطعة من مثلث على سبيل الدستان الأول وهذا: لدستان الوسطى [113] و] في جميع الأوتار.

ثم يقدر من ذلك اصبع واحد إلى جهة المشط ثم يُشَدَّ عليه دستان من مثنى على شرائط الدستانين اللذين سلفا.

ثم يقدر من هناك اصبع ونصف ويشد على الموضع قطعة من زير على سبيل الدساتين المتقدمة، وهذه قسمة الدساتين، وأنا مبتدي بشرح علل هذه القسمة وموضح لما صارت كذلك بلا زيادة ولا نقص.

إن هذه الآلة ليس فيها شيء إلا وفيه علة فلسفية: إمّا هندسية وإما عددية، وإما نجومية، فأما قسمة الدساتين فإن العلة فيها عددية وذلك: انه لما كان طول الوتر ثلاثين اصبعاً كان أقلّ أجزائه المنطوق به لفظاً واحدة العُشر وهو ثلاث أصابع، فكان موضع نغمة وشُدَّ هنالك دستان السبابة، ولأن ما كان أقل من العشر – كجزء من أحد عشر وجزء من اثني عشر وغيرهما من الأجزاء – لا يقال له جزء مطلق معلوم لأنه لا اسم له، وإنما الاسم لفظاً واحدة كعشر وتسع وثمن إلى أن يبلغ النصف.

ثم طلبوا الجزء الذي يلي العشر لِيُشَدَّ في مكانه دستان فكان التسع، فلم يجدوا للثلاثين تسعاً، ولم يكن هناك موضع دستان لأن الوتر لا ينطق إلا من موضع جزء من أجزائه فجاوزه [113] و] ونظروا أيضاً إلى الثمن معدوم

من الثلاثين، وكان التسع كذلك فجاوزه. ثم طلبوا السُدس – وهو خمسة – فكان موضع النغم فشدوا فيه دستان الوسطى وهو على اصبعين من دستان السبابة وخمسة من أول الوتر.

ثم طلبوا الخُمس فوجدوه – وهو ستة – فشدوا هنالك دستان البنصر. ثم نظروا إلى موضع الرُبع الذي قدره لجملة الدساتين فشدوا عليه دستان الخنصر.

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ولم تُجرَّ النغم هذا الجزء من الوتر – أعني الربع – إلا للعلة التي ذكرناها: من عمق العود وحاجته إلى مساواة النغم وحاجة النغم إلى مساواته.

ثم صبروا الجزء الذي بعد الرُبع – وهو الثلث – حدّ العمق من جسم العود. ثم صبروا الجزء الذي بعد الثلث – وهو النصف – للعرض وهو أعرض موضع يجب أن يكون فيه، ويجب أن يكون موقعه من العود على ثلاث أصابع من نهاية المشط إلى ما يلي الأوتار، والعلة في ذلك: محاذاته لضرب الأوتار، وذلك أن هذا الموضع من العود أكثره سعة وأكمله دويًا، وإنما صار مضرب الأوتار على ثلاث أصابع من المشط لأنه موضع جزء من أجزاء الوتر وهو العُشر.

وينبغي أن يكون جسمه في غاية ما يمكن [114] و] من الرقة ويكون ذلك عاملاً فيه لجميع أجزائه، حتى لا يكون في ظهره موضع أرق ولا أثخن من موضع وكذلك في بطنه، فإن اختلاف أجزائه في الرقة والثخن مما يُحيله عن استواء الأوتار وائتلاف النغم.

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الفن الثاني

في معرفة الأوتار والنغم

أما الأوتار فهي أربعة، أولها: البيم وهو وتر من معاء دقيق متساوي الأجزاء وليس فيه موضع أغلظ ولا أدق من موضع، ثم طوي حتى صار أربع طبقات وقتل فتلا جيداً.

وبعده: المثلث وسبيله سبيل البيم غير أنه من ثلاث طبقات.

وبعده: المثنى وهو أيضاً أقل من المثلث بطبقة – وهو من طبقتين – غير أنه من ابريسم، حتى قُتِلَ فصار في قياس الطبقتين من المعاء في الغلظ.

وبعده: الزير وهو أيضاً أقل من المثنى بطبقة واحدة – وهي أن يكون من طبقة واحدة – وهو من ابريسم في حال طبقة من طبقات الأمعاء.

فجعل البيم أربع طبقات لأنه أساس لأوائل النغم وهي النغم الكبار الخارجة من أوسع موضع في الحنجرة – وهو أصل قصبه الرنة – ولذلك يجب إذا عُلق البيم في موضعه – الذي هو أعلى مواضع الأوتار – أن يُمد ملواه ويترنم بهذه النغمة – أعني أول نغمة في [114] ظ] أصل الحنجرة، ويُحرك البيم بإبهام اليد اليمنى، فإذا استوى مع تلك النغمة فأوقفه على ذلك المد فإنها مرتبته في التسوية. وإنما جعلته الحكماء على هذه السبيل من غلظ الجسم ليساوي هذه النغمة الغليظة في الحنجرة.

ثم تتراقب النغم في الأوتار كتراقبها في الحنجرة نغمة بنغمة حتى تصير إلى أدقها في الأوتار، ولذلك صار المثلث أقل من البيم في الغلظ لأن النغم إذا

تراقت في الحنجرة دقت واحتاجت من الأوتار إلى نغمٍ دقاق لمقايستها، ولهذه العلة أيضاً صار المثنى أقل من المثلث، والزرير أقل من المثنى.

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فأما لم صار المثنى والزرير ابريسم دون البيم والمثلث؟ فإن ذلك لعلتين، إحداهما: إن النغم إذا تراقت حتى تصير من الدقة إلى مثل حالها في المثنى والزرير احتاجت إلى صفاء طنين الابريسيم [الذي] إذا مُدَّ كان أصفى طنيناً من المعاء. والعلة الثانية: إن الوتر في هذا الموضع يحتاج من المد لتقوم نغمته وتثقيفها إلى ما لا تقوى عليه طبقة واحدة من المعاء الدقيق ولا طبقتان، فكان الابريسيم إذا صُبِّر بقياس ذلك المعاء في الغلط قوي على ما يحتاج إليه من المد دون المعاء.

[Fārābī (al-), 1967, p. 580–583]:

”والبقية هي قريبة من ربع طنيني، فلذلك قد يوجد لها اتفاق قريب من اتفاق ربع طنيني، وإنما يلحقها ذلك بسبب أن القسمة ليست تبلغ إلى أن يكون طرف المفضول متناهياً إلى حقيقة الموضوع الذي منه تخرج النغمة المقصودة، لكن، ربما حاد إلى أزيد أو أنقص. فإن كان المقصود ربع طنيني، فزال عن موضع القسمة فزاد زيادة يسيرة، صار بقية فلم يسمع له اتفاق أصلاً. وإن كان المقصود بعد بقية وزال عن موضع القسمة فنقص نقصاناً يسيراً أمال البقية إلى ربع طنيني سمع لها اتفاق ما [...] فلذلك صار يعسر علينا الحكم في البقيات التي في العود، إنها غير متلائمة النغم“.

[Fārābī (al-), 1967, p. 516]:

”[...] غير أنه ليس في تكثير الدساتين كبير غناء. وكثير من الناس يستعملون نغماً غير هذه بحسب حاجاتهم إليها في تميم الطرائق التي يستعملونها أو في ترتيبها، من غير أن يكون لتلك النغم أمكنة محدودة، فبعض تلك النغم يستخرج فيما بين الدساتين وبعضها يستخرج أسفل دستان الخنصر وبعضها فوق دستان السبابة، ويُقصد باستخراجها أن تعزز النغم. ومتى أحب إنسان أن يعرف تلك النغم، فالوجه في ذلك أن يطلب ملائمتها في الأمكنة المعروفة، إما على الدساتين أو في أمكنة آخر“.

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

”والتوصيلات - وهي أيضاً من جنس التمزيجات، أو مقارنة لها - وهو: أن تنقر دستان، ثم تحرك الإصبع إلى دستان فوقه أو تحته على الاتصال، إرادة لأن تغير الصوت من حدة إلى ثقل، أو ثقل إلى حدة، تغيراً على الاتصال“.

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

”[...] فلأن المشط إذا كان مرتفعاً - أو الأنف - حتى صار ذلك سبباً لتباعد وضع الوتر عن وجه الآلة، فإذا قبض الوتر إلى شد الدستان حتى يلتصق بوجه الآلة، احتاج ضرورة إلى أن يتمدد، والسبب في ذلك: أنه قد كان قبل خطأ مستقيماً واحداً، والآن نريد أن يصير خطين يحيطان بالخط الأول لو ثبت بمثلث، وكل ضلعين مجموعين من المثلث أطول من الثالث، ولن يطول الوتر إلا بفضل تمدد، والتمدد يغير الطبقة إلى الحدة“.

[Lādhiqī (al-), 1986b, p. 179]:

”وبعض العملة المتأخرين يشدون على ساعد تلك الآلة وترًا سادسا ويسمونها عود أكمل وقد وضع على سواعد تلك الآلات علامات دالة على مخارج نغمات مدار الإلحان من تلك السواعد ويسمى تلك العلامات بالدساتين سواء كانت أوتاراً مشدودة أو خطوطاً مكتوبة وغيرها“.

Neubauer's German translation of the latter in [Neubauer, 1993, p. 328]:

“Man bringt (*qad wuḍī‘a*) auf dem Hals dieser Instrumente [d.h. der Lauten] Zeichen (*‘alāmāt*), die die Ausgangsorte der Töne auf dem Griffbrett bezeichnen, in denen sich die Melodien bewegen (*makhārīju naḡhamāti madārī I-alḥān min tilka s-sawā‘id*). Man nennt (*wa-yusammā*) diese Zeichen Bünde (*dasātīn*), ob sie nun [aus] Saiten [bestehen], die [um den Hals] gebunden werden (*awtār mashdūda*), aus Linien, die [darauf] gezeichnet sind (*khuṭūṭ maktūba*), oder aus anderem“.

[Neubauer, 1993, p. 328]:

“Die Bünde (*dasātīn*) bestehen aus einer Reihe von Zeichen (*neṣāni-ye čand*), die man auf den Hälsen (*sawā‘ed*) der Saiteninstrumente (*ālāt-e dawāt-e outār*) anzubringen pflegt (*wad‘ karde*) zum festen [und sicheren] Aufsetzen (*tašaddod*) der Finger auf die Saite und zum Hervorbringen der Töne (*esteḡhrāḡ-e naḡamāt*) auf ihr“. (Bold font is used here for Persian terms.)

[Fārābī (al-), 1967, p. 498–499]:

”وهذه الآلة، من الآلات التي تحدث فيها النغم بقسمة الأوتار الموضوعية فيها وتُشدُّ على المكان المستدق منها دساتين تحت الأوتار تحدّد أسماها التي تُسمع منها النغم فتقوم لها تلك مقام حوامل الأوتار، وتُجعل موازية لقاعدة الآلة التي تسمى المشط“.

[Neubauer, 1993, p. 329]:

“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. 329]:

“Bei einer Quintstimmung der Saiten 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 التسوية، فإن نغم كل واحدٍ من الأوتار الثلاثة، التي هي أسفل من البيم، ترتفع فوق الدستان الذي كانت تُسمع منه في التسوية المشهورة بعد طنيني، فإن صادفت عنده دستاناً خرجت فيه وإلا لم تخرج، أو يتفق أن يقع عليه إصبع“.

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 que 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 **coïncident** avec des ligatures sur lesquelles on les produit. D'autres ne **coïncident** 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]:

“Nach den von ihm tradierten Anweisungen verhalten sich die Saitenstärken von der *zir-* zur *bamm*-Saite wie 1:2:3:4. Analog müßte der Umfang der Bünde vom Zeigefinger- bis zum Kleinfinger- bund im Verhältnis 4:3:2:1 abnehmen. **Beides ist unrealistisch**". (Bold type mine.)

[Neubauer, 1993, p. 331–332]:

“Im Zusammenhang mit dem Stimmen der Saiten gibt al-Kindi eine Anweisung für die richtige Haltung der Finger auf den, wie al-Hindi (6./12. Jh.) sagen wird, ‘Bünden für die Fingerkuppen’: ‘Der kleine Finger wird auf die *bamm*-Saite gelegt und mit festem Griff gegen den *Kleinfinger*-Bund gedrückt, ohne sich von der Stelle zu bewegen, für die er vorgesehen ist, und indem er nach einer Seite die Saite frei [schwingen] läßt, denn [sonst] ergibt sich zwangsläufig eine Trübung der Töne. Der kleine Finger soll jeweils am Anfang der Bünde, direkt hinter ihnen, liegen, während die übrigen [Finger sich] in der Luft zwischen dem Kleinfinger- und dem Ringfinger-Bund [befinden]. [Diesen Punkt] überschreite [d]er [kleine Finger] nicht und bleibe auch nicht hinter ihm zurück, dem wenn er ihn [nur] ein wenig überschreitet [und auf den Bund gerät], entsteht im Ton eine Taubheit, und wenn er hinter ihm zurückbleibt und zwischen die beiden Bünde zu liegen kommt, entsteht ein *Zirpen*. Dies ist ein allgemein gültiges Gesetz, das für alle Finger gilt bei ihrer Bewegung über die Saiten hin und bei allen Bünden für denjenigen, der der Sache auf den Grund geht.’ Dies ‘allgemein gültige Gesetz’ und die Beschreibung der korrekten Position der Finger der linken Hand gilt bis heute und stellt der präzisen Beobachtung und Formulierung al-Kindi’s bzw. seiner Quelle ein hervorragendes Zeugnis aus. Auch der letzte Zweifel am praktischen Gebrauch der Bünde dürfte hiermit ausgeräumt sein”.

[Neubauer, 1993, p. 331]:

“... ‘Es gibt noch einen Bund, der zwischen dem ‘Ringfinger’- und dem ‘Kleinfinger’-Bund liegt, [aber] der wird [normalerweise] auch nicht gebraucht. Dieses [?] sind Bünde, die aus der ursprünglichen Zahl [sechs] herausfallen. Sie werden von den Persern in ihren Modi verwendet. Ich benutze sie **auch** und treffe ihre [richtigen] Stellen [auf dem Griffbrett], da ich sie kenne, auch ohne [zusätzliche] Bünde. Den Schülern fällt das aber schwer. **Sie fortzulassen ist [daher] besser und richtiger.**’ Hieraus folgt, daß ein ägyptischer Hofmusiker des 5./11. Jahrhunderts auch persische Musik zu Gehör brachte und daß er sie auf seiner einheimischen Laute mit oder ohne zusätzliche Bünde spielte. Daß er die zusätzlichen Bünde und damit das persische Repertoire für Anfänger des Lautenspiels lieber vermied, ist verständlich. Das heute zu hörende Argument jedoch, daß es generell nicht möglich war, auf einer

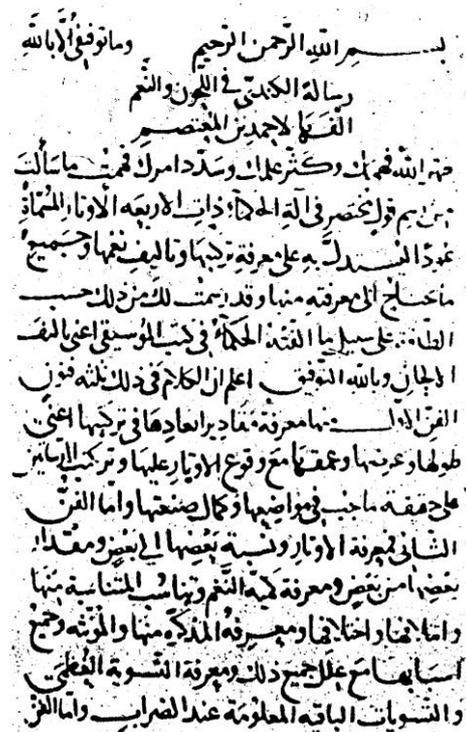
Laute mit Bünden auch Zwischentöne darzustellen, und daß man aus diesem Grund die Bünde im Laufe der Zeit abgeschafft habe, ist in dieser Ausschließlichkeit nicht zutreffend. Auch sollte die zählbeige Vorstellung, Bünde seien in der arabisch-islamischen Musikgeschichte lediglich zu theoretischem Gebrauch, nicht aber in der Praxis verwendet worden, nunmehr der Vergangenheit angehören”.

[Taḥḥān (ibn a-ṭ-~ al-Mūsīqī), 1990, p. 175]:

“وبين دستاني وسطى العرب ودستان البنصر دستان آخر يسى دستان زلزل وأكثر الناس يُهمله ودستان آخر يقع بين دستان البنصر ودستان الخنصر يُهمل أيضاً وهذه الدساتين الخارجة عن العدد الأول فهي مما يستعمله الفرس في طرائقهم وأنا أستعمل ذلك وأطرق مواضعه لمعرفتي به بغير دساتين وذلك يصعب على المتعلمين فتركه لهم أولى وأحق”.

[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”.



FHT 39 First page of the *Risālah fi-l-Luḥūn wa-n-Nagham* (*Mukhtaṣar al-Mūsīqā fi Ta'rif a-n-Nagham wa Ṣin'at al-‘ūd*) by Ya‘qūb ibn Iṣḥāq al-Kindī, taken from [Kindī (al-), 1965].⁴³⁶

⁴³⁶ The image was edited and cropped for clarity.

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- Please note that “Grove Music Online” stands for “The New Grove Dictionary of Music and Musicians”, 2nd Edition [2001], online version [2001-2020], originally McMillan then [2004⁺] Oxford University Press. [<https://www.oxfordmusiconline.com/grove/music/>]
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