Safī al-Dīn al-Urmawī and the Theory of Music:
Al-Risāla al-sharafiyya fī al-nisab al-ta'līfiyya
Content, Analysis, and Influences

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SAFĪ AL-DĪN AL-URMAWĪ AND THE THEORY OF MUSIC:
AL-RISĀLA AL-SHARAFIYYA FĪ AL-NISAB AL-TAʿLĪFIYYA
CONTENT, ANALYSIS, AND INFLUENCES

Dr. Fazli Arslan[*]

Introduction

One of the most important figures of the history of Middle Eastern music is Safī al-Dīn 'Abd al-Mumin al-Urmawī (d. 1294). One meets his name in the introductions to most of the books written in the field of the theory of Eastern music. Al-Urmawī analyzed thoroughly the Greek sources and the works of Muslim scholars such as al-Kindī, al-Fārābī and Ibn Sīnā. He studied the practical music of his time scientifically and systematized it. The theory and practice of this systematization can be found in his main treatise *al-Risāla al-sharafiyya fī al-nisab al-taʿlīfiyya* (The Sharafian Treatise on Musical Proportions).

It is acknowledged that the contribution of Safī al-Dīn al-Urmawī is of tremendous importance in the chain of theoretical works in the history of Arabic music starting with al-Kindī. He studied the sciences in al-Mustansiriyya school in Baghdad and was well known as a celebrated calligrapher and writer of literature. Safī al-Din was also a good physicist and a performer of the *ʿūd* (oriental lute). Being famous with his compositions abroad, Safī al-Dīn invented two musical instruments and trained students in the fields of calligraphy and music. *"Old Orient Sound System with 17 Notes"* which was systematized by Safī al-Dīn was considered as one of the best sound systems by some writers. It is thanks to this system and other achievements that he was claimed as Zarlino of the Orient.

The works of Safī al-Dīn in the field of music theory, *Kitāb al-adwār* (The Book of Musical Modes) and *al-Risāla al-sharafiyya fī al-nisab al-taʿlīfiyya* were the sources for many authors who wrote about the theory of music for several centuries after his time. Qutb al-Dīn Mahmud al-Shīrāzī (d. 1310), Abd al-Qadīr b. Ghaybī al-Marāghī (d. 1435), Fath Allāh Mūmin al-Shirwānī (d. 1486), Muhammad b. 'Abd al-Hamīd al-Lādhiqī (d. 1494) and Alishah b. Haci Buke (d. 1500) are some of the writers who relied on Safī al-Dīn in their works.

The treatise *al-Risāla al-sharafiyya* consists of five discourses under different headings. Its content is analysed in this article.[1] A special focus is laid on the mathematical fundamentals of music in the second, third and fourth discourses of the book. The parts of the works of al-Kindī al-Fārābī and Ibn Sīnā that benefited to Safī al-Dīn are also indicated. Finally, the traces of *al-Sharafiyya* are tracked by showing references to it in some works written in later centuries, in order to emphasize the impact of the book on the subsequent studies and the innovations it brought.

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[*] The Ministry of Education of Turkey, the Board of Education, the Centre of Examining Educational Materials.
[1] The study is based on the Arabic text that I have extracted from the three oldest manuscript copies of *al-Sharafiyya* in Turkey (The Language and History-Geography Faculty, Saib Sencer MS I/4810; Topkapi Palace Museum Library, Ahmad III, MS 3460; Nuruosmani Library, MS 3647) and the copy in Paris Bibliotheque Nationale, MS 2479.

First Discourse of *al-Sharafiyya*

In the first discourse of *al-Sharafiyya,* composed of five subheadings, Safī al-Dīn examined the theory of sound and approached the subject by narrating ideas mostly from al-Fārābī and partly from Ibn Sīnā. In this discourse, Safī al-Dīn explains the ideas of al-Fārābī on the formation of sound and points out what he considers as the defective aspects of the Second Master's analysis. He defines the note and explains the reasons of the acuity and gravity. In this context, he examines some ideas of al-Fārābī and Ibn Sīnā on this subject and indicates that he disagrees with them and states the falsity of their opinions. Then he explains the reasons of the acuity and gravity in the stringed and wind instruments, before he writes on the features of the note.[2]
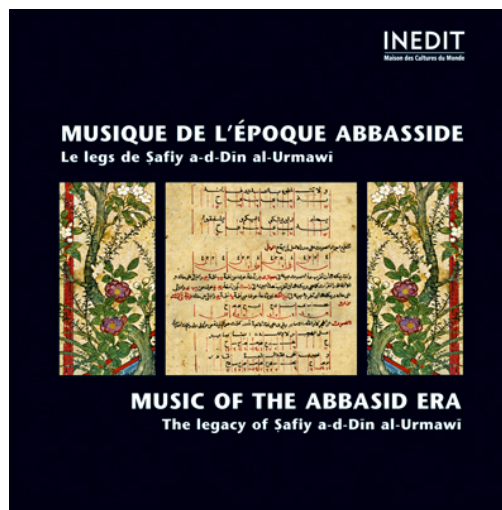

Figure 1. Cover of the CD-Rom issued in February 2007 "Music of the Abbasid Era: The Legacy of Safiy a-d-Dîn al-Urmawî" by the violonist and musicologist Nidaa Abou Mrad and the Arab classical music ensemble of Antonine University (Lebanon).

Second Discourse

This chapter is about ratios of numbers to each other, making up of intervals, the ratio of the intervals made up, the levels and names of consonance and dissonance.

The Ratio between the Numbers:

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[2] On the theory of sound, see Abū Nasr Muhammad b. Muhammad b. Tarkhān al-Fārābī (d. 950), *Kitāb al-Mūsīqī al-Kabīr,* ed, Ğattās Abd al-Malik Khashaba and Mahmûd Ahmad al-Hifnī, Cairo, n.d. pp. 211-224; Ikhwān al-Safā, *Rasā'il: al-Risāla al-Khāmisa fī al-mūsīqī,* edited by Khayr al-Dīn al-Ziriklī, Cairo, 1928, vol. 1, 137-141; Ibn Sīnā, (d. 1037), *Kitāb al-Shifā, Gawāmi' 'ilm al-mūsīqī,* edited by Zekeriyyā Yūsuf, Cairo, 1956. pp. 4-13; R. D'Erlanger, "Traité anonyme dédié au Sultan Osmanli Muhammed II", *La Musique Arabe*, Paris, 1939, iii, 17-25; Fath Allāh al-Shirwānī *Majalla fī al-mūsīqī,* edited by Fuat Sezgin, Frankfurt 1986, v. 26, fols. 47-54; Muhammad b. 'Abd al-Hamīd al-Lādhiqī, *al-Risāla al-fathiyya fī al-mūsīqī* Istanbul Municipality, Taqsim Ataturk Library MS K23, fols: 13b-16b; Rauf Yekta, *Türk Mûsikîsi Nazariyâti* (Turkish music theory), Istanbul, 1924, pp. 14-34.

According to Safī al-Dīn there is always a ratio between two numbers. He arranged them as 12 parts. Firstly, two numbers are equal to each other (the position of equality) if there is no equality between the numbers, there is one of the ratios below:

Mithl and guz': First level 1+1/2 (3/2), then continuing to infinity 1+1/3 (4/3), 1+1/4 (5/4). This super particular is the ratio of (1+1/N).
Mithl and agzā': the first level of this goes on like 1+2/3 (5/3), 1+3/4 (7/4), 1+4/5 (9/5)…
Di'f and guz': starts with 2+1/2 (5/2) and goes on like 2+1/3 (7/3), 2+1/4 (9/4) …
*Di'f and agzā'*: starts with 2+2/3 (8/3) and goes on like 2+3/4 (11/4), 2+4/5 (14/5) …
Amthal: First level is 3 and then goes on like 5, 6, 7, 9 …
Amthal and guz': First level goes on like 3+1/2 (7/2), 3+1/3 (10/3), 3+1/4 (13/4) …
Amthal and agzā': First level goes on like 3+2/3 (11/3), 3+3/4 (15/4) ….
Ada'f : First level is 4, then goes on like 8, 16. In order to keep the word short Safī al-Dīn says "*guz'* and *agzā* are added like this and goes on forever". That is to say, *ada'f* and *guz'* starts with 4+1/2 (9/2), 4+1/3 (13/3), and *ada'f and agzā'* with 4+2/3 (14/3) then goes on like 4+3/4 (19/4) ….

Then he showed all the ratios between the two numbers on a thread divided into 12 equal parts in order to make us see all the ratios practically.
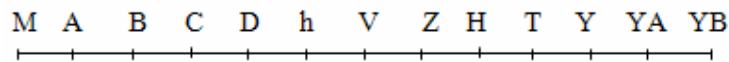
Let us have a look at the ratios between numbers on this figure.
YB/Y=6/5, YB/T=4/3, YB/H=3/2, YB/Z=12/7, YB/V=2, YB/h=12/5, YB/D=3, YB/C=4, YB/B=6, Then, YA/Y=11/10, YA/T=11/9, YA/H=11/8, YA/Z=11/7, YA/V=11/6, YA/h=11/5, YA/D=11/4, YA/C=11/3, YA/B=11/2, Then, Y/T=10/9, Y/H=5/4, Y/Z=10/7, Y/V=5/3, Y/h=2, Y/D=5/2, Y/C=10/3, Y/B=5, Then, T/H=9/8, T/Z=9/7, T/V=3/2, T/h=9/5, T/D=9/4, T/C=3, T/B=9/2, Then, H/Z=8/7, H/V=4/3, H/h=8/5, H/D=2, H/C=8/3, H/B=4, Then, Z/V=7/6, Z/h=7/5, Z/D=7/4, Z/C=7/3, Z/B=7/2, Then, V/h=6/5, V/D=3/2, V/C=2, V/B=3, Then, h/D=5/4, h/C=5/3, h/B=5/2, Then, D/C=4/3, D/B=2, D/A=4, Then, C/B=3/2, C/A=3, Then, B/A=2[3]

The Names of the Intervals:

Safī al-Dīn names the intervals which he calls "usable". He points out that the rest is recognized with their ratios. The intervals are:

1. Zu'l-kul merrateyn (two octaves): The first of the intervals Safī al-Dīn names. The interval positioned between YB/C, H/B, D/A is the first level of *ada'f* level. Its ratio is 2/1x2/1=4/1.
2. Zu'l-kul ve'l-hams (octave and penta chord): It is between YB/D, T/C, V/B. 2/1x3/2=3.
3. Zu'l-kul ve'l erba' (octave and tetra chord): H/C interval is an example for this. 2/1x4/3=8/3.
4. Zu'l-kul (octave): It is positioned between the intervals of YB/V, Y/h, H/D, V/C, D/B, B/A. Its value is 2/1.
5. Zu'l-hams (penta chord): The first of *mithl and guz'* levels. It is positioned between YB/H, T/V, V/D. Its ratio is 3/2.

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[3] These 11 ratios which are out of the numbers of equality are mentioned in *Mukaddimāt al-usūl* as it was mentioned in *al-Sharafiyya*, Alishah b. Haci Buke, *Muqaddimāt al-usūl,* University of Istanbul, The Library of Ancient Works, The Department of Persian Manuscripts, MS 1097, fol. 5a. For more details on the intervals and ratios in al-Shirwānī, see al-Shirwānī, *Majalla fī al-mūsīqī,* fol. 39.

6. *Zu'l-erba* (tetra chord): The intervals of YB/T, H/V, D/C. The second level of *mithl and guz'* at tetra chord. Its ratio is 4/3.

In spite of the fact that Safī al-Dīn says the intervals mentioned above is recognized with their names and the rest is recognized with their ratios, he also points out that the interval of 9/8 is known as "tanīnī" (whole-tone) and the one with 256/243 is called *bakiyye* (remnant/*limma*). Among the ones he named there is also an interval called *irkha* and he indicates that this is the quarter of "tanīnī (9/8)".
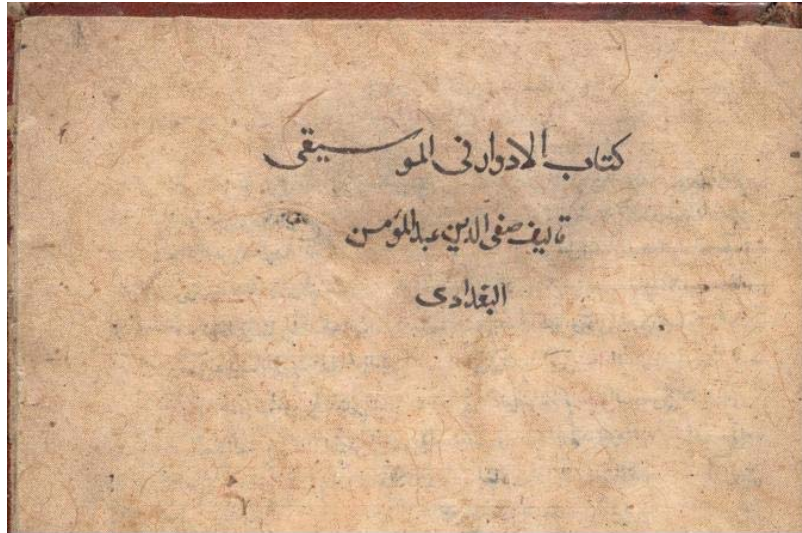

Figure 2. First page of "Kitab al-adwar" by Safi al-Din.

In the treatises of al-Kindī, the terms octave, penta chord, tetra chord and tanīnī (9/8) are frequently encountered[4]. In the *Risāla fi al-mūsīqī* of Ikhwān al-Safā, there is no information on the ratios of the numbers with each other in the way Safī al-Dīn put forward. However, the sentences in Ikhwān al-Safā about this subject are important. "The best compositions are the ones produced with the most consonant ratios"[5]. Then, it is pointed out that these consonant ratios are 2/1, 3/2, 4/3, 5/4, 9/8[6]. In the *Sixth Risāla* of Ikhwān al-Safā where "*numbers, the effect of numerical ratios on the people and the ratios related to music*" mostly take place, these subjects are examined: "The ratio is a measure between two amounts. When the two numbers are compared to each other, both are either equal or not. If there is no equality between the two numbers, one is either smaller or larger than the other. When the smaller one is compared to the larger one, there are nine positions. These are: 3/2, 4/3, 5/4, 6/5, 7/6, 8/7, 9/8, 10/9, 11/10… Besides, the ratios of *di'f* (two fold), *mithl and guz'*, *mithl and agza'*, *di'f and guz'*, *di'f and agza'* and *ada'f* are also indicated"[7].

After naming nine harmonious intervals as octave, penta chord, tetra chord, *tanīnī, mujannab, bakiyye*, two octaves, octave and penta chord, octave and tetra chord, Shirwānī points out that the consonant intervals

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[4] See Ahmed Hakki Turabi, *el-Kindî'nin Mûsikî Risâleleri*, MA Thesis, İstanbul 1996, (especially on *Risala fī khubr sinā'at al-ta'līf*), p. 113.
[5] Ikhwān al-Safā, *Risāla fī al-mūsīqī*, i, 161.
[6] Ibid, i, 164.
[7] Ikhwān al-Safā, ibid, *al-Risāla al-sādisa fī al-nisba al-'adadiyya wa 'l-handasiyya*, i, 181-182.

are 12 in practice and he adds three octaves, two octaves and penta chord, two octaves and tetra chord to the ones mentioned above[8].

The Parts of Intervals:

Safī al-Dīn divides the intervals he explains into three parts; large, middle and small.

1. Large Intervals: Two octaves, octave and penta chord, octave and tetra chord and octave intervals.

2. Middle Intervals: Penta chord and tetra chord intervals.

3. Small Intervals: The intervals such as 5/4, 6/5 and 7/6… He calls the small intervals as "*lahnī*" (melodic) and further subdivides them into three:

    a. Large *lahnī* intervals; 5/4, 6/5, 7/6 ratio intervals.

    b. Middle *lahnī* intervals; 8/7, 9/8, 10/9 ratio intervals.

    c. Small *lahnī* interval; the intervals starting with 11/10 and continuing.

Figure 3. Extract from the colophon page of "Kitab al-adwar" by Safi al-Din.

Compared to the performers of his period, Safī al-Dīn points out that *lahnī* intervals are divided into three. These are the extra intervals the biggest of which is 9/8, middle one is 14/13 and the smallest one is 256/243. He claims that all consonant melodies are made up of these three because the other *lahnī* intervals look and sound like each other. Therefore, he explains that 9/8 is used instead of 8/7 and 10/9, and that instead of all middle intervals 14/13, and instead of all small *lahnī* intervals 256/243 is used.

Consonant and Dissonant Intervals

Later on, Safī al-Dīn divides the intervals he described into consonants and dissonants.[9] He divides the consonants into two as first level consonants and second level consonants:

1. Octave intervals; the major consonant and the most natural one of the intervals.

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[8] Al-Shirwānī, *Majalla fī al-mūsīqī*, fols. 59-66.
[9] For an identical definition, see al-Shirwānī, ibid, fol. 59.

2. Second level consonant intervals; two octave, octave and pent chord, octave and tetra chord intervals.

Then there is the pent chord and tetra chord. The intervals of 5/4, 6/5 and 7/6 out of these are the weak consonant intervals. As for the small *lahnī*, the most consonant of them are 8/7 and 9/8. He points out that as the intervals get smaller, so does the weakness.

Figure 4. Extract from a scene of music (Hadith Bayâd wa Riyâdh), 13th century
Source : http://expositions.bnf.fr/livrarab/grands/099.htm.

Ibn Sīnā divides the intervals into three as large, middle and small intervals. Octave intervals were classified by Ibn Sīnā as large interval, tetra chord and pent chord intervals as middle, and the others coming after tetra chord are classified as *lahnī*[10]. To Ibn Sīnā also, the large *lahnī* intervals are the ones with 5/4, 6/5, 7/6, 8/7, 9/8, 10/9, 11/10, 12/11, 13/12 and 14/13 ratios. Middle *lahnī* intervals are the ones from 15/14 to 29/28. The others starting with 30/29 are the small *lahnī* intervals.[11]

Al-Lādhiqī classified intervals as large, middle and small in the same way as Safī al-Dīn and pointed out that this classification belongs to Safī al-Dīn. This classification also exists in Al-Shirwānī.[12]
The large and middle intervals Rauf Yekta pointed out with a heading of "consonant intervals" are the same as those recorded by Safī al-Dīn. Yekta pointed out all the other intervals except these as "small intervals" and showed them to the staff. [13]

The Third Discourse of *al-Sharafiyya*

The main topic of this third part of the treatise is about the addition, division, subtraction of the intervals and the formation of these kinds.

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[10] Ibn Sīnā, *Gawāmi' 'ilm al-mūsīqī*, pp. 18-19.
[11] Ibid, pp. 23-25.
[12] Al-Lādhiqī, *al-Risāla al-fathiyya*, fol. 35b. See also al-Shirwānī, *Majalla fī al-mūsīqī,* fols. 92-93.
[13] Yekta*, Türk Musikisi Nazariyâti,* p. 94; Also see *Traité anonyme,* pp. 34-41.

The Addition of the Intervals:

Safī al-Dīn starts the third discourse with the processes of the addition, division and subtraction of the intervals. If two intervals are equal to each other the numerator and the denominator are multiplied by each other while being added. The biggest ('*uzmā*) and the smallest (*suğrā*) number of the interval are obtained. Then in order to find the medium (*wasat*) number, the numerator of the one is multiplied by the denominator of the other as these two are of equal ratios. If we add the two tetra chords, it is 4x4=16 which is '*uzmā* side. 3x3=9 gives the number which is *suğrā*, while 4x3=12 is the medium number. So, three numbers are formed, which are 16, 12, and 9. It is obvious that 16/12=4/3.

If we want to add a third tetra chord to these, we should do the arithmetic of 16/9x4/3. Calculating this we get 64, 48, 36, and 27 – which are numbers whose ratios to each other subsequently are 4/3.

If one of the two intervals is big and the other is small, we multiply the numerator and the denominator by each other. Let us add 4/3 and 9/8. The result is 4/3 x9/8=36/24 and these are the big and small sides. Later on, if we want to leave the tetra chord at the beginning side or in Safī al-Dīn's words "if we want to do the addition on the high in pitch (*tīz*) side", we multiply the denominator of the tetra chord by the numerator of the other ratio. That is to say, it is 3x9=27 which is one of the *wasat* numbers. In other words, in the ratios between the three numbers 36, 27, 24, pent chord comes at the beginning side and *tanīnī* comes after that: 36/27=4/3 and 27/24=9/8.

If we want to do the addition at the low in pitch (pest) side, that is, if we want to leave the *tanīnī* at the beginning, then we multiply the denominator of the *tanīnī* by the numerator of the tetra chord. In this case the medium number is 32. In other words, as it is seen between the numbers of 36, 32, 24, 36/32=9/8 is at the beginning side, 32/24=4/3 is at the end.

The Division of the Intervals:

If we divide any interval into two equal parts, the process to be done is to multiply the numerator and the denominator of the interval by 2 and to find the medium (*wasat*) number by adding half of the difference between the big number we get and the small number. For example: we divide 4/3 into two; we get 4x2=8 and 3x2=6 and these are the big and the small sides. For the medium number, we add 1 which is half of 2, the difference of 8 and 6 into the small side. This number is 7. We get the numbers of 6, 7 and 8. In this case a tetra chord is divided into two intervals as 8/7 and 7/6.

The intervals can also be divided into more than two parts. If so, the number intended to be divided into how ever many numbers is multiplied by the numerator and the denominator.

The Subtraction of the Intervals from Each Other:

As we want to subtract a small interval from a big interval, if the ratio to be subtracted is intended to leave at the high in pitch side, firstly the numerator of the big side and the denominator of the small side are multiplied and then the denominators are multiplied by each other. Let us subtract 3/2 from 4/3. It is 3x3=9, 3x2=6. We multiply 2 by 4 for the *wasat* number. We get the numbers of 9, 8, and 6 which is a process when we want 9/8 to leave at the high in pitch side. Here, 9/8 is at the high in pitch and 4/3 ratio which exists between 8 and 6 is left at the low in pitch side. If we want to leave the ratio to be obtained at the low in pitch side, in this case we multiply the denominators by each other. The result is 12. As it is seen, the ratio of 9/8 which is between the numbers of 12, 9, 8 is at the low in pitch side.

The subjects of the addition, the division and the subtraction of the intervals do not take place in *Treatises of al-Kindī*, and *Rasā'il* of Ikhwān al-Safā. Al-Fārābī studied this subject in detail as "simple numerical relations between the intervals".[14] Ibn Sīnā allocated the second discourse of his work to this subject. The first part of the second discourse, which he divided into two, is about the addition of the intervals with each other and their subtraction from each other, while the second part is about redoubling the intervals and their division.[15]

Figure 5. Lute player, Iraq 10th century
Source: http://trumpet.sdu.edu/M151/Racy1.GIF

Later on, the addition, subtraction and division of the intervals were dealt with by subsequent authors. Al-Lādhiqī dedicated the second part of his treatise to this topic[16], and Rauf Yekta dealt with it in detail in the chapter *Mûsikînin Mebādi-i Riyâziyesi* (The Preliminary Mathematics of Music).[17]

The Arrangement of the Intervals within Tetra chord and Constituting the Kinds:
Safī al-Dīn arranged tetra chords, from 5/4 to 256/243, with *lahnī* intervals. And this is no more than three intervals and four notes called *jins* (kind). If the ratio of the biggest of the intervals in tetra chords is bigger than the total sum of the other two, it is called *layyin* (weak) kind. The rest is called *qawī* (strong) kind.

In a tetra chord there are three ratios bigger than the other two. These are 5/4, 6/5, 7/6. *Layyin* is divided into three. The one whose biggest interval is 5/4 is called *rāsim* (enharmonic), the one with 6/5 is *lawnī* (chromatic) and the one with 7/6 is named *nāzim* (chromatic). The following one will be 8/7, which is not bigger than the other two ratios; it is classified in the *qawī* (diatonic) kinds.

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[14] Al-Fārābī, *Kitāb al-mūsīqī al-kabīr,* pp. 188-204.
[15] Ibn Sīnā, *Gawāmi' 'ilm al-mūsīqī,* pp. 33-41.
[16] Al-Lādhiqī, *al-Risāla al-fathiyya,* fols. 46a-52a; see also al-Shirwānī, *Majalla fī al-mūsīqī,* fols. 83-89; *Traité anonyme,* pp. 47-50.
[17] See *Türk Musikisi Nazariyati,* pp. 35-45.

Layyin classes are arranged as follows:

Rāsim (*daif*/feeble)	:	5/4x32/31x31/30=4/3.
Rāsim (*eşed*/firm)	:	5/4x24/23x46/45=4/3.
Lawnī (feeble)	:	6/5x19/18x20/19=4/3.
Lawnī (firm)	:	6/5x15/14x28/27=4/3.
Nāzim (feeble)	:	7/6x16/15x15/14=4/3.
Nāzim (firm)	:	7/6x12/11x22/21=4/3.

Next come *qawī* (strong) kinds:

First non-conjunct (feeble)	:	8/7x14/13x13/12=4/3
First non-conjunct (firm)	:	8/7x21/19x19/18=4/3.
Second non-conjunct (feeble)	:	9/8x64/59x59/54=4/3.
Second non-conjunct (firm)	:	9/8x48/43x86/81=4/3.
Third non-conjunct (feeble)	:	10/9x12/11x11/10=4/3.
Third non-conjunct (firm)	:	10/9x9/8x16/15=4/3.

The following ones are the kinds formed by putting the two equal ratios together. These are *zü't-tadi'f* (doubling) kinds. They are arranged in three classes:

First doubling	:	8/7x8/7x49/48=4/3
Second doubling	:	9/8x9/8x256/243=4/3
Third doubling	:	10/9x10/9x27/25=4/3

Safī al-Dīn reminds us that *bakiyye* interval is named for 256/243 in "second doubling kind" and points out that this is the most often used; it is called *zü'l-müddeteyn.*

Then three intervals are arranged with the two ratios following each other in a tetra chord; this kind is called *muttasil* (conjunct /continuous).

First conjunct	:	8/7x9/8x28/27=4/3
Second conjunct	:	9/8x10/9x16/15=4/3
Third conjunct	:	10/9x11/10x12/11=4/3

Thereafter, the kinds formed as not following each other but formed as skipping one ratio are arranged. These kinds, called *munfasil* (disjunct), are three parts:

Feeble disjunct	:	8/7x10/9x21/20=4/3
Medium disjunct	:	9/8x11/10x320/297=4/3
Firm disjunct	:	10/9x12/11x11/10=4/3.

After finishing the kinds he arranged under the consideration of the tetra chord as composed of three intervals, Safī al-Dīn points out that it is possible to divide the tetra chord into four intervals opposite to the

general rule of "a tetra chord is composed of three intervals". This is most conveniently classified in two ways.

First   :   13/12x14/13x13/12x96/91=4/3.

Second   :   13/12x14/13x15/14x16/15=4/3.

The second one is arranged as 24 classes and the most convenient one is the first class (13/12, 14/13, 15/14, 16/15); it is called as *the first single* kind (Isfehān). Safī al-Dīn subtracts 16/15 from the tetra chord and names the rest *the second single* kind (Rāhewī).

The Consonant and Dissonant of the Kinds:

Safī al-Dīn divides these kinds into three classes: major consonant, mid consonant and weak consonant. The first one of the *qawī* kinds is the most consonant, the most well known and the most used one with its six classes.

36 classes of *layyin* (*rāsim*, *lawnī*, *nāzim* classes) are weak harmonious. They are not used. Safī al-Dīn points out that the tetra chord with 9/8x9/8x256/243 (diatonic) ratio is mostly used. He also explains that it is also possible for the person studying into this letter to arrange many kinds out of the ones he himself arranged.

Thus, Safī al-Dīn emphasizes on these kinds hugely in his work. This subject was dealt with in detail in al-Fārābī. Before him, al-Kindī also had explained three kinds: *tanīnī* (including every diatonic kinds), *lawnī* (including every chromatic kinds) and *te'līfī* (composed kind –including every enharmonic kinds). Tanīnī is composed of "tanīnī-tanīnī-fadla" (ton-ton-limma) intervals. *Lawnī* is arranged as fadla-fadla-three halves tanīnī; (1 ½ tone). *Te'līfī* kind is arranged as irkha-irkha-two tanīnī (tones).[18]

Al-Fārābī examined *layyin* and *qawī kinds* under the heading of "the arrangement and classes of the kinds" in detail. Although it has a great similarity with al-Fārābī's, Safī al-Dīn's approach never refers to al-Fārābī in the third discourse dedicated to the arrangement of the kinds.[19]

Ibn Sīnā allocated the third discourse of his *Gawāmi' 'ilm al-mūsīkā* of *Kitāb al-Sifā* to the kinds. Defining these kinds, as they are composed of three intervals and four notes, he calls them "lahnī". *Qawī* kinds are explained in the third discourse and *lawnī* ones are in the fourth part.[20] Two other authors hit upon the kinds issue. While al-Lādhiqī devoted a large place in his work to the topic,[21] al-Shirwānī never mentioned it, arguing that "it would exceed the capacity of his brief work.".[22]

Rauf Yekta takes this subject into his work and explains it completely in parallel with Safī al-Dīn.[23] After examining all the kinds Safī al-Dīn did, Rauf Yekta explains: "After this tiring work, maybe it will be asked how many tetra chords consonants with each other were obtained. As a response, we would say with shyness that only four consonants were decided and a tetra chord was obtained. The others were confined into the theoretical books. Additionally, these obscured the ideas of the European artists who attempted to

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[18] For detailed information, see *Risāla fī khubr sinā'at al-ta'līf* (Turabi, p. 124).
[19] Al-Fārābī, *Kitāb al-mūsīqī al-kabīr*, pp. 278, 317.
[20] For details see: Ibn Sīnā, *Gawāmi'*, pp. 45-46.
[21] See al-Lādhiqī, *al-Risāla al-fathiyya*, fol. 53a; *Traité anonyme*, pp. 51-76.
[22] See al-Shirwānī, *Majalla fī al-mūsīqī*, fol. *99*.

do unfruitful works to realize them while they were unveiling the mystery of the kinds in Greek music so many centuries later".[24]

Figure 6. Extract from Abû Ma'shar al-Balkhi's Kitâb al-mawalîd.

The Fourth Discourse of *al-Sharafiyya*: The Arrangement of the Kinds in Big Layers

The Formation of Two Octaves with Tetra chords and Tanīnī Intervals:

In this part, Safī al-Dīn firstly arranges two octave scales with tetra chords. He calls the tetra chords in two octaves *tabaka* (layer) and mentions the first, second, third, fourth layers subsequently. He calls tanīnī *fāsila* in this arrangement. In this case, an octave composed of two tetra chords *(tabaka)* and a tone (*fāsila/tanīnī*) and two octaves consist of four tetra chords and two tones.

He arranges the tetra chords and *tanīnī* intervals mentioned above within two octaves as nine classes. In the first three classes *fāsila* is at the low in pitch side, tetra chords are at the high in pitch side, in the second three classes *fāsila* is at the high in pitch side and tetra chords are at the low in pitch side, in the third three classes "*fāsila* intervals" are in the medium and tetra chords are at the low in pitch and high in pitch sides. Also, there are two tetra chords and a ta*nīnī* in the second octave. In the second octave *tanīnī* intervals change their position in each class and they are at the low in pitch, the high in pitch and the medium. Safī al-Dīn marked the tetra chords as "C", and the *tanīnī* intervals as "B" and he arranged the sequences like this:

If the two *fāsila* (*tanīnī*) are both at the low in pitch side; *munfasil al-athqal.*
If the two *fāsila* are at the high in pitch side; *munfasil al-ahad.*
If the first *fāsila* is at the low in pitch and the other is at the high in pitch, then a tetra chord is at the medium; *muttasil.*
If the two *fāsila* are between the tetra chords; *munfasil al-awsat* or *fāsilat al-wustā.*

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[23] Yekta, *Türk Musikisi Nazariyati,* p. 59.
[24] Ibid, p. 63.

The symbols, ratios and names of these nine classes which he arranged in two octaves with tetra chords and *tanīnī* intervals are as follows:

Double Octave
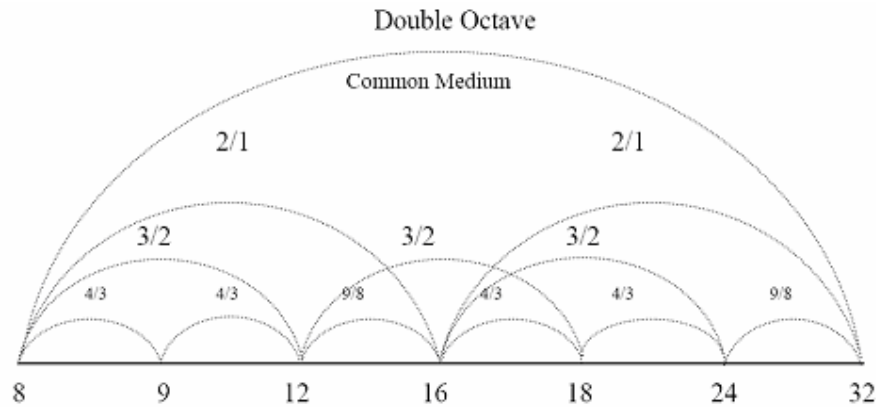
I. C-C-B C-C-B: 4/3x4/3x9/8x4/3x4/3x9/8=4/1=4: *Munfasil al-ahad*
II. C-C-B B-C-C: 4/3x4/3x9/8x9/8x4/3x4/3=4: *Munfasil al-ahad al-athqal*
III. C-C-B C-B-C: 4/3x4/3x9/8x4/3x9/8x4/3=4: *Munfasil al-ahad al-awsat*
IV. B-C-C B-C-C: 9/8x4/3x4/3x9/8x4/3x4/3=4: *Munfasil al-athqal*
V. B-C-C C-C-B: 9/8x4/3x4/3x4/3x4/3x9/8=4: *Munfasil al-athqal al-ahad*
VI. B-C-C C-B-C: 9/8x4/3x4/3x4/3x9/8x4/3=4: *Munfasil al-athqal al-awsat*
VII. C-B-C C-B-C: 4/3x9/8x4/3x4/3x9/8x4/3=4: *Munfasil al-awsat*
VIII. C-B-C C-C-B: 4/3x9/8x4/3x4/3x4/3x9/8=4: *Munfasil al-awsat al-ahad*
IX. C-B-C B-C-C: 4/3x9/8x4/3x9/8x4/3x4/3=4: *Munfasil al-awsat al-athqal*

The two octaves are arranged by combining the tetra chords as shown above.

Al-Fārābī called "*tanīnī*-tetra chord-tetra chord" arrangement "*munfasil al-athqal*', "tetra chord-tetra chord-tanīnī" arrangement *munfasil al-ahad*, "tetra chord-tanīnī-tetra chord as *munfasil al-awsat*. He made this two arrangements in two octaves and he called the arrangement of stanīnī-tetra chord-tetra chord tanīnī-tetra chord-tetra chord" *munfasil cem-i tām*; "tetra chord-tetra chord-tanīnī tetra chord-tetra chord-tanīnī" was called *munfasil cem-i tām*, "tetra chord-tanīnī-tetra chord tetra chord-tanīnī-tetra chord" was called *cem' al-ictima*. Al-Fārābī did not use such symbols as "C" for tetra chords and "B" for tanīnīs intervals like Safī al-Dīn.[25]

The Arrangement of Tetra chords in One Octave with the Intervals at Kinds:

Safī al-Dīn arranges *munfasil al-ahad* with some of the kinds he made up in his third discourse. *Munfasil al-ahad* (C-C-B) is composed of the intervals of 4/3x4/3x9/3=2/1. He arranges the tetra chords in *munfasil al-ahad* firstly with the intervals of "first non-conjunct kind" (*gayr-i muttasil*). First non-conjunct kind's intervals are 8/7x14/13x13/12=4/3. He arranges the first and the second tetra chord from these intervals and puts 9/8 at the end in order to complete the circle. Safī al-Dīn points out that he doesn't use "*layyin* kinds" as they are dissonant and some of the *qawī* kinds as they are very near in value.

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[25] See. Al-Fārābī, *Kitāb al-mūsīqī al-kabīr*, p. 329-332; This subject was taken place in al-Lādhiqī and *Traité anonyme* just like the one in *al-Sharafiyya*. See *al-Risālah al-fathiyya*, fols. 38a-41a and *Traité anonyme*, pp. 78-91.

I. *Munfasil al-ahad* in lower octave is composed of these intervals as it is used with the intervals of "first non- conjunct kind" (*ghayr-i muttasil*):

Octave
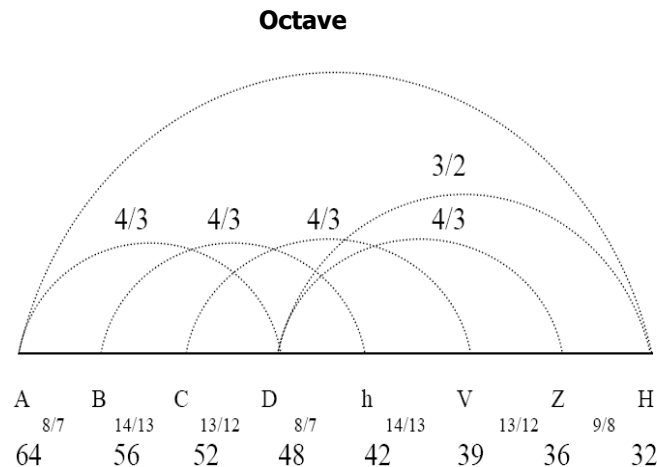
II. *Munfasil al-ahad*, with the intervals of "second non-conjunct".
   9/8x64/59x59/49x9/8x64/59x59/54x9/8=2/1.
III. With the intervals of "third non-conjunct ";
   10/9x12/11x11/10x10/9x12/11x11/10x9/8=2/1.
IV. With the intervals of "first conjunct" (*muttasil*);
   8/7x9/8x28/27x8/7x9/8x28/27x9/8=2/1.
V. With the intervals of "second conjunct ";
   9/8x10/9x16/15x9/8x10/9x16/15x9/8=2/1.
VI. With the intervals of "third conjunct ";
   10/9x11/10x12/11x10/9x11/10x12/11x9/8=2/1.
VII. With the intervals of "first doubling" (*zü 't-tadī´f*);
   8/7x8/7x49/48x8/7x8/7x49/48x9/8=2/1.
VIII. With the intervals of "second doubling";
   9/8x9/8x256/243x9/8x9/8x256/243x9/8=2/1.
IX. With the intervals of "third doubling";
   10/9x10/9x27/25x10/9x10/9x27/25x9/8=2/1.
X. With the intervals of "first disjunct (feeble)" (*munfasil*);
   8/7x10/9x21/20x8/7x10/9x21/20x9/8=2/1.
XI. With the intervals of "second (medium) disjunct";
   9/8x11/10x320/297x9/8x11/10x320/297x9/8=2/1.
XII. With the intervals of "third (firm) disjunct";
  10/9x12/11x11/10x10/9x12/11x11/10x9/8=2/1.

The Arrangement of Tetra chords in Two Octaves with the Intervals at Kinds:

Safī al-Dīn arranged *munfasil al-ahad* at the "lower octave (*zu'l-kull al-athqal*)" with the intervals of *qawī* kinds up to present. He also goes on to perform the same process in two octaves with again the

arrangement of *munfasil al-ahad* and with the types of *qawī* kinds mentioned above. These are 12. Reflecting on the first table, the others will go on at the same order, he does the same arrangement of *munfasil al-ahad* in the lower octave in two octaves. The ratios are:

I. With the intervals of "first non-conjunct kind" (*ghayr-i muttasil*).
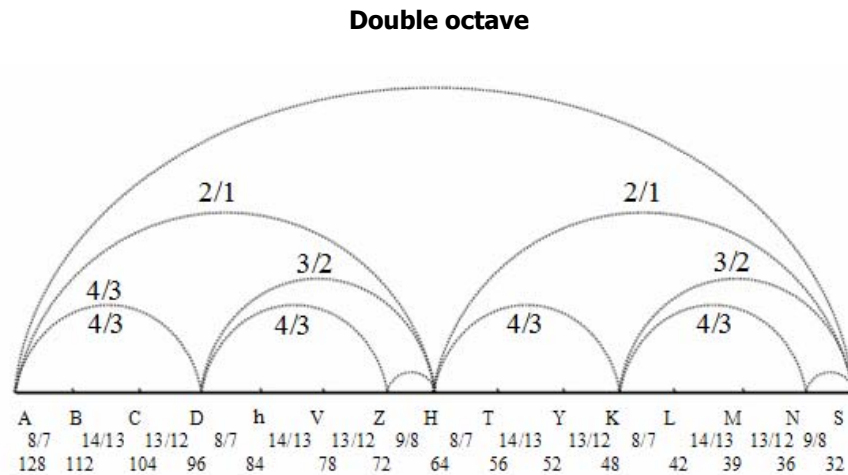
Double octave

II. With the intervals of "second non-conjunct";
9/8x64/59x59/54x 9/8x64/59x59/54x9/8x9/8x64/59x59/54x9/8x64/59x59/54x9/8=4/1=4.
III. With the intervals of "third non-conjunct ";
10/9x12/11x 11/10x10/9x12/11x11/10x9/8x10/9x12/11x11/10x10/9x12/11x11/10x9/8=4.
IV. With the intervals of "first conjunct/muttasil";
8/7x9/8x28/27x8/7x 9/8x28/27x9/8x8/7x9/8x28/27x8/7x9/8x28/27x9/8=4.
V. With the intervals of "second conjunct";
9/8x10/9x16/15x9/8x10/9x16/15x9/8x9/8x10/9x16/15x9/8x10/9x16/15x9/8=4.

VI. With the intervals of "third conjunct";
10/9x11/10x 12/11x10/9x11/10x12/11x9/8x10/9x11/10x12/11x10/9x11/10x12/11x9/8=4.
VII. With the intervals of "first doubling" (*zü't-tad'īf*);
8/7x8/7x49/48x 8/7x8/7x49/48x9/8x8/7x8/7x49/48x8/7x8/7x49/48x9/8=4.
VIII. With the intervals of "second doubling";
9/8x9/8x256/243x9/8x9/8x256/243x9/8x9/8x9/8x256/243x9/8x9/8x256/243x9/8=4.
IX. With the intervals of "third doubling ";
10/9x 10/9x27/25x10/9x10/9x27/25x9/8x10/9x10/9x27/25x10/9x10/9x27/25x9/8=4.
X. With the intervals of "first disjunct" (*munfasil*);
8/7x10/9x21/20x8/7x 10/9x21/20x9/8x8/7x10/9x21/20x8/7x10/9x21/20x9/8=4.
XI. With the intervals of "second disjunct";
9/8x11/10x 320/297x9/8x11/10x320/297x9/8x9/8x11/10x320/297x9/8x11/10x 320/297x 9/8=4.
XII. With the intervals of "third disjunct";
10/9x12/11x11/10x10/9x12/11x11/10x9/8x10/9x12/11x11/10x10/9x12/11x11/10x9/8=4.

Safī al-Dīn indicates that when examined the most consonant one and the best one to the human nature of these scales are two scales of "second doubling kind" (*zü't-tad'īf al-thanī*) (9/8x9/8x256/243=4/3 and 10/9x10/9x27/25=4/3) "second conjunct kind" (*muttasil*); (9/8x10/9x16/15=4/3).

Common Notes in the Scales:

Safī al-Dīn explains with an example how other kinds in octave can be arranged. Such as the scale arranged with the intervals of "the second conjunct kind" in the bass octave:
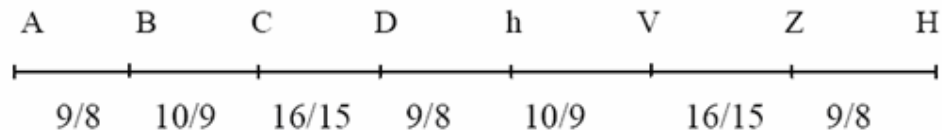
The order of 9/8x10/9x16/15=4/3 here is the ratios of "the second conjunct kind" with those of the first class. The third class of the same kind is like 10/9x16/15x9/8=4/3. This third class here exists between B and h. As it is mentioned here it is possible to see several more tetra chords in this way in these scales. Safī al-Dīn calls them "*bahr*".

The tetra chord between B and h here is accepted as "s*econd bahr*". Also, C-V tetra chord is the ratios of "the second conjunct kind" with its sixth class and it is called the "*third bahr*" in the scale. D-Z tetra chord is the "*fourth bahr*" and the ratios are the same as those of the first one. h-H tetra chord has the same values as those of the second tetra chord. Safī al-Dīn calls the total of these *bahr* (tetra chordal species) in one octave as "*şadd*".

Safī al-Dīn gave the *bahrs* (tetra chords) mentioned above in his *Kitāb al-adwār* in one octave with the keys of Rāst scale.[26] In *al-Sharafiyya* he showed the eight different octaves which are in two octaves that he presented with a table.[27]

The Accordatura of Stringed Instruments and *Ūd:*

Safī al-Dīn says that all the sounds exist in one string but one string is not enough to compose and perform it and that two, three, four or more stringed instruments were invented for this purpose. Two stringed instruments can be accorded in different ways. The most common one is the tetra chordal accord. The 'ūd, which is considered to be the most perfect and well known of the instruments, is a five string instrument. The one at the top is the *bamm* and then comes *mathlath, mathnā, zīr* and *hādd* strings.

The *'Ūd* instrument is named as the most excellent instrument of all in Ikhwān al-Safā[28] and the most famous one in al-Fārābī.[29] The same idea is expressed in the following books. The reason why the instrument is called "*'ūd kāmil*" (the perfect lute) is because it includes all the notes.[30]

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[26] Safī al-Dīn, *Kitāb al-adwār,* Yale University, The Beineke Rare Book and Manuscript Library, MS S 73, fol. 30.
[27] Alishah presented seven scales of one octave which he showed in an Ushshāq scale of two octaves with their names. He pointed out these full scales are called "all sorts of kinds". Alishah b. Haci Buke, *Mukaddimat al-Usūl,* fol. 29b; also see for *bahr* Al-Lādhiqī, *al-Risāla al-fathiya,* fol. 76a; for common notes see *Traité anonyme*, p. 103.
[28] Ikhwān al-Safā, *al-Risāla fi al-mūsīqī,* i, 148.
[29] Al-Fārābī, *Kitāb al-mūsīqī al-kabīr,* p. 498.
[30] Al-Lādhiqī, *al-Risāla al-fathiyya*, fol. 88a.

The names of *bamm*, *mathlath*, *mathnā*, *zīr* are the same in each music manuscript.[31] Besides, al-Kindī mentioned about the ones tying one more string named *hādd* below *zīr* string in his age, and he adds that they take five things, five senses, five fingers and planets and five prosody circles into consideration while doing this.[32] Al-Fārābī allocated a great part for the *'ūd* while he was explaining the subject of producing notes and instruments and talked about the tunes of four strings of the *'ūd* instrument mentioned above and about the accord orders in many ways. At the end, he pointed out that one of the three ways is to add a fifth string to the *'ūd* instrument in order to achieve the two octaves/*haddetu'l-hāddāt*. Two octaves will be completed with the note when the ring finger touched on the fifth string.[33]

Figure 7. Some instruments.

In the following works the instrument of *'ūd* has five strings with *hādd*.[34] The accord of *'ūd* is a tetra chordal accord. In this case there are two octaves between the open position of the bass (A) at the top and the key where the ring finger touches at the lowest string. A-Lh. In all music manuscripts (*Adwār*) the accord orders between the strings of *'ūd* is the same. According to al-Fārābī well-known accord is the one where the sound of ring finger tune of each string and the sound of open position of the lower string is equal.[35] This expression is the same as the one Safī al-Dīn presented above.[36]

Determining 17 Notes on the *'Ūd* : The Division of the Frets:

Safī al-Dīn points out that firstly he determines seven tones in the first tetra chord on the *bamm* string of the *'ūd* with ratios of "the second doubling kind" (9/8x9/8x256/243=4/3 tone-tone-limma), which he calls "*zü 'l-müddeteyn*", then as limma-limma-tone 9/8x9/8x256/243=4/3. He does not perform the duty to find the others, just points out the names of tones. The tones he determined is shown on a table of the *ūd* with their high in pitch octaves in *Kitāb al-adwār* and *al-Sharafiyya* as follows[37]:

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[31] Al-Kindī talks about the strings of this instrument in detail both in the book *Kitāb al-musawwitāt al-watariyya* (see Turabi, pp. 149-153) and in *Risālah fī agzā' khubriyya* (Turabi, pp. 163-167) and he connects celestial bodies, natural events, and human morality with emotions and behaviours. Also see; Ikhwān al-Safā, i, 149, al-Fārābī, *Kitāb al-mūsīqī al-kabīr,* p. 502; Ibn Sīnā, *Gawām'i,* p. 148.

[32] *Kitāb al-musawwitāt al-watariyya* (Turabi, p. 142).

[33] Al-Fārābī, *Kitāb al-mūsīqī al-kabīr,* pp. 588-592.

[34] Ibn Sīnā, *Gawami',* p. 148; Alishah, *Mukaddimat al-usūl,* fols. 89a-89b.

[35] Al-Fārābī, *Kitāb al-Mūsīqī al-kabīr,* p. 597. Here al-Fārābī tells about various accord orders of ûd.

[36] Al-Kindī, *al-Risāla al-kubrā fī al-ta'līf* (Turabi, p. 176); Ikhwān al-Safā, i, 149, Ibn Sīnā, *Gawâmi',* p. 148.

[37] Safī al-Dīn, *Kitāb al-adwār,* fol. 33.

Bamm	H	Z	V	H	D	C	B	A
Mathlath	Yh	YD	YC	YB	YA	Y	T	H
Mathnā	KB	KA	K	YT	YH	YZ	YV	Yh
Zīr	KT	KH	KZ	KV	Kh	KD	KC	KB
Hādd	LV	Lh	LD	LC	LB	LA	L	KT
	khinsir	binsir	wustā al-zalzal	wustā al-kadim	sabbābah	mujannad al-sabbābah	Zāyid	mutlak

Safī al-Dīn shows the tunes on the strings after the *bamm* by giving the names. However, he tells in his *Kitāb al-adwār* the division of an octave into 17 intervals in detail and this manner is carried on in the works of following *adwārs* and new works.[38] These 17 tones (18 with its octave) are shown depending on their distance to the starting sound like this:

N°	Names of the notes	Ratios	Sent
1	A (ا)	1/1	0,00
2	B (ب)	256/243	90,22
3	C (ج)	65536/59049	180,45
4	D (د)	9/8	203,91
5	H (ه)	32/27	294,13
6	V (و)	8192/6561	384,36
7	Z (ز)	81/64	407,82
8	H (ح)	4/3	498,04
9	T (ط)	1024/729	588,27
10	Y (ى)	262144/177147	678,49
11	YA (ىا)	3/2	701,96
12	YB (ىب)	128/81	792,18
13	YC (ىج)	32768/19683	882,40

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[38] Safi al-Dīn, *Kitāb al-adwār,* fols. 4-6; Alishah b. Haci Buke, *Mukaddimat al-usūl,* fols. 48a-49a; *Traité anonyme,* pp. 27-28; Al-Ladhiqî, *al-Risâlah al-fathiyya,* fols. 25a-26a; Also see; Yalçin Tura, *Türk Musikisinin Meseleleri (The Problems of Turkish Music)* Istanbul, 1988, pp. 182-184; M. Cihat Can, *XV. Yüzyil Türk Mûsikîsi Nazariyâti (Ses Sistemi),* PhD Thesis, Istanbul, 2001, pp. 156-157; Murat Bardakçi, *Meragali Abdulkadir,* Istanbul, 1986, pp. 56-57.

14	YD (يد)	27/16	905,87
15	Yh (يه)	16/9	996,09
16	YV (يو)	4096/2187	1086,31
17	YZ (يز)	1048576/531441	1176,54
18	YH (يح)	2/1	1200,00

These tones are shown on a porte:

A   B   C   D   h   V   Z   H   T   Y   YA   YB   YC   YD   Yh   YV   YZ   YH

The Scales of *Maqāms*

After telling the harmonious arrangements of *tanīnī, mujannab,* and *bakiyya* intervals Safī al-Dīn starts to form *maqām* scales with these intervals. He indicates that the performers of his age have given the following names to the ranges he mentioned above and he gives the intervals:

1	Ushshāq	T-T-B	A-D-Z-H
2	Nawā	T-B-T	A-D-h-H
3	Abūsalik	B-T-T	A-B-h-H
4	Rāst	T-C-C	A-D-V-H
5	Nawrūz	C-C-T	A-C-h-H
6	Irāq	C-T-C	A-C-V-H
7	Isfehān	C-C-C-B	A-C-h-Z-H
8	Buzurg	C-T-C-C-B	A-C-V-H-Y-YA
9	Zīrāfkand	C-C-B	A-C-h-V
10	Rāhawī	C-C-C	A-C-h-Z

Safī al-Dīn points out that seven out of ten kinds are of 4/3 value, one is 3/2, one is 5/4 and another one is 6/5.

We can count the intervals given in the table as follows. In this case we will remember which ratios Safī al-Dīn used for *tanīnī, mujannab* and *bakiyya* intervals:

Ushshāq   : 9/8x9/8x256/243=4/3

Nawā   : 9/8x256/243x9/8=4/3

Abûsalik   : 256/243x9/8x9/8=4/3

Rāst   : 9/8x65536/59049x2187/2048=4/3

Nawrūz   : 65536/59049x2187/2048x9/8=4/3

Irāq   : 65536/59049x9/8x2187/2048=4/3

Isfehān   : 65536/59049x2187/2048x2187/2048x256/243=4/3

Buzurg   : 65536/59049x9/8x2187/2048x65536/59049x256/243=3/2

Zīrāfkand   : 65536/59049x2187/2048x256/243=8192/6561[39]

Rāhawī   : 65536/59049x2187/2048x2187/2048=81/64[40]

Safī al-Dīn arranges the first seven of the kinds above having the value of full tetra chord with their equals and one tanīnī, that is to say, he does it by adding the pentha chords of the same ranges into these tetra chords. While doing this he arranges them by leaving interval (tanīnī-9/8) at the high pitch side (*munfasil al-ahad*), at the low pitch side (*munfasil al-athqal*) and at the middle (*munfasil al-awsat*) and he points out the most used ones of the ranges.

The first kind (Ushshāq) is arranged with the first and second tetra chords with the arrangement of *munfasil al-ahad*, *munfasil al-athqal* and *munfasil al-awsat* as follows:

Munfasil al-ahad : A-D-Z-H-YA-YD-Yh-YH: 4/3x4/3x9/8=2/1

Munfasil al-athqal: A-D-Z-Y-YA-YD-YZ-YH: 9/8x4/3x4/3=2/1

Munfasil al-awsat: A-D-Z-H-YA-YD-YZ-YH: 4/3x9/8x4/3=2/1

He says that of the three, the range arranged as *munfasil al-ahad* is the most used. To note, this is the range of Ushshāq arranged as tetra chord-tetra chord-tanīnī, its tetra chords are also arranged as T-T-B: 9/8x9/8x256/243x9/8=4/3.

As the interval ratios of the ranges above were mentioned before, we will not mention them again here. So, a range of Ushshāq is composed of ratio values of 9/8x9/8x256/243x 9/8x9/8x256/243x9/8=2/1 in one octave. This is the following topic and *maqām* ranges are composed of the ranges arranged here. As same as above Nawā, Abūselik, Rāst, Nawrûz, Irāq, Isfehān kinds are arranged, there occurs totally 63 scales.

Safī al-Dīn determined the ones well known among the musical artists and mostly used in these ranges. He demonstrated them in a table such as below:

Ushshāq   :   A-D-Z-H-YA-YD-Yh-YH

Nawā   :   A-D-h-H-YA-YB-Yh-YH

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[39] This is the kind as Safī al-Dīn indicates, having a value of 5/4. The ratio is the average value of the major third with a value of 8192/6561 used in practice.

[40] Safī al-Dīn gives the ratio of 6/5 for Râhewî. But the ratio of 6/5 is the ratio used instead of the minor third with the ratio of 32/27.

Abûsalik	:	A-B-h-H-T-YB-Yh-YH
Rāst	:	A-D-V-H-YA-YC-Yh-YH
Hijāz	:	A-C-V-H-Y-YC-Yh-YH
Nawrūz	:	A-C-h-H-Y-YB-Yh-YH:
Isfehān	:	A-D-V-H-YA-YC-Yh-YH
Zanqüla	:	A-D-V-H-Y-YC-Yh-YH
Rāhawī	:	A-C-V-H-Y-YB-Yh-T
Zīrāfkand	:	A-C-h-H-Y-YB-YC-YV-YH
Buzurg	:	A-C-V-H-Y-YA-YD-YV-YH
Muhayyer Husaynī	:	A-C-h-H-YA-YC-Yh-YH
Nihüft	:	A-C-V-H-Y-YA-YC-Yh-YH
Hijāz (its another scale):		A-C-h-H-Y-YC-Yh-YH
Kawasht	:	A-C-V-H-Y-YB-YC-YV-YH
Kardāniye	:	A-D-V-H-Y-YA-YD-YV-YH
Husaynī	:	A-C-h-H-YA-YB-Yh-YH
Irāk	:	A-C-V-H-Y-YC-Yh-YZ-YH

Safī al-Dīn showed the one (*rast*) he chose among these scales with its 17 tones and indicated that the ones knowing the arrangements of the intervals would be able to show each period with the same method. Safī al-Dīn did not show all the *maqāms* he named and gave the intervals in the table. The ones he showed in the table are: Ushshāq, Abusalik, Nawā, Rāst, Husaynī, Rāhawī, Zanqüla, Irāk, Isfehān, Zīrāfkand, Hijazi/Hijaz, Buzurg. He showed these *maqām* scales by adapting on each tone as 17 layers. However, he started from the starting sound of the second tetra chord of the former layer at each layer.

In the *Treatises of al-Kindī*, although the *maqāms* which Safī al-Dīn mentioned with the names above are not taken place, together with tanīnī, *lawnī* and *te'līfi* names consisting the *maqāms*, three more kinds and seven *maqām* ranges are presented. These are shown with the notes of modern time by the editors studying al-Kindī. These *maqāms* do not have a special name in al-Kindī but they are shown with their equal *maqāms* in Greek music [41]. The subject of *maqām* is in the important topics of subsequent music manuscripts.[42]

Safī al-Dīn completes his work by mentioning several accords of the *ūd*, the subject of transforming tones (*nagme*), in the fifth discourse the subject of *īkā'* and composing.

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[41] Turabi, pp. 83-84.

[42] The source of these *adwārs* is Safī al-Dīn. However, there have been substantial differentiations in defining *maqāms* and their numbers and existed important varieties about this subject between these manuscripts. See Alishah, fols. 14b-24b; al-Lādhiqī, *al-Risāla al-fathiyya*, fols. 74a-74b; al-Shirwānī, *Majalla fī al-mūsīqī*, fol. 100; Hizir b. Abd Allah, *Kitāb al-adwār,*Topkapi Rewan no: 1728, fol. 63b; *Traité anonyme*, pp, 107-120.

Conclusion

Safī al-Dīn is a scholar who occupies an important place in the history of Eastern music in the XIIIth century. His fame relies on the influential works he wrote in the field of theoretical music. Besides being a theoretician, he was a professional music performer, a composer and an inventor of musical instruments. As in the Eastern sources, Safī al-Dīn is also one of the theoreticians that took a valuable place in the works of Western modern writers who studied Eastern music. His works had been a source for almost all the musical writings composed in subsequent centuries. These writings, are as if they were, mere annotations on the original discoveries of Safī al-Dīn. The authors of these works name Safī al-Dīn the master of this field and praise him.

The main treatise of Safī al-Dīn *al-Sharafiyya* is perfect in terms of both arrangement and style. This feature of the work is, as we mentioned before, due to the fact that the author knew Arabic previous literature and built upon it.

Safī al-Dīn studied the ratios between the numbers very systematically, named the intervals established with these ratios, classified them, and explained the consonance and dissonance ones in detail.

After al-Fārābī, the tetra chord divisions had never been examined in such a detailed way in any *adwār*. Safī al-Dīn showed all possible divisions and pointed out the most consonant of these. He mentioned the tetra chords with four intervals and penta chordal kinds and explained the consonant ones. Some writers following him avoided this topic as it is complicated and full of details, and did no more than following the same route as Safī al-Dīn.

Safī al-Dīn al-Urmawī benefited from several sequencing forms of tetra chord, penta chord and *tanīnī* intervals while he was arranging two octave ranges. While forming one and two octave ranges, he arranged the intervals of tetra chord and penta chord in several ways and formed the *maqāms* with the consonant ranges appearing after this work. In addition, he mentioned some topics such as the determination of 17 sound ranges, common tones of scales, transposition, performing of an instrument, the order of accords, and the performance with several accords and compositions.

The examination and naming of the *maqāms* in *Kitāb al-Adwār* and *al-Sharafiyya* of Safī al-Dīn were achieved for the first time. In *al-Sharafiyya* Safī al-Dīn arranged 63 ranges with tetra chords and penta chords, and he produced 18 *maqāms* out of them and showed the scales of 12 ones in the tables by adapting them into 17 tones/notes. Up until the end of the fifteenth century, there seems no great change in the classification and naming of the *maqāms* that Safī al-Dīn accomplished.

Having a great knowledge over the terminology of music in his age, Safī al-Dīn surveyed almost all the topics in *al-Sharafiyya* with a clear and understandable language and style. With the purpose of being a light for the incoming studies in the future, we believe that *al-Sharafiyya's* valuable work supplied some substantial contributions which should be noticed by everybody writing over theoretical music in the Islamic heritage of the past.

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