Al-Fārābī’s Conception of Music Theory as the Universal Science of Melody

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Abstract

Al-Fārābī conceived of music theory as a universal science of melody whose task is to determine the whole range of what is musically possible. It does not restrict itself to codifying the conventions of any particular musical idiom. In this, it is akin to logic – the universal science of all things thinkable, which does not reduce to the grammar of any given natural language.

Keywords

Al-Fārābī – Ptolemy – music theory – logic – grammar

1 Introduction

The purpose of this paper is to understand two related things: the program of al-Fārābī’s (d. 339/950) Kitāb al-Mūsīqī al-kabīr and his conception of music theory as a science of melody. The two things are related, because the program of the Kitāb is to carry out a complete and systematic reconstruction of this science. So we learn from the exordium1 where al-Fārābī announces that he has found no adequate pre-existing treatment of music: neither in Greek sources

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1 The exordium takes the form of a letter. The addressee is not named. Our sources say that he was Abū Ǧaʿfar Muhammad b. al-Qāsim al-Kaṭḥī. See for example the beginning of Abū Naṣr al-Fārābī, Kitāb al-Mūsīqī al-kabīr (MS Istanbul, Köprülü Library, 953), as reproduced in facsimile in Abū Naṣr al-Fārābī, Kitāb al-Mūsīqī al-kabīr, ed. with an introduction by Eckhard Neubauer (Frankfurt am Main: Institute for the History of Arabic-Islamic Science at the Johann Wolfgang Goethe University, 1998), 2.
translated into Arabic, nor in original Arabic sources closer to home in time as well as space. The aim of the Kitāb is thus to overcome their deficiencies. It will give a ‘complete’ presentation of theoretical music by discovering its first principles, showing what follows from them and thereby correcting all the mistakes that have hobbled the discipline. Al-Fārābī says that the ‘ancients’ (al-qudamā’) – here he means the ancient Greeks – must have already given such a presentation given their ingenuity and their commitment to scientific enquiry. If he sincerely believes this and hence that a complete science of music once existed, then his task is to reconstruct it. If his words are purely rhetorical, then his task is to collect clues from the treatises available to him and from musical practice known to him either first hand or from testimonies and, by some kind of philosophical art of detection, piece it together for the first time. Either way, the very program of the Kitāb requires that al-Fārābī put forward and defend in detail a very peculiar conception of music theory.

2 Evidence That al-Fārābī Was Well Informed about Ancient Greek Music Theory

This conception has deep roots in ancient Greek music theory. Al-Fārābī is very well informed. For example, he explicitly mentions the traditional Greek note names and adopts names in Arabic to correspond to them. He even transliterates the Greek note names using Arabic letters. He explicitly restates Aristoxenus’ argument that the fourth consists in two and a half whole tones, without mentioning Aristoxenus by name. He takes up the objections raised against this argument by Ptolemy, without mentioning his name either. He addresses the question whether the octave and a fourth is a consonance, siding against Ptolemy and with the Pythagoreans, but explicitly criticizing the Pythagoreans for adducing the wrong reasons. Perhaps the most important witness to the intensity of al-Fārābī’s engagement with ancient Greek music theory is that, in the second book of principles, i.e., the fourth book of the

2 Abū Naṣr al-Fārābī, Kitāb al-Mūsiqī al-kabīr, ed. by Ġaṭṭās ‘Abd al-Malik Ḥaṣaba and Maḥmūd al-Ḥifnī (Cairo: Dār al-kātib al-ʿarabī, 1967), 340. All the translations are from my translation of the Kitāb. All translations from other works cited in this paper are my own unless otherwise indicated.
3 Al-Fārābī, Kitāb al-Mūsiqī al-kabīr, ed. by Ḥaṣaba, 506–8.
4 Al-Fārābī, Kitāb al-Mūsiqī al-kabīr, ed. by Ḥaṣaba, 144–47.
5 Al-Fārābī, Kitāb al-Mūsiqī al-kabīr, ed. by Ḥaṣaba, 163–65.
6 Al-Fārābī, Kitāb al-Mūsiqī al-kabīr, ed. by Ḥaṣaba, 181–83. I will return to this point of contention between al-Fārābī and Ptolemy in §4 of this paper.
Kitāb in the order in which they come, he radically rewrites the second book of Ptolemy’s Harmonics. This is a topic for another paper, though I will have occasion to give some details in what follows. For our purposes, the important thing is the disruptive nature of al-Fārābī’s treatment of ancient Greek music theory. We naturally expect him to correct what he perceives to be mistakes in it: that is part of his program. The surprise is his willingness to turn basic assumptions on their head. Three examples will suffice. All three of them are taken from the second book of principles of the Kitāb.

3 Three Examples of al-Fārābī’s Disruption of Ancient Greek Music Theory

The first is this. The surviving Greek documents concur on a fundamental constraint governing the arrangement of intervals within the tetrachord: in order of rising register, the smallest is at the bottom of the tetrachord, while the greatest is at the top. In the chromatic tetrachord, for example, the smallest interval is some kind of semitone; the greatest is some kind of third: the third is at the top of the tetrachord; the semitone is at the bottom, and a second semitone is sandwiched in between. There are exceptions to this rule. One of them is Archytas’ diatonic tetrachord whose intervals, expressed as ratios of whole numbers from lowest to highest in register, are: 28:27, 8:7, 9:8. But this is an oddity. Ptolemy states it as a matter of principle, based on musical perception (he says), that all genera of the tetrachord have in common the consensus arrangement of intervals that places the greatest interval at the top of the tetrachord and the smallest one at the bottom. Al-Fārābī, by contrast, goes out of his way to present tables for the ‘blended genera’ of the tetrachord (al-ağnās al-maḥlīṭāt). Blending tetrachords of the same genus depends on recognizing

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7 Al-Fārābī, Kitāb al-Mūsāqī al-kabīr, ed. by Ḩašaba, 319–492.
8 It is an assumption of this paper that al-Fārābī has an Arabic translation of Ptolemy’s Harmonics in front of him. I cannot defend that assumption here except to say, in the most general terms, that the Kitāb has too many close, dense allusions to, and discussions of, this work to be explained otherwise. An-Nadīm’s (d. c.385/995) Fihrist makes no mention of an Arabic translation of Ptolemy’s Harmonics circulating in Baġdād. So my assumption is that al-Fārābī had access to one when he was living in Syria.
9 As reported by Ptolemy, Harmonics, 1.13, ed. by Ingemar Düring, Die Harmonielehre des Klaudios Ptolemaios (Göteborg: Elanders Boktryckeri Aktiebolag, 1930), 30.9–31.18. For an English translation, see Andrew Barker, Greek Musical Writings (Cambridge: Cambridge University Press, 1989), 2304.
10 See Ptolemy, Harmonics, 1.15, ed. by Düring, Die Harmonielehre, 33,22–23. Barker, Greek Musical Writings, 2307.
the possibility of inverting the usual order of intervals. This indicates a willingness to turn Ptolemy’s principle on its head. By Ptolemy’s principle, for example, the proper order of the ‘even diatonic’ tetrachord, expressed as ratios of whole numbers, is, from the smallest and lowest interval to the greatest and highest one: 12:11, 11:10, 10:9. The inverted order countenanced by al-Fārābī is from the greatest and lowest interval to the smallest and highest one: 10:9, 11:10, 12:11. His table for the blend of the two is presented as a list of six numbers between 45 and 60 – taken as string lengths – that show, in effect, the superposition of the one arrangement over the other: 45, 49 1/11, 50, 54, 55, 60.11 There is nothing like this in any Greek musical text known to me. One must wonder what its motivations are.

The second example of al-Fārābī’s disruptive interventions in ancient Greek music theory is the way he parses the double octave into a system of fourths and disjunctive tones. The way familiar to us from Book Two, Chapter Five of Ptolemy’s Harmonics is that of the ‘complete disjunctive changeless system’ (systēma ametabolon). The skeleton of this system features a whole tone, as its lowest interval, followed by two conjunct fourths; a disjunctive whole tone separates this pair of conjunct fourths from a higher pair of conjunct fourths:

1. [Whole Tone] [Fourth/Fourth] [Whole Tone] [Fourth/Fourth]

Al-Fārābī accepts this parsing of the double octave and gives it the Arabic equivalent of Ptolemy’s name, ‘the complete disjunctive changeless system’ (al-ġam’ at-tāmm al-munfasīl ġayr al-mutaġayyir).12 But he gives two other parsings of which no equivalent can be found in Ptolemy or other Greek musical writings.

Al-Fārābī’s second parsing is this:

2. [Fourth/Fourth] [Whole Tone] [Fourth/Fourth] [Whole Tone]

We recognize here the inversion of the first parsing: it places a pair of conjunct fourths at the bottom of the system and displaces the whole tone at the bottom

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11 Al-Fārābī, Kitāb al-Mūsūqi al-kabīr, ed. by Ḥašaba, 399.
12 Al-Fārābī, Kitāb al-Mūsūqi al-kabīr, ed. by Ḥašaba, 331. Both al-Fārābī and Ptolemy characterize any two-octave system as complete. They call the two-octave system under discussion ‘changeless’ for different reasons. Al-Fārābī calls it ‘changeless’ if the genus of the tetrachord is the same throughout (333). Ptolemy calls it changeless if the notes coincide in ‘function’ and ‘position,’ see Ptolemy, Harmonics, 11.5, ed. by Düring, Die Harmonielehre, 52,12–14. See Barker, Greek Musical Writings, 2:2325–26. Here is not the place to discuss the significance of this discrepancy.
of the first parsing to the top of the whole system, while using a disjunctive whole tone to separate the lower pair of conjunct fourths from the higher pair. Al-Fārābī calls this parsing of the double-octave ‘the complete changeless disjunctive system,’ just like the first parsing.\footnote{An important qualification is in order here. In al-Fārābī, Kitāb al-Mūsīqī al-kabīr, ed. by Ḥaşaba, 331, I take al-Fārābī to refer to the second parsing as an instance of ‘the complete changeless disjunctive system’ because of its use of the disjunctive tone. However, on page 341 of the edition, al-Fārābī proceeds to assign Greek note names (in the manuscript that the Cairo editors call ‘$\Phi$’) and Arabic equivalents to all fifteen notes in the second parsing. To do that, he has to use names from the so-called synēmmenōn – ‘conjunctive’ – tetrachord. For the note at the eighth scale degree in both parsings is called mesē in Greek and wustā in Arabic. But in the first parsing, mesē/wustā forms a disjunctive tone with the note at the ninth degree of the system – a note that is called paramesē in Greek and fāṣilat al-wustā in Arabic to signal that it forms the disjunctive tone with mesē/wustā and thus serves as the lower bounding note of the ‘disjunctive’ tetrachord that sits atop the disjunctive tone (the rest of whose notes are explicitly called ‘disjunctive,’ i.e., ‘diezeugmenōn’). In the second parsing, by contrast, the ninth degree and the eighth degree do not form a disjunctive tone, but rather the lowest interval of the next tetrachord – namely a tetrachord conjoined with a second, still higher tetrachord to span the second and higher double fourth of the system. To signal this new relation of the eighth and ninth scale degrees in the second parsing, the name given to the note at the ninth degree will be trītē synēmmenōn in Greek and taqilat al-muttaṣilāt in Arabic. For our purposes, the significance of these names for the note at the ninth degree of the second parsing is that synēmmenōn and al-muttaṣilāt mean conjunctive. This is a good reason to refer to the second parsing as a conjunctive systematisation. I note that al-Fārābī explicitly refers to it in this way on page 341 and following in the edition. The reader who wishes a helpful diagram (with traditional Greek note names) and discussion of the Greek perfect disjunctive system and its difference from the conjunctive system, would do well to consult the introduction to Barker, Greek Musical Writings, 233.} This is in keeping with his appellations for the genera of the tetrachord: any given genus and its inversion get the same name, as we saw above in the case of the ‘soft diatonic.’\footnote{There is no evidence, in the second book of principles in the Kitāb, of an attempt by al-Fārābī to ‘blend’ the default complete changeless disjunctive system and its inversion, though nothing would prevent him from making such an attempt given that he is willing to countenance the inversion as well as the default system.}

Al-Fārābī’s third parsing of the double octave is this:

3.[Fourth] [Whole Tone] [Fourth/Fourth] [Whole Tone] [Fourth]

Here we have a single pair of conjunct fourths separated by a disjunctive tone from a single fourth both at the top of the system and at the bottom. This is what al-Fārābī calls the ‘complete changeless conjunctive system’ (al-ğam'
at-tāmm al-muttaṣil ǧayr al-mutaqayyir). It is very strange for a couple of reasons.

The first is its name. It is a ‘conjunctive’ system for no better reason, it would seem, than that it has a single pair of conjunct fourths in the middle. But, of course, the default complete disjunctive system and its inversion, in the first and second parsings of the double octave, both have two pairs of conjunct fourths. It may be said, therefore, that the complete disjunctive system is more conjunctive than its conjunctive counterpart. For that matter, the ‘conjunctive’ system has two disjunctive whole tones that separate the middle pair of conjunct fourths from the lower and the higher ends of the system – for which reason, it might also be said that the complete conjunctive system is at least as disjunctive as its conjunctive counterpart.

Ptolemy too considers a system that he calls ‘conjunctive.’ But the Ptolemaic system is conjunctive, just because it is missing the disjunctive tone that separates the lower octave from the rest of the system. Moreover, the Ptolemaic system is not ‘complete.’ Unlike al-Fārābī’s conjunctive system, which is complete in the relevant sense, Ptolemy’s falls short of the double octave: it covers only an octave and a fourth:

[Whole Tone] [Fourth/Fourth/Fourth]

Precisely, because the Ptolemaic conjunctive system is missing the second disjunctive whole tone, it features a trio of conjunct fourths above the whole tone at the bottom of the system. The system is of interest to Ptolemy, because he takes it to be an ancient device for accommodating what we may regard as a change of key during the course of a single melody. For the effect of eliminating the disjunctive tone between the second fourth and the third fourth, in order of rising pitch, is to give a melody a path between one complete disjunctive system within a given double octave and another such system within a double octave a fourth higher or lower than the first one. Suppose the melody begins within the first complete disjunctive system. When it reaches the lower note of the disjunctive whole tone separating the lower octave from the higher, it can do one of two things, assuming that it rises in pitch. Either

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15 Al-Fārābī, Kitāb al-Mūsāqī al-kabīr, ed. by Ḫašaba, 343.
16 There may be a better justification for calling it ‘conjunctive.’ See below.
17 Again, the second parsing is conjunctive just insofar as it assigns names to the notes at the ninth degree and higher from the conjunctive – synēmmenōn – tetrachords. See footnote 13.
it can continue exploring the notes of the system it started in by going up the disjunctive whole tone and entering the pair of conjunct fourths above; or it can treat the note it has now reached not as the lower note of the disjunctive whole tone in the first system, but as the shared note at the boundary between two conjunct tetrachords in a complete disjunctive two-octave system whose disjunctive tone, separating its higher octave from its lower octave, is a fourth higher than that of the first two-octave system – the equivalent of adding an accidental to the key-signature of the melody. See the figure below:

Ptolemy’s point is just that the ‘incomplete conjunctive system’ is not a system in its own right, but merely a pathway from one complete system to another. The three conjunct tetrachords of the conjunctive ‘system’ are not really in the same system at all. As seen above, we have a pathway from one complete disjunctive system in blue to a second complete disjunctive system in red that conjoins Fourth A, in the first such system, Fourth B, shared by both, and

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19 This is the main lesson of Ptolemy, *Harmonics*, 11.6, ed. by Düring, *Die Harmonielehre*, 53.28–57.9; Barker, *Greek Musical Writings*, 2:314–61.
Fourth C, in the second system whose lower bounding note – namely the lower bounding note of Fourth C – coincides in pitch with the lower bounding note of the disjunctive whole tone of the first system. Notice that the disjunctive system in red is a fourth higher than the disjunctive system in blue, as we can see by tracking the disjunctive whole tone from the one system to the other.20

Al-Fārābī’s ‘conjunctive system,’ by contrast, is not a pathway between two complete disjunctive systems a fourth apart, but rather a complete two-octave system in its own right. Moreover, it is as changeless as the complete disjunctive system and its inversion – our first two parsings of the double octave into a system of fourths and whole tones. This gives us another point of contrast with Ptolemy who explicitly denies that the conjunctive system we have been discussing is changeless; indeed, he characterizes it as metabolikon,21 presumably because it represents change (metabolē) in a melody from one key or register to another in the way we have just seen.

Because al-Fārābī’s ‘complete conjunctive system’ is a complete two-octave system in its own right, it presents another peculiar departure from ancient Greek music theory. This it shares with the inversion of the complete disjunctive system: in both the second and third parsings of the double octave, the lowest note is the lower bounding note of a fourth which, once filled in, will be a tetrachord. As Peter Schubert has pointed out to me, we never see this in Greek music theoretical texts. We can think of the third parsing as a duplication of the central octave in Ptolemy’s complete disjunctive system after it has been conjoined to itself: perhaps that is the best justification for calling it the ‘conjunctive system.’ We can think of the second parsing as the anomalous presentation of the complete disjunctive system given by Hucbald (d. 930)

20 Just to be clear: the so-called conjunctive system is neither the blue disjunctive system, nor the red disjunctive system, as figured above, nor a fusion of the two, but rather an abstraction that results if we forget everything in the blue and the red systems except for the pathway leading up from the lowest whole tone in the blue system through fourths A, B and C, or back again. My diagram is adapted from the one indicated at the end of Harmonics, II.6. My diagram features a whole tone and fourth above Fourth C, in the red system, to show that the red system is a complete disjunctive system a fourth higher in register than the complete disjunctive system in blue and thus that the pathway under discussion may be understood as a modulation from one key to another. Needless to say, the red system will also feature a whole tone whose upper bounding note will be the lower bounding note of fourth B. This whole tone will be a fourth higher than the lower whole tone at the bottom of the blue disjunctive system.

21 Ptolemy, Harmonics, II.6, ed. by Düring, Die Harmonielehre, 54.9. Barker, Greek Musical Writings, 2:328.
in *De Musica* why not displace the whole tone at the bottom of the system to the top?\(^{22}\) But our Greek sources never make room for such systems.

The third and final example of al-\-Fārābī’s disruptive interventions in ancient Greek music theory is his treatment of keys. His technical term for key is *tamdīd*, which is the verbal noun taken from the verb ‘to stretch’ in its causative form. It is a not bad Arabic rendering of the Greek word for key (among other things), which is *tonos* – likewise related to the Greek verb ‘to stretch’: *teinō*. Once again, al-\-Fārābī parts company from Ptolemy. Ptolemy has seven keys, each one of which corresponds to one of the octave species, i.e., one of the seven different arrangements of the intervals of the octave that result when we think of the octave as starting and ending on a different note of a given scale spanning an octave and taken as the default setting. But that is not the end of the story. If it were, each octave species as a whole would play out in a different register. To prevent that from happening, Ptolemy transposes each octave species into precisely the same octave. Hence, the *tonoi* or keys for Ptolemy are realizations within the same ambitus of the seven different octave species. By contrast, al-\-Fārābī’s keys are all in the same species of the octave, but transposed to different registers. This idea is a familiar one: music today in many parts of the world is built on a system of keys capable of reproducing the same arrangement of intervals at each of the twelve half tones that fill up an octave in equal temperament. Some such idea was not unfamiliar to ancient Greek music theorists. In Book One, Chapter Ten of *De musica*, Aristides Quintilianus ascribes a system of thirteen tonoi to Aristoxenus.\(^{23}\) The number thirteen suggests that Aristoxenus had a system of keys like the one known to us except that it allowed for redundancy by having two keys an octave apart. Al-\-Fārābī has a system of fifteen keys, which is to say that it reproduces the same arrangement of intervals at every named note in the complete disjunctive system. In the same passage of *De musica* where Aristoxenus is mentioned, Aristides also

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\(^{22}\) Hucbald, *Hucbaldi de musica: Scriptores ecclesiastici de musica*, ed. by Martin Gerbert (Hildesheim: Georg Olms Verlagsbuchhandlung, 1963), 1112. Claude Palisca, ed., *Hucbald, Guido and John on Music: Three medieval treatises*, trans. by Warren Babb (New Haven, London: Yale University Press, 1978), 28. Notice that one anomalous consequence of having a disjunctive whole tone at the top of the system in the second parsing is that the highest note of the system will need a name – just because names are conventionally assigned to all fifteen notes – but no traditional Greek name exists for this note if it is the upper bounding note of a disjunctive whole tone. For this reason, al-\-Fārābī makes up a new name: *infiṣāl al-muttaṣilāt*, which means ‘the disjunctive note of the conjoined notes.’ Hucbald does not make up a new name.

mentions certain “more recent people” who allow for fifteen keys. He says that they extended the system of keys to an octave and a tone. We do not know who these people were, or why they thought it would be a good idea to add two more keys to the redundant one allowed by Aristoxenus. Andrew Barker has asked me whether it is possible that al-Fārābī read Aristides in Arabic. Even if he had, it would still be a question why he followed the ‘more recent people’ mentioned in De musica.

4 What Are al-Fārābī’s Motivations? Do They Depend on a Concern for Empirical Adequacy?

In the second section of this paper, I briefly documented the depth and intensity of al-Fārābī’s engagement with ancient Greek music theory. In the previous, third section, I presented three examples of al-Fārābī’s willingness to disrupt ancient Greek music theory and turn it on its head. These two sections together raise the question I will now address: what motivates al-Fārābī’s disruptions? If we can understand what motivates them, perhaps we may understand better his conception of music theory as such.

Here it is natural to wonder, at least to start with, whether al-Fārābī is aware of current and historical musical practices in the Islamic empire that ancient Greek music theory could not explain. He would then think that ancient Greek music theory is empirically inadequate. In that case, he could be taken to think that empirical adequacy is required of music theory and hence that the task of music theory as such is to describe accurately the way music is actually practiced. This is indeed a natural train of thought, but it cannot be the whole story.

No doubt, al-Fārābī expects music theory to be empirically adequate. This expectation clearly motivates his criticism of Ptolemy in the second book of the madḥal or eisagōgē, i.e., the second book of the Kitāb in the order in which they come.25 Al-Fārābī does not mention Ptolemy by name here; instead, he speaks of those who ‘imitate the Pythagorean school’ in adopting and extending its ‘first principle’ (uṣūluhum).26 We can see from context which Pythagorean ‘first principle’ he has in mind: it is the claim that all concordant intervals correspond to ratios of whole numbers that are either epimoric ((n+1):n) or multiple (nm:n). This is the principle enunciated in the prologue to the Euclidean Sectio

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24 Aristides Quintilianus, De musica, ed. by Winnington-Ingram, 207. Barker, Greek Musical Writings, 2:421.
25 Al-Fārābī, Kitāb al-Mūṣiqi al-kabīr, ed. by Hašāba, 107–211.
26 Al-Fārābī, Kitāb al-Mūṣiqi al-kabīr, ed. by Hašāba, 182.
It does not much matter whether al-Fārābī read this treatise in an Arabic translation. What matters is first that Ptolemy engages critically with the principle it enunciates and second that al-Fārābī has immersed himself in Ptolemy’s *Harmonics*.

On the one hand, Ptolemy excoriates those ‘Pythagoreans,’ like the author of the *Sectio canonis*, who adopt the first principle at issue, who accept that every concord plus an octave is itself a concordant interval, but who deny that the octave and a fourth is a concord – on the grounds, presumably, that its corresponding ratio is neither epimoric, nor multiple. The octave and a fourth corresponds to the epimeric ratio of 8:3. It is notorious that the author of the *Sectio canonis* conspicuously leaves out the octave and a fourth when discussing the concordant intervals formed by adding an octave. Ptolemy lambastes the ‘Pythagoreans’ for this in Book One, Chapter Six of the *Harmonics*, because he says that the ear perceives the octave and a fourth as a concord.28

Yet Ptolemy himself is at pains to argue that epimoric ratios have special musical significance: indeed, not just because the ratios corresponding to concordant intervals are epimoric or derived from such ratios,29 but also for the ratios corresponding to the smaller intervals of the tetrachord, namely the different whole tones and semitones. Thus Ptolemy’s project in Book One, Chapter Fifteen of the *Harmonics* is to present divisions of the tetrachord by genus that are consistent with a preference for epimoric ratios and the musical ‘appearances.’30 In this respect, he is one of those criticized by al-Fārābī for ‘imitating the Pythagoreans’ by extending the application of their first principle in the way just indicated.

Al-Fārābī’s criticism of Ptolemy on this point concerns the so-called ‘tense diatonic’ tetrachord. Ptolemy’s ratios for this genus are, in order from lowest to highest interval: 16:15, 9:8, 10:9. All these ratios are epimoric. The Ptolemaic tense diatonic is thus an alternative to the ‘ditonic diatonic,’ the genus whose ratios are: 256:243, 9:8, 9:8. This is the diatonic found not only in Plato’s *Timaeus*, but even in the *Sectio canonis* whose author uses it in Proposition Nineteen

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29 Of course, that will raise for Ptolemy the problem of how to reconcile his preference for epimorics and multiples with his commitment to treating the octave and a fourth as a concordant interval. For that special problem and his resolution of it, see Ptolemy, *Harmonics*, I.7, ed. by Düring, *Die Harmonielehre*, 16,1–15. See Barker, *Greek Musical Writings*, 2:289–90.
to fill out his two-octave disjunctive system. But though the two whole tones of the ‘ditonic diatonic’ correspond to the epimoric ratio, 9:8, the semitone at the bottom of the tetrachord is a ‘leimma,’ literally that which is left over after two ‘epigdoic’ whole tones are taken from a fourth. The leimma corresponds neither to an epimoric nor to a multiple ratio. Nevertheless, Ptolemy cannot simply dismiss the ‘ditonic diatonic,’ because it is found through concords, i.e., by successively taking fourths from fifths, and was thus useful for tuning instruments.³¹ In Book One, Chapter Sixteen of the Harmonics, Ptolemy tries to have his cake and eat it too. He tries to argue that his own ‘tense diatonic’ is somehow more correct than the ‘ditonic diatonic’ and that musicians can sing in the former genus while being accompanied by instruments tuned in the latter without really noticing the difference because the 9:8 whole tone is close enough to the 10:9 whole tone and the leimma is close enough to the 16:15 semitone. Al-Fārābī will have none of this.

Without mentioning Ptolemy by name, al-Fārābī says, in effect, that Ptolemy’s theoretical commitments cannot do justice to musical practice. He is wrong, first of all, to insist on treating the octave and a fourth as a concord. It is at best a highly deficient concord – so deficient that it is never used in the ‘basis of a melody’ (fī aṣlī laḥn) and seldom in a melody’s ‘amplification’ (tazyidāt). That is the reason, he says, that “the adepts of the practical art of music” reject it.³² By implication, he thinks that Ptolemy is needlessly twisting himself in knots in Book One, Chapter Seven of the Harmonics to accommodate the octave and fourth as a concord with his preference for epimoric ratios. That in turn shows up the utter foolishness of his attempt both to do away with the leimma and to assimilate it to his preferred semitone corresponding to the epimoric ratio, 16:15. For al-Fārābī explicitly denies that practising musicians ever confuse or assimilate the leimma to the 16:15 semitone. He says that the most diverse musical idioms in the Islamic lands use the leimma.³³ He adds with an unusually sarcastic turn of rhetoric: “As for the other interval that is close to the leimma, namely the one whose lower bounding note exceeds its higher bounding note by reason of 16:15, no one prefers its sonority when heard to that of the leimma (al-faḍlā): this is like the extra portion of beauty of someone who is naturally beautiful over someone who is dolled up, decked out in jewelry and fine clothes; the difference between the two is altogether obvious.

³² Al-Fārābī, Kitāb al-Mūsīqi al-κabīr, ed. by Hašaba, 182.
³³ Al-Fārābī, Kitāb al-Mūsīqi al-κabīr, ed. by Hašaba, 183.
to the senses, as clear as day – especially as concerns melodies.” Ptolemy makes his pitch for the 16:15 semitone because his theoretical commitments have made him deaf to musical practice – everywhere.

The lesson we learn from al-Fārābī’s take-down of Ptolemy here is that music theory must be empirically adequate. Indeed, it must. But it does not follow, for al-Fārābī, that its task is to describe or codify music as it is actually practised. We can see this, and its implications, if we consider al-Fārābī’s assessment of what I will call ‘indigenous’ music theorists, i.e., the music theorists writing in Arabic about the musical practice known to them.

5  Al-Fārābī on Ishāq b. Ibrāhīm al-Mawṣīli

At the beginning of the previous section I floated the natural thought that maybe al-Fārābī’s disruptive interventions in ancient Greek music theory are motivated by his awareness of current and historical musical practices in the Islamic empire that this music theory cannot account for. We just saw that he believes that music theory must be empirically adequate. If that commitment implied, for him, that the task of music theory as such is to describe or codify music as it is actually practised, we would expect him to single out the best indigenous music theorists for getting it closer to the mark than the ancient Greeks; we might furthermore expect his engagement with these theorists to help explain his disruptions of ancient Greek music theory. Sure enough, he does single out the best indigenous music theorist – by name, in fact, which is unusual for al-Fārābī. Here I mean Ishāq b. Ibrāhīm al-Mawṣīli (d. 235/850). But the surprise is that, though he is properly respectful to Ishāq, al-Fārābī clearly rejects what he takes to be Ishāq’s conception of music theory. If we reflect on his assessment of Ishāq, we stand to learn something important about al-Fārābī’s motivations.

The first book of the madhal, and thus the very first book of the whole Kitāb, tries, among other things, to present the difference between practical and theoretical music. It does so in terms of an Aristotelian notion, that of a hexis – hay’a – or disposition, as we might say in English. A disposition might be characterized as the state of a person who has developed a certain habit. The person who has developed the habit of riding a bicycle prudently, yet confidently, in city traffic without interfering with motorized vehicles and without terrorizing pedestrians has a certain disposition, namely the skill of

34  Al-Fārābī, Kitāb al-Mūsāqī al-kabīr, ed. by Ḥašaba, 183–84.
35  Al-Fārābī, Kitāb al-Mūsāqī al-kabīr, ed. by Ḥašaba, 58–60.
a competent urban cyclist. The disposition comes with practice, though perhaps initially under the supervision of an instructor. Practice can, of course, lead to the gradual undoing of the good habits, even after they have settled in, as when confidence in the competent urban cyclist gives way little by little to cock-sureness, which means that some effort and vigilance are required to preserve the good habits. At the beginning of Book Two of the *Nicomachean Ethics*, Aristotle is interested in using this idea of a disposition to help us understand virtue: courage, for example, is the disposition to carry out courageous actions as the result of developing the relevant habits, perhaps by practising at military exercises under a good drill sergeant. To prepare this application of the idea to the virtues, Aristotle gives his own examples, including a suggestive musical one: “Again, every virtue arises and disintegrates from and through the same things – as too with every skill. For both good lyre-players and bad ones come about through lyre playing.”36 In the first book of the *madḥal*, al-Fārābī may be understood to run with this very example and explore it with much greater interest than Aristotle – with the hope of showing the different ways the disposition for music in human beings can manifest itself.

As Aristotle’s own example suggests, at least part of the disposition for practical music in human beings consists in developing the relevant habits that dispose a person to produce melodies – by singing or playing them on an instrument. Al-Fārābī thinks that every human being can develop this disposition to some level of proficiency, but that doing so requires a lot of practice manipulating the relevant instrument in the relevant way or, at least, by learning how to use one’s organs of vocalization in the relevant way. At even the highest level of proficiency, this is a disposition for reproducing melodies already known to us. At the lowest level of proficiency, it is the disposition all – or most – of us have for humming tunes in the shower.37 It is thus distinguishable from a second disposition, namely that for fashioning new melodies that have never been heard before, either by composing them or improvising on the spot. This disposition can also be developed to different degrees of proficiency. At its lowest degree of proficiency, it may just be an impulse – perhaps to vocalize as an expression of a person’s affective state. A lyrical shout of joy would count. Scarce any practice is required for this. But at its highest level of proficiency, engagement with, and mastery of, some particular musical idiom is required.38

Al-Farabi says that these two dispositions for practical music are different enough that they do not always come together in one and the same person. The question of concern to him is which of the two directs the other. The answer depends on the end pursued by the disposition for fashioning new melodies, which is just the fashioning of new melodies for people to enjoy. This disposition therefore treats the disposition for reproducing melodies as an instrument for achieving its peculiar end. Thus the relation of the former disposition to the latter is like that of the master builder to the art of carpentry. The end of the master builder is to build new buildings for people. To carry out that end, she directs the art of carpentry and the other skilled trades in the appropriate way. The disposition for fashioning new melodies is thus the master builder of music. In the art of building, the art of carpentry and the other skilled trades are separate from the master builder who, in the nature of the case, is a master builder and not a carpenter or a mason. But in the art of music, it does sometimes happen that the master builder and the relevant instruments are united in one and the same person. That will happen when the fashioner of new melodies is also the person who has developed the disposition for performing melodies to a high level of proficiency. Al-Farabi says explicitly that Ishāq al-Mawṣilī was such a person.

Ishāq also had some claim to be a music theorist. We have a witness to his modal theory in Yahyā b. ‘Alī b. Yahyā al-Munaǧǧim’s (d. 275/888) Kitāb ḥī’s reflections here may be, among other things, an attempt to fill a lacuna in Aristotle’s Poetics. In Chapter Six, Aristotle enumerates the six parts of tragedy: story, characters, utterance, thought, spectacle and music. Aristotle, De arte poetica, ed. by Rudolf Kassel (Oxford: Oxford University Press, 1965), 1450a.7–14. He says that the story is the end of tragedy, because the end is always the ‘most important part’ of any thing (1450a.23); the other parts of tragedy are subordinate to the story, as – for example – the characters are for the sake of the story and not the other way round. That means that the production of tragedy will fall to the poet and not to dancing master or the designer of sets and costumes. Nor will it fall to the music director. The poet is thus the master builder of tragedy, using the art of dancing, set design and so forth as tools or means to the relevant end. But Aristotle has nothing of interest to say about music and its uses in tragedy. I take al-Farabi to be saying in the part of the Kitāb I have been discussing that even within the province of music itself, there is more to say about the end pursued and the way the art is internally structured so that the end may be realized. I must not be taken to say that al-Farabi is thinking here of tragedy, as Aristotle understood it. All I am suggesting is that while al-Farabi is undertaking, in the Kitāb, to convert music theory into a science in Aristotle’s sense, he is struck – as anybody should be – by how little Aristotle himself has to say about music and thus finds himself having to fill in many gaps. This is one of them. Al-Farabi’s response, in the first book of the Kitāb, to Aristotle’s Poetics would be a paper in its own right.

39 Al-Farabi, Kitāb al-Mūsīqī al-kabīr, ed. by Ḥašaba, 59.
40 Al-Farabi, Kitāb al-Mūsīqī al-kabīr, ed. by Ḥašaba, 61. Al-Farabi’s reflections here may be, among other things, an attempt to fill a lacuna in Aristotle’s Poetics. In Chapter Six, Aristotle enumerates the six parts of tragedy: story, characters, utterance, thought, spectacle and music. Aristotle, De arte poetica, ed. by Rudolf Kassel (Oxford: Oxford University Press, 1965), 1450a.7–14. He says that the story is the end of tragedy, because the end is always the ‘most important part’ of any thing (1450a.23); the other parts of tragedy are subordinate to the story, as – for example – the characters are for the sake of the story and not the other way round. That means that the production of tragedy will fall to the poet and not to dancing master or the designer of sets and costumes. Nor will it fall to the music director. The poet is thus the master builder of tragedy, using the art of dancing, set design and so forth as tools or means to the relevant end. But Aristotle has nothing of interest to say about music and its uses in tragedy. I take al-Farabi to be saying in the part of the Kitāb I have been discussing that even within the province of music itself, there is more to say about the end pursued and the way the art is internally structured so that the end may be realized. I must not be taken to say that al-Farabi is thinking here of tragedy, as Aristotle understood it. All I am suggesting is that while al-Farabi is undertaking, in the Kitāb, to convert music theory into a science in Aristotle’s sense, he is struck – as anybody should be – by how little Aristotle himself has to say about music and thus finds himself having to fill in many gaps. This is one of them. Al-Farabi’s response, in the first book of the Kitāb, to Aristotle’s Poetics would be a paper in its own right.
41 Al-Farabi, Kitāb al-Mūsīqī al-kabīr, ed. by Ḥašaba, 63.
It is clear that, as a music theorist, he was regarded as an authority. That authority was surely based on his complete mastery of practical music. In particular, he must have had complete mastery over the relevant musical idiom – the idiom within which he was able to fashion new melodies that found favour with the Bağdādī public of his time. It is natural to assume that his music theory was an insightful presentation of the rules governing this idiom. Who better to codify these rules than someone like Ishāq? These considerations make it plausible to think that Ishāq's music theory exhibited a high degree of empirical adequacy and that it would also find favour in al-Fārābī's eyes for this very reason.

And yet al-Fārābī explicitly denies that Ishāq was a music theorist at all. He says that those who possess either or both of the dispositions for practical music I have been discussing have knowledge 'that music is,' but lack the science of music, which is knowledge of 'why it is.'

There is much to say about this distinction between knowledge that and knowledge why. It comes from Aristotle who says in many places that we genuinely know something only when we have grasped its causes or principles. Al-Fārābī is treating scientific knowledge of causes as a disposition in its own right, namely as a distinct, theoretical one. This too is an Aristotelian idea. It places the focus not on occurrent knowledge, i.e., on the circumstance of our active engagement with a science when we draw on it to answer a question that has been put to us – and get the answer right. Rather it treats scientific knowledge as dispositional, i.e., as an intellectual skill we have developed by having practiced at the relevant science through the discovery of its first principles. That skill will be an aptitude in the one who possesses it to exercise insight: in recognizing special cases and applications, in discerning otherwise unsuspected relations between seemingly unrelated things of interest to the science, and in correcting the mistakes made by others. Such insight comes from detaching ourselves from what is familiar or prior in relation to us – that which is particular and closer to perception – and turning ourselves to that which is

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43 Al-Fārābī, Kitāb al-Mūsāqī al-kabīr, ed. by Hašāba, 59.


45 By implication, treating scientific knowledge as dispositional – as a 'hexis' – is equivalent to treating it, in Aristotle's terms, as a 'first actuality': the first actuality will be the disposition in the sense I just spelled out; the 'second actuality' will be occurrent knowledge. Cf. Aristotle, De anima, B 1 16–27.
prior by nature – the universal, which is furthest from perception.\(^{46}\) By adapting these Aristotelian ideas to music, al-Fārābī is telling his reader that Ḳisḥāq may well be more conversant than anybody else in the particulars of the musical idiom fashionable in Baġdād of his time,\(^{47}\) but he never detached himself from these particulars and thus never developed the special intellectual disposition that is music theory in the true scientific sense of the word.

This implies, for al-Fārābī, that scientific music theory cannot just be empirically adequate. It must achieve a high degree of universality.\(^{48}\) As al-Fārābī puts it at the end of the first book of the madḫal (and of the whole Kitāb), theoretical enquiry is enquiry into universals and therefore requires ‘the power of knowing or grasping universally, which is what we find in the expert in musical science.’\(^{49}\) It is not hard to see what he means by this.

Al-Fārābī thinks that all human beings are potentially musical. That potentiality is just a part of human nature. But human nature expresses itself in many different ways: hence, musical cultures are diverse. The music theorist has to take an interest in the full range of musical possibilities – not just the musical idiom of one place and time. It is true that, at the beginning of the second book of the madḫal (and the whole Kitāb), al-Fārābī excludes from consideration the musical culture of Black Africans and that of Northern Europeans.\(^{50}\) We may and should deplore this ‘othering’ of these people, but it does not undermine my claim that music theory is meant by him to be universal in the way I just indicated. Al-Fārābī believes wrongly that Black Africans and Northern Europeans live in physical conditions too harsh to allow human nature to develop culturally in what he takes to be the normal or ‘natural’ way, as he would put it. The thought is not that these people are somehow constitutionally unable to be musical. Al-Fārābī must think that if they migrated to the temperate region around the Mediterranean Basin and further east along the same latitudes, they would eventually develop their own musical culture too in a normal or ‘natural’ way. It must be understood that suspicion of, and even


\(^{47}\) I recognize that care is needed here. It is quite possible that Ḳisḥāq was more cosmopolitan than my words suggest. Baġdād was culturally cosmopolitan: he would have been exposed to all sorts of different musical currents there. But that does not affect the polemical point that al-Fārābī is making against him.

\(^{48}\) For some of the special difficulties associated with this view, see Thérèse Druart, “Al-Fārābī: the Happy Marriage between Logic and Music,” *Ishrāq: Islamic Philosophy Yearbook* 10 (2022): 72–89.


disgust for, other people is compatible with expectations of universality for music theory. The point that matters here is that, however conversant Isḥāq may be in the musical idiom of Bağdād of his time, he cannot count as a music theorist, in al-Fārābī's books, because he has not detached himself from the relevant particulars and directed his intellectual gaze at the universal.

This does not mean that Isḥāq has nothing to contribute to music theory. Nobody can be conversant in all possible musical idioms: after all, not all that is possible for music has yet been invented. Music theory is still required to be empirically adequate, just like astronomy and medicine. Thus al-Fārābī explicitly allows the music theorist to consult the parochial experts on local musical idioms. He says that these experts will serve the music theorist in the same way that technicians skilled at dissection will assist medical scientists and technicians skilled at taking astronomical observations will assist the mathematical astronomer. In other words, the scientific music theorist will use the disposition for fashioning new melodies as a tool for enquir[y], just as the disposition for fashioning melodies uses the disposition for playing and singing melodies as a tool for making new melodies known to the public.

6 Languages, Logic and Music Theory

Al-Fārābī's treatment of Isḥāq suggests that he may have thought that there is an analogy between music theory and logic. Indeed, he may even have thought that his assessment of Isḥāq was a reprise of an earlier debate about the importance and value of logic by contrast with the natural languages.

At the centre of this debate was al-Fārābī's teacher Abū Bīšr Mattā (d. 328/939) – a Bağdād Peripatetic who believed that logic is universal in scope, a tool applicable to all things thinkable that we may use to catch out falsehoods and error. In this, it had a special vocation that it could not share with any of the natural languages. Hence, it is the logician, not the grammarian of any historical language, who will decide whether a discourse, be it in Greek, Arabic or Persian, mounts a valid argument. In 932, Abū Bīšr participated in a public debate in Bağdād with the Arabic grammarian, Abū Saʿīd as-Sīrāfī (d. 368/979), who argued that there is no universal science for judging the correctness of a discourse. The only science for doing this is that of the grammar of the


52 Al-Fārābī, Kitāb al-Mūsīqī al-kabīr, ed. by Ḫašaba, 101.
language in which the discourse is written or delivered. Witnesses of the debate judged that as-Sīrāfī was the winner.

Al-Fārābī cannot have been cowed by Abū Bišr’s trial. He too was a logician and shared his teacher’s understanding of the difference between logic and grammar. We find this point of view expressed in his Naṣṣ at-tawḥīḍ (Introduction to Logic). Thus he writes: ‘Logic is the art concerning the things that guide the rational power towards the truth about everything it is possible to be wrong about, and it knows everything by which we may guard against going wrong on every matter discoverable by the intellect. It has the same status with respect to the intellect that grammar has with respect to the tongue.’ The point here is that Arabic grammar can tell you how to speak and write flawless Arabic; it cannot tell you how to preserve the truth in doing so. The analogy with music theory, as al-Fārābī understands it, is perfectly natural. Music theory does not collect the conventions governing melodies in any given place at any given time: that is the task of someone who, like Ishâq, has cultivated the practical disposition for fashioning melodies to a high level of proficiency. Thus we may think of Ishâq as the Sirāfī of music – as a grammarian, in other words. By contrast, scientific music theory is supposed to be universal with respect to melody in the same way that logic is universal for all thinking.

7 What about al-Fārābī’s Disruption of Ancient Greek Music Theory?

We may now return to al-Fārābī’s disruptions of ancient Greek music theory. I believe that all of them may be understood as attempts to help music theory become universal – by accounting for as many musical possibilities as possible. This explains his willingness to countenance the inversions of the ancient Greek tetrachords. The thought would be something like this. Ptolemy was surely right to say in Book One, Chapter Fifteen of the Harmonics that musical perception approves of placing the largest interval at the top of the tetrachord and the smallest at the bottom. What this surely means is that people listening to melodies approve of melodies in which the tetrachords are arranged in this way. But the inversion of any given arrangement of intervals


is the same such arrangement, except that it has been turned upside down. Al-Fārābī is telling us, in effect, that an upside-down tetrachord must have musical potential and should therefore not be overlooked. What if Ptolemy should reply that audiences of music lovers in Alexandria of his day would not like upside-down tetrachords and would therefore judge them unmusical? I believe that al-Fārābī would say one or both of the following things: either the Alexandrian audiences could learn to love the upside-down tetrachords, or we should expect to find audiences outside of Alexandria – some time in the past, present or future – who love them, because, on the face of it, the musical potential is the same. The same line of reasoning surely explains al-Fārābī’s willingness to countenance the Hucbald-like inversion of Ptolemy’s ‘complete disjunctive system.’ For that matter it must explain his willingness to countenance his third, default parsing of the double octave into a system of fourths and disjunctive tones. As I pointed out in §3, that system is just the central octave of Ptolemy’s complete disjunctive system – conjoined with itself to fill out two octaves. No one disputes that the central octave of the complete disjunctive system is musically valid. Therefore, it must be musically valid to fill out two octaves by conjoining the central octave of this system with itself. Why not? If there is no good answer, then universal music theory must open the doors to it. What about a parsing of the double octave into fourths and disjunctive tones that conjoins four fourths and adds two conjoined whole tones? Why doesn’t al-Fārābī make that a default setting? Would it not be arbitrary to exclude it? Here the answer must be ‘no,’ because the two whole tones are not really disjunctive of anything in this case: they are just two whole tones tacked on to four conjoined fourths to fill out the double octave. Al-Fārābī must think that a musically valid parsing of the double octave into fourths and disjunctive whole tones must put the whole tones to work – as disjunctive whole tones.55

I will conclude this section by arguing that even al-Fārābī’s idea of fifteen keys can be motivated by his conception of music theory as a universal science of all musical possibilities.

The first task of the second book of the madḥal (and the whole Kitāb) is to determine the largest ambitus within which human beings will naturally tolerate hearing melodies. Any given melody might explore a very small ambitus. The question is rather where to set the goal posts such that all melodies are

55 Having said that, one can see that al-Fārābī’s conception of music theory is not just disruptive of ancient Greek music theory; it is potentially disruptive of itself. The constraint on musical potential is natural human musicality. That is not much of a constraint: human beings can learn to love the oddest things in music. Who is to say that they could not learn to love a double octave system laid out as four conjoined fourths and a ditone? This is a very important point. I cannot develop it here in the way that it deserves. But see §8 below.
played – somewhere – on the same field. Al-Fārābī reports that a Sogdian man by the name of Aḥmad al-Aḥwaṣ invented a stringed instrument called the šāhrūd that had an ambitus of four octaves. Aḥmad took his instrument on a tour of all the civilized lands. He performed melodies across the four-octave ambitus, and al-Fārābī reports that no audience anywhere had any objection. This is supposed to imply that human beings naturally tolerate melodies within a four-octave compass. That inference implies that music theory has to find a way to accommodate a given parsing of the double-octave into fourths and whole tones so that any given melody can, in principle, be played anywhere within this compass. As it turns out, the strategy of transposing a given parsing of the double octave to each of the fifteen named notes is a way to do just this. If that is right, then all of al-Fārābī’s most flamboyant disruptions of ancient Greek music theory can be understood as motivated by the concern to make music theory much more universal, i.e., accommodating of many more musical possibilities, than ancient Greek music theory ever was.

8 A Disquieting Thought about al-Fārābī’s Disruptions of Ancient Greek Music Theory

The universal aspirations of music theory, as al-Fārābī conceives it, are supposed to open the door to the greatest number of musical possibilities. But these aspirations are not supposed to let in just anything: not all collections of different musical pitches will count as melody. If we ask al-Fārābī what constraints universal music theory can place on musical possibilities so that we get melody rather than nonsense, his answer will involve an appeal to human nature. All human beings are naturally musical. If we wish to know what is musically possible, all we have to do is ask human beings what they like to listen to. That is why it is so important to take note of audience tastes – and to accept as an authority the taste of lay-audiences: those that do not include trained musicians. Perhaps because he spent so much of his life in Baḡdād, at the confluence of so many different musical cultures, or perhaps because he was from Central Asia, at the confluence of still other musical cultures, he was so struck by how diverse musical cultures can be.

57 The attention al-Fārābī gives to Sogdian cultural achievements in the Kitāb (and the Sogdian language in the Kitāb al-Ḥurāf) suggests that he himself was Sogdian. Gabriela Currie has encouraged me to think that this Central Asian background may have been significant: Central Asia was itself a confluence of many different musical cultures. A Sogdian would not have needed to visit Baḡdād to appreciate musical diversity. A Sogdian who had spent much of his life in Baḡdād might well have been all the more struck by how diverse musical cultures can be.
al-Fārābī had a keen sense of musical diversity. His Aristotelian philosophical commitments gave him what he took to be resources for developing a music theory that might make a study of this rich diversity in a rigorous way. But there is a problem with making natural human musicality the constraint on musical potential: human beings can learn to love pretty much anything. Once al-Fārābī has encouraged us to ask why we could not parse the double octave into four fourths and two disjunctive tones three ways, rather than just one, we can keep asking ‘why not’? Why not parse the double octave into three tritones, four leimmata and one whole tone? It will not do to say that no audience in the Islamic lands of al-Fārābī’s time or earlier would approve of ‘melodies’ based on such a parsing, because nothing known to us about human nature excludes the possibility that a musical culture based on my parsing might develop in the future. Again, it would not do for al-Fārābī to write off my parsing as conceivable only where human nature has been distorted by inhospitable conditions, because, for all he knows, the ‘alien’ might one day emerge in the bosom of what he takes to be the civilized world. Thus al-Fārābī’s music theory is not only disruptive of ancient Greek music theory; it is potentially disruptive of itself.

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