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Al-Fārābī and the Role of Arabic Music Theory in the Latin Middle Ages*

By DON M. RANDEL

AMONG THE NUMEROUS and varied works that were translated from Arabic into Latin in the twelfth and early thirteenth centuries is the *Classification of the Sciences* (*Iḥṣā' al-ʿulūm*) by Abū Naṣr Muhammad Ibn Muhammad Ibn Ṭarkhān al-Fārābī (d. A.D. 950), a brief treatise whose rather considerable influence extends to the writings of Vincent of Beauvais, Roger Bacon, Jerome of Moravia, Lambert, and numerous other writers on musical and nonmusical subjects alike.¹ In his discussion of the mathematical sciences, al-Fārābī gives an account of music, dividing it into the sciences of practical and theoretical music. The appeal of this simple division to scientists like Bacon is in itself quite suggestive. But the nature of the Latin translations themselves and the ways in which they were used by writers concerned primarily with music, particularly Jerome of Moravia and Lambert, show a great deal about what medieval Europe both was and was not learning and borrowing from the Arabs. In fact, what they did borrow from al-Fārābī suggests why they did not borrow a great deal more.

As with many of the other works being translated, the translators seem not to have understood fully al-Fārābī's *Classification*. Indeed, similar misunderstandings haunt the work of his twentieth-century translators. The nature of the misunderstandings, too, can tell us something about what the Latin writers sought in al-Fārābī. Hence, we must begin by trying to understand what al-Fārābī himself seems to have had in mind.

* Parts of this material were first presented at a session of the annual meeting of the American Academy of Religion in Washington, D.C. in the fall of 1974. My work on this subject owes much to the stimulation of the chairman of that session, Prof. Ismaʿil al-Fārūqī.

¹ On the subject of translations generally, see George F. Hourani, "The Medieval Translations from Arabic to Latin Made in Spain," *The Muslim World*, LXII (1972), 97-114. Arabic and Latin texts of the *Classification of the Sciences*, together with a Spanish translation, are given by Ángel González Palencia, *Al-Fārābī, Catálogo de las ciencias*, 2d ed. (Madrid, 1953). Of the section on music, Henry George Farmer offers Arabic and Latin texts and an English translation with commentary in *Al-Fārābī's Arabic-Latin Writings on Music*, 2d ed. (New York, 1960), reproduced for the most part from his "The Influence of Al-Farabi's 'Iḥṣā' al-ʿulūm' (De scientiis) on the Writers on Music in Western Europe," *Journal of the Royal Asiatic Society*, 1932, pp. 561-92.

His division of the science of music into the sciences of practical and theoretical music presents no problem and is the most widely adopted single element of his thought on music. Nor is the meaning of his brief account of the science of practical music in doubt. Here he distinguishes between natural and artificial instruments, the former being "the larynx and the uvula, and what is in them, and then the nose," the latter being "the reedpipes, and the lutes, and such like."² Only the names of the specific artificial instruments seem to have troubled the Latin writers in any way, as we shall see.

The principal difficulties have been caused by the five parts into which he divides the science of theoretical music. Here, however, we can put our questions directly to al-Fārābī, for this portion of the *Classification of the Sciences* is but an outline of his *Grand Book on Music* (*Kitāb al-mūsīqī al-kabīr*).³ The monumental work that has survived under this title is itself only the first of two books that al-Fārābī wrote, or intended to write, on music, and it is divided into two parts (*ajzā*). The first of these two parts is further divided into two essays (*maqālāt*). The second part consists of three fields of inquiry (*funūn*), each discussed in two essays. Thus, there are eight essays all told. As we shall see in more detail, the first pair of essays constitutes an introduction to the art of music and, together with parts of the first essay of the second pair, corresponds to the first of the five parts enumerated in the *Classification*. The second pair concerns the elements of the art and corresponds primarily to the second part named in the *Classification*. The third pair discusses musical instruments, as does the third part described in the *Classification*. The fourth and final pair of essays in the *Grand Book* is concerned with melodies, the first of the pair, like the fourth part in the *Classification*, dealing primarily with rhythm, and the second, like the fifth part in the *Classification*, dealing with the various kinds of melodies and their composition.

The following are the Arabic text of al-Fārābī's discussion of the five parts of the science of theoretical music in the *Classification*, Gerard of

² Farmer, *Al-Fārābī's Arabic-Latin Writings on Music*, p. 14.

³ The larger work is available in an Arabic edition by Ghattas Abd-el-Malek Khashaba and Mahmoud Ahmed el Hefny (Cairo, 1967) and in the French translation of Baron Rodolphe D'Erlanger's *La Musique arabe*, Vol. I (Paris, 1930) and Vol. II (Paris, 1935). Eugen Alfred Beichert, *Die Wissenschaft der Musik bei al-Fārābī* (Regensburg, 1931), seems to have worked from the Latin and French translations of the two treatises, respectively, and comments without further elaboration (p. 39) that a comparison of the two works shows "eine überraschende Deckung beider Systeme. . . ." Farmer, who certainly knew the Arabic of both treatises, seems to have taken no notice of the detailed correspondences between the two and, as a result, goes astray on a few points in his translation of the *Classification*. Eilhard Wiedemann, "Über al Fārābīs Aufzählung der Wissenschaften (De scientiis)," *Sitzungsberichten der physikalisch-medizinischen Sozietät zu Erlangen*, XXXIX (1907), 74-101 (reprinted in Eilhard Wiedemann, *Aufsätze zur arabischen Wissenschaftsgeschichte*, 2 vols. [Hildesheim, 1970], I, 323-50), discusses only the *Classification* and works from the Latin version of Gerard of Cremona, of which he gives a partial German translation. Wiedemann does, however, comment occasionally on problems of Arabic vocabulary.

Cremona's Latin version, dating from the middle of the twelfth century, and my own English translation of the Arabic:⁴

* وينقسم علم الموسيقى النظرية إلى أجزاء عظمى خمسة أولها القول في المبادئ والأقوال والأوايل [Marginal note التي شأنها أن تستعمل في استخراج ما في هذا العلم وكيف الوجه في استعمال تلك المبادئ وبأي طريق تستنبط هذه الصناعة ومن أي الأشياء ومن كم شيء تلتيم وكيف ينبغي أن يكون الفاحص عما فيها * والثاني القول في أصول هذه الصناعة وهو القول في استخراج النغم ومعرفة عدة النغم كم هي وكم أصنافها وتبين نسب بعضها من بعض والبراهين على جميع ذلك والقول في أصناف أوضاعها وترتيباتها التي تصير بها موطاة لأن يأخذ الآخذ منها ما شاء ويركب منها الألحان والثالث القول في مطابقة ما تبين [Interlineal note في الأصول والأقوال والبراهين على أصناف آلات الصناعة التي تعد لها وإيجادها كلها منها ووضعها فيها على التقدير والترتيب الذي تبين في الأصول. والرابع القول في أصناف الإيقاعات الطبيعية التي هي أوزان النغم والخامس في تأليف الألحان في الجملة ثم في تأليف الألحان الكاملة وهي الموضوعات في لأقوال الشعرية المؤلفة على ترتيب وانتظام وفي كيفية صنعها بحسب غرض عرض من أغراض الألحان وتعريف الألحان التي تصير بها أبلغ وأنفذ في بلوغ الغرض الذي له عملت.

Et diuiditur scientia musice speculatiua in partes magnas quinque. Prima earum est sermo de principiis et primis quorum proprietas est ut administrentur in inuentione eius quod est in hac scientia, et qualiter sit modus in administratione illorum principiorum, et qua uia inuenta sit hec ars, et ex quibus rebus, et ex quot rebus componatur, et qualiter oportet ut sit inquisitor de eo quod est in ea. Et secunda est sermo de dispositionibus huius artis, et est sermo in inueniendo neumas et cognitionem numeri neumarum quot sint, et quot species earum, et declinatione proportionum quarundam ad alias, et demonstrationum super omnia illa, et sermo de speciebus ordinis earum, et situum ipsarum quibus fuerint preparate ut accipiat acceptor ex eis quod uult, et componat ex eis armonias. Et tertia est sermo de conuenientia que declaratur in radicibus cum sermonibus et demonstrationibus super species instrumentorum artificialium, que preparantur eis, et acceptione eorum omnium in ea, et situ ipsorum in ea secundum mensurationem et ordinem qui declaratur in radicibus. Et quarta est sermo de speciebus casuum naturalium qui sunt pondera neumarum. Et quinta est de compositione armoniarum in summa; deinde de compositione armoniarum integrarum, et sunt ille que sunt posite in sermonibus metricis compositis secundum ordinem et ordinationem, et qualitate artis earum secundum unamquamque intentionum armoniarum, et docet dispositiones quibus fuerint penetrabiliores et magis ultime in ultimitate intentionis ad quam facte sunt.

⁴ The Arabic text is after Farmer's *Al-Fārābī's Arabic-Latin Writings on Music*, pp. 12–13, to which the reader is referred for variant readings, a few of which I have adopted; the Latin is after González Palencia's *Al-Fārābī, Catálogo de las ciencias*, pp. 153–54; my English version differs from Farmer's (pp. 15–16) in ways that will be discussed below.

The science of theoretical music is divided into five large parts. The first of these is the discourse on the principles (*mabādī*) and the propositions (*aqāwīl*), the nature of which is to be used in the derivation (*istikhrāj*) of what is in this science; and the method of the application of those principles; and in what way this art is discovered (*tustanbaṭu*); and from which things and from how many things it is joined (*tulta'amu*); and how the investigator of what is in it should be characterized.

And the second is the discourse on the rudiments (*uṣūl*) of this art; and it is the discourse on the derivation (*istikhrāj*) of the notes, and the knowledge of how great their number is and how many species (*aṣnāf*) of them there are, and the explanation of the proportions between one and another, and the demonstrations for all of that; and the discourse about the species [of the genera] (*aṣnafu* [*l-aṣnās*]), their composition (*awḍā'*), and the arrangements of them by which they become concordant (*muwāṭa'a*), for one chooses from them what one wants and composes melodies from them.

And the third is the discourse on the conformity of what is explained in the rudiments, propositions, and demonstrations to the species of artificial instruments that are adapted (*tu'addu*) to them; and the production of all of them [the notes, etc., that constitute the rudiments] in them [the instruments]; and their position [that of the notes, etc.] in them [the instruments] according to the calculation (*taqdīr*) and arrangement (*tartīb*) that are explained in the rudiments.

And the fourth is the discourse on the species of natural rhythms (*iqā'āt*), which are the measures (*awzān*) of the notes.

And the fifth is on the composition of melodies in general (*fī l-jumla*) and then on the composition of the perfect (*kāmila*) melodies; and these [i.e., the perfect melodies] are the ones set in poetical statements [which poetical statements are] composed according to arrangement (*tartīb*) and regularity (*intizām*) and in the manner of their art [i.e., the art of poetical statements] in accordance with the central purpose of the melodies and [in accordance with] the definition of the melodies, which [melodies] become by them [i.e., by means of the poetical statements] more profound and effective in the attainment of the purpose for which they are composed.

In the Middle Ages as well as more recent times, the technical terms used in Arabic writings in all fields have caused the greatest difficulty. Al-Fārābī's description of the first part of the science of theoretical music provides several illustrations of these vexing problems in translation, for here we encounter a complex of terms whose meanings can be discovered only if we take into account what al-Fārābī writes elsewhere about the nature of science and art in general. What appear to be general terms, often with similar meanings, turn out to have precise places in his scheme. In the present case, we must begin by distinguishing principles (*mabādī*) from rudiments (*uṣūl*), the terms for both of which are most often rendered "principles" in the French translation of the *Grand Book*.⁵ Thus, in the preface to his *Grand Book*, al-Fārābī tells us that "Every theoretical art consists of principles and what follows from them."⁶ He often uses

⁵ E.g., D'Erlanger, *La Musique arabe*, I, 2-3.

⁶ El Hefny, *Kitāb al-mūsīqī*, p. 43; D'Erlanger, *op. cit.*, I, 3.

the phrase "first principles" in this connection, as for example in his description of the topics covered in the first of the two essays on the elements (*istaqisāt*) of music.⁷ These two essays also deal with the rudiments, for it is at the end of the second of these essays that we encounter this second term.⁸ The relevance of the rudiments has already been described in the preface, where al-Fārābī tells us that three conditions are necessary for the theorist of any art: to know the rudiments, to be able to discover what is attendant on them, and to be able to recognize and correct the errors of others.⁹

One must know how to identify these rudiments, however, and this is done by means of rules (*qawānīn*). As al-Fārābī explains at the beginning of the second essay on the elements, these rules, together with the first principles, have been the subject of the first essay on the elements. They are "the rules by means of which one derives the notes and the intervals," which, as we shall see, are among the rudiments of the art.¹⁰ It is to these rules that al-Fārābī refers in the *Classification* when he speaks of the "propositions, the nature of which is to be used in the derivation of what is in this science." That these "propositions" (*aqāwīl*) are in fact the same as the "rules" discussed in the *Grand Book* is clear from the chapter on the science of language that opens the *Classification*. There he writes that "rules (*qawānīn*) in every art are universal or general propositions (*aqāwīl*)" and that among the purposes of these rules is to enable one to understand what pertains to a given art and what does not.¹¹

Thus, as in other arts, a knowledge of the theory of music requires that one know the first principles. One must then know the rules or general propositions by means of which one derives all of the rudiments of the art, since a complete mastery of these rudiments, too, is essential for the theorist. Finally, these rules enable one to determine precisely in what the art does and does not consist, and they enable one to avoid error. Related to these aspects of theory are the two remaining subjects comprising the first part of the science of theoretical music, both of which are discussed in the first pair of essays in the *Grand Book*: the way in which man comes to discover the art of music and the character and training appropriate to the person who would investigate this art.

If the first part of music theory thus treats of first principles and the

⁷ El Hefny, *op. cit.*, p. 319; D'Erlanger, *op. cit.*, I, 115.

⁸ El Hefny, *op. cit.*, pp. 491-92; D'Erlanger, *op. cit.*, I, 162.

⁹ El Hefny, *op. cit.*, p. 37; D'Erlanger, *op. cit.*, I, 2.

¹⁰ El Hefny, *op. cit.*, p. 319; D'Erlanger, *op. cit.*, I, 115.

¹¹ González Palencia, *Al-Fārābī, Catálogo de las ciencias*, Arabic text, p. 10; Spanish translation, p. 5. This passage also makes it clear that *aqāwīl* is the reading to be preferred in the discussion of music, a point on which the sources for the *Classification* disagree with one another and a point that troubled Farmer, *Al-Fārābī's Arabic-Latin Writings on Music*, pp. 12-13, 15, 57-58, and Alfred Guillaume, in his review of González Palencia in the *Journal of the Royal Asiatic Society*, January 1933, pp. 157-59.

rules for deriving the rudiments, the second of al-Fārābī's five parts of music theory deals with the rudiments themselves. We might suspect, however, that it would be difficult to separate entirely the discussion of the rules for deriving the rudiments from the discussion of the rudiments proper; and indeed, the organization of the *Grand Book* confirms this suspicion. We have already seen that al-Fārābī describes the first of the second pair of essays in the *Grand Book* as dealing with the rules for deriving notes, intervals, and the like, and these derivations are in fact carried out in great detail in the course of that essay. At the same time, we know from the *Classification* that these notes and intervals are among the rudiments of the art. Thus, to the extent that it actually derives all of the rudiments, the second pair of essays in the *Grand Book* corresponds to the second part of music theory outlined in the *Classification*. But to the extent that this second pair of essays also presents rules to be employed in the derivations, it is related to the *Classification's* first part of music theory. It is because this second pair of essays deals with more than just the rudiments themselves that the term "elements" is used in its title, for this term evidently refers to both the rules and the rudiments.

Al-Fārābī's enumeration of the rudiments that comprise the second part of theoretical music includes some of the most difficult terminology in the *Classification*. But it is now clear that the second pair of essays in the *Grand Book* contains the detailed explanations that can enable us to understand that terminology. Here al-Fārābī uses the lute much as Western theorists use the monochord to illustrate the derivation of all of the notes or pitches in his system. He provides elaborate calculations of the ratios between notes and thus of the size of intervals, instructions for the addition and subtraction of intervals from one another, and a discussion of the number and names of the notes in his system as compared with the system of the ancient Greeks. This much corresponds simply enough to the first part of his remarks in the *Classification*. But when in the *Classification* he begins to discuss the "species" (*aṣnāf*), his precise meaning is less obvious.

The first problem with this passage arises because "species" is not strictly a technical term as used here, though one might at first suppose quite reasonably that it has the meaning frequently encountered in Western discussions of the modes. It has, for example, already been used in the passage under study to refer to the individual notes in the system. Thus, when the term appears a second time, we must ask "species of what?" as indeed the absence of the definite article in the Arabic text requires. In replying to the criticism of his translation of this passage, Farmer correctly observes that al-Fārābī here refers to the "species of the genera" (*aṣnāfu l-ajnās*), though his translation does not make this clear. In fact, the text as presented by both Farmer and González Palencia requires emendation, for as it stands, its answer to our question "species of what?"

makes little sense: “species of their composition.” If “their” refers to notes, as would be most likely, the passage makes no sense at all. González Palencia falls into just this difficulty in trying to adhere strictly to his text.¹² Farmer, on the other hand, tacitly emends his text by assuming the absent definite article before *ajnās*, thus making the term stand alone without any need for a complimentary term to answer the question “of what?”¹³ Here, however, we are equally at a loss to understand the passage, for there is no single element in al-Fārābī’s system called a “species.”

Instead, we find in the *Grand Book* an extended discussion of the “species of the genera,” the latter being the numerous tetrachords bounded by a fourth that are named and classified at length and that underlie a large part of his system.¹⁴ This is clearly what is intended in the *Classification*, too, and since this text requires emendation in any case, it should be emended accordingly. Once this is done, the remainder is easily understood with the continued help of the *Grand Book*. The possessive pronoun of the phrase “their composition” can now be seen to refer to the genera, for the term “composition” (*waḍʿ*, pl. *awḍāʿ*) is the one used in the *Grand Book* to describe the various possible combinations of smaller intervals within the intervals of the fourth, fifth, and octave.¹⁵ Another passage in the *Grand Book* then discusses the combining of genera and which combinations (or “arrangements,” to use the *Classification*’s word) are consonant (or “concordant,” as two sources for the *Classification* read).¹⁶ Finally, we learn from the *Grand Book* that in composing a melody one chooses the notes from one of the various groups (*jamʿ*, pl. *jumūʿ*; sometimes the forms *jamāʿa* and *jamāʿāt* are used) and that the foremost distinguishing features of the groups are the particular genera that they include. This passage concludes with a set of tables representing the groups, identifying in each case the species of genera employed and listing for each note in any group those of the remaining notes in the group that are consonant with it and those that are dissonant.¹⁷ Thus it is that the *Classification* speaks of the genera and their arrangements as the basis for the composition of melodies.

The third pair of essays in the *Grand Book* concerns musical instruments, and the first of these essays begins with a brief description of what

¹² See his Spanish translation, p. 49.

¹³ The absence of a definite article in such a context signifies that the noun in question is part of an *idāfa* construction with one or more following nouns in the genitive. The text is grammatically correct as it stands. It is defective, nevertheless, in that its meaning (“species of the composition of the notes”) cannot be made to fit within al-Fārābī’s system. Farmer recognized this defect, but his emendation is similarly defective.

¹⁴ El Hefny, *Kitāb al-mūsīqī*, pp. 273–317; D’Erlanger, *La Musique arabe*, I, 101–14.

¹⁵ El Hefny, *op. cit.*, p. 348; D’Erlanger, *op. cit.*, I, 127.

¹⁶ El Hefny, *op. cit.*, pp. 393–414; D’Erlanger, *op. cit.*, I, 137–42.

¹⁷ El Hefny, *op. cit.*, pp. 880–958; D’Erlanger, *op. cit.*, II, 2–17.

is to follow.¹⁸ After observing that he has already devoted two essays to the rudiments and that he has already shown how these rudiments, as described theoretically, can be tested by the senses with the aid of an instrument constructed for the purpose, al-Fārābī tells us that he now proposes to show how these rudiments can be experienced on the musical instruments actually in use. He proposes to study each of these instruments and show which are capable of producing all of the notes and which can produce only some of them. Thus, he says, the reader will learn the application of what has been explained in the essays on the rudiments. Similarly, at the end of the second essay on the instruments, he writes that he has dealt in these two essays with the instruments that are most in use in his country, showing the notes and groups that are proper to each of them. In so doing, he has addressed not just other theorists, as is the practice of some authors, but has addressed the practical musician as well.¹⁹ And, indeed, the bulk of these two essays is taken up with extremely detailed accounts of a variety of instruments, most notably the lute.

These are clearly the subjects that al-Fārābī has in mind when, in the *Classification*, he describes the third part of the science of theoretical music. Here he writes of the conformity of the “rudiments, propositions, and demonstrations,” the meanings of which terms we have learned in connection with the first two parts of theoretical music, to the “artificial instruments,” as distinct from the “natural instruments” described elsewhere as making up the human voice.²⁰ With the *Grand Book* in mind we can see that his reference to the instruments that are “adapted” (preferable, in this context, to Farmer’s and González Palencia’s “prepared” for *tu’addu*) to the rudiments implies that all instruments do not illustrate all of the rudiments equally well. Finally, he makes explicit the connection between the notes to be produced on musical instruments and the calculations and arrangements (of genera and the like) that fall under the general heading of the rudiments.

Although the Latin writers, as we shall see, had difficulty with the vocabulary in question, the subject of the fourth part of theoretical music is quite simply rhythm. The subject is taken up briefly in the abstract in the *Grand Book*’s discussion of the rudiments. It is in the first of the final pair of essays in the *Grand Book*, however, that it is treated in great detail. Here al-Fārābī describes and classifies the numerous rhythms in use among the Arabs of his day.

The fifth and final part of theoretical music, according to the *Classification*, concerns the composition of melodies, and here again we require

¹⁸ El Hefny, *op. cit.*, pp. 493–98; D’Erlanger, *op. cit.*, I, 164–65.

¹⁹ El Hefny, *op. cit.*, pp. 874–77; D’Erlanger, *op. cit.*, I, 304–6.

²⁰ “Artificial instruments” is the reading given by two of Farmer’s sources, though his main source actually reads “instruments of the art.” That the former reading is to be preferred follows from al-Fārābī’s earlier distinction between natural and artificial instruments.

the help of the *Grand Book* in understanding fully al-Fārābī's remarks. At the end of the final essay of the *Grand Book*, he summarizes what has gone before by observing that melodies "in general" are of two kinds. Melodies of the first kind simply please the senses, whereas those of the second kind are for the purpose of affecting the soul. The latter are the "perfect" melodies.²¹ Although the term "perfect" has not been used in this context before, the twofold classification of melodies goes back to the very opening pages of the *Grand Book*, where al-Fārābī writes that the term "melody" can refer either to a certain succession of notes or to a succession of notes that are joined to letters and words so as to express some thought.²² This definition is then repeated and elaborated upon at the beginning of the final pair of essays. Here we read that a "melody, in general, is a group of notes ordered according to a certain arrangement" and that among melodies, some fulfill no further condition while the others are joined to texts.²³ Thus, the phrase "melodies in general" refers both to all melodies and to the first of the two kinds of melodies.

The first or general kind of melody is dealt with in the first of the final pair of essays in the *Grand Book*, and it is in this essay that the subject of rhythm is also treated, as we have already seen. The fourth and fifth parts of theoretical music, therefore, share an essay in the *Grand Book* to some extent. But the "perfect" melodies, which seem clearly to constitute the principal object of the fifth part of theoretical music, are the sole subject of the final essay of the *Grand Book*.

This last essay treats in great detail the joining of notes and texts in the composition of vocal music. Here al-Fārābī discusses, for example, the setting of both measured and unmeasured texts, observing that measured texts have greater "regularity" (*intizām*).²⁴ And although he gives considerable attention to the makeup of the texts themselves, he points out that these are governed by principles of their own and constitute the arts of poetry and rhetoric.²⁵ These points explain his remark in the *Classification* that the poetical statements of the perfect melodies are "composed according to arrangement and regularity and in the manner of their art." The central point about the perfect melodies, however, is that their purpose is the creation of certain states in the listener or the arousing of the listener to certain actions. And only with the aid of texts can melodies attain this purpose as it is manifested in the very definition of melodies.²⁶

Al-Fārābī's purpose in the passages just discussed and in the remainder of the *Classification* is to provide an abstract scheme for the understanding of music in the context of other scientific disciplines. It is certainly not

²¹ El Hefny, *op. cit.*, pp. 1, 179–80; D'Erlanger, *op. cit.*, II, 94–95.

²² El Hefny, *op. cit.*, p. 47; D'Erlanger, *op. cit.*, I, 5–6.

²³ El Hefny, *op. cit.*, p. 881; D'Erlanger, *op. cit.*, II, 3.

²⁴ El Hefny, *op. cit.*, p. 1,094; D'Erlanger, *op. cit.*, II, 65.

²⁵ El Hefny, *op. cit.*, p. 1,092; D'Erlanger, *op. cit.*, II, 64.

²⁶ El Hefny, *op. cit.*, pp. 1,180–81; D'Erlanger, *op. cit.*, II, 95.

possible to form any musical impression from these remarks of the particular repertory to which they refer. Of course, al-Fārābī did have specific musical material in mind, as we know from the copious detail of the *Grand Book*, and we know, too, that he was concerned about the conformity between theory and practice. But the *Grand Book* evidently was not translated during the Middle Ages, and Latin writers on music seem not to have made any use of it. Hence, in borrowing from the *Classification* when writing about music, Latin authors were appropriating elements of a scheme that could help them think about their own music just as it helped al-Fārābī to think about his. Indeed, the power and thus the appeal of al-Fārābī's scheme as a scientific theory consisted precisely in its applicability to any and all kinds of music imaginable.

Several features of the Latin translations and the ways in which they were used suggest that a theory was being borrowed quite independent of any particular musical repertory. Even in the best and most complete of the Latin versions—the one by Gerard of Cremona quoted above—there is reason to doubt that the translator fully understood his text. At the very least, the literal translations often given to such technical terms as there are in the Arabic make it seem unlikely that the translator was concerned to see connections between al-Fārābī's musical system and the practice of music in Europe. For example, *īqā'* is the standard term among Arabic writers, including al-Fārābī, for rhythm or rhythmic pattern, though it means literally "a fall." The Latin translators use *casus* here, which means "a fall," instead of *modus*, the central term in discussions of rhythm and rhythmic patterns in both classical and medieval Latin sources. Similarly, the translations refer to the *pondus* of notes, their "weight," when al-Fārābī's *wazn*, though its literal meaning is "weight," clearly means "measure" in the sense of poetic measure or duration. Here there are several Latin words that would have been more appropriate, such as *mensura* or *tempus*. I know of no Latin musical theorist who uses *pondus* in this way except in quoting al-Fārābī. Even *'ūd*, the root of our own word "lute," causes some trouble, for although Gerard gives *cithara*, most Latin versions use simply *chorda*, that is, "string." In thus substituting a general term for al-Fārābī's reference to the lute, the Latin theorists make it seem once again that their interest lies in the power of his general theory rather than in the specific musical culture from which the theory sprang.

One might argue that these peculiarities in the translations resulted from the inadequacy of the Latin vocabulary actually in use in the twelfth century when the translations were made. It is true, for example, that most of the discussions of musical rhythm and meter in medieval Latin date from somewhat later. In so arguing, however, we would at least have to recognize that the use of different terms in the later sources argue against an Arabic origin for the concepts in question. But more to the point is that the twelfth-century translations were still being repeated un-

changed in the thirteenth century, sometimes alongside technical discussions of rhythm and polyphony that employ the standard Latin terms.

This brings us to the question of how al-Fārābī's remarks on music were used. Of Latin writers on music, Jerome of Moravia, writing in the third quarter of the thirteenth century, makes the greatest use of them, for he quotes them in their entirety with acknowledgement.²⁷ His treatise is instructive, for it gathers together the works of several writers, primarily those who, like Franco of Cologne, were concerned with what was newest in thirteenth-century European music. But Jerome also seeks to transmit the wisdom of the ancients, and in so doing, he makes it clear that al-Fārābī's little treatise had attained the status of a classic, worthy to be placed, as Jerome places it, between the writings on music of Isidore of Seville and Boethius. Jerome is evidently no more bothered by the conflicts of vocabulary between al-Fārābī and the thirteenth-century theorists than he is by the striking differences in outlook between al-Fārābī and Boethius. Hence, like al-Fārābī, Jerome was concerned with both the speculative and the practical, but he could accommodate a rather substantial gulf between the two. And, in his attention to the speculative, he clearly felt obliged to recognize the authority of certain of the ancients, even if they could not be reconciled among themselves or with current practice. This encyclopedic approach to the learning of the ancients and the moderns accords well with the fact that Jerome's source for al-Fārābī was his contemporary and fellow Dominican, Vincent of Beauvais.²⁸ That Vincent should have been Jerome's source further suggests the way in which the appeal of al-Fārābī's writings on music lay in their power to organize thinking about music and to relate music to other branches of learning, not in the knowledge that they might convey about the practice of music. The nature of this appeal accounts for both the selection of works made by the translators and for the role played in their transmission by writers like Vincent of Beauvais who were not primarily musicians. Symptomatic of the whole situation is that al-Fārābī's remarks on music were cited by Roger Bacon and not by his musical contemporary Franco of Cologne.

Bacon gave music a strictly secondary place in his writings. His treatment of it includes none of the rich detail that we find in his discussion

²⁷ Hieronymus de Moravia, *Tractatus de musica*, ed. Simon M. Cserba (Regensburg, 1935), pp. 22–23.

²⁸ For Vincent's text and a discussion of it, see Gottfried Göller, *Vinzenz von Beauvais O.P. (um 1194–1264) und sein Musiktraktat im Speculum doctrinale*, Kölner Beiträge zur Musikforschung, Vol. XV (Regensburg, 1959), pp. 60, 92–93. Vincent's source is ultimately the twelfth-century translation by John of Seville rather than the one by Gerard of Cremona. For a comparison of these texts, see Farmer, *Al-Fārābī's Arabic-Latin Writings on Music*, pp. 20–31. Vincent, and thus Jerome, share the problems of vocabulary discussed above, and the tradition that they follow has the further obvious fault of failing to preserve al-Fārābī's distinction between two kinds of melodies in the fifth part of theoretical music. This failure is but another example of the way in which ignorance of the details of al-Fārābī's thought on music made certain aspects of his general scheme either unintelligible or simply irrelevant.

of optics, for example. Instead, his concern is to show the value of music for the study of theology, and even this concern is placed in the general context of an attempt to show the application of mathematics to sacred subjects.²⁹ Al-Fārābī is first cited in a list of familiar authorities in the *Opus tertium*, and what Bacon says here as well as in the *Opus majus* about the divisions of music derives more from the other writers than from al-Fārābī.³⁰ Only in passing does he divide writings on music into theoretical and practical teachings, and only after adopting a distinction between visible and audible music does his scheme coincide with al-Fārābī's again in dividing audible music into that for the human voice and that for instruments.³¹ It is quite possible that these particular remarks do not derive from al-Fārābī at all. Bacon does, however, cite al-Fārābī's *De scientiis* (as the *Classification* was known in Latin) on one point—that the musician, like the mathematician, should proceed by demonstration to show the causes of things.³² Gerard's translation of al-Fārābī, after enumerating the parts of practical music, puts the matter as follows: "Speculativa vero dat scientiam eorum omnium, et causas omnes eius ex quo componuntur harmoniae. . . ."³³ Thus, although Bacon cares little for the details of the science of music, he does care that it be treated scientifically. And on this crucial point, his authority was not a writer of Latin or Greek but a writer of Arabic.

Given this respect for al-Fārābī's thought, why does Bacon not make more use of it, in the way that he makes use of Arabic authorities on the other sciences? First of all, the *Grand Book* was evidently not available to him. And as for the Latin translations of the *Classification*, he too may have been troubled by their vocabulary and thus unable to relate any but the most abstract features of their contents to his own experience. The inadequacy of translations from Greek, Arabic, and other languages is a favorite theme of Bacon, and Gerard himself is among the translators acidly described as not knowing the languages from which they translated, the subjects about which they translated, or even Latin itself.³⁴ But whereas Bacon had recourse to his own practical experience and that of people around him in overcoming these difficulties in writings on some of the

²⁹ This is particularly true of his remarks on music in the *Opus majus*. For the Latin text, see *The 'Opus majus' of Roger Bacon*, ed. John Henry Bridges, 3 vols. (Oxford, 1897–1900), I, 237–38. For an English translation, see *The Opus majus of Roger Bacon*, trans. Robert Belle Burke, 2 vols. (Philadelphia, 1928), I, 259–60. The discussion of music in Chaps. 59 and 60 of the *Opus tertium* occurs in a similar context. See *Fr. Roger Bacon opera quaedam hactenus inedita*, ed. J. S. Brewer (London, 1859), pp. 228–34.

³⁰ *Opus tertium*, ed. Brewer, p. 231.

³¹ *Opus majus*, ed. Bridges, p. 237; trans. Burke, p. 259.

³² *Opus tertium*, ed. Brewer, p. 231.

³³ González Palencia, *Al-Fārābī, Catálogo de las ciencias*, p. 103.

³⁴ Similar passages to this effect are found in the *Opus tertium*, ed. Brewer, p. 91; the *Compendium studii philosophiae*, *ibid.*, pp. 471–72; and in the *Opus majus*, ed. Bridges, pp. 67–69, trans. Burke, pp. 76–77.

sciences, no such practical experience of al-Fārābī's musical system was available to help him understand it. Hence, what remained available and useful to Bacon in al-Fārābī's musical thought was an attitude toward music rather than any particular understanding of the content of music as a subject for investigation.

Franco of Cologne, on the other hand, devotes only a few sentences to establishing the philosophical context of his treatise on mensurable music before attacking his subject in the most concrete terms.³⁵ Apart from St. Gregory, he cites only the two "philosophers" whom he credits with having already treated fully the theory and practice of plainsong, respectively: Boethius and Guido. He goes on to say that there are both good things and errors in the writings of both ancients and moderns on his own "science" of mensurable music and that if he is able to discover something new, he will "uphold and prove it with good reasons."³⁶ In these remarks we can perhaps see a reflection of the scientific attitude that his contemporary Bacon advocated with al-Fārābī's authority and perhaps even an echo of al-Fārābī's own distinction between theory and practice. But more important than these introductory sentences in revealing Franco's attitude is the way in which he turns quickly to the material of his subject, treating it in a systematic way that appeals to practical examples rather than to authority. Given this attitude, most of what al-Fārābī had to say about the specific nature of music was of no consequence.

The most practical of the Latin musical treatises in which we find al-Fārābī quoted at length is Lambert's *Tractatus de musica*.³⁷ Lambert's concerns and his treatment of them turn out to be much like those of Franco. He begins, however, with a somewhat longer introduction than Franco's and one that draws extensively on the *De divisione philosophiae* of Dominicus Gundissalinus, a twelfth-century writer working in Toledo.³⁸ Gundissalinus, in turn, draws primarily on Isidore of Seville and al-Fārābī for his statements about music, and the views of these two authorities are thoroughly rearranged and scrambled in the process. Nevertheless, virtually everything that al-Fārābī says about music in the *De scientiis* finds its way into Gundissalinus's treatise in one form or another. In particular, Gundissalinus reproduces the whole of al-Fārābī's division of theoretical music into five parts, relying apparently on the translation of John of Seville.

The views of Isidore and al-Fārābī do not really mix very well, and Lambert, in quoting Gundissalinus, tolerates many more incongruities

³⁵ *Ars cantus mensurabilis*, ed. Cserba in Hieronymus de Moravia, *Tractatus de musica* pp. 230–50; and E. de Coussemaker, *Scriptorium de musica medii aevi nova series*, I (Paris, 1864), 117–35; trans. Oliver Strunk, *Source Readings in Music History* (New York, 1950), pp. 139–59.

³⁶ Cserba, *op. cit.*, p. 230; Strunk, *op. cit.*, pp. 139–40.

³⁷ Coussemaker, *Scriptorium*, I, 251–81.

³⁸ Ed. Ludwig Baur, *Beiträge zur Geschichte der Philosophie des Mittelalters*, Vol. IV, Heft 2–3 (Münster, 1903). The discussion of music is on pp. 96–102.

than he should. But he seems to have been troubled by a good bit of what Gundissalinus had borrowed from the *De scientiis*. In fact, the troublesome passages discussed earlier clearly bothered him most, for he either modifies them or omits them altogether. For the *chorda* and *fistula* of his source, he substitutes his own list of instruments: *organum*, *vielle*, *cythara*, *cytole*, and *psalterium*. And the passage about rhythm, with its unusual vocabulary, does not appear at all, even though rhythm is central to Lambert's concerns. Lambert preserves al-Fārābī's distinction between practical and theoretical music, but of al-Fārābī's five branches of theoretical music, Lambert preserves only the second, which can scarcely have meant to him anything like what it meant to al-Fārābī. Rhythm is treated in a separate context in which all music is divided into that with rhythm and that without. His general terms for discussing rhythm are *modus* and *mensura*.

To say that Franco and Lambert borrowed many fewer of al-Fārābī's words than they left out is not to say that the influence of al-Fārābī's thought was inconsequential. Quite the contrary, for the spread of his views helped to bring about a profound change in music as an idea and as a subject of scientific thought. The spirit that underlies both his simple division of music into the sciences of practical and theoretical music and his explicit rejection (in the *Grand Book*) of the Pythagorean *musica mundana*, the first of the celebrated three divisions of music that so many later writers inherited from Boethius, is precisely the spirit that informs many of the most important musical treatises of Europe from the Middle Ages. Much of the value of the works of men like Lambert, Franco, and their contemporaries springs from a hard-headed concern for being practical, systematic, and faithful to their own observations. Their attitude might be characterized by a narrower and more modern use of the term "scientific." Whether individual writers on music absorbed this attitude directly from the Latin translations of Arabic works like al-Fārābī's *Classification* or whether they absorbed it indirectly through men like Roger Bacon who acknowledged a debt to Arabic science and mathematics, the importance of Arabic thought for this feature of much medieval European music theory deserves at least as much emphasis as the importance of Arabic thought for the history of medieval science generally.

To be sure, not all writers of the thirteenth century (not even Lambert) abandoned the Boethian division of music into *musica mundana*, *musica humana*, and *musica instrumentalis*. Some writers (like Lambert) seem to have continued to feel obliged to give at least a sampling of the wisdom of the ancients before getting down to business. Nor was this the first time that Western writers had displayed a measure of skepticism and practical concern. Already in the eleventh century, for example, Guido of Arezzo had referred to Boethius's writings as "useful not to singers, but

only to philosophers.”³⁹ Nevertheless, thirteenth-century remarks like the following, by Johannes de Grocheo, have a particularly forceful and direct character: “Those who divide in this way [into *musica mundana*, *musica humana*, and *musica instrumentalis*] either invent their opinion or they wish to obey the Pythagoreans or others more than the truth, or they are ignorant of nature and logic. . . . Celestial bodies in movement do not make sound, although the ancients believed this. . . .”⁴⁰ And one must be struck by the similarity of al-Fārābī’s statement on the same subject written three centuries earlier in the *Grand Book*: “The opinion of the Pythagoreans that the planets and the stars, in their courses, cause sounds to be born that combine harmoniously is false. In physics it is demonstrated that their hypothesis is impossible—that the movement of the heavenly bodies cannot produce any sound.”⁴¹

Johannes de Grocheo’s authority for this remark is actually Aristotle’s *De caelo* (II, 9), and Roger Bacon acknowledges the same authority in making a similar remark in the *Opus tertium*.⁴² Al-Fārābī is, in all probability, indebted to Aristotle on this point, too, since there is a great deal in al-Fārābī’s thought that is openly appropriated from Aristotle. Whatever the ultimate source of this particular idea, however, we must bear very much in mind the fact that the Latin Middle Ages owed Aristotle’s *De caelo* to a translation by Gerard of Cremona from the Arabic.⁴³ Thus, even where particular currents of thought appear to have Greek roots, the role of Arabic science in transmitting those particular currents to the Latin West is often crucial.

A. C. Crombie writes that “the outstanding scientific event of the twelfth and thirteenth centuries was the confrontation of the empiricism long present in the West in the practical arts, with the conception of rational explanation contained in scientific texts recently translated from Greek and Arabic.”⁴⁴ In the history of music, the empiricism antedating this confrontation is well represented in Guido’s remark about Boethius. The confrontation itself, on the other hand, is revealed in the tendency, noted by Joseph Smits van Waesberghe, of thirteenth-century writers to

³⁹ *Epistola de ignoto cantu*, ed. Martin Gerbert, *Scriptores ecclesiastici de musica*, II (1784; repr. Milan, 1931), 50. The *Epistola* is translated in Strunk, *Source Readings*, pp. 121–25.

⁴⁰ *De musica*, ed. Ernst Rohloff in *Die Quellenhandschriften zum Musiktraktat des Johannes de Grocheio* (Leipzig, n.d.), p. 122; my translation.

⁴¹ El Hefny, *Kitāb al-mūsīqā*, p. 89; D’Erlanger, *La Musique arabe*, I, 28.

⁴² Bacon, *Opera quaedam hactenus inedita*, ed. Brewer, p. 229. Bacon is quite explicit on this point, and thus Nan Cooke Carpenter, *Music in the Medieval and Renaissance Universities* (Norman, Okla., 1958), p. 84, is mistaken in implying that he owed this to al-Fārābī.

⁴³ A. C. Crombie, *Medieval and Early Modern Science*, I (Garden City, N.Y., 1959), 43.

⁴⁴ Robert Grosseteste and the *Origins of Experimental Science 1100–1700* (Oxford, 1953), p. 1.

base their classifications of music more directly on observed musical practice.⁴⁵ And the principal agent of that confrontation in the history of music is al-Fārābī. His classification of music as either theoretical or practical, though perhaps derived from the Aristotelean division of the sciences,⁴⁶ provided a striking model for Latin writers, and his insistence on demonstration and on the conformity of theory and practice directly and indirectly prepared the way for a flowering of a new kind of music theory.

It is the nature of this rather considerable intellectual and philosophical debt that accounts for the treatment by Lambert and other writers of the few technical details that are touched on in al-Fārābī's *Classification* and perhaps even for the lack of Latin translations of highly detailed musical treatises like the *Grand Book*. Latin writers in a variety of fields admired and sought to adopt the rational and practical turns of mind displayed in al-Fārābī's writings, but it was his very insistence on the conformity of theory and practice that reinforced their inclination to take from him and other Arabic writers only that which was directly useful to them. Arabic science seemed to teach the value of logic in its relation to direct personal experience, but much of what al-Fārābī had written about music did not bear on their personal experience. Thus, they borrowed from him, often through the mediation of their colleagues at work in the natural sciences, a methodological structure into which they could fit their own personal musical experience. This meant that the precise meanings of a few technical music terms in the *Classification of the Sciences* mattered little and that the *Grand Book on Music* could just as well remain untranslated altogether.⁴⁷

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⁴⁵ Joseph Smits van Waesberghe, *Musikerziehung: Lehre und Theorie der Musik im Mittelalter*, Musikgeschichte in Bildern, ed. Heinrich Besseler and Werner Bachmann, Vol. III: Musik des Mittelalters und der Renaissance, Lfg. 3 (Leipzig, n.d.), p. 150.

⁴⁶ See Crombie, *Robert Grosseteste*, pp. 37–40.

⁴⁷ For a broad view (though one that does not include music) which claims that medieval Europe borrowed heavily from Arabic culture in scientific and technological fields but not so extensively in intellectual and aesthetic spheres, see Hamilton Gibb, "The Influence of Islamic Culture on Medieval Europe," *Bulletin of the John Rylands Library Manchester*, XXXVIII, No. 1 (September 1955), 82–98.