
A Distant Music

OTTO STEINMAYER

M. L. West, *Ancient Greek Music*. (Clarendon Press at Oxford University Press, 1992), xiii+410 pages, pb., \$24.00

ANCIENT MUSIC was as a subject of study for the longest time something of the last frontier of classics. Not only was very little accurate information available, but music itself was not always considered worthy of “hard” scholarship. Now since the versatile Martin L. West has turned his hand to ancient music, we have got—and not a minute too soon—a clear and complete account of the evidence, and a rational interpretation of it. Furthermore West’s prestige has insured that music is now become a subject considered worthy of a scholar’s attention.

It’s no exaggeration to say that Martin West’s *Ancient Greek Music* is a book we have been desiring for centuries: a clear, complete, unprejudiced, thorough, rigorous and deep account of the evidence for the basic realities of ancient music. You wouldn’t believe how much garbage has been written about ancient music. Anything sane is welcome, and a really good big book like West’s is a prodigy.

Everybody knows that Greek poetry, including stichic verse such as elegy and, at one time, hexameter, was *sung*. Greek poetry was not just poetry. Think of the modern poetry reading, somebody in a jacket reciting with that peculiar intonation that lets you know you’re at a *serious* occasion. No, no! Greek poetry was SONG! Not only did people sing their poems, a lot of the time they even *danced* to them! How different from the, uh, dignity of the academy. But how fun! How humane!

I repeat, *everybody* knows this, they knew it a long time ago. It has taken an unconscionably long time for a general book to come out that would illuminate the musical side of ancient poetry. Now, here it is. All scholars whose study or teaching brings them in touch with poetry, dramatic, lyric, or choral, *must* get this book, read it, and meditate on its contents. There will always be tin ears,

but from now on there is no more excuse for those with tin ears to claim they are the whole and the *musikoi*¹ the crippled.

It is assumed that the duty of a reviewer of learned books is to find faults because, as Housman and my novelist friends say, detecting faults is useful whereas praise is not. However, in the case of West's *Ancient Greek Music* pouncing on faults can serve little purpose, first of all because the book contains very few faults, second because the study of ancient music is comparatively still an infant, and to wrangle over details would amount to strangling it in its cradle. West has not by any means written the last word on ancient music; his book is a marvelous beginning, and West's opinions will certainly suffer some surprising refutations or modifications, just as the whole field of musicology had to be rethought after the baroque performance movement got into full (so to speak) swing, much to the delight of some of those refuted.

The subject of ancient Greek music is perceived as technical, more technical than other parts of classical studies because it requires skills outside the ordinary bounds of scholarship. Scholars who breeze through documents in Linear B or Roman cursive may quail when faced with a sheet of music. Understanding music, as anything else, requires an aptitude and patience; but the basics are not that difficult. Music is in us by nature. It's a rare person who hates a tune. It would help, though, if I gave an introduction to West's introduction.

"Music" is literally the art of what belongs to the Muses, and includes not only "music" in the modern sense, but also dancing, poetry, and learning. But we will stick to the modern sense. The ancient Greeks reckoned music along with food, sex, and wine as one of the great joys of life; Sophocles calls death, among other things, "lyreless" (OC 1222).

Most music was song, words and tune. The voice was foremost. The Greeks cultivated generally only two instruments, the lyre and the *aulos*. The lyre with its soundbox, arms, and strings attached to a crossbar is familiar to everyone from pictures. It is even played today in Africa. The earliest lyres had a tortoise-shell for a soundbox; the larger and more resonant *kithara* was built hollow, out of wood, and served as the instrument of concerts.

Homer shows professional bards like Phemius and Demodocus, as well as amateurs like Achilles, playing the lyre and singing heroic poetry, but firm information on exactly how they played doesn't exist. The lyre started out with a small number of strings,

probably seven. It gained a few more, up to twelve, and remained in use until the end of antiquity.

In the past scholars liked to translate the word *aulos* as “flute.” Milton’s devils march in phalanx to the sound of “flutes and soft recorders.”² The *aulos*, though, was nothing of the kind, but (most probably) a double-reed instrument much like an oboe. The oboe also appears in Homer, and like the lyre survived to the end of antiquity. There is evidence for strictly instrumental music, but it’s hard to know how popular it actually was. Even most of dance music was song with words. The *Copa* of the Vergilian Appendix paints a lively picture of such popular dance.

Trumpets, drums, tambourines, bells, clappers, gongs of a sort existed, but these the Greeks considered noise-makers, not instruments of music. People banged drums in Bacchic festivals, but not to mark the rhythm in choruses. Euripides calls in drums for special effect in his music to the *Bacchae*. Trumpets served for signaling in war and in civil life. A good variety of other musical instruments existed, but except for the panpipe, the Greeks curiously seem to have had no real flute, that is, no pipe whose sound was excited by the passage of breath over a hole or through a windway.

It is difficult to determine what sort of scales the “classical” music employed. There’s evidence that they were what ethnomusicologists today call “gapped,” that is, the octave is not completely filled up with regular steps. The Greeks called their scale the *harmonia*, which roughly means “the notes that fit together.” It’s very probable that this *harmonia* was a scale of five notes which can be commonly heard in eastern music even today. It consists of a semitone, an interval of two tones (a ditone), a tone, another semitone, and another ditone, and you can pick it out on the piano by playing E, F, A, B, C, E. At some point the semitones E-F and B-C were divided each into a pair of quartertones, and this is what we believe to have been the classical *harmonia* of the fifth century. We are all familiar with the various “modes,” Dorian, Phrygian, Aeolian, and so on; one mode differed from another in the arrangement of the notes and the amount of emphasis on each. Note that even with only five notes in the scale (not counting the octave), three different modes are possible, each of which reveals upon exploration a special emotional character. The ancient modes were certainly distinguished as much by the style of playing and emotion sought for

in each as by arrangement. These old scales were replaced by others during the fourth century.

The pitches I have given above represent relative arrangement. The pitch of the starting note varied to accommodate the particular singer. A lyre can be tuned to any pitch, and oboes came in many sizes. The Greeks did not sing in “harmony” in the modern sense, that is, the simultaneous singing of different pitches.

Melody followed the words closely, and took its rhythm from the meter of the verses. Composers set one syllable to one note, and though it would be unfair to label ancient melodies “simple,” to the ears of most of us they would likely sound simple. We are not used to monody and ignorant of its potentials. Furthermore, modern melody that works in an implied harmonic context makes much use of the interval of the third, both the major and the minor variety. Ancient Greek melodies, like certain historical Chinese melodies, must have evolved around the intervals of the fourth and fifth, which our ears hear as “hollow.”

Setting one syllable to many notes (in modern terms “melisma”) was an innovation of the later fifth century, and to conservative ears sounded silly, so much so that Aristophanes could make a joke out of it (*Frogs* 1314).³

The Greeks preferred a high, clear, piercing timbre of voice in singing, what musicians today call a “white” voice. They judged the cicada a singer among the insects because they heard these desired qualities in the cicada’s buzzing. They sought the same timbre in their lyres and oboes, although towards the end of the fifth century we have evidence that people were beginning to enjoy sweeter sounds as well.

People sang and played on all sorts of occasions. We know about the part of music in public artistic events, in dramas, choral performances, and solo recitals. Plenty of private music-making went on, at parties, of course, or at work, and even at funerals, though music was *per se* a joyous thing. The texts of songs display the whole range of human emotions, and the music surely reflected it. People liked tunes and remembered their favorites. Aristophanes’ old men in choruses especially relish the songs of Phrynichus, the hits of their own youth.

Two things—if I am allowed to paraphrase St. Paul⁴—are required of him that will study ancient music: he that comes to it must believe that music existed, and that it was capable of

rewarding its hearers with deep emotion. Many scholars have simply ignored that music existed in ancient life. Others have studied the problem of ancient music accepting the first, but not the second condition, deaf not to tones but to feelings. One must always remember that poetry was song. With what contempt a cultured modern Greek would treat a tourist who told him that he liked Theodorakis's words but cared nothing for Theodorakis's music.

Up until this very decade, ancient Greek music was held to be a vaguely disreputable field of study, and I, as one of those who did my bit, must thank West for his compliment to us who slogged on in research despite the low status we held.

I suppose scholars thought the subject of music neglectable for the very good reason that until the middle and end of the nineteenth century, there was simply no actual music to look at. All we had was literary evidence: a series of introductions to musical concepts, much like the things that you pick up for your child when he or she starts doing "theory" in piano class. With these follows a handful of complex mathematical treatises, including Claudius Ptolemy's (who calculates harmonic ratios down to the equivalent of seven decimal places). Then there are polemical works: the far-rago of Aristoxenus' writings that passes under the title of the *Harmonics*, and a rather kooky work by one Aristides Quintilianus, who is preoccupied with assigning musical notes to mystical concepts. This last reads like Rimbaud's *Sonnet des voyelles* rewritten lengthily by Mde. Sosostriis, *Your Guide to the Stars*. Ptolemy too, alas, wasted much breath droning on the same pipe.

Thank goodness, we have complete and systematic tables of ancient musical notation drawn up by one Alypius. People always wonder whether we can actually read the music that we dig up and be sure we know what the notes are. We can. The explanation is complex but convincing—another reason to read West. It's worth noting that the consistent and correct use of these signs throughout antiquity suggests that notation must have been taken more seriously than people believe.

The trouble is that each and every one of these treatises is stupefyingly boring, packed with ugly and obscure technical words, graceless in style, often not very intelligent. Aristoxenus, in addition, is querulous and paranoid. What a penance to read them! At least in our childhood "theory" classes we sat at a piano and could look forward to get back to playing something fun—and if we stayed the course we found that theory actually helped us to play.

But the ancient Greek treatises have no apparent connection to anything we can *hear*, much less get pleasure out of.

To approach the great joy and art of music in such a way is absurdly against nature. We first come to music by hearing our mother sing, then we learn to sing ourselves, and only then, if we're inclined, do we pick up the intellectual skills. In the case of ancient Greek music, the fact that nothing but theory was available seduced scholars to all kinds of learned wackiness. That somewhat shady Jesuit antiquarian Athanasius Kircher in 1650 tried to remedy the lack of tunes by forging one. Benedetto Marcello (brother of Alessandro, he of the famous d-minor oboe concerto) in the early eighteenth century also passed off a snippet of his own composition. Serious scholars left the subject alone, with the exception of Marcus Meibom, who edited the theoretical texts for Elzevir in 1652.

Other scholars, more enthusiastic than discriminating, conceived extravagant ideas of the power of ancient music from their reading of Plato and the anecdotists. Arbuthnot, Swift, and their friends ridiculed these pedants in an amusing passage of the *Memoirs of Martinus Scriblerus*, a parody of the famous story of Pythagoras' "music therapy." Here, Cornelius—Martin's father—by playing on his lyre succeeds in causing two apple-women to cease quarreling, for a much different reason than he believes.⁵

Hope for a true understanding of ancient music revived when fragments of music began to be discovered and published from 1841 on. It was and remains a slender but genuine hope. These finds do not amount to much; we have only a little over fifty fragments, most of them predictably quite mutilated, among them only one complete piece.

The prejudices of the nineteenth century also threw a painful obstacle in the path of understanding. Scholars took the fragments, transcribed them into modern notation, and attempted to perform them. Perhaps they presumed that the Delphi inscriptional hymns ought to come out sounding like Wagner. The results were frightful. Here Macran, the 1902 editor of Aristoxenus, discusses a performance:

The incommunicable nature of music finds a striking illustration in the effect which the remnants of ancient Greek melody produce on the modern hearer. Some years ago . . . Sir

Robert Stewart delivered a lecture . . . on the Music of Distant Times and Places; and illustrated it by specimens from various nationalities and periods, an ancient Greek hymn being included in the number. It was the unanimous verdict of all the musicians present that, while the music of the less civilized nations was often crude, barbarous, and monotonous in the highest degree, the Greek hymn stood quite alone in its absolute lack of meaning and its unredeemed ugliness.⁶

What Macran has to say about Sophocles later on leads us to suspect his taste. But it was a taste or lack of taste he shared with many others. I shudder to think what they would have said about classical Balinese or Dayak music.

Imagine if in three thousand years a scholar were to try to reconstruct the sound of western music as we know it from a half dozen beginners' theory books, two or three academic treatises on, say, pitch relationships in Schönberg, and fifty assorted scraps, mostly pop, each containing not more than five bars together, of which the only complete piece was an advertising jingle. With the best will in the world, there's only so far he could get.⁷

West does his very best. He has collected all the most important ancient passages, and made it easy to see all the evidence in one place. He discusses music in all its aspects, technical, social, esthetic, organological, theoretical, and historical, and liberally illustrates his arguments. My favorite part of *Ancient Greek Music*, and what I believe will delight others who pick it up, is the collection of ancient scores, everything gathered from inscriptions, papyri, or manuscripts long enough to be singable or useful. There it is, real music!

Now it is the time I ought to discuss reservations I hold on particular points. It is hard to avoid technical vocabulary. Perhaps you'd like to have a dictionary of music at your elbow.

West wrote the standard handbook on ancient Greek prosody and he speaks on meter with an authority that I cannot assail. He is absolutely right to say that at least the rhythmic element of the musical part of songs has survived. I am puzzled, though, by the trouble he takes in the section here on rhythm, trying to adapt the words of fifth century song to bar-lines. Barring is a feature of music that employs a steady, metronomic beat; there is no need for bar-lines in, for example, Gregorian chant. Even seventeenth century French harpsichordist-composers dispense with bar-lines in

their unmeasured preludes. At the other extreme, *gamelan* music, when notated, can dispense with barlines because the rhythmic structure is already written into the notes. Western barring developed to clarify the rhythms of seventeenth-century dance music.

West tacitly assumes that ancient Greek music went along according to this steady metronomic beat. Certainly some of it did, things such as marching songs and the *parodoi* of tragedies, which are in a definite one-two anapestic meter. Later song also shows a metrical structure which can be put into modern barring without any violence to the original. Our Song of Seikilos (West 15) offers surprising proof. The actual inscription notates not only the pitches and words, but also the rhythm. Seikilos wanted his tune to be sung with a steady beat in what we would now call 6/8 meter.

But is it fair to extend this assumption to all other genres and eras? In chanting Pindar and dramatic choruses I have noticed that I cannot clap hands to the verses in any such way that the beats fall into a continuous pulse. A syncopation will come along frequently to destroy the sequence. If you were to start a metronome and attempt to chant, say, *polla ta deina* from *Antigone*, you will quickly find yourself singing against the clicks.

The theorists do not speak of a continuous beat. Bacchius Geron defines rhythm in six different ways following six different authorities, only one of whom says anything that could be interpreted as vaguely justifying the assumption of a metronomic beat.⁸

My own opinion is that the term *rhythmos* means in music and metrics what it also means in painting and sculpture, that is to say “shape.” *Rhythmos* is shape cut in the medium of something moving, as one can speak of the *rhythmos* of a dance, which is the positions the limbs take it in the dance’s course. Certainly no one can reduce ancient lyrics to barred notation without being driven to arithmetic feats of vertiginous complexity. Better, I think, to leave the whole issue of barring alone. It is a convention of modern notation and performs no useful or necessary function in transcriptions of Greek music.

It might be said that West and all the rest of us are on shakiest ground in the treatment of scales. West takes the irregular scales recorded by Aristides Quintilianus⁹ as “probably” originally described by Damon, Pericles’ music teacher, and so refers to them as “Damonian.” The notes of the *Orestes* fragment can fit Aristides’ Dorian or Phrygian, (though one note lacks to determine which of the two) and thus we can be pretty certain that these

scales do stem from the late fifth century. Apart from the *Orestes* fragment and the fragment from *Iphigenia in Aulis* (West 4), the passage from Aristides is our only evidence for the nature of fifth-century scales, and so this calling them “Damonian”—except as a handle of convenience—seems to me to be close to canonizing them, and that is going too far.

This is a good place to discuss a very difficult problem in the study of the ancient musical scores. While the fragments of Euripides’ music conform to an irregular, “gapped” type of scale system, everything later can be assimilated to the regularized scale systems we find in the theoretical writers. There is no doubt that a revolution in musical styles started at the very end of the fifth century, in the appearance of the so-called “New Music,” and developed over the next century. This revolution brought about the complete uprooting of fifth century and earlier music, and meant that the sonic material itself radically changed.

I find it impossible to believe that practical musicians of the fifth century and before ever had much use for abstract theory, especially mathematical theory. The only people you see in Greek literature plucking monochords or calculating ratios are sophists and philosophers, not musicians.¹⁰ In my seventeen years of violin lessons about as much theory as I used was in learning to play in tune by listening for beatless thirds. Outside the western sphere there flourish great traditions of music that do not make use of scales with rationalized intervals. The Balinese, for example (and the Balinese scale is very close indeed to the ancient *harmonia* that Pseudo-Plutarch ascribes to Olympus¹¹), tune their *gamelan* instruments by ear, with reference to a set of keys kept by the gong-smith. Slight variations make the *gamelan* sweeter or more brilliant.¹²

The writings of Aristoxenus and others show that theorists contracted a near mania for the mathematization of musical intervals and scales. The controversy on how to measure intervals and reduce them to numbers raged down to Claudius Ptolemy’s time, when he, with his superior arithmetical skills, fixed them as far as science was concerned once and for all. The consequence of this measuring and calculating was that irregular scales early became extinct, along with the quartertone, the *diesis* of the theorists. The material of music became more and more “diatonic,” that is, it used scales that were fixed sequences of whole and half steps. For three hundred years after the end of the fifth century composers,

mainly academic, employed “chromaticisms,” half-tone steps foreign to the diatonic scale, but the Seikilos song is written in a mode easily recognizable to any modern listener as a “modern” western mode. In the fifteenth century church mode scheme, it is “mixolydian,” as is the Christian hymn (West 51) from several centuries later. Thus it seems that western music has been distinctively “western” to the ear for a much longer time than anyone has thought.

It has always been supposed that the scales of fifth-century and earlier music contained quartertones. A quartertone is half of a modern semitone, a very small interval indeed. The place of quartertones in fifth and pre-fifth century music is another vexed question. Nobody these days can sing them. But the theorists, who felt compelled to devise a rigid system of modes for all pitches, and each in the three “genera” of enharmonic, chromatic, and diatonic, treat quartertones as if they had a value in the making of melody equal to any other, wider interval.

People over the world do strange things with voice and notes. Romanian choirs can sing in parallel minor seconds, Arabs, Indians, and Indonesians sing and play quite comfortably in scales whose notes are bent away from the western equal-tempered norm, as much as by a quartertone. We westerners conceive musicians in these other scales to be making conscious and calculated adjustments to their tuning. Hardly. Once one grasps the character of a scale one accepts the harmony of its intervals. There are traditions that even use quartertones. However, I have never heard anyone anywhere sing more than two quartertones in a row, nor have I read that any such “microtonal” music, in which intervals less than a semitone can be used to any length and in any order, exists in a traditional style. Some Brahmins when chanting the Vedas will realize the pitch-accent by going up or down, and then returning, a quartertone’s interval from a fixed steady pitch. Instruments are not so limited. Charles Ives wrote a piece for two pianos tuned a quartertone apart, and Harry Partch wrote microtonal music that works very well.¹³ You may note that Partch confines microtonal melodies to instruments that can be tuned to reproduce them accurately, and asks his singers only to chant or perform a free vocalization.

The *diesis* or quartertone must, I think, have functioned somewhat as does the comparable unit in Indian music, the *śruti* or 22nd

part of the octave, an interval of theoretical but not practical application used in the defining of the various ragas. This interpretation squares with the picture that Plato gives of the “harmonicists” who twang their strings and one-up each other by claiming that they can hear the very smallest intervals, and so identify the atom, so to speak, of music.¹⁴ The followers of Aristoxenus throughout antiquity defined larger intervals as collections of these dieses.

But I doubt that the quartertone was ever used as much more than a note to which one went up to or down to from another note and then returned from. The term *diesis* seems to support this. West, discussing Philolaus fr. 6 points out that *diesis* means “‘a letting through,’ probably from the way in which an aulete raised [or lowered] a note slightly by half-stopping.” Such an inflection whether up or down from a note would result in an audible ornamental nuance, comparable to what present day viola da gamba or transverse flute players do with their *battement* and *flattement*, but such inflexions can hardly function as basic structural elements of melody.

In fact—and this ought to make ancient Greek music seem something closer to home—even western musicians up to the present have always played fast and loose with tuning. Any kind of keyboard tuning is a deliberate violation of the purity of theoretical ratios; piano tuners even tune *octaves*, the chastest of intervals, a little sharp towards the top of the keyboard. Pythagoras would have been outraged.

The real problem is that we can know nothing about the scales unless we have music that shows how the sonic material was used and how the notes *felt*. Think of trying to write Greek with the aid of a vocabulary list and a grammar that does not contain examples. Until we get more fragments of score—who knows? we can always hope—it is going to be remarkably troublesome even for a West to make anything but the barest of guesses about melody and style. Without musical scores, too, we can say nothing about the tuning of the lyre or of the *aulos*, or even begin to guess at a solution to the desperate puzzle of how the two pipes of double *auloi* accompanied each other. I have always been skeptical how much practically useful information we can get from the theorists, since not one of them, anywhere, refers to or gives an example from a particular tune, *with the notes*.

It is simply not possible with any confidence to draw conclusions about the nature of ancient melody or about larger structure

from such a small and scattered sample of what must have been an enormous volume of music. What survives to be a sample is an evanescently tiny fraction, and these fragments are mutilated severely, so that whole limbs of melody are missing and we cannot tell whether the melody of the *Orestes* fragment was symmetrical (as Wessely and Crusius restored it)¹⁵ or balanced in some other way, or simply asymmetrical. A critic in the early part of this century observed that “Melody is the most artificial thing in music.”¹⁶ It is hard to comprehend this truth until one has composed music oneself, when one sees that the only way to the principles by which melody grows is to study models.

All these scraps, too, come from a range of several hundred years, and only two certainly from the fifth century. We can get a good taste of later styles, but these differed much from that of the fifth century. We don’t want to hear the music of mime and self-conscious hymn-writers, we want to hear the music of Pindar and Sophocles.

One thing that *Ancient Greek Music* conspicuously lacks is an attempt on West’s part to make an imaginative reconstruction of how Greek music on the whole must have sounded. I cannot blame him or fault him for leaving this part to others. West’s job was to collect, order, and interpret the evidence according to the best scholarly method, not to write us a novel. On the other hand, I could have wished that West had been freer with his knowledge of living world musics and had hazarded some flights of aural imagination. We cannot reconstitute ancient Greek melody, but we very much want to know how this music *sounded*. Theoretical considerations are of little importance, if we study Greek music with the modest goal of finding out as much as possible that will help us understand better how poetry and drama affected the hearer’s emotions. If West had let his mind stray a little from strict scholarship, he might have encouraged those who will follow him (not necessarily classical scholars) to contribute their own speculations and to compose music anew for drama and poems.

Yet West’s real and golden merit is to have moved the study of ancient music out of the dark and to have brought it up to the light. There has been no book-length and catholic study of ancient music until now, and now with *Ancient Greek Music* as a common point of departure for scholars and musicians alike, we can develop his points, research more deeply, refine and argue to an even clearer idea of ancient music’s sound. Ancient music, unlike

the bulk of classical studies, can still be considered a new and open field. There are many lines of investigation open, which we, “nauseating crambe verities and questions over-queried,” recommend to acuter inquirers.

When I first heard the small fragment of Euripides’ *Orestes*, performed on recording by Gregorio Paniagua and the Atrium Musicae of Madrid,¹⁷ even though what they perform is the patched makeshift of a few wretched tattered lines, I was astonished and enlightened. I heard great dramatic feeling in it. The fragment was not to me a mere curiosity but a piece of real music, and a token and witness of the immense power tragedy had to move the emotions. I feel the deepest yearning to recover this ancient music, for it struck me, just on the faith of this fragment, that the words of tragedy, or of choral ode, or lyric, alone contain at most only half the *meaning* of the work of art that was once complete. The bare words we have now are of the greatest beauty. I imagine that when there was music of equal quality that accompanied and informed those words, then ancient Greek poetic, musical, vocal art must have been of indescribable splendor and emotion. If even a fraction of this glory could be recovered, the whole understanding of Greek literature would change radically and much for the better, for we would *feel* it more. West in this book has given us a lot of help towards this end, and for that I am deeply grateful to him.

NOTES

1. I hope no one will mind my leaving the Greek *Græck*; it means “one who worships the Muses” and I can’t think of an English equivalent. “Cultured” won’t do. Respect for the Muses is close to the Sanskrit literary-theoretical concept that the true reader is a *sahyādaya*, literally “someone with a heart.”

2. *Paradise Lost* 1.549

3. Frogs, incidentally, are portrayed as musicians by the Balinese as well as by Aristophanes.

4. Hebrews 11.6, an appropriate quote here also because our faith in the beauty of ancient melodies is the evidence of things unheard.

5. Arbuthnot, John, et al., *Memoirs of Martinus Scriblerus*. ed. Charles Kirby Miller (New York 1966), 115–117, with an eye to Sextus Empiricus, *Adv. Professores* 6.8.

6. Aristoxenus, *Harmonics*, ed. Henry S. Macran (Oxford 1902), 4. Cf. 82.

7. For an amusing skit on this subject see “The Vanity of Human Wishes” in *Musical Quarterly* 10 (1924), 172–7.

8. Bacchius Geron, *Eisagoge*, §93 von Jan
9. Pp. 18.5-19.10, Winnington-Ingram
10. See Plato, *Rep.* 531a-b, Hibeh Pap. 13, and the stories regarding Pythagoras, e.g., Diogenes Laertius 8.12
11. *Moralia* 1134f-1135a
12. Colin McPhee, *A House in Bali* (Singapore 1986), 165, 189.
13. Listen to the recording *Music of Harry Partch*, CRI CD 7000. Partch's book *A Genesis of a Music* (New York 1974) is the clearest possible guide through the complexities of harmonic ratios and temperaments.
14. *Rep.* 531a-b again. The term *śruti* itself means "something [*sc.* the minimum] perceptible by the hearing."
15. As printed by von Jan in *Musici Scriptores Graeci* (Leipzig 1895).
16. Ezra Pound, *The ABC of Reading*. (New York 1960), 24. Pound reports the quote to come from Boris De Schloezer's *Stravinsky* (Paris 1929).
17. Harmonia Mundi CD HMA-190.1015