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The Ancient Greeks and Voice: Some Remarks

Abstract

This article examines the role of the voice (phōnē) in ancient Greek musical thought, from archaic epic poetry to Hellenistic and Imperial theory. It traces how the voice is conceptualised as the primary musical medium, materially present in the world, capable of being “thrown” and heard at a distance, and at the same time resistant to theoretical description. Through readings of Homer, Hesiod, Aristoxenus, Theophrastus, Ptolemy, and related texts, the article argues that the voice occupies a central but paradoxical place in Greek musical culture: indispensable to performance and to the mythological imagination of sound, yet resistant to the quantitative frameworks through which musical theory was elaborated.

Keywords: *ancient Greek music; voice; phōnē; Aristoxenus; Theophrastus; Ptolemy; acoustics; performance.*

1. Introduction

In our relationship with ancient Greek civilization, one thing is notably absent: the voice. Rationally, we know that archaic literature and much of classical literature were almost exclusively oral. We also know the enormous importance of song as a vehicle of poetic language, a medium for memory, and the sonic body of mythical narration. However, what we lack, and what we will likely never fully recover, despite all the research efforts, is a profound understanding of the perceptual

horizon of ancient Greek societies; what, for an ancient Greek, made the difference between the ordinary, everyday voice and that of the poet. And this, of course, not in terms of content, but rather in terms of the quality of the voice itself, in its articulation, timbre, management of pitches—in short, in everything that makes the voice one of the most flexible and varied sonic objects, capable of encompassing the infinite nuances between the extremes we define as 'speaking' and 'singing' (List 1963). The following observations certainly do not aspire to resolve such a complex issue, but rather aim to offer, more humbly, a clarification of some sources and a basis for future discussions.

Greek thought on sensory perception in general, and sound in particular, reaches very high levels of abstraction. As far as sound is concerned, one need only recall, among other things, Plato's barely concealed impatience with empirical measurement of musical intervals (Meriani 2003, 83-113); the evident disinterest of music theorists in timbre, in contrast with the analytical precision devoted to the quantification of rhythms and of relative pitches; or, most paradoxically, the theory of the Harmony of the Spheres, which projects into the cosmos a system of sounds inaudible to the physical ear but imaginable by the intellect through such abstract, extra-musical factors as Pythagorean ratios (MacLachlan 1991; Zhmud 2012, 337-346). This cultural orientation has had enormously durable effects on so-called Western thought and is the precondition for the constitution of music as an "art" or as an object of intellectual theorising. It should not, however, cause us to forget that music, in itself, is first and foremost an activity, a doing. As Christopher Small argued in a now-classic volume (1998), to music (as a verb) is an action that involves in equal measure,

albeit in different ways, those who produce sound and those who receive it. If this is true of every musical genre and occasion – from the jam session to the rave to the formal concert – it is all the more true of ancient Greek music, which for much of its history developed in a context of near-total orality, in conditions of deep continuity with the performative activities we today separate from music proper under the labels of poetry and dance but which, in Greek culture, are encompassed within the macro-category of *mousikē*. Musical performance involves vocal emission, phonatory articulation, and bodily movement; and it is in this physicality that the role of the voice must be sought.

In the Greek experience, especially in the archaic period, the voice is what allows memory and collective identity to exist (Susanetti 2019). In a culture structured on orality, there is no other way to give life to stories, myths, and knowledge. It is no accident, I believe, that the voice plays a pivotal role in Zeus' political programme, so to speak, after his victory over his opponents. One of his most important acts is coupling with Mnemosyne, thereby generating the Muses. The birth of the Muses is generally associated with the beauty of song and the origins of poetry, which is certainly true; but there is also a political dimension to it, if we consider this act within the wider context of the other measures taken by the new ruler to secure his power. The Muses' voice marks the beginning of a new era that includes human beings: human music is a gift from the Muses and Apollo, a reflection of their own music.

Hesiod makes this explicit: the Muses “tell of what is now and what shall be and what was in the past, with concordant voice, and their voice flows untiring, from their mouths, and sweet” (*Theog.* 38-40). But their singing is not about spreading joy only. They can decide who is to become a just and powerful

king, by granting him a “sweet tongue” and “honeyed words” (83-84). A king is powerful insofar as he can convey his words sweetly and effectively. In this sense, the Muses function as a kind of living memorial, one that exists not in space, like Augustus’ *Monumentum Ancyranum*, but in time, for as long as the song continues.

There is, furthermore, a revealing voice in the pre-Zeus world: that of Typhoeus (Hes. *Theog.* 820-835), last of the Titans, son of Gaia and Tartarus. Typhoeus is a fascinating figure from a sonic point of view: his hundred heads emit a variety of different utterances, sometimes sounding like speech addressed to the gods, sometimes like a bull or a lion, sometimes like a hissing serpent. He is, in other words, the sonic counterpart of the cosmic chaos against which Zeus contends. The victory over Typhoeus is, *inter alia*, the victory of an orderly voice – the concordant, sweet, continuous, and homogeneous voice of the nine Muses, through which the past, the present, and the future are linked in a meaningful chain of events – over the bellowing and nonsensical outbursts of a monster (Goslin 2010).

2. *Voice in Ancient Performance*

In epic and didactic poetry, represented for us chiefly by Homer and Hesiod, the poetic word is inseparable from the voice of the Muse. The daughters of Zeus and Mnemosyne represent the totality of the repertoire accessible to the poet-singer, who can begin his song only after obtaining, through the invocation, the credentials for sectoral access to what amounts to an immense database curated by the nine daughters of Helicon. But this is only part of the story: downloading the story into the singer’s local memory, necessarily more limited than the Muses’ divine cloud, as it were, does not of itself guarantee

a successful performance. For the song to reach its audience effectively, an adequate output is needed – the right *phōnē*: clarity of articulation, power, endurance. In a song culture such as archaic Greece, the voice is the principal condition for the very existence of poetry. But what kind of voice?

As with memory, the singer's possibilities too appear as a pale echo of the Muses'. The voice of the Muses is supremely beautiful and, above all, immune to fatigue – or so Hesiod would have us believe, for he depicts them singing continuously with an *akámatos* ("tireless") *audē*. The poet, being human, must reckon with the weakness of the body and the risk of vocal breaking. When the poet of the *Iliad* approaches the catalogue of ships – a veritable tour de force of memory and lungs, with its own fresh invocation to the Muses – he acknowledges the physical limits that will force him to list only the names of the commanders, not of every single warrior. This is not simply an inability to remember all the Achaean soldiers' names; the references to a heart of bronze and to the many mouths and tongues that would be needed invoke, unmistakably, the insufficiency of the human voice before the unattainable divine model.

However, for all its limitations, even the human voice of the poet can be a dispenser of joy. In archaic culture, before philosophy appropriated musical questions and coloured them with ethical and pedagogical overtones, song aimed above all at *térpsis*, at pleasure. Apollo takes pleasure (*ho dè phréna térpēt' akouōn*) on hearing the paeon intoned by the Achaeans (*Il.* 1, 474); Achilles, even in his anger, takes pleasure in singing the deeds of ancient heroes in his tent, accompanying himself on the kithara (*phréna terpómenon phórmingi ligeíēi*, *Il.* 9, 186) (Raffa 2011); and to Phemius, the bard of the palace at Ithaca, the poet

of the *Odyssey* gives the revealing patronymic *Terpiádēs*, suggesting his membership of a family of musicians (*Od.* 22, 330). *Térpsis* appears as the result of the inseparable union of *melos* and *logos*: the voice must not only reach the listener's ear, but must reach it with clarity, preserving the intelligibility of the words.

In this respect, Greek develops an important semantic field around the idea of the “thrown” voice. We find it in the well-known Homeric phrase *épea pteróenta* (“winged words”), which implies not an aimless fluttering but a well-directed flight – particularly if the adjective refers, as has been observed, less to wings in general than to the fletching that stabilises an arrow's trajectory (Wackernagel 1860; Horn 2015). By contrast, the word that is merely implied and does not need to travel to be understood is *ápteros*, “wingless” (e.g. *Od.* 22, 398). The same idea may underlie the equally famous formula that has words launched, like arrows, from the “fence of the teeth” (*hérkos odóntōn*; Maiullari 2000, 29); and it is certainly present in the common use of the verb *híēmi*, “to throw,” in connection with vocal emission.

Other semantic fields pertain to clarity: those of brightness (*ligyrós*, *lamprós*) and distinctness (*saphēs*; Kaimio 1977, 42–47). Volume and pitch are often conflated in auditory experience, and this conflation occurs in Greek as well: violent vocal emissions are described using expressions that invoke both volume (e.g. *méga iákhein*) and acuteness of voice (*oxý boeîn*). The ambiguity persists even at the dawn of theoretical reflection: Archytas of Tarentum, a pioneer of ancient acoustics, does not distinguish between force and pitch. For him the origin of every sound is an impact (*plāgā*), from whose force and speed pitch derives directly, indistinguishable from volume

(Bowen 1982; Ciancaglini 1998; Huffman 2005, 103-161; Raffa 2014).

Yet clarity of the sung or spoken voice is concerned with something more specific than pitch or volume: it depends on the possibility that the listener's ear may distinguish the individual phonemes, which in turn depends on the articulation of consonants. Making the voice carry to a given distance and making it carry intelligibly are two different things, and the second is obviously harder. Two scenes in the *Iliad* are illuminating. In the first (*Il.* 8, 220-244), Agamemnon delivers a brief motivational address to the Achaeans caught in a sudden Trojan assault; in the second (*Il.* 11, 1-16), he raises a battle cry at dawn. In the latter scene the poet simply uses the verb *boáoō*, "to shout"; in the former, however, he specifies that Agamemnon shouts in such a way as to make himself penetratingly intelligible (*gegōnōs*, 227). In that participle lies the difference between the inarticulate shout – which achieves its purpose merely by arriving at its destination – and the "launched" word, which must be recognised – *gégōna* is perhaps cognate with *gignōskō*¹ – by its addressee.

This insight – that the voice's real power lies in the sharp articulation of its consonants – becomes something of a minor theoretical tradition in antiquity. An inscription on a fifth-century BC *epínētron* from Eleusis² depicting an Amazon playing the trumpet bears the text *to[t]etotoe*, a probable indication that the phoneme /t/ was used, then as now, to articulate the sound of wind instruments. Syllables beginning

¹ Frisk 1960, s.v. γέγωνα; Beekes-van Beek 2010, s.v. γυνώσκω.

² *Beazley Archive Pottery Database* 7965,

<https://www.beazley.ox.ac.uk/record/1AC0221E-BE65-49DB-A602-69E056FFA39E>; Pöhlmann-West 2001, 8-9.

with *tau* appear also in the solmisation system of the Anonymous of Bellermand. Aristides Quintilianus (*De mus.* 2, 14, p. 79, 7-8 Winnington-Ingram) explicitly recognises in the dental stop a kind of excellence (*tōn symphōnōn tò kálliston ... tò t*), deriving partly from the fact that it is not violent like the aspirates and partly from the active involvement of the tongue. Aristides also likens *tau* to the sound of plucked strings and, in another passage of his treatise (*De mus.* 3, 25, p. 130, 10 Winnington-Ingram), compares the written shape of the letter to a plectrum and links it to Apollo. At the opposite pole, as far as articulatory clarity is concerned, was the sigma, which due to its continuous nature was felt to be indefinite and therefore often avoided in choral compositions (D'Angour 1997).

A pseudo-Aristotelian problem ([Arist.] *Probl.* 19, 10, 918a, 29-34) asks why singing, normally more pleasing than instrumental music, is less pleasing when it occurs without words, that is, in the mode of *teretízein* (“humming”; Rocconi 2003, 90-91). The author’s answer is that instruments are “more capable of making attacks heard than is the mouth”; this implies that consonants supply vocal emission with the *kroûsis* it would otherwise lack (Raffa 2024a, 90-91). One might say, in Archytas’ parlance, that consonants trigger the *plēgai* through which words are launched toward the listeners’ ears and reach them while retaining their recognisability.

Voices are most distinct in proportion to the precision of their sounds; for it is impossible that they should be distinct if the sounds are not perfectly articulated, just as with the seal-impressions on rings, if they are not modelled accurately. ([Arist.] *Aud.* 801b, 1-5; transl. mine)

In the aesthetics of the ancient voice, this idea of “definition of contours” seems to operate not only at the level of

pronunciation but also, more specifically, at the level of singing. Porphyry, drawing on Aristoxenus, provides a striking formulation:

“In singing, on the other hand, we take care not to blend the parts together; this too is a consequence of continuous movement. Hence, we criticise those who speak haltingly and with hesitation, as though unable to manage the natural pace of speech; and, correspondingly, we do not praise those who perform songs in a hurried and precipitate manner either. These, even if they suppose they are being accomplished and singing in a difficult style, sing while they cannot avoid disfiguring even the melody, because of the approximation [of the notes] and the similarity with the other kind of voice. For a melody, the more it is accelerated and excessively hurried – almost forced to become continuous – the worse it is performed; whereas the more it is held back and performed slowly, the clearer, more distinct, and more refined in its forms it appears.” (Porph. in *Harm.* 1, 1, p. 9, 16-29 Raffa; transl. mine)

Whether these words reflect the taste of Porphyry’s own time, derive from an intermediate source, or represent a misreading of Aristoxenus’ text, the testimony suggests that Greek thought, over many centuries, held that in singing the contours of individual sounds should be preserved – an aesthetic principle analogous to that which privileges the clear articulation of consonantal boundaries in the word and frowns upon the succession of two or more vowels – the carriers of pitch and timbre in speaking – without any consonant sound to divide them. *Glissando* and *portamento* would, on this view, be the melodic equivalent of hiatus in speech.

3. The Voice as Sound

What appears evident from the Homeric poems onwards is that the voice is conceived of as possessing a material body: it can be thrown towards a specific target, like an arrow or a missile – this is probably the meaning behind the expression *épea pteróenta*; and sounds and voices, as objects travelling from A to B, can collide with and obstruct each other.

Some details in the Sirens episode of the *Odyssey* are illuminating in this respect. The Sirens' actions are described as a kind of sonic ambush: they wait until the target is within “shouting range” (*hóson te gégōne boēsas*, *Od.* 12, 181), then “shoot” their voice like a weapon. Note the use of the verb *entýnō* (*ligurón d' éntynon aoidēn*, 183), which elsewhere applies to the preparation of equipment for a specific purpose, and after the Sirens' words the expression *hōs phāsan hieísai ópa kállimon* (192), where the verb *hiēmi* seems to allude to the throwing of the voice as an object. Accordingly, to prevent the voice from being “shot” one must block its source, located in the pharynx already in Homeric poetry: one might recall, for instance, Odysseus' grip on Eurycleia's throat to prevent her from crying out (*Od.* 19, 479–481).

When a voice is observed from outside, confused and mingled with other equally powerful utterances, the effect is entirely different. In a well-known passage from the *Iliad*, the poet contrasts the quiet order of the Achaeans' advance – enabling them to hear their generals' commands – with the Trojans' shouting in a babble of different tongues and accents, compared to a flock of sheep bleating simultaneously (*Il.* 4, 433 ff.). The ability to reach a specific *skopós* – a target – is characteristic of the human voice alone.

The *Argonautica* of Apollonius Rhodius offers a significant variant of the Sirens episode (4, 891-919) that reveals a more sophisticated understanding of vocal acoustics. Unlike Odysseus, who has been warned about the Sirens and has a strategy in place, the Argonauts are caught off guard and must improvise; it is Orpheus who, on the spur of the moment, seizes his kithara and “beats” the Sirens’ voice (904-911). This narrative implies two assumptions: first, that a sound can be “un-heard” if another sound strong enough fights it off; and second, that it takes some time for a sound to take effect. These subtle changes from the Homeric model may reflect the philosophers’ growing interest in sense perception and acoustics, from Plato to the Hellenistic schools.

The adverb *diaprýsion* (“piercing”, literally “going through”), used in the Agamemnon scene (*Il.* 8, 227), illuminates the physical conception of the voice. Its only non-sonic usage in Homer describes a ridge that deflects rivers and forces them across a plain (*Il.* 17, 747-751). Just as a highland ridge holds off a river, Agamemnon’s voice cuts through the sonic turmoil of battle. Sound possesses a bodily mass that occupies space. This is consistent with the use of adjectives like *méga* and *makrón* with reference to vocal loudness – they are size-words applied to a sonic phenomenon.

In Homer we find many references to the voice’s quantitative and qualitative aspects – loudness, pleasantness, clarity – but little or nothing on how the voice is produced. The poet of the *Iliad* does seem aware of the role of the windpipe in phonation: when Achilles strikes Hector in the neck (*laukaníē*, *Il.* 22, 325) without severing the windpipe (*aspháragos*, 328), the hero is still able to utter a few last words. The distinction between the

two terms reflects a basic anatomical awareness that survived into the later philosophical and medical literature.

4. *Voice in Music Theory*

We have already recalled how the sound of the voice, being produced by a living being, is considered in ancient thought the finest of all sounds; musical instruments can be said to have a “voice” only insofar as they possess characteristics analogous to those of *phōnē*. Yet music theory does not seem to develop from the voice, but from the artificial sound of instruments. Of the two notation systems known through the extant musical sources and decodable through the tables in Alypius’ *Eisagōgē mousikē*, the series of signs used for instrumental music appears to be older than the vocal one. Moreover, harmonic science – the study of musical intervals and their concatenation according to certain formal requirements which we need not elaborate on here (Barker 2007, 6-12) – takes as its basis for study not vocal sounds but the sounds of pipes and, later (Creese 2010), vibrating strings, which can readily be equated with linear lengths, facilitating the demonstration of Pythagorean ratios; sounds from other sources such as bronze discs and simple-bore tubes were also employed.

Despite the qualitative primacy generally accorded to it, the voice seems to have remained too uncertain an object to serve as the reference point within the quantitative framework in which Greek music theory initially developed. The uncertainty in question does not concern the mechanism of phonation itself, whose workings in broad outline appear reasonably clear from early periods. The function of the larynx is analysed by philosophers from the late Classical period onwards, as shown by the *De audibilibus* attributed to Aristotle and the *Peri phōnēs*

sections of the pseudo-Aristotelian *Problems*, and eventually finds a place in later medical literature (see Urso's essay in this volume). What appears obscure – or even mysterious – is how the voice manages to produce the sounds used in music, what we call notes.

The melodic capacity of the voice presents a challenge to both the Pythagoreans and the Peripatetics. For the former, the problem lies in identifying, in the phonatory process, the same quantitative principles that govern the system of mathematical ratios (*lógoi*) connected with musical intervals. One of the rare attempts to explain this process within Pythagorean terms comes from Claudius Ptolemy (*Harm.* 1, 3), who compares the human trachea to a “natural aulos” (*aulòs physikós*) in which the point of origin of the voice, instead of remaining in the larynx as anatomy dictates, travels up and down the windpipe – approaching the mouth to produce higher notes, retreating toward the diaphragm for lower ones. Ptolemy even finds a second comparison: the movable bridge of the monochord (*hypagōgeús*). This conceptual apparatus is ultimately unable to capture the specific nature of vocal emission: instead, it can only conceive of it by stripping it down and flattening it onto an abstract, linear geometrical model.

Galen, roughly a contemporary of Ptolemy, offers a similar comparison in his *De usu partium* (vol. 3, p. 533 Kühn), describing the composite structure formed by the three laryngeal cartilages as a kind of aulos, with a reed-like body in its interior. Here too the analogy, though illuminating, is necessarily approximate: in the aulos the mouthpiece and the end of the pipe are opposite to each other, while in the human body the larynx sits at the end of the windpipe. Any representation of the natural

vocal utterance through a comparison with the artificiality of instruments inevitably carries a certain degree of approximation.

The instability of the singing voice also troubles the Pythagoreans. In Porphyry's description of a student singer who tries to replicate a note proposed by his teacher, fluctuating between sounds that are too high and too low, we can sense the precariousness of the voice's grip on correct intonation (Porph. *in Harm.* 1, 4, p. 103 Raffa). Plato had already addressed this: explaining how boys learning to sing should accompany themselves on the kithara, he attributed to the strings of the instrument the quality of *saphēneia* – clarity in pitch differentiation – as a guide for acquiring correct intonation (Raffa 2024b).

The Peripatetic tradition, by contrast, is far more attentive to the performative aspects of the voice: how it arises, how it moves through discourse or melody, how it interacts with the sound of instruments, why it produces certain effects on those who emit it and on those who hear it. This interest is unsurprising when situated within the broader Peripatetic research programmes on tragic and comic performance, on the arts of acting, musical execution, and oratory, in all of which the role of the voice is fundamental. A conspicuous novelty, compared to Pythagoreanism, is the emphasis on the dynamism of the voice and its presentation as a form of movement. As we have noted, Aristoxenus is not concerned with the reasons why the voice can intone musical intervals; he cares that a sound can be said to be intoned, i.e. endowed with a certain *tásis* (pitch), a term borrowed, once again, from an area foreign to the voice – that of strings.

Theophrastus of Eresus, another great direct pupil of Aristotle, approaches the voice from a similarly anti-quantitative

standpoint; indeed, while Aristoxenus merely disregards the Pythagoreans' concerns, the philosopher from Eresus devotes a substantial portion of his argument to their refutation (Barker 1977). According to Theophrastus (frg. 716 Fortenbaugh), melody arises from a particular type of movement of the soul, which he calls *kinēma melōidētikón* – literally “melody-producing movement” – a *hápax legómenon* that marks its distance from Aristoxenian terminology. The soul “translates into voice” (*phōnēi hermēneúein*) this melodic movement, “directing” (*trépei*) the voice according to its own will (Raffa 2018, 45-67).

There is at least one important difference between Theophrastus' position and Aristoxenus'. For Aristoxenus, the movements of the voice – continuous (*synechēs*, suitable for speech) and discrete (suitable for melody, as it holds each pitch long enough to be identified and moves without ambiguity to the next) – exist only in the moment of vocal emission. Their effect is to produce in the listener the impression of a continuous or discrete motion. Theophrastus, by contrast, speaks of a movement of the soul, occurring independently of whether the soul decides to “translate” it into vocal terms. Vocal melody is, in his account, the epiphenomenon of a process that takes place elsewhere and, if it remains interior, need not generate any melody at all.

It is worth noting that Theophrastus also offers what amounts to a revised Pythagorean account of the physiological differences between high and low vocal production. Against the tradition (ultimately going back to Archytas) that simply correlates greater force with higher pitch, he proposes a different model: the total force required remains constant, but its distribution within the body changes. Singers, he says, need

effort for low notes no less than for high ones; the difference is that for high notes they “draw in the sides” (*synágousin tà pleurá*) and “stretch the trachea” (*tēn artērian ekteínousin*), compressing it with force, while for low notes they do the opposite. He even adds an empirical observation: if one places a hand on a singer’s side, one feels greater vibration during the emission of higher notes.

This is a minority viewpoint that found no successors, and that appears isolated even within the Aristotelian tradition to which Theophrastus belongs. The pseudo-Aristotelian *Problems* do preserve related observations: one problem (19, 3, 917b, 30-34; Raffa 2024a, 193-195; 204-207) asks why singers risk vocal breaking on certain notes more than others, and the answer alludes to the fatigue caused by pressure on the voice (*píesis tēs phōnēs*) in the emission of low notes as well as to the ascending melodic movement (*epítasis*). These observations, however valuable for understanding ancient singing practice, do not belong to music theory in the strict sense. Theophrastus thus remains, as far as we know, the only thinker to have used phenomenological observation of vocal physiology for the purposes of a broader theoretical argument about the nature of pitch differences between sounds.

5. Conclusions

The first action named in the opening of the *Iliad* – which is to say, in Western literature – is singing. The very idea of *mousikē* is born within song, since without song there is neither *mēlos* nor *lógos* nor *rhythmós*. Musical instruments, as we have recalled, have a “voice” only insofar as they are assimilable to the human voice. In the practice of accompanied song, as far as we can tell, the instrument doubles the vocal line in unison or at

the octave, touching at most other consonances such as the fifth or the fourth; in any case it remains closely bound to the vocal line, diverging from it only through heterophonic procedures – slight melodic variations performed simultaneously with the sung melody (Raffa 2024b). Consequently, instrumental language is modelled on vocal language, to such an extent that ancient music does not appear to possess anything analogous to what we today call idiomatic instrumental language.

Despite this enormous importance, however, the voice remains difficult to understand in its functioning and difficult to describe without falling either into the conventionality of a formulaic or at least repetitive adjective-set, or into the proliferation of metaphors and synaesthesia that are as ephemeral as the perceptual contexts and horizons of meaning from which they spring. Moreover, poised as it is between the world of the spoken and the world of the sung, with all the infinite gradations that exist between those two poles, the voice resists serving as a paradigm for a mode of thought that, like ancient thought, places the stability and univocity of pitch as the criterion for admitting sounds into the musical field. It remains for us a fugitive object, whose traces we must seek wherever the written words of poets, prose-writers, and theorists carry the imprint of its sonic body.

Bibliografia

1. BARKER Andrew, «Music and Mathematics: Theophrastus Against the Number-Theorists», *Proceedings of the Cambridge Philological Society*, 23, 1977, pp. 1–15
2. BARKER Andrew, *The Science of Harmonics in Classical Greece*, (Cambridge University Press, Cambridge 2007)

3. BEEKES Robert and VAN BEEK Lucien, *Etymological Dictionary of Greek* (Brill, Leiden-Boston 2010)
4. BOWEN Alan C., «The Foundations of Early Pythagorean Harmonic Science: Archytas, Fragment 1», *Ancient Philosophy* 2, 1982, pp. 79-104
5. CIANCAGLINI Claudia A., «L'acustica di Archita», *Maia* 50, 1998, pp. 213-251
6. CREESE David, *The Monochord in Ancient Greek Harmonic Science* (Cambridge University Press, Cambridge 2010)
7. D'ANGOUR Armand, «How the Dithyramb Got its Shape», *Classical Quarterly* 47/2, 1997, pp. 331-351
8. FRISK Hjalmar, *Griechisches etymologisches Wörterbuch* (Winter Verlag, Heidelberg 1960)
9. GOSLIN Owen, «Hesiod's Typhonomachy and the Ordering of Sound», *Transactions of the American Philological Association* 140/2, 2010, pp. 351-373
10. HORN Fabian, «ἔπεα πτερόεντα Again: A Cognitive Linguistic View of Homer's 'Winged Words'», *Hermathena* 198, 2015, pp. 5-34
11. HUFFMAN Carl, *Archytas of Tarentum: Pythagorean, Philosopher and Mathematician King* (Cambridge University Press, Cambridge 2005)
12. KAIMIO Maarit, *Characterization of Sound in Early Greek Literature* (Societas Scientiarum Fennica, Helsinki 1977)
13. LIST George, «The Boundaries of Speech and Song», *Ethnomusicology* 7/1, 1963, pp. 1-16
14. MACLACHLAN Bonnie, «The Harmony of the Spheres: Dulcis Sonus», in WALLACE Robert and MACLACHLAN Bonnie (eds.), *Harmonia Mundi: Musica e filosofia nell'Antichità* (Edizioni dell'Ateneo, Roma 1991), pp. 7-19

15. MAIULLARI Franco, «Il sogno e l'arco: sofismi e paradossi nel canto 19 dell'Odissea», *Quaderni Urbinati di Cultura Classica* 65, 2000, pp. 15-60
16. MERIANI Angelo, *Sulla musica greca antica: studi e ricerche* (Guida ed., Salerno 2003)
17. PÖHLMANN Egert and WEST Martin L., *Documents of Ancient Greek Music: The Extant Melodies and Fragments* (Oxford University Press, Oxford 2001)
18. RAFFA Massimo, «Il canto di Achille (Ps. Plut. De mus. 40, 1145D–F)», *Quaderni Urbinati di Cultura Classica* 99/3, 2011, pp. 165-176
19. RAFFA Massimo, *Acustica e divulgazione in Archita di Taranto: il fr. I Huffman come 'protrettico alla scienza'*, in BELLIA Angela (ed.), *Musica, culti e riti nell'Occidente greco* (Serra ed., Pisa-Roma 2014), pp. 95-101
20. RAFFA Massimo, *Theophrastus of Eresus: Commentary Volume 9.1* (Brill, Leiden-Boston 2018)
21. RAFFA Massimo (a cura di), [Aristotele], *Questioni di armonia: Problemi, Libro XIX* (Bompiani-Giunti, Milano 2024a)
22. RAFFA Massimo, «La pratica eterofonica nell'accompagnamento del canto: una lettura di Pl., *Leg.*, 7, 812D-E», *Rivista di Cultura Classica e Medioevale* 66/1, 2024b, pp. 139-146
23. ROCCONI Eleonora, *Le parole delle Muse: la formazione del lessico tecnico musicale nella Grecia antica* (Quasar ed., Roma 2003)
24. SMALL Christopher, *Musicking: The Meanings of Performing and Listening* (University Press of New England, Middletown, CT 1998)
25. SUSANETTI Davide, *Luce delle Muse: la sapienza greca e la magia della parola* (Bompiani-Giunti, Milano 2019)

26. WACKERNAGEL Wilhelm, *ἔπεα πτερόεντα: ein Beitrag zur vergleichenden Mythologie* (Schweighauser, Basel 1860)
27. ZHMUD Leonid, *Pythagoras and the Early Pythagoreans* (Oxford University Press, Oxford 2012)