'Without Timotheus, Much of our *Melopoiia* would not exist; but without Phrynis, there wouldn't have been Timotheus': Pherecrates' twelve strings, the *Strobilos* and the Harmonic *Paranomia* of the New Music

Abstract

In this paper, I offer a close discussion of the musical innovations attributed to Phrynis, Timotheus and other 'New Musicians' mentioned in a famous fragment of Pherecrates' *Chiron*, interpreting this fascinating passage in the light of the extant evidence about ancient harmonic theory and practice, as well as the latest research findings. In particular, I shall advance a new hypothesis concerning the nature of Phrynis' innovative 'twister' (*strobilos*): producing a special bending (*kampē*) of a semitone, this gadget allowed Phrynis to combine five different *harmoniai* (Dorian, Phrygian, Lydian, Iastian and 'Loose Lydian') in the same twelve-string tuning. Making a subtle modification to this device, Timotheus further expanded the harmonic palette of his twelve-string *kithara*, introducing the lamenting aulos-mode par excellence, the Mixolydian, into the realm of lyre music. Philoxenus increased this system by adding an extra string, reaching the 13-step arrangement which is at the heart of Aristoxenian harmonic theory.

Keywords

New Music; Timotheus; Phrynis; *polychordia*; *strobilos*; modulations; harmonic theory; Aristoxenus; Ptolemy.

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'Without Timotheus, much of our *melopoiia* would not exist; but without Phrynis, there wouldn't have been Timotheus': so writes Aristotle in a famous passage of the *Metaphysics*.[1] In this paper, I shall offer a close discussion of the musical innovations attributed to these and other 'New Musicians' mentioned in a much-debated fragment of Pherecrates' *Chiron*, reading this intriguing, if at times enigmatic, passage in the light of the extant evidence about ancient harmonic theory and instrumental practice. In particular, I aim to show how the technical innovations that Pherecrates ascribes to Phrynis – notably his use of 'exharmonic' bends (*kampai*) and his introduction of a mysterious 'twister' (*strobilos*) – indeed played a crucial role in expanding the harmonic palette available to virtuoso *kithara* players, and thereby paved the way for the complete 'destruction' of the esteemed *harmonia* of old undertaken by Timotheus and further expanded by Philoxenus.

1. Pherecrates' *Chiron*: the harmonic evolution of the New Music and the rivalry between *auloi* and *kitharai*

Let us start by sketching briefly the dramatic context of the Pherecrates fragment, which is preserved in the Pseudo-Plutarchan treatise *On Music* (1141d–1142a = fr. 155 *PCG*).[2] In this remarkable piece, a personified Lady Music is put on stage and her body displays clear signs of ill-treatment. To explain her sorry state, Lady Music provides her interlocutor, Lady Justice, with a detailed account of the savage and perverted attacks she suffered on the part of the most distinguished exponents of the avant-garde style known in modern scholarship as the 'New Music'. In order to portray appropriately their violent 'contempt for law' (*paranomia*), Lady Music plays with technical notions and specialised vocabulary related to the realm of string music, producing a long series of effective and provocative double-entendres. For instance, she laments that Melanippides 'made [her] slacker with his twelve strings',[3] whereas Phrynis 'bent

* I wish to thank the anonymous reviewer for his helpful and detailed remarks, and Dr Enrico E. Prodi for discussing with me some textual issues raised by the Pherecrates fragment.

[1] Arist. *Metaph.* 993b15–16: εἰ μὲν γὰρ Τιμόθεος μὴ ἐγένετο, πολλὴν ἂν μελοποιίαν οὐκ εἴχομεν· εἰ δὲ μὴ Φρῦνις, Τιμόθεος οὐκ ἂν ἐγένετο. See also Phot. *Bibl.* 320b.

[2] A Greek text and a new English translation of this passage are provided in an appendix to this article. All translations are mine, unless otherwise noted.

[3] Fr. 155.5: χαλαρωτέραν τ' ἐποίησε χορδαῖς δώδεκα.

and twisted' her body 'into five different modes (*harmoniai*)' with his new instrument of torture, the 'twister' (*strobilos*).[4] And when Timotheus found her walking on her own – a neat image that hints at solo musical performances and, at the same time, casts Lady Music in a rather unflattering light by Athenian standards[5] – he 'untied' her and 'loosened her up' with his twelve strings.[6]

Here we are already faced with the first puzzling element of this story, namely Pherecrates' insistence on strings: why did he choose to centre his parody on string instruments, and not on the aulos? One could think that Pherecrates' preference stemmed simply from the fact that strings offered him plenty of useful material for his sexual innuendos. This is of course the case, but it would not have been any less true for the aulos, especially given the dubious moral reputation that female aulos players had in Classical Athens.[7]

The aulos would have been a perfect candidate also for another important reason, namely that the bold musical innovations introduced by the New Musicians were epitomised by the development of a 'new', highly mimetic kind of dithyramb – the realm of aulos music par excellence.[8] The same applies also to the other key battlefield of the New Music, which was known in antiquity as 'theatrical music' (*skēnikē mousikē*): the performance of tragedies and comedies, once again genres normally accompanied by the aulos and not lyres.

Technical evidence too shows that the much-discussed harmonic innovations characteristic of the New Music originated in aulos playing. For instance, immediately before quoting the Pherecrates passage that is the focus of our discussion, the author of the Pseudo-Plutarchan treatise explicitly identifies the aulos' *polyphōnia* as the origin of the 'multiplication of notes' that characterised the first 'musical revolution' of Greek history, i.e. the new dithyrambic style developed by Lasus (*De Mus.* 1141c: πλείοσί τε φθόγγοις καὶ διερριμμένοις χρησάμενος […]).[9]

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[4] Fr. 155.14–16: Φρῦνις δ' ἴδιον στρόβιλον ἐμβαλών τινα /κάμπτων με καὶ στρέφων ὅλην διέφθορεν, / εἰς πέντε χορδαῖς δώδεχ' ἁρμονίας ἔχων. Here I have adopted Martin West's brilliant emendation εἰς for the MSS ἐν: cf. West 1992a, 28–9.

[5] Only prostitutes and slaves would walk unaccompanied, whereas 'respectable' women did not normally leave their homes (and at times even their chambers) unattended: e.g. Hom. *Od.* 1.328–36, Theognis 1.579–82, and SEG xxxix.868 (Keos), a decree which prohibits 'free women and girls' from walking alone, and establishes fines of ten and five drachmas for these offences.

[6] Fr. 155.25: ἀπέλυσε κἀνέλυσε χορδαῖς δώδεκα.

[7] Cf. Lynch in press.

[8] See e.g. Pratinas *PMG* 708, who vehemently attacks the preeminence gained by virtuoso aulos players over choruses. Taplin 1987, 103, suggests that line 10 might contain a pun on Phrynis' name: παῖε τὸν φρυνεοῦ ποικίλου πνοὰν ἔχοντα (φρυνεοῦ Girard; φρυναιου MS A). If his thought-provoking suggestion is correct, then Pratinas would be attacking here the skilled auletes that 'have the breath of the mottled toad/Phrynis', i.e. those that performed his innovative dithyrambs. On Phrynis' harmonic innovations, see §4 below.

[9] According to Martin West (1992b, 346), Lasus' innovations may have consisted in introducing enharmonic divisions of the semitone into vocal music, following the model of the 'all-toned' aulos (Pind. *Ol.* 7.12, *Pyth.* 12.19) – a flexibility that diatonic lyres could not emulate. For the contrast between an archaic aulos style featuring

The author significantly highlights that this first paradigm shift was akin to the radical harmonic revolution brought about by Melanippides in more recent times – that is to say, precisely the 'first offender' mentioned by Lady Music in Pherecrates' *Chiron*. Similarly to Lasus, Melanippides too ripped ancient music 'into a multiplicity of notes' (διέρριψεν εἰς πλείονας φθόγγους, 1141c), thereby mangling the revered model of the seven-stringed lyre *harmonia* traditionally ascribed to Terpander.

In similar vein, the most renowned Classical aulete, Pronomus of Thebes, was remembered as the first to have been able to play all of the three basic *harmoniai* – Dorian, Phrygian and Lydian – on one and the same instrument.[10] The crucial importance of this kind of modulations for the innovative style of the New Music is discussed in a famous passage by Dionysius of Halicarnassus, which provides us with further interesting details:

> οἱ δέ γε διθυραμβοποιοὶ καὶ τοὺς τρόπους μετέβαλλον Δωρίους τε καὶ Φρυγίους καὶ Λυδίους ἐν τῷ αὐτῷ ἄσματι ποιοῦντες, καὶ τὰς μελῳδίας ἐξήλλαττον τότε μὲν ἐναρμονίους ποιοῦντες, τότε δὲ χρωματικάς, τότε δὲ διατόνους, καὶ τοῖς ῥυθμοῖς κατὰ πολλὴν ἄδειαν ἐνεξουσιάζοντες διετέλουν, οἵ γε δὴ κατὰ Φιλόξενον καὶ Τιμόθεον καὶ Τελεστήν, ἐπεὶ παρά γε τοῖς ἀρχαίοις τεταγμένος ἦν καὶ ὁ διθύραμβος.
>
> (Dion. Hal. *Comp.* 19, 85.18–86.7)
>
> Indeed, composers of dithyrambs used to switch between modes too, employing Dorian ones as well as Phrygian ones and Lydian ones in the same song; they changed also melodic patterns, making them sometimes enharmonic, sometimes chromatic and sometimes diatonic. And they persevered in practicing such licences with great impudence also in their rhythms – I mean composers such as Philoxenus, Timotheus and Telestes, since among the ancients the dithyramb too was orderly and regulated.

Once again, we are told that the defining trait of this innovative musical style consisted in an intensive use of various sorts of modulations. Harmonic modulations clearly take central stage here,[11] and affect not only the basic structures of the scales – changing between Dorian, Phrygian and Lydian systems – but also their inner 'melodic paths' (*meloidiai*), moving between enharmonic, chromatic and diatonic divisions of the tetrachord.[12]

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undivided semitones and a later archaic/early Classical one with divided semitones, cf. Ps.-Plut. *De Mus.* 1135a–c and 1137a–b. See also D'Angour 2011, 195–229.

[10] Paus. 9.12.5, Ath. *Deipn.* 14.631e. These auletic modulations were made possible by the introduction of rotating collars: cf. West 1992b, 87, 97. On the basic nature of these three modes, see e.g. Ps.-Plut. *De Mus.* 1134a (archaic auletes used these three modes in different strophes, switching instruments between them), Bacch. *Isag.* 303.3–4, and other passages discussed below.

[11] The same contrast between an earlier focus on rhythmical variations, and a later interest in melodic/harmonic modulations is outlined at *De Mus.* 1138b–c.

[12] These terms correspond to the three basic genera identified by Aristoxenus (e.g. *ap.* Ps.-Plut. *De Mus.* 1143e): enharmonic (quartertone+quartertone+ditone), diatonic (semitone+tone+tone) and chromatic (semitone+semitone+tone-and-a-half). These basic models could be subject to subtle alterations known as tuning 'shades': cf. Barker 1989, 12–13.

These daring experiments are again attributed to our 'usual suspects', Timotheus as well as his younger colleagues Philoxenus and Telestes, and their highly mimetic dithyrambs. And yet, there was another equally distinguished and innovative musical genre that was strictly related to stringed instruments: the so-called *nomoi*, solo musical songs accompanied by the professional many-stringed *kithara*. As one of the Aristotelian *Problems* tells us (19.15), these solo songs were particularly suited to musical contests because of the extraordinary mimetic qualities that stemmed from their technical complexity. Thanks to frequent modulations and a rejection of antistrophic structures in favour of 'through-composed' free-forms, professional kitharodes were capable of producing sustained mimetic representations[13] in 'long and multiform' songs,[14] which undermined the consistent ethos preserved by simpler unmodulating choral pieces.[15] Interestingly, the only extended specimen of kitharodic *nomoi* that has survived to this day is precisely by Timotheus (*Persians*, *PMG* 791), and confirms many of these traits with regard to its dramatic and rhythmical qualities.[16]

More generally, we know that *polychordia* ('many-stringedness') became one of the characteristic hallmarks of the New Music, both in a positive sense in the New Musicians' unabashedly proud self-promotion and as a symbol of its corrupted ethos in the eyes of conservative critics.[17] As Plato tells us, this *polychordia* represented an attempt to emulate the astounding modulating capabilities of the aulos on professional stringed instruments, to such an extent that the aulos could be ironically described as 'the most polychord' instrument of all.[18] This witty remark clearly hints at important technical developments, which we can identify in greater detail thanks to the testimony offered by other Classical sources. For instance, a celebrated fragment by Ion of Chios extols the rich harmonic palette of his new eleven-stringed lyre and highlights its unprecedented ability to produce 'concordant three-way paths of *harmonia*' (fr. 32 West).[19] We

[13] Ps.-Arist. *Probl.* 19.15, 918b16–18: καθάπερ οὖν καὶ τὰ ῥήματα, καὶ τὰ μέλη τῇ μιμήσει ἠκολούθει ἀεὶ ἕτερα γινόμενα.

[14] Ps.-Arist. *Probl.* 19.15, 918b15–16: ἡ ᾠδὴ ἐγίνετο μακρὰ καὶ πολυειδής; cf. Gaud. *Isag.* 331.18–19 Jan, on the multiform realisations (πολυειδῶς) of the chromatic genus, a point that is relevant for the discussion below (esp. §5). The same features characterised also solo songs employed in late tragedy (*apo tēs skēnēs, Probl.* 19.15, 918b26–29).

[15] Ps.-Arist. *Probl.* 19.15, 918b22–25: μεταβάλλειν γὰρ πολλὰς μεταβολὰς τῷ ἐνὶ ῥᾷον ἢ τοῖς πολλοῖς, καὶ τῷ ἀγωνιστῇ ἢ τοῖς τὸ ἦθος φυλάττουσιν. διὸ ἁπλούστερα ἐποίουν αὐτοῖς τὰ μέλη. ἡ δὲ ἀντίστροφος ἁπλοῦν […]. Cf. Arist. Quint. *De Mus.* 15.19–20.

[16] *PMG* 791; cf. Hordern 2002.

[17] On the politics of *polychordia*, see Csapo 2004, Power 2007 and LeVen 2014, 81–83. On the *oligochordia* of the archaic music destroyed by Crexus, Timotheus and Philoxenus, cf. Ps.-Plut. *De Mus.* 1135d.

[18] Pl. *Resp.* 3.399d3–5 (ἢ οὐ τοῦτο πολυχορδότατον, αὐτὰ τὰ παναρμόνια αὐλοῦ τυγχάνει ὄντα μίμημα […]), with Lynch 2016a, 183–4. See also *PMG* 947.

[19] As I will show elsewhere, Ion's reference to the *harmonias triodous* available in his eleven-stringed lyre tuning most likely refers to the set-up required to modulate between the traditional seven-stringed forms of the Dorian, Phrygian and Lydian *harmoniai* on the same instrument, without stopping to retune it. A different but kindred account of this passage is offered in West 1992a, 23–8.

also hear of special kind of short-lived lyre, called the 'tripod' (Ath. *Deipn.* 637b–f), which was invented by Pythagoras of Zakynthos and allowed him to switch between Dorian, Phrygian and Lydian modes without changing instrument or retuning – that is to say, precisely the feat accomplished by Pronomus on the aulos.

All these testimonies clearly indicate that the competition between *auloi* and professional lyres was one of the key stimuli that led to the development of the complex, if controversial, harmonic modulations characteristic of the New Music, and the beginning of this process is to be identified in the realm of aulos music.

In keeping with this, in his ground-breaking 2010 monograph, Stefan Hagel has cogently shown that the 'ancient scales' preserved in Aristides Quintilianus' *De Musica* record precisely the arrangement of different modes on modulating *auloi*. In fact, if we set each scale to the pitch of its respective 'intermediate note' *mesē*[20] – the note that was the key reference point for ancient scales, just as the tonic is for us[21] – it becomes apparent that these scales belong to one and the same modulating instrument, as their top notes fall on the same pitch and the rest can be accounted for fairly easily in terms of instrumental design.[22]

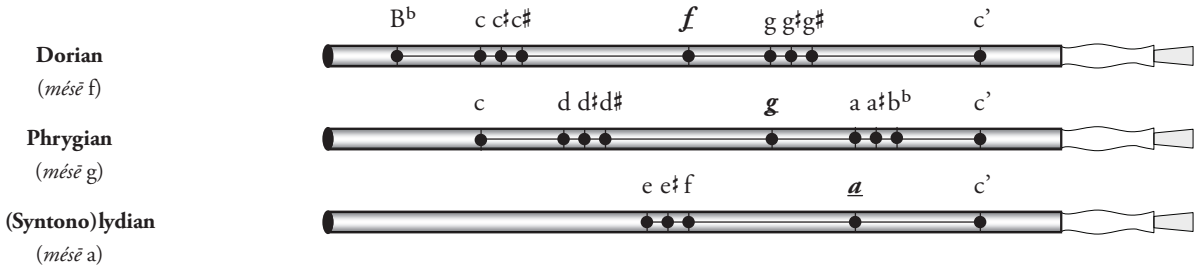

Figure 1: The Aristides scales as aulos modes

(selection of Dorian, Phrygian, Lydian; half sharp sign ♯ indicates quarter-tone intervals)

[20] The relative pitch of the 'intermediate notes' (*mesai*) of different modes is enshrined in the Greek notation system (Hagel 2010, 13), and is also discussed in theoretical treatises (esp. Ptol. *Harm.* 54–64, with Barker 1989, 23–5, 327–37). Hence, we know for instance that Lydian *mesē* stands a tone above Phrygian *mesē,* which in turn stands a tone above Dorian *mesē.* As for the absolute pitch of these notes, Stefan Hagel has persuasively shown that Lydian *mesē* corresponded approximately to our modern *a* (Hagel 2010, 452–3 and 68–92), making Phrygian *mesē g*, Dorian *mesē f* and so on. See also Aristox. *El. Harm.* 47.1–16, where the author describes two modulating systems that arranged the *harmoniai* on the basis of the relative pitch of their *mesai* (*El. Harm.* 47.1–16 Da Rios); these systems are probably to be identified with the two archaic 'ways'/ 'styles' (*tropoi*) mentioned at *El. Harm*. 29.18.

[21] Cf. Ps.-Arist. *Probl.* 19.36, where the very notion of 'being in harmony' is defined as standing in a specific relation to *mesē*. *Mesē* was also the first string to be tuned (Dio Chrys. 68.7), sometimes to the pitch of an aulos (Xen. *Symp.* 3.1.1).

[22] Hagel 2010, esp. 34–8 and 390–5.

But how could all this be emulated on a lyre? This is the question that will occupy us until the end of this paper and the answer lies, I believe, at the heart of Pherecrates' ironic portrayal of Lady Music's demise.

2. **The basic structure of traditional lyre *harmoniai***

Before addressing this question, however, we need to take a moment to review some key technical features that informed traditional lyre tunings and told them apart from auletic scales.[23] A clearer understanding of the traditional lyre model will allow us to appreciate its evolution under the influence of the New Musicians' aulos-driven experimentations, which ultimately led to the many-stringed *kithara* tuning mocked by Pherecrates.

As Stefan Hagel has shown clearly, two well-defined technical traits characterised the lyre tunings traditionally employed by musicians from Philolaus' time down to Ptolemy. Firstly, lyre tunings had an essentially diatonic nature, in keeping with their Mesopotamian counterparts, even though they admitted some slight variations in their finer tuning shades.[24] Secondly, they conformed to a basic framework,[25] known as *harmonia* without further qualifications, which spanned an octave and was divided into two tetrachords separated by a tone: an interlocking and symmetrical system of fourths and fifths, which arises from the process of tuning the instrument by means of concords.[26] The remarkable consistency of this model is represented in Figure 2, which also shows that this octave *harmonia* was not merely a theoretical construct:[27] on the contrary, this framework informs precisely the selection of *kithara* and lyre tunings that Ptolemy records as being still employed by traditional players of these instruments, showing how this practical model remained unchanged throughout Greek culture.[28]

[23] Cf. Arist. Quint. *De Mus.* 77.26–7: οὐ γὰρ ταὐτὸν ᾠδῆς εἶδος ἔν τε κιθάρᾳ καὶ αὐλῷ πρέπον ('for the shape/form of a tune suitable for the *kithara* is not the same as that of the melody proper to the aulos').
[24] Hagel 2010, 436.
[25] Hagel 2010, 109 and 196.
[26] Cf. Philolaus fr. 6 Huffman, with Barker 2007, 265–6, Lynch 2016a and 2019.
[27] Of course, the framework defined by this octave *harmonia* was destined to play a central role in harmonic theory too, as will become clearer below. But the point I wish to emphasise now is that only lyre/*kithara* tunings conformed consistently to this model, whereas aulos modes did not. Cf. Lynch 2016a, esp. 280–3.
[28] Ptol. *Harm.* 39.8–17, 80.6–18, with Barker 1989, 356–61, and Hagel 2010, 196.

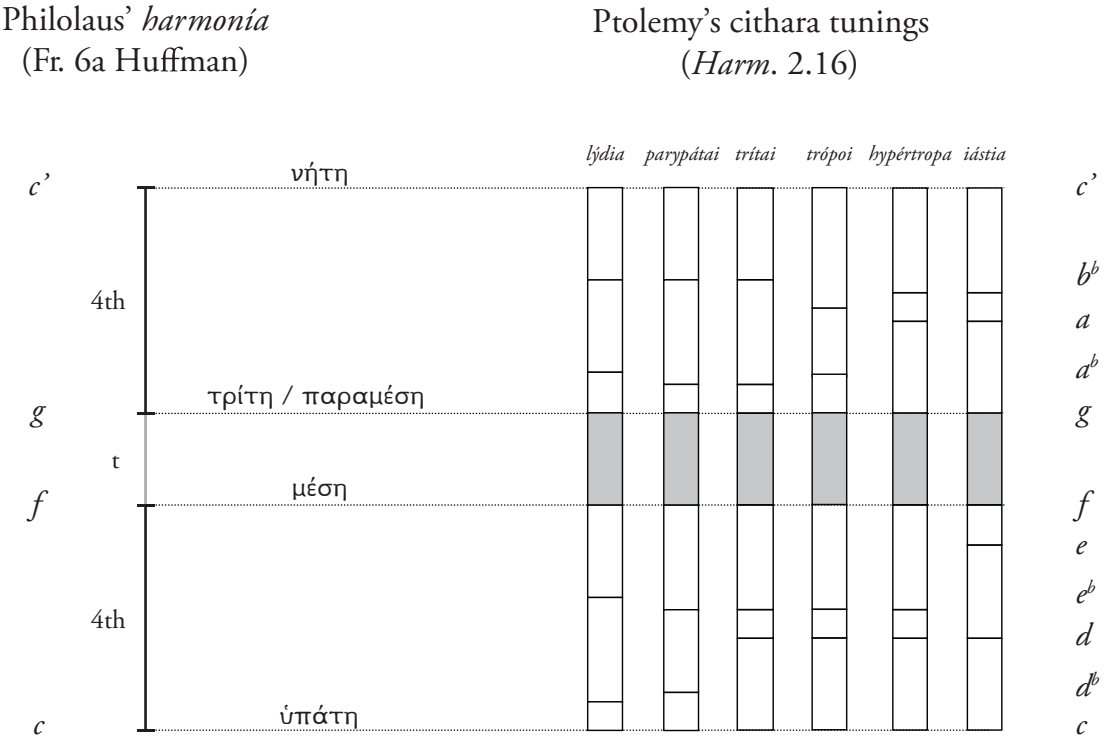

Figure 2: The Stable Framework of Lyre *harmoniai*

In this connection, it is telling that one of the Aristotelian *Problems* (19.35a) defines the octave as 'the most beautiful' and the 'most complete' consonance on the grounds that it contains the other two in itself and, therefore, represents nothing less than the 'unit of measurement (*metron*) of melody' as a whole.[29] In keeping with this, the octave framework of *harmonia* and its four stable 'boundaries' (*horoi*) – *c-f-g-c'* – were destined to play a key role also in Aristoxenus' harmonic theory. In fact this set of four notes defines the essential model that underlies Aristoxenus' system as a whole, and he significantly calls them 'fixed/immovable' notes, i.e. notes whose relative pitch should not be altered.[30]

Therefore, in order to produce different modes on a lyre, it was necessary to 'fit' (*harmozein*) different sequences of intervals within this octave system, starting from the basic diatonic series that results from the process of tuning the lyre by means of 'concords'.[31] After setting the pitch of the 'leader' string *mesē*,[32] all the other strings were tuned by alternating intervals of fifths and

[29] Ps.-Arist. *Probl.* 19.35a, 920a.36–8; see also Ptol. *Harm.* 50.12–20.

[30] On the customary division of the notes of a tetrachord into 'fixed' and 'movable', cf. e.g. Aristox. *El. Harm.* 28.10–12, 57.13–59.16.

[31] διὰ συμφωνίας: cf. e.g. Aristox. *El. Harm.* 31.1, 68.15–69.2, 69.9; Ptol. *Harm.* 1.14.2.5, 1.16.77; Ps.-Plut. *De Mus.* 1145b–c. This standard procedure was one of the very first skills learned by lyre students: see e.g. Ar. *Nub.* 968.

[32] Dio Chrys. 68.7; on *mesē* as 'leader', see e.g. Ps.-Arist. *Probl.* 19.33, 19.36. Cf. the tuning system for Mesopotamian lyres detailed in UET VII.74, with Franklin forthcoming.

fourths, and the simplest *harmonia* that results from this procedure is nothing less than the renowned Dorian diatonic mode.[33]

From this perspective, it is far from surprising to find out that the diatonic genus was regarded as 'the first and the oldest' (Aristox. *El. Harm.* 24.20–25.4) or the 'most natural' (*physikōteron*),[34] as opposed to the advanced 'technical' character of the chromatic (*technikōteron*) and the exacting nature of the enharmonic.[35] This primacy of the diatonic is reflected also in Cleonides' digest of Aristoxenian harmonic theory, where the complete series of the seven octave species (*eidē dia pasōn*) is recorded only in diatonic form (197.4–199.1 Jan).

Another aspect of Cleonides' list suggests a lyre-based conception too. In fact, the seven modes are first listed in descending order of pitch of their relative *mesai*, but then each of them is defined on the basis the relative placement of the semitones in the sequence: that is to say, precisely the intervals that are 'left behind' (*leimmata*) after setting up a lyre *harmonia* by means of concords.[36]

Mixolydian	ST t t ST t t **t**
Lydian	t t ST t t **t** ST
Phrygian	t ST t t **t** ST t
Dorian	ST t t **t** ST t t
Hypolydian	t t **t** ST t t ST
Hypophrygian	t **t** ST t t ST t
Hypodorian	**t** ST t t ST t t

Figure 3: The lyre-based, diatonic species of the octave
(Cleonid. 198–9 Jan, Arist, Quint. 15.8–20; *mesē* marked in bold and underlined, St in small caps)

In similar vein, the other major source that preserves the list of the seven species of the octave, Aristides Quintilianus, precedes it with an explanation of the special terms employed 'by the ancients' to indicate the fourth, the fifth and the octave, namely *syllabē* ('grasped together'), *di'oxeiōn* ('through the high-pitched strings') and *harmonia* (Arist. Quint. *De Mus.* 15.8–20) – terms that, as we know from Philolaus, belonged specifically to the realm of lyre playing.[37]

[33] On the basic nature of the Dorian lyre mode, cf. Ar. *Eq.* 984–96; on its distinguished cultural status, see e.g. Pl. *Lach.* 188d.
[34] Arist. Quint. *De Mus.* 16.10–11; cf. Theon. *Math. Plat.* 56.3–5.
[35] Arist. Quint. *De Mus.* 16.12–18, perhaps summarising genuine Aristoxenian material.
[36] Cf. Ptol. *Harm.* 23.2 and *passim*, and Pl. *Tim.* 35b4–36b6.
[37] Philolaus fr. 6 Huffman, with Barker 2007, 264–76. Aristoxenus credits to Eratocles and his followers the approach according to which different *schēmata* of the octave may be produced by cyclically reordering a fixed sequence of intervals (*El. Harm.* 10.19–11.12, 46.7–10).

3. Pherecrates' first offender: Melanippides' twelve-string tuning and the three most ancient *tonoi*

Keeping all this in mind, let us now go back to Pherecrates' *Chiron* and look in detail at his comic characterisation of the progressively more heinous crimes perpetrated by the New Musicians against the harmonious body of Lady Music.

The first offender named by Lady Music is Melanippides, who is literally defined as the 'initiator' of all her troubles (fr. 155.3, ἐμοὶ γὰρ ἦρξε τῶν κακῶν Μελανιππίδης). Indeed, as mentioned above, Melanippides had already been singled out at the very beginning of this section of the Pseudo-Plutarchan treatise as the first composer who dared to taint the revered seven-stringed tuning that survived untarnished since Terpander's time. According to the Pseudo-Plutarch, Melanippides distorted this ancient model by ripping it into 'a multiplicity of notes'[38] – that is to say, exactly the same trait that a few lines earlier characterized the aulos' revolutionary *polyphōnia*.

As we have seen in paragraph 1, the defining technical feature that corresponded to the 'multiplication of notes' first introduced by the New Musicians was the ability to modulate seamlessly between Dorian, Phrygian and Lydian on one and the same instrument – a tuning system that, on the aulos, looked something like Figure 1. From this point of view, it is worth noticing that Pherecrates' Lady Music does not literally say that Melanippides was the 'first' (πρῶτος) to have achieved the same result on lyres. This is an emendation proposed by Meineke but the manuscript text reads πρώτοις in the plural[39] – a word that may have entailed a suggestive reference to the 'first *tropoi*', following the usage attested in Aristoxenus, Dionysius of Halicarnassus and Bacchius.[40] This expression is also akin to the words employed by Ptolemy

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[38] Ps.-Plut. *De Mus.* 1141c–d: 'Similarly also the later composer Melanippides did not remain within the kind of music that preceded him, and neither did Philoxenus or Timotheus. For he (*scil.* Melanippides) scattered about and increased the notes of the lyre, of which there had been seven as far back as Terpander of Antissa (οὗτος γάρ, ἑπταφθόγγου τῆς λύρας ὑπαρχούσης ἕως εἰς Τέρπανδρον τὸν Ἀντισσαῖον, διέρριψεν εἰς πλείονας φθόγγους). And aulos music too changed from simpler to more varied: in fact, in the olden days up to Melanippides, the composer of dithyrambs, aulos players were paid by poets – a fact which shows how poetry took the lead, whereas aulos players were subordinate to chorus instructors. Later on this custom too was destroyed, so that also the comic poet Pherecrates put on stage Music herself in the shape of a woman, her whole body completely disfigured by torture […]'. On the dominant place gained by aulos players, cf. Pratinas *PMG* 708 with note 8 above.

[39] Fr. 155.4: ἐν τοῖσι <u>πρώτοις</u> ὃς λαβὼν ἀνῆκέ με. Meineke emendation πρῶτος is not very helpful, as it is not clear in what exactly Melanippides would have been the first to take Lady Music. Perhaps the text read something like τρόποισι πρώτοις or (less likely) πρώτοις τρόποισιν ('taking me in the first ways/manners') – see above and note 40.

[40] *El. Harm.* 29.17–30.1: τοῖς δὲ συνειθισμένοις τῶν ἀρχαϊκῶν τρόπων τοῖς τε πρώτοις καὶ τοῖς δευτέροις ἱκανῶς δῆλόν ἐστι τὸ λεγόμενον. See also Dion. Hal. *Comp.* 19, 85.18–86.7 (quoted above) and Bacch. *Is.* 303.3–4: 'those who sing the three *tropoi*, which ones do they sing? (Οἱ οὖν <u>τοὺς τρεῖς τρόπους</u> ᾄδοντες τίνας ᾄδουσι;) Lydian, Phrygian and Dorian (Λύδιον, φρύγιον, δώριον). And those who sing seven, which ones do they sing? Mixolydian, Lydian, Phrygian, Dorian, Hypolydian, Hypophrygian, Hypodorian.' As we shall see, this list of seven *tropoi*

to identify the group of the three 'most ancient *tonoi*', once again corresponding to the Dorian, Phrygian and Lydian modes,[41] which according to him were the only ones employed by the 'ancients' in traditional songs:[42]

> ἁπλῶς γὰρ τοὺς τρεῖς [*scil.* τόνους] τοὺς ἀρχαιοτάτους, καλουμένους δὲ δώριον καὶ φρύγιον καὶ λύδιον παρὰ τὰς ἀφ' ὧν ἠρξαντο ἐθνῶν ὀνομασίας [...] τόνωι διαφέροντας ἀλλήλων ὑποθέμενοι, καὶ διὰ τοῦτο ἴσως τόνους αὐτοὺς ὀνομάσαντες [...].
>
> (Ptol. *Harm.* 62.19–22)
>
> The three most ancient *tonoi*, which are called Dorian, Phrygian and Lydian after the name of the people who produced them [...], differ from each other by a tone, and perhaps they called them *tonoi* for this reason […].

So how would this kind of modulation look on a lyre? As shown above, the Dorian diatonic mode was the basic model for all lyre tunings,[43] so that should be our starting point. If we combine it with the Phrygian and Lydian octave species detailed by Cleonides, Aristides and Ptolemy,[44] a few surprising elements emerge:

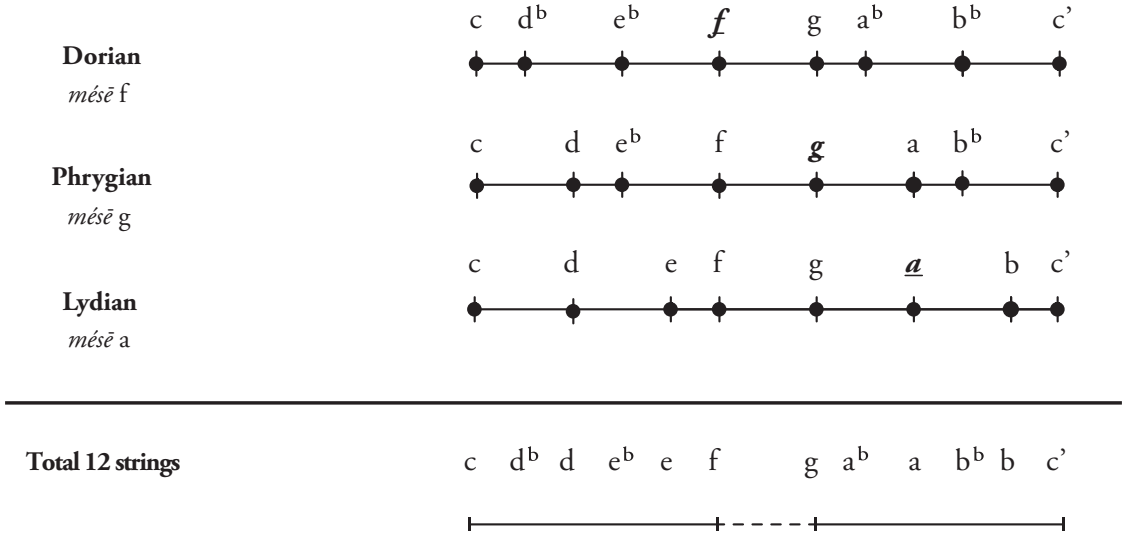


Figure 4: Melanippides' twelve-string tuning

corresponds exactly to the range of modes that was available on the advanced twelve-string tuning mentioned by Pherecrates. On the use of the term *tropos* to refer to sexual habits, see e.g. Theopompus *ap.* Ath. *Deipn.* 6.260f; see also Aristoph. *Ran.* 1325–30, where Aeschyluses accuses Euripides to compose melodies/limbs (μελοποιῶν) on 'twelve-trick Cyrene', a famously skilled prostitute, and subsequently mocks the *tropos* of these solo songs (τὸν τῶν μονῳδιῶν διεξελθεῖν τρόπον).

[41] On the basic nature of the Dorian, Phrygian and Lydian, see also Arist. Quint. *De Mus.* 23.1–2 (Εἰσὶ δὲ τῷ γένει τόνοι <γ> · δώριος φρύγιος λύδιος) and Ath. *Deipn.* 637d–e (διένειμεν δὲ τὰς τρεῖς χώρας ταῖς τρισὶν ἁρμονίαις τῇ τε δωριστὶ καὶ φρυγιστὶ καὶ λυδιστί).

[42] Cf. passages quoted in notes 40 and 41, as well as Ptol. *Harm.* 56.4–6: οὐδὲ οὐ προεκεκόφει τοῖς παλαιοῖς ἡ μέχρι τούτων παραύξησις τῶν τόνων – μόνους γὰρ ἤ,δεισαν τόν τε δώριον καὶ τὸν φρύγιον καὶ τὸν λύδιον ἐνὶ τόνωι διαφέροντας ἀλλήλων κτλ. On *parauxēsis* as the origin of new musical scales, cf. Arist. Quint. *De Mus.* 15.6–8.

[43] For the sake of clarity, the tuning systems detailed in Figure 4 and following are based on the standard diatonic; however, the practical *kithara* tunings recorded by Ptolemy and reported in Figure 2 above show that these tunings admitted various diatonic shades, and this principle perhaps applied also to the tunings reconstructed in this article.

[44] Cf. Figure 3 above.

First, all three modes conform to the basic framework of the lyre *harmonia*, which covers an octave and comprises two tetrachords separated by a tone (*c-f-g-c'*). Second, the three *mesai* proper to each scale – i.e. the so-called dynamic *mesai*, marked in bold – fall exactly a tone apart, as Ptolemy prescribes. And the very fact that this tuning structure comprises more than one 'dynamic' *mesē* is illuminating, since this is exactly the definition of 'modulating system' provided by Cleonides and Aristides Quintilianus:[45]

> Τῇ δὲ τοῦ <ἀμεταβόλου> καὶ ἐμμεταβόλου διοίσει, καθ' ἣν διαφέρει τὰ ἁπλᾶ συστήματα τῶν μὴ ἁπλῶν. ἁπλᾶ μὲν οὖν ἐστι τὰ πρὸς μίαν μέσην ἡρμοσμένα, διπλᾶ δὲ τὰ πρὸς δύο, τριπλᾶ δὲ τὰ πρὸς τρεῖς, πολλαπλάσια δὲ τὰ πρὸς πλείονας […].
>
> (Cleon. *Is.* 201.14–18 Jan)

> The difference between 'unmodulating' and 'modulating' systems is the same as that between systems which are simple and those which are not. For simple systems are attuned to one *mesē*, double ones to two, triple ones to three, complex ones to several […].

Finally, the number of strings required to produce all these modes on the same instrument is twelve,[46] that is to say precisely the number of strings that Pherecrates attributes to Melanippides' tuning.

4. 'Five *harmoniai* in twelve strings': Phrynis the 'Ionian-bender' and his innovative 'twister' (*strobilos*)

Twelve strings characterise also the tuning that Pherecrates ascribes to Phrynis, the composer that Aristotle singled out as the key precursor of Timotheus' daring musical style. Pherecrates too highlights the crucial role played by Phrynis in the development of this musical trend, especially with regard to a new 'gadget' of his invention: the 'twister' (*strobilos*), a device which allowed him to produce special melodic 'bends' (*kampai*) that were to become a hallmark of the New Music in general, and his own style in particular.[47] This 'bending and twisting', Lady

[45] Aristides Quintilianus (14.24–6) defines 'unmodulating (*ametabola*) systems' as having one *mesē*, while 'modulated' ones (*metaballomena*) as having more than one.

[46] An exceptionally detailed representation of a twelve-string *kithara* is offered in a Herculaneum fresco (*Insula* V, 17-18, Guzzo 2003, 105); another remarkable Herculaneum fresco (National Archaeological Museum of Naples, inv. nr. 9109 LIMC I.2 s.v. Achilleus 51) portrays Chiron – the subject of Pherecrates' comedy – teaching Achilles to play a many-stringed *kithara* that comprises at least 11 or 12 strings (*non vidi*). For further examples, see West 1992b, 63.

[47] See e.g. Ar. *Nub*. 969–70: 'If one of them dared bending a certain bend (κάμψειέν τινα καμπήν) such as those they play nowadays in Phrynis' style (τὰς κατὰ Φρῦνιν), which are so hard to bend (τὰς δυσκολοκάμπτους) […]'. Cf. Franklin 2013, 226–31; Restani 1983, 156–66.

Music tells us, 'destroyed her completely' (κάμπτων με καὶ στρέφων ὅλην διέφθορεν), since Phrynis was able to produce 'up to five *harmoniai* in twelve strings' (εἰς πέντε χορδαῖς δώδεχ' ἁρμονίας ἔχων). But how can we identify the two modes that, added to the three employed by Melanippides, would bring us to a total of five?

Some evidence to this effect is ironically offered by Phrynis' most famous rival, Timotheus. In one of his characteristically smug outbursts,[48] Timotheus heralds his own victory over Phrynis and calls him disparagingly 'a Ionian bender' (τὸν ἰωνοκάμπταν, *PMG* 802). As some commentators have observed, this nickname cannot possibly allude to Phrynis' origins, given that Timotheus himself was Ionian while Phrynis was not, and must therefore refer to Phrynis' distinctive use of the Ionian mode.[49]

Strikingly, it is indeed possible to incorporate the formalised counterpart of the Ionian mode, the Hypophrygian octave species,[50] into the twelve-string tuning we have reconstructed for Melanippides without making any alterations to it. In fact, the set of intervals proper to the Hypophrygian *tonos* is already hidden in this harmonic network of sounds, with the only difference that the *mesē* of the new Ionian mode must be identified with a different note, *d* (Figure 5).

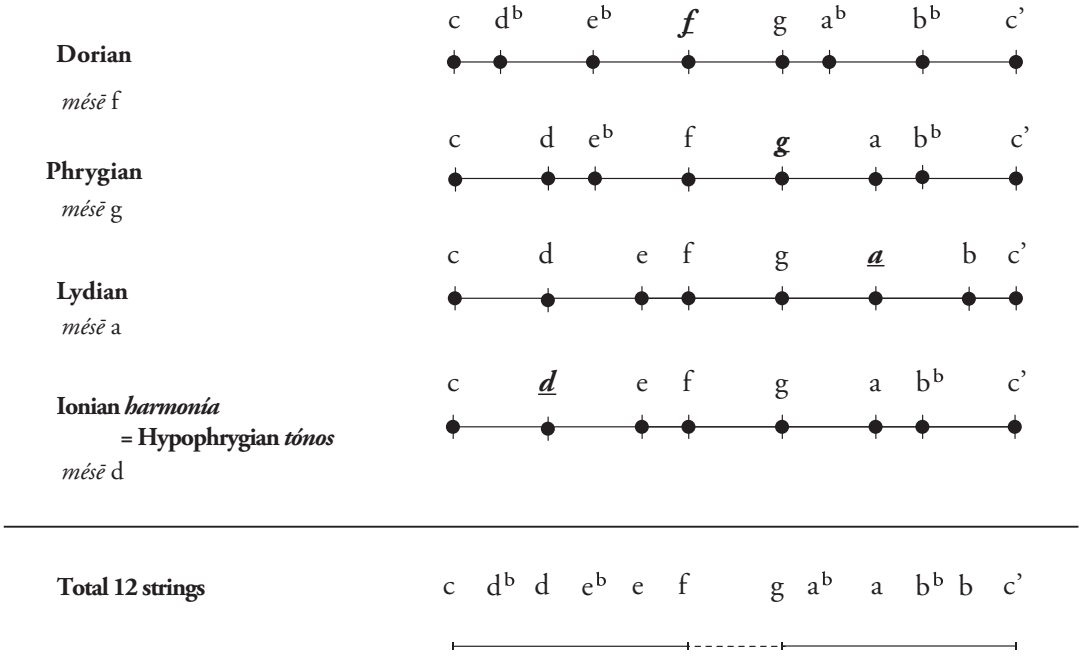


Figure 5: Phrynis' Ionian *harmonía*

[48] Cf. Plut. *De laude ipsius* 539c, Tim. *PMG* 796 and 791.202–40.
[49] West 1992b, 361. Phrynis came from Mytilene on the island of Lesbos.
[50] On the *ēthos* of this mode and its use in imitative, non-antistrophic song, cf. Ps.-Arist. *Probl.* 19.30, 19.48. On the correspondence of Hypophrygian and Iastian in traditional *kithara* tunings, cf. Ptol. *Harm.* 39.14, 80.16, with Hagel 2010, 58; see also Winnington-Ingram 1968, 17, 27, Barker 1984, 283, Barker 1989, 360.

But what kind of 'exharmonic bending' did Phrynis apply to this Ionian mode in order to produce a fifth *harmonia*? And how is this related to his infamous *strobilos*?

In 2011, Egert Pöhlmann published the images of two newly discovered tuning mechanisms found in separate tombs in Leucas, dating from the 5th century BC. He defined them as 'tuning pegs' representing 'the immediate forerunners of their Hellenistic counterparts', and proposed to identify them with Phrynis' *strobilos*.[51]

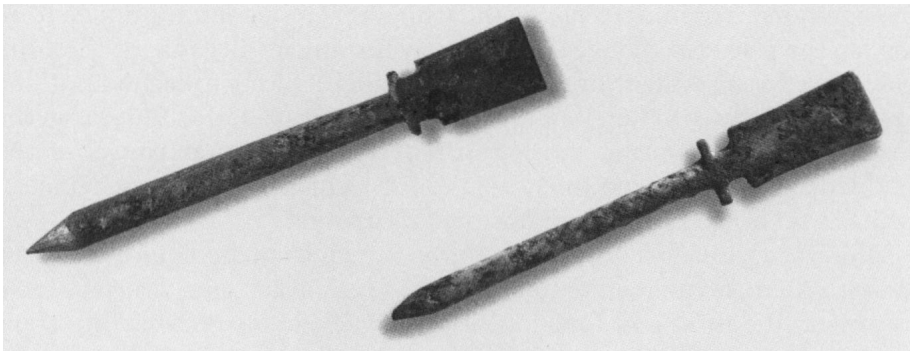


Figure 6: Leucas' tuning mechanisms (Pöhlmann 2011, 128)

While his general reconstruction is very persuasive, there are a few features of the Leucas findings that tell them apart from tuning pegs and suggest a slightly different usage. First, they are made of bone, not wood, making them sturdier than most Hellenistic pegs. Second, these two items were found separately in different tombs, indicating that each belonged to a single instrument, whereas tuning pegs are found in fairly large amounts (up to 28) together with the relative instruments.[52] Finally, the Leucas mechanisms do not feature any holes to fasten the strings, a defining trait of Hellenistic pegs. Their shapes are remarkably different too, especially with regard to the two protruding spikes that are close, but clearly separate from, the large flat head at one end of the shaft.

The combination of these elements opens the possibility that the Leucas tuning mechanisms might not have been exactly tuning pegs but rather individual levers, which could be hinged to the instrument by means of the two protruding prongs and rapidly altered the pitch of a specific note by a well-defined interval. These sorts of devices are still employed nowadays in folk lyres and harps: these so-called 'sharping levers' (Figure 7) allow skilled players to modify quickly and easily the pitch of a single string by a semitone in the course of a performance, operating the lever with their left hand without stopping to re-tune the instrument.[53]

[51] Pöhlmann 2011, with further bibliography.
[52] See the example of the Dardanos lyres discussed in Byrne 1993, with further references.
[53] See also the so-called 'hook harps', diatonic instruments fitted with 'strong metal J-shaped hooks inserted in the neck'. Thanks to these devices, players can 'raise the pitch of each string by a semitone simply by turning its hook'.

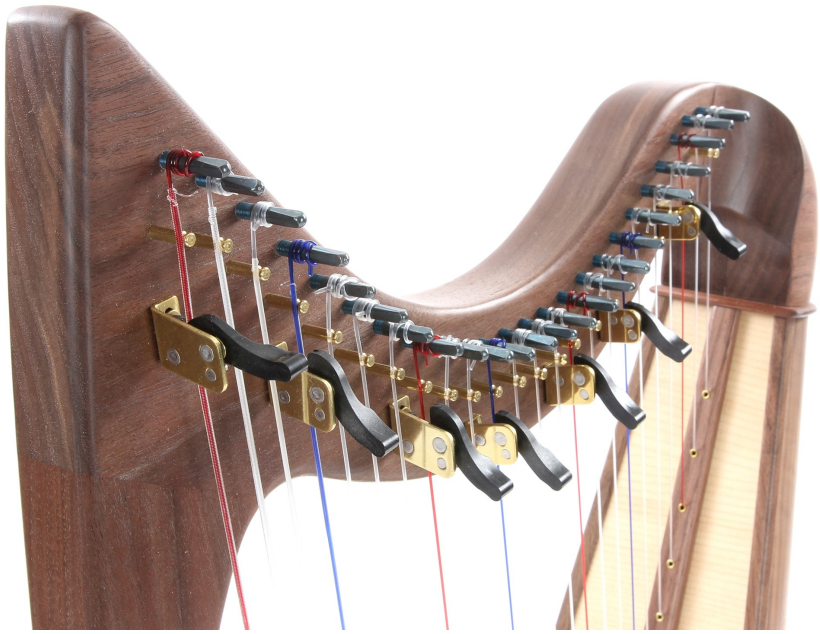


Figure 7: Detail of a modern folk harp with sharping levers on C and F strings.

Figure 8A offers schematic representations of this hypothetical device and its support system, which might have been attached to, or otherwise integrated into, the instrument's yoke. Such a set-up would be consistent with Lady Music's claim that Phrynis shoved his new twister into her body (ἐμβαλών), and this unique feature of his instrument would have represented a natural target for Pherecrates' comic verve.

Both of these points are significantly featured in a scene depicted on a Paestan red-figured bell krater by Asteas (Figure 8B and 8C) which is dated around 350 BC and, therefore, is roughly contemporary to the Aristotelian passage quoted at the start of this paper. As shown by recent scholarship, Asteas' so-called '*phlyax* vase' actually represents a comic scene that goes back to Old Comedy and most likely belongs to Eupolis' *Dēmoi*, which was produced around 417–10 BC and was extremely popular up to late antiquity.[54] The scene reproduced on the Asteas vase portrays a stark opposition between two characters, each identified by an inscription: a young wreathed Phrynis, who holds his *kithara*, and an old man, labelled as Pyronides ('the fiery one' or 'the purifier' – Storey 2011, 94–5), who is trying to drag him away.

The extant fragments of Eupolis' comedy show that its central character was called precisely Pyronides, an old man who attempted to restore the 'virtuous order of old' in a 'degenerate'

They were originally fitted to the first, second, fourth and fifth degrees of the scale, and gradually spread to all the strings of the instrument (*NG* ss.vv. 'Harp' and 'Hook Harp').

[54] On the Asteas vase, see Taplin 1993, 42, Goulaki-Voutira 2001–2, Csapo 2010, 61–4; on Eupolis' *Dēmoi*, Storey 2003 and 2011.

contemporary Athens. In order to do so, he brought back to life distinguished political leaders of the past, such as Solon and Pericles, who helped him arrest various contemporary troublemakers; hence, as suggested by E. Csapo, the Asteas vase probably shows the moment in which Pyronides tries to drag Phrynis away to punish him for his offences against traditional music.[55] In this connection, it is worth noting that one of the extant fragments of the *Demes* refers to someone 'whistling away in their instrumental music' (νιγλαρεύων κρούματα, *PCG* 121) – a rare term that is employed also at the end of the Pherecrates fragment to characterise Philoxenus' musical excesses (see §6 below).[56]

Against this background, a neglected detail of the Asteas krater becomes particularly significant, namely the device that sticks out from the *kithara*'s yoke and Phrynis is pointing at with his left index finger (Figure 8B).[57] Marked in a different colour from the rest of the instrument, this device is clearly distinguished from the yoke as well as the half-rings that hold the strings in place[58] and cannot be a plectrum, given that Phrynis already holds one in his right hand as usual in visual depictions of kitharodes.[59] Pictorial constraints aside, its shape is rather similar to that of the Leucas findings and, most importantly, it appears exactly where we would expect it to be: right at the centre of the lyre *harmonia*, breaking it visually into two and representing the main target of Pyronides' anger, as well as the central focus of the scene as a whole. In fact, both Pyronides and Phrynis are staring at it, inviting us to do the same.

[55] Csapo 2010, 61–4, with further bibliography.

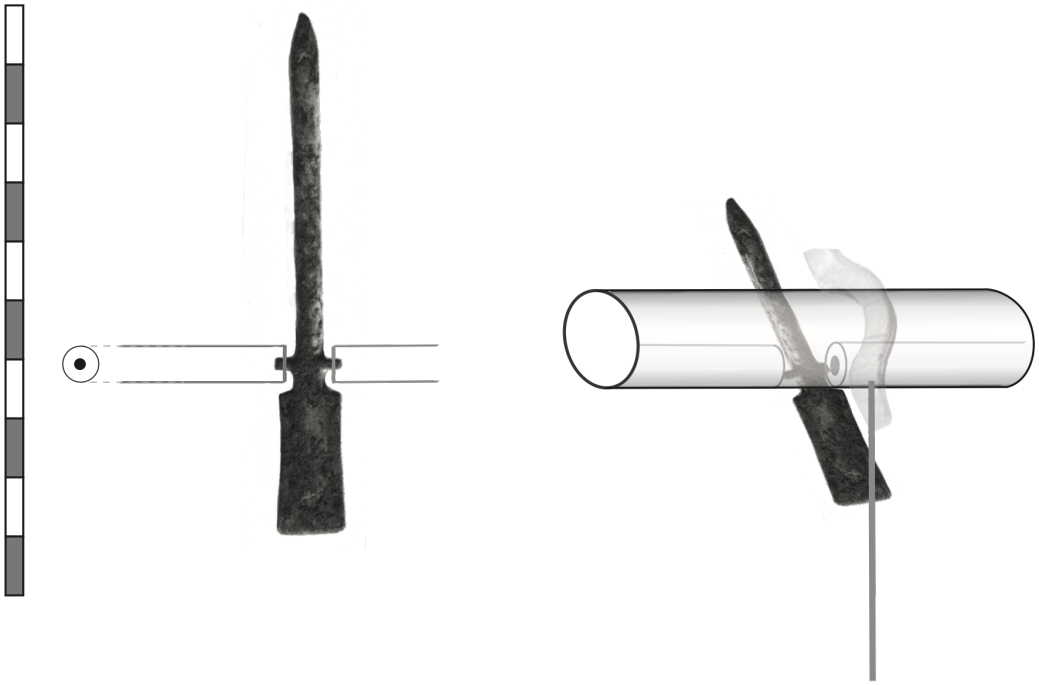
[56] See also Eup. *Adesp.* fr. 326 *PCG*, which presents a contest between 'new' and 'old' musical *tropoi*; according to Storey 2003, 170, this unassigned fragment may also belong to the *Demes* and Speaker A should be identified with Phrynis.

[57] I am deeply grateful to the Museum of Salerno, and especially Mr Gaetano Guida, for their prompt and courteous help in providing detailed pictures of the vase.

[58] For this tuning system, see Hagel 2016, 164. The number of strings depicted on this vase seems to be the traditional seven, not twelve. This might have increased the comic effect of the scene, displaying Phrynis' attack on the traditional *harmonia* even more vividly, but is probably simply a matter of artistic media: it would have been difficult to depict more strings in a relatively small image such as this one. By contrast, large Herculaneum and Pompeii frescoes portray in painstaking detail *kitharai* with a great number of strings. See for instance the famous twelve-stringed *kithara* shown in Pompeii *Insula* V, 17–18, and the remarkable Herculaneum fresco depicting Chiron and Achilles (see note 46 above), which shows that the connection between Chiron and many-stringed lyre tunings was still perceived in the 1st century BC.

[59] It cannot be a finger either: Phrynis' left hand has five, whereas Pyronides' right hand and fingers are represented in a frontal perspective, like his right foot and toes at the bottom of the scene.

A.



B.

Figure 8A: *exempli gratia* drawings of the *strobilos* as sharping lever and its holder, based on the Leucas findings and Elgin yoke (diameter ca. 1.7 cm – Bélis 1985) ; Figure 8B: details from the Asteas bell krater, Museo Provinciale Pc 1812 – pictures courtesy of Gaetano Guida, Settore Musei, Biblioteche e Pinacoteche, Provincia di Salerno.

C.

Figure 8C: the Asteas bell krater, Museo Provinciale di Salerno Pc 1812 – Picture courtesy of Settore Musei, Biblioteche e Pinacoteche, Provincia di Salerno.

The Asteas vase, however, opens up another possibility to explain the functioning of the *strobilos*. As shown in Figure 9 below, the *strobilos* might also have been a sort of modulating key that passed through the instrument's yoke but was not exactly a tuning peg, in that it did not support the string. In fact, the Asteas vase shows clearly how the *kithara*'s strings were attached to half-rings placed onto the yoke. Hence, the string would not have been secured to the *strobilos* itself but could have been looped around its shaft before being fixed to the half-ring: in this way, the string's tension could have been altered by rotating the *strobilos*, holding it by its flat head. From this perspective, the two protruding spikes might have served an important function too: as shown in Figure 9, they could have been inserted into a corresponding cross-shaped groove in the yoke, limiting the device's movement to produce approximately a semitone and securing it in place once operated (Figure 9C).[60] This kind of mechanism, which is literally 'shoved into'

[60] The items in Figures 9 and 10 are drawn to scale, so that *strobilos*' flat head corresponds approximately to 2.5 cm and the diameter of the yoke matches that of the Elgin lyre (circa 1.7 cm); Hagel 2016 argues that this was a standard diameter, on the basis of the 5th-century bone tuning pins found in Locri.

Lady Music's body (*emballein*, v.14), could be aptly described as a 'twister' (*strobilos*>*strephein*) since it is turned around itself by the player and, in the process, winds the string around its shaft.

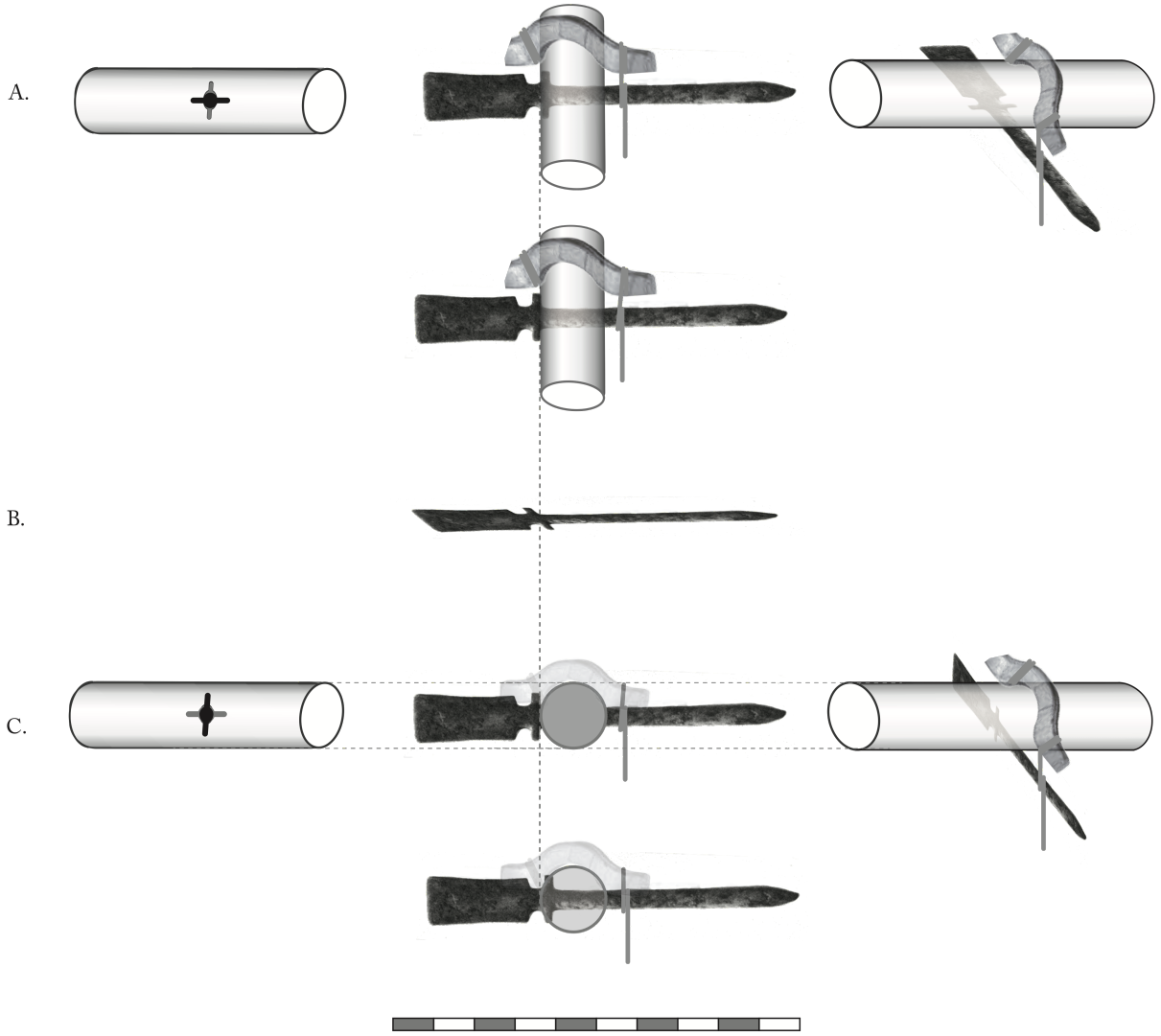


Figure 9: Phrynis' *strobilos* as a modulating key and its movements. 9A: The *strobilos* starts from its 'neutral' position, inserted into the yoke, and is then shifted out of the horizontal groove); 9B: it is subsequently rotated, thereby raising the pitch of the string; 9C: it is inserted again into the vertical groove, securing it in place.

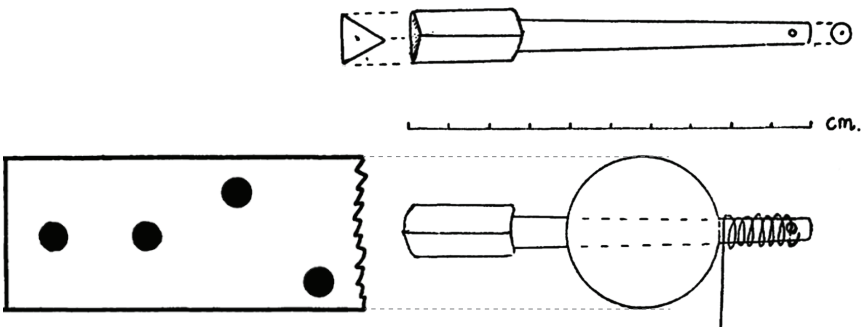


Figure 10: Hellenistic tuning pegs, Dardanos lyre (Byrne 1993)

This picture seems to be confirmed by the testimony offered in *P. Oxy*. 14 1704, which records a conveyance of buildings and corn-land at Sesphtha.[61] This property included a water-wheel (μοιλ̣[αίου] ἀ̣λετικοῦ, *scil.* ἀ[ν]τλητικοῦ) with a 'rotating shaft' or 'windlass' (σὺν στροβίλῳ, line 11), and the basic principle behind the functioning of this mechanism is the same as that of the modulating key reconstructed above: the length of the rope attached to the cylindrical barrel is shortened by its rotating motion.

This kind of modulating key could have also inspired the subsequent development of the Hellenistic tuning pegs (Figure 10), which allowed musicians to do away entirely with half-rings or pins and let them fit an even larger number of strings onto their instruments[62] – more than 20, in the case of the Dardanos lyre – which became more and more similar to many-stringed oriental harps.

Hence, I suggest that Phrynis' 'twister' might have been a device of this kind: a modulating key that raised the pitch of a single string by approximately a semitone, whether or not it should be identified exactly with the Leucas findings.

If we take Timotheus' accusation seriously, Phrynis employed this mechanism to alter the structure of the Ionian mode, 'bending' one of its notes in order to produce a fifth *harmonia*. It is indeed possible to achieve this result by altering one of the notes comprised in the Ionian mode we have reconstructed above. This note corresponds to one of the four 'fixed' elements of the basic skeleton of the lyre *harmonia*, its intermediate string *mesē*, *f* : in other words, nothing less than the 'leader' and essential point of reference for the lyre tuning as a whole.[63]

[61] See also *P. Oxy*. 51 3641.

[62] Interestingly, visual representations of such many-stringed lyres offered in Pompeii and Herculaneum frescoes (e.g. Moregine, Sulpicii villa, Triclinium A; Herculaneum basilica, National Archaeological Museum of Naples, inv. nr. 9109) portray the instrument's tuning pegs at a 45-degree angle to the yoke, just as the *strobilos* in the Asteas vase.

[63] On the key role of 'thetic', i.e. Dorian, *mesē*, see above note 32 and Hagel 2010, 117–22.

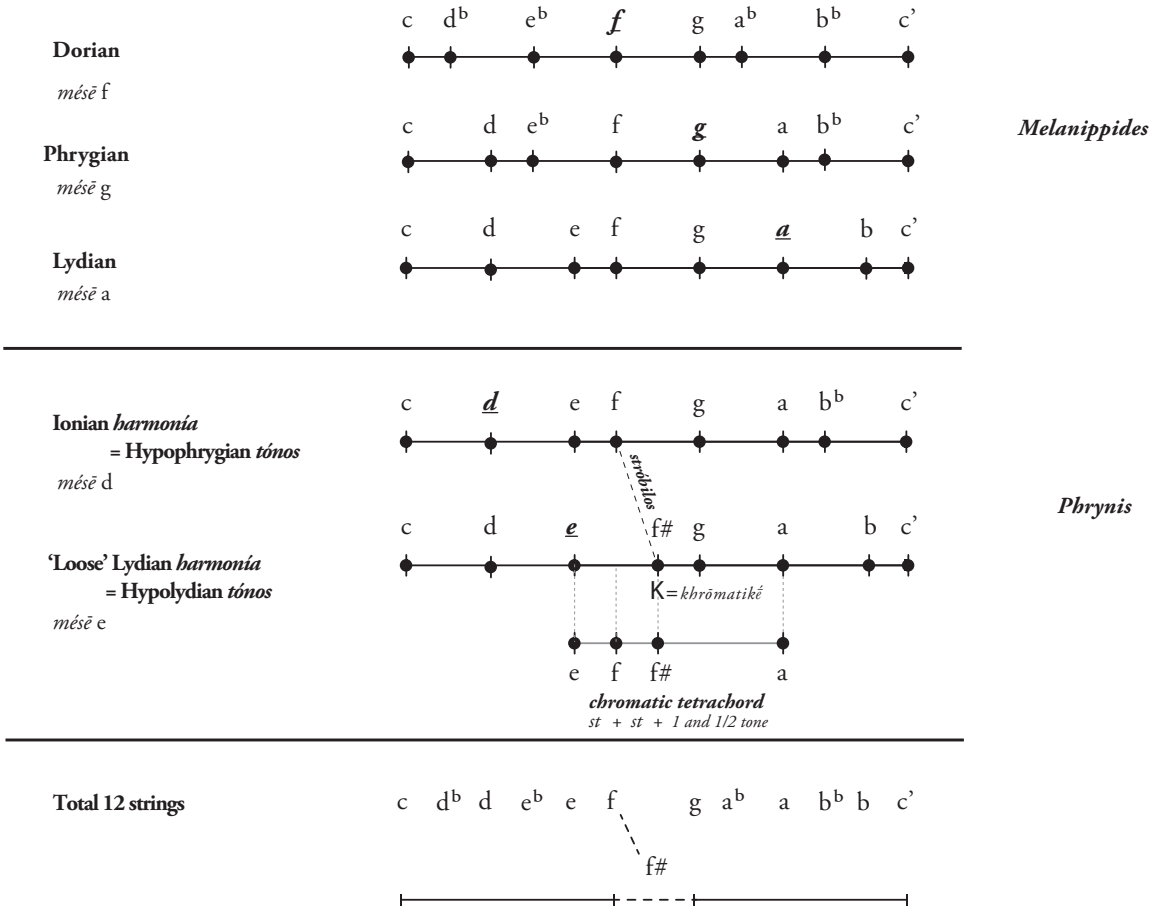


Figure 11: Phrynis' *strobilos* bending the Ionian mode

As shown in Figure 11, if the note f is bent up by a semitone, the core *harmonia* (*c-f-g-c'*) of the lyre's body is broken down for the very first time, which is what Lady Music herself laments: 'by bending and twisting me, he destroyed me completely' (κάμπτων με καὶ στρέφων ὅλην διέφθορεν, fr. 155.15). And Phrynis' bends are quite literally 'ex-harmonic', just as those of his predecessor Cinesias,[64] in that they venture 'out of' the central boundaries of the lyre *harmonia,* and produce a new note that is significant under many respects. In fact, f♯ corresponds to the

[64] Fr. 155.9: ἐξαρμονίους καμπὰς ποιῶν ἐν ταῖς στροφαῖς, 'making ex-harmonic bends at the turn between strophes'. For this interpretation of the expression ἐν ταῖς στροφαῖς, cf. Xen. *De re equestri*, 7.15–17, which describes in detail the movements that the jockey should make to guide his horse while undertaking turns (ἐν ταῖς στροφαῖς) and make him 'turn around' (ἀναστρέφειν, κάμπτειν) promptly, skills that were particularly vital in war. This reading explains why Pherecrates' subsequently focuses on the strangeness of the overall 'composition' of Cinesias' dithyrambs (τῆς ποιήσεως τῶν διθυράμβων, fr. 155.10–11): if these exharmonic tricks were performed (by the aulete?) between strophes, then the links between different sections of his compositions would have sounded weird and confusing to a conservative audience, blurring the boundaries between the individual parts of each piece. The military overtones of this expression might shed some light also on the obscure comparison that completes verse 11, καθάπερ ἐν ταῖς ἀσπίσιν ('just as in shields', fr. 155.11): cf. Ar. *Eq.* 845–7 and especially Dion. Halic. *Ant. Rom.* 2.70.5.4–10, who describes the features of the Curetes' rhythmical dance 'in armour' (χορείαν δὲ καὶ κίνησιν ἐνόπλιον), which was accompanied by the aulos and by the 'sound produced by hands on shields' (καὶ τὸν ἐν ταῖς ἀσπίσιν ἀποτελούμενον ὑπὸ τῶν ἐγχειριδίων ψόφον).

note called *chrōmatikē*, a 'colouring' (K in instrumental notation),[65] and its introduction into the tuning system we have reconstructed defines the sequence of intervals that Aristoxenus would call a 'chromatic' tetrachord (e-f-f♯-a, St+St+One-and-a-Half tone). Hence, in keeping with the characterisation offered in many technical sources, this genus results precisely from an alteration of the basic diatonic structure of the tuning,[66] and has an especially 'technical' nature (*technikōteron*) – one of the defining labels attached to the New Musician's avant-garde style.

But there is more. The fifth tuning that results from this upward bending corresponds to nothing else than the diatonic version of the 'loose' Lydian mode, the Hypolydian *tónos,*[67] and the structure of this 'loose' Lydian mode was identified exactly in Phrynis' time: in fact, as Aristoxenus tells us, it was first defined by a slightly older contemporary of Phrynis, the illustrious musical theorist Damon of Oa.[68]

A side-by-side comparison between the 'loose' Lydian mode and its 'standard'/'tense' counterpart (Figure 12) reveals two other interesting features.

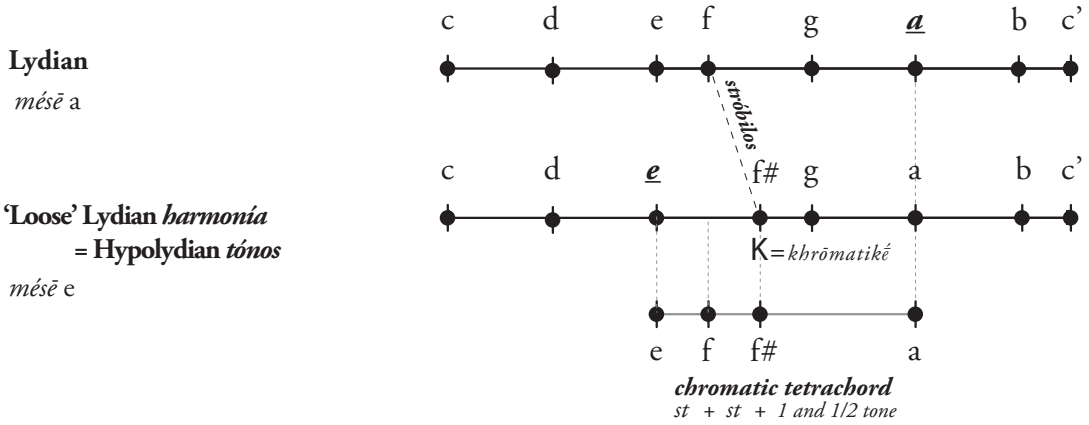


Figure 12: 'Loose' Lydian vs Lydian *harmonia*

[65] Hagel 2010, 368.

[66] Cf. Pap. Hibeh 1.13.15–22, where *chrōma* is used interchangeably with diatonic (cf. Barker 1984, 184–5), and more clearly Adrastus ap. Theon, *Math. Plat.* 55.4–6 (καλεῖται δὲ πάλιν τὸ γένος τῆς τοιαύτης μελῳδίας χρωματικὸν διὰ τὸ παρατετράφθαι καὶ ἐξηλλάχθαι τοῦ πρόσθεν […]), Nicomachus *Ench.* 263.7–10, and Arist. Quint. *De Musica* 92.19– 26, where the chromatic is defined as 'the diatonic augmented and densely populated with semitones (χρωματικὸν γένος διατονικόν ἐστιν ηὐξημένον καὶ πεπυκνωμένον ἡμιτονίοις) […]; it is so called because it colours the other intervals'). Aristoxenus (*ap.* Ps.-Plut. *De Mus.* 1137c–e) testifies to the kitharodic origins of this genus; similarly, Philochorus (*ap.* Ath. *Deipn.* 14.638a) lists '*chrōmata euchroa*' among the many innovations developed by the virtuoso *kithara* player Lysander of Sicyon. Cf. Barker 1982.

[67] The Hypolydian *tonos* is listed among the ancient scales recorded by Aristides Quintilianus as the equivalent of the 'Loose Lydian' *harmonia* mentioned in Plato's *Republic.* Given that Aristides' transcriptions reproduce aulos scales, it is listed in its enharmonic form. For its diatonic variant, see e.g. Cleon. *Is.* 198.3–6 and 19–20 Jan, Bacch. *Is.* 309.3–5. Jan, Gaud. *Is.* 352–3.

[68] Ps.-Plut. *De Mus.* 1136e. This passage cannot mean that Damon had literally invented this tuning, since its discovery is credited to the seventh-century aulete Polymnestus at 1141b. For this and other reasons that go beyond the scope of this article, this passage must mean that Damon found out how to incorporate the 'loose' Lydian mode within the modulating system of lyre/*kithara* tunings.

First, the two tunings are identical except for the effect of the chromatic 'bending' of f to f♯. Second, the *mesē* of the 'loose Lydian' mode (*e*) is exactly a fourth lower than that of the 'standard'/'tense' Lydian' (*a*) – a remarkable feature that foreshadows the full system of hypo and hyper scales employed in the Greek notation system, as well as the principles that are at the heart of Aristoxenian harmonic science as a whole.[69]

In other words, this new scale could be properly regarded as a 'looser' version of the standard Lydian because the introduction of the chromatic note f♯ makes it possible identify the note *e* as a new *mesē*,[70] and this new *mesē* is 'looser' than the standard Lydian one by a fourth – the interval that in Aristoxenus' system marks the distance between hypo modes and their standard counterparts.

5. Timotheus' new peak of musical transgression: modulating to the Mixolydian mode 'against the law'.

If this reconstruction goes along the right lines, Phrynis could indeed produce up to five different *harmoniai* in a twelve-string tuning thanks to his new 'twister'. But even all this, Pherecrates' Lady Music says, was still bearable because Phrynis' 'error' was just temporary – in other words, his sinuous melodic 'bends' were passing transitions that occurred in the course of a piece but the standard framework of the lyre *harmonia*, and especially its *mesē* f, would be restored before the end of the performance. So what was it that made Timotheus' innovations so much worse than Phrynis', while at the same time being a continuation of his achievements? Why did Timotheus' music represent at the same time the origin of 'much of our *melopoiia*', as Aristotle puts it, as well as a new apex of the New Musicians' transgressions (*paranomia*) against the laws of ancient music (παρανομῶν εἰς τὴν ἀρχαίαν μουσικήν, Ps.-Plut. *De Mus.* 1132e)?[71]

Timotheus himself proudly confirms this stern accusation in the self-referential closing section of the *Persians*: 'the leader of the Spartans' he says 'drives me away with fiery blame because I dishonour the older Muse (παλαιοτέραν) with new hymns'.[72] This emblematic event is discussed at length in several historical testimonies and later anecdotes. For instance, the historian Artemon[73] reports that 'Timotheus was generally believed to have used a more polychord

[69] West 1992b, 231 and 257, fig. 9.2.
[70] By definition, *mesē* is the note below the disjunctive tone (Cleonides *Is.* 201.18–20), so *e* could not be taken as *mesē* before the introduction of the chromatic note f♯.
[71] On Timotheus' *kainotomia*, cf. Aristox. fr. 76 Wehrli and Satyrus *Vit. Eur.* fr. 39, 22.5 Arrighetti. For *kainotomia* and *paranomein*, see Plut. *An seni* 795c–d. More generally, Pl. *Leg.* 3.700a3–701b3.
[72] *PMG* 791.206–12.
[73] Perhaps Artemon of Cassandreia (3–2 cent BC).

(πολυχορδοτέρῳ) tuning system on his *magadis*;[74] for this reason he was called to account by the Spartans for corrupting ancient music (ὡς παραφθείροι τὴν ἀρχαίαν μουσικήν) […]' (Ath. *Deipn.* 14.636e). Similarly, we hear in the Plutarchan *De Musica* that Timotheus, Philoxenus and their contemporaries had become 'more vulgar' and 'lovers of novelty', rejecting the 'few-stringed set-up, simplicity and dignity (*semnotēta*) that is proper to music that is wholly archaic' (1135d). Another anecdote reported in a seemingly Aristoxenian passage of the same treatise, just a few pages after the Pherecrates fragment, provides us with some additional clues.

> Ἆτ' οὖν ἠθῶν μάλιστα φροντίδα πεποιημένοι οἱ παλαιοί, τὸ σεμνὸν καὶ ἀπερίεργον τῆς ἀρχαίας μουσικῆς προετίμων. Ἀργείους μὲν γὰρ καὶ κόλασιν ἐπιθεῖναί ποτέ φασι τῇ εἰς τὴν μουσικὴν παρανομίᾳ, ζημιῶσαί τε τὸν [ἐπιχειρήσαντα] πρῶτον [τοῖς] πλείοσι τῶν ἑπτὰ χρήσασθαι παρ' αὐτοῖς χορδῶν καὶ παραμιξολυδιάζειν ἐπιχειρήσαντα.
>
> (Ps.-Plut. *De Mus.* 1144e–f)
>
> The ancients were primarily concerned with ethical characters, and valued above all the dignity and artless nature of ancient music. Thus the Argives are said to have once laid down a penalty for transgressions against the laws of music, and to have fined the first man who tried to use more than the seven strings that were customary for them and attempted to modulate into the Mixolydian mode against the law (*paramixolydiazein*).

Once again, the musical innovations associated with an increase in the number of lyre strings are explicitly depicted as a breach of the laws of music (*paranomia*), and this uncompromising defence of the nobility and simplicity of ancient music is ascribed to another Dorian community, the Argives. But this testimony is unique in that it sheds light on the strictly technical implications of this moral-cum-aesthetic charge by means of the astonishing and unparalleled verb *paramixolydiazein*.

This term obviously refers to a modulation to the Mixolydian mode but it is the prefix *para-* that makes it particularly illuminating. On the one hand, it echoes the musical *paranomia* mentioned only a few lines before, emphasising its negative ethical implications. On the other, it conveys the idea that the Mixolydian mode is set 'next to' the traditional *harmonia* comprising two tetrachords separated by a tone – a usage that is significantly akin to Ptolemy and Porphyry's use of the verb *parazeugnusthai* to indicate the simultaneous presence of conjunct and disjunct octave arrangements in the Unchanging Perfect System.[75]

This 'illegal' introduction of the Mixolydian mode is again contrasted with the dignity (τὸ σεμνόν) characteristic of traditional music. And precisely this *semnotēs* is identified by

[74] On the problems raised by this term, see Barker 1988 and West 1983, 79.

[75] Cf. Ptol. *Harm.* 51.19–20, Porph. *In Ptol. Harm.* 165.6–20, with Barker 2015, 522–5. On 'Changeless' and the 'Modulating' Perfect Systems and their importance in ancient Greek harmonics, see Barker 2007, 13–18.

Aristoxenus and other authors as the distinctive ethical trait proper to the Dorian mode,[76] which in turn represented the traditional model for all lyre *harmoniai*. Indeed all the sources which report variations on this anecdote ascribe this stark defence of the traditional seven-stringed *harmonia* to various Dorian people. In keeping with all this, if we now turn back to our reconstruction of the New Musicians' twelve-string tuning and apply Phrynis' *strobilos* to the Dorian mode, we end up precisely with the Mixolydian *harmonia* (Figure 13).

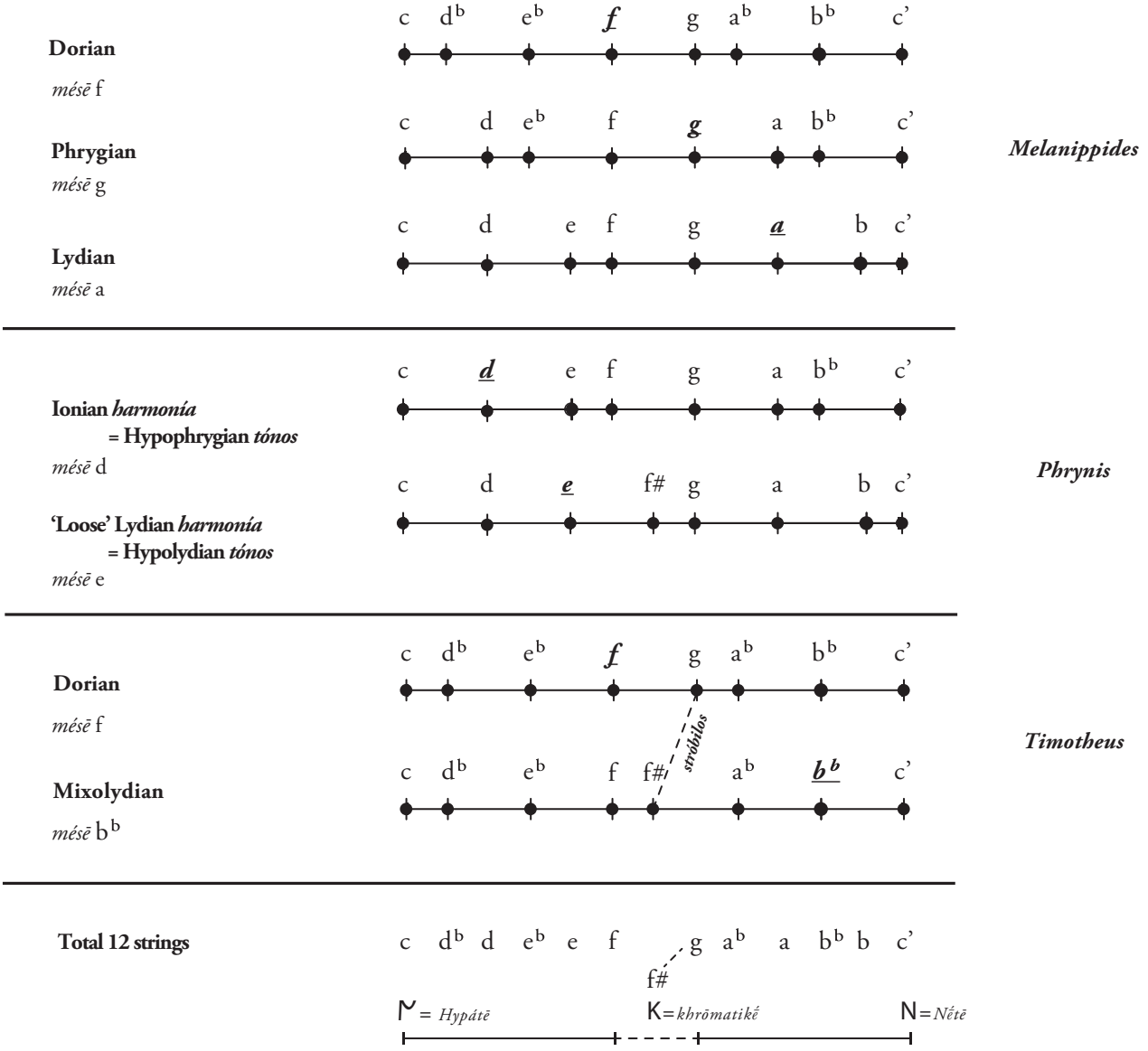


Figure 13: Timotheus' 'illegal' modulation from Dorian to Mixolydian

[76] Aristox. fr. 82 Wehrli (ap. Ps.-Plut. *De Mus.* 1136f): ἀλλ' ἐπεί, ὡς προείπομεν, πολὺ τὸ σεμνόν ἐστιν ἐν τῇ Δωριστί, ταύτην προυτίμησεν […]. See also Aristox. fr.84, Luc. *Harm.* 1.12.

Just as Phrynis produced the 'Loose Lydian' mode by 'bending and colouring' the Ionian, Timotheus reached a new peak of musical transgression by using Phrynis' mechanism to modulate between Dorian and Mixolydian: in other words, he managed to introduce the lamenting aulos-mode par excellence, the Mixolydian,[77] into the realm of traditional Hellenic lyre music. In order to do so, however, he had to apply Phrynis' mechanism to a different fixed note of the lyre *harmonia*, *paramesē*, switching its pitch between *f*♯ and *g*.

In addition, he had to change the way in which *strobilos* operated, using it in the exact opposite manner to Phrynis': in fact, in Timotheus' case, the basic pitch of the string *paramesē,* g, had to be tuned when the *strobilos* was in its 'vertical', tense position (Figure 9C). The string's pitch would be then 'slackened' to *f*♯ in the course of the performance, rotating the *strobilos* into its horizontal/'neutral' position (*g* > *f*♯, Figure 9A) – a change which, in turn, reveals the structural breakdown of the essential core of the traditional lyre *harmonia* (*c–f–f*♯*–c'*).[78] And this is exactly what Lady Music accuses Timotheus to have done: 'he slackened me up (ἀπέλυσε) and loosened me asunder (κἀνέλυσε) with his twelve strings' (v. 25).[79]

Furthermore, differently from Phrynis' transient bending, this 'loosening' of *g* to approximately *f*♯ did not need to be 'rectified' before the end of the performance, since the *mesē* of the *kithara* tuning as a whole (*f*) was still available.[80]

Hence, by altering the Dorian mode, Timotheus produced 'deviant' (ἐκτραπέλους, fr. 155.23)[81] and intricate melodies which not only disrupted the essential structure of the traditional lyre

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[77] Ps.-Plut. *De Mus.* 1136d1–2: Καὶ ἡ Μιξολύδιος δὲ παθητική τίς ἐστι, τραγῳδίαις ἁρμόζουσα.

[78] As Aristoxenus laments, fashionable musicians like Timotheus 'flattened even the pitch of some of the fixed notes' (Ps.-Plut. *De Mus.* 1145d: οὐ μόνον τῶν κινεῖσθαι πεφυκότων φθόγγων, ἀλλὰ καί τινων ἀκινήτων ἀνιεμένων). This is the end of a complex passage that begins with the anecdote on *paramixolydiazein* quoted above, but then delves into finer implications related to tuning shades: see Barker 1984, 244–6. Among other things, this passage offers us a salutary reminder that practicing musicians employed a variety of diatonic and chromatic shades – a point that of course applies also to the tunings reconstructed in this article.

[79] In the closing *sphragis* of the Persians (*PMG* 791.229–33), Timotheus boasts to have 'made the *kitharis* spring up anew, opening the many-hymned chambered treasury of the Muses' with 'metres and rhythms of eleven strikes' (μέτροις ῥυθμοῖς τ' ἑνδεκακρουμάτοις). Timotheus' expression is unlikely to refer to the number of strings of his instrument, as the terms *krousis/krouma* indicated the combination of two or more notes that give rise to a melodic figure – i.e., the minimum building blocks of a melody. Cf. *Anon. Bell.* §§ 29–30 ('An instrumental melody is defined as the one that is made of notes combined with each other and is called *krouma'* (ὀργανικὸν δὲ μέλος λέγεται τὸ ἐκ τῶν συναφιεμένων ἀλλήλοις φθόγγων, ὃ καλεῖται κροῦμα) and the musical examples of melodic *krouseis* provided at *Anon. Bell.* §§2 and 6 (πρόκρουσις, ἔκκρουσις, ἐκκρουσμός; cf. §§18 and 68). It is perhaps not coincidental that Timotheus links these basic melodic figures (*kroumata*) with his new rhythms: on the relationship between rhythm and melodic profiles in Greek music, cf. Lynch 2016b. See also LeVen 2011, who offers a thought-provoking, non-technical interpretation of the expression μέτροις ῥυθμοῖς τ' ἑνδεκακρουμάτοις.

[80] One could not renounce the note *f* in the Dorian mode, given that it is the *mesē* of this tuning as well as the lyre *harmonia* as a whole, whereas the note *g* is not required in the Mixolydian *harmonia*. On the importance of *mesē* in performance, see e.g. Ps.-Arist. *Prob.* 19.20. On the use of the coupling of Dorian/Mixolydian modes at the end of a piece, see Aristox. *ap.* Ps.-Plut. *De Mus.* 1142f with discussion below (esp. note 92).

[81] This may be a pun on his transgression of melodic *tropoi*; this term was also applied to deviant laws or habits, e.g. Theognis 1.290 (ἐκτραπέλοισι νόμοις).

harmonia, but actually reproduced on his twelve-stringed *kithara* the pair of modes that Aristoxenus presents as the very essence of tragedy: Dorian and Mixolydian, a perfect blend of magnificence and *pathos*.[82]

Most significantly, this transition between Dorian and Mixolydian corresponds to the 'first consonant *metabolē*' identified by Ptolemy as a key expansion of the traditional system of lyre tunings:

> ἁπλῶς γὰρ τοὺς τρεῖς τοὺς ἀρχαιοτάτους, καλουμένους δὲ δώριον καὶ φρύγιον καὶ λύδιον παρὰ τὰς ἀφ' ὧν ἤρξαντο ἐθνῶν ὀνομασίας […] τόνῳ διαφέροντας ἀλλήλων ὑποθέμενοι, καὶ διὰ τοῦτο ἴσως τόνους αὐτοὺς ὀνομάσαντες, ἀπὸ τούτων ποιοῦσι πρώτην μεταβολὴν σύμφωνον ἀπὸ τοῦ βαρυτάτου τῶν τριῶν καὶ δωρίου τὴν ἐπὶ τὸ ὀξὺ διὰ τεσσάρων, προσαγορεύσαντες τοῦτον τὸν τόνον μιξολύδιον ἐκ τῆς πρὸς τὸν λύδιον ἐγγύτητος, ὅτι μηκέτι τονιαίαν ὅλην πρὸς αὐτὸν ἐποίει τὴν ὑπεροχήν, ἀλλὰ κατὰ τὸ περιλειπόμενον τοῦ διὰ τεσσάρων μέρος μετὰ τὸ ἀπὸ τοῦ δωρίου ἐπὶ τὸν λύδιον δίτονον.
>
> (Ptol. *Harm.* 62.18–63.1)
>
> The three most ancient *tonoi*, which are called Dorian, Phrygian and Lydian after the name of the people who produced them […] differ from each other by a tone, and perhaps they called them *tonoi* for this reason. Starting from these, they make the first consonant modulation starting from the lowest of the three, the Dorian, moving up a fourth, calling this *tonos* Mixolydian because of its proximity to the Lydian, since the difference between them was not a tone anymore but the part of the fourth that is left after the ditone between the Dorian and the Lydian.[83]

Of course, Ptolemy is right in saying that the Mixolydian mode is closer to the Lydian than the other *tonoi*: in fact, there is only a semitone between Mixolydian *mesē* $b^{\flat}$ and Lydian *mesē a,* whereas the *mesai* of the other three traditional *tonoi* are a tone apart. In the following lines, Ptolemy describes how to fill out the rest of the tuning, listing first the Hypolydian *tonos*, which corresponds to the 'Loose Lydian' *harmonia*, and then the Hypophrygian, the formalised counterpart of the Iastian. After mentioning the seventh and last *tonos*, the Hypodorian, Ptolemy adds a revealing observation:

> τὸν δὲ ὑπὸ τὸν δώριον ὑποδώριον, ᾧ τόνῳ τὸν διὰ πασῶν ἐσόμενον ἐπὶ τὸ ὀξὺ τὸν αὐτὸν ὄντα προσηγόρευσαν ὑπερμιξολύδιον ἀπὸ τοῦ συμβεβηκότος, ὡς ὑπὲρ τὸν μιξολύδιον εἰλημμένον – τῷ μὲν <ὑπό> καταχρησάμενοι πρὸς τὴν ἐπὶ τὸ βαρύτερον ἔνδειξιν, τῷ δὲ <ὑπέρ> πρὸς τὴν ἐπὶ τὸ ὀξύτερον.
>
> (Ptol. *Harm.* 63.5–8)

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[82] Aristox. fr. 81 (Ps.-Plut. *De Mus.* 1136d): the tragedians 'took the Mixolydian *harmonia* and joined it together (συζεῦξαι) with the Dorian, because the latter produces magnificence and dignity and the former extreme passions; and tragedy is a mixture of these'. By introducing the chromatic note f♯ into the Dorian mode, Timotheus reproduced on his *kithara* the acute tritone f♯–c', which represented under many respects the hallmark of the Mixolydian mode (Lynch 2016a, 271–3). And the highest note of this twelve-stringed tuning still corresponds to the Dorian *nētē c'* (N in instrumental notation), i.e. the highest boundary of all the Aristides scales (Hagel 2010, 34–8).

[83] Transl. Barker 1989, slightly modified.

> They called Hypodorian the *tonos* below the Dorian, and the one that was to be at an octave above it, and so was the same as it, they named Hypermixolydian after its essential attribute – that is, on the grounds that it was placed above the Mixolydian, using *hypo* to indicate lower pitch and *hyper* to indicate higher.

The overall meaning of this passage is fairly straightforward: the *mesē* of the Hypermixolydian *tonos* (*c'*) is precisely an octave higher than that of the Hypodorian *tonos* (*c*) and, therefore, yields the same octave species. For this reason, according to Ptolemy, the Hypermixolydian *tonos* represented just a useless duplication of an existing model. However, why did Aristoxenus and his followers adopt it in the first place?

6. Philoxenus' 'hyperbolic' trills and the Locrian mode

We can answer this question by turning to the very last lines of the Pherecrates fragment quoted by the Pseudo-Plutarch. As the author warns us, Lady Music is not talking about Timotheus any longer but is decrying Philoxenus' innovations, which she describes as 'ex-harmonic, hyperbolic and immoral whistly trills (*niglarous*)'.[84] Now, the reference to 'hyperbolic' sounds (ὑπερβολαίους) in a context so dense with technical references of course brings to mind the use of this very term to denote the tetrachord called *hyperbolaion*, which in Aristoxenian theory is placed a fourth above the highest note of the central octave, and therefore falls 'outside' the range of the traditional *harmonia*. In this sense, Philoxenus' hyperbolic trills were literally 'ex-harmonic' (ἐξαρμονίους), as they crossed they upper boundary of the lyre *harmonia* (*c'*), just as Cinesias and Phrynis' chromatic bends crossed the central boundary *f*–*g*.

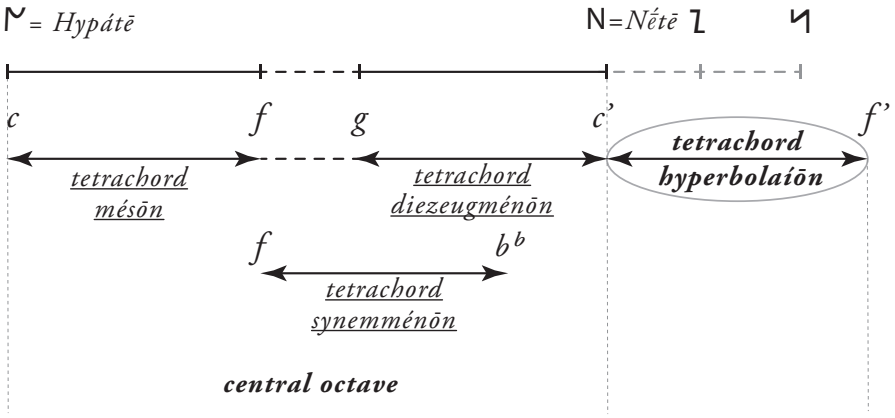

Figure 14: The 'hyperbolic' tetrachord

[84] This kind of elaborate and high-pitched trills was originally related to the aulos (cf. Pollux *Onom.* 4.83, Phot. *N*300, s.v. νιγλαρεύων, Suda *N*366, s.v. νίγλαροι) and is mocked elsewhere in comic poetry (e.g. Aristoph. *Ach.* 554, and especially Eup. fr. 121 *PCG*, from *Dēmoi*, discussed in §4 above.

In keeping with this, a passage of the collection of treatises known as *Anonyma Bellermanniana* tells us that 'the hyperbolic region of the voice is the whole area that stretches beyond the Hypermixolydian' (ὑπερβολοειδής ἐστι πᾶς ὁ ἀπὸ τοῦ ὑπερμιξολυδίου, §64). As we have seen earlier, in order to introduce the Hypermixolydian *tonos* into our tuning it is necessary to consider the highest note of the Dorian mode (*c'*) as the *mesē* of the new system. But given that *mesē* is by definition a note that lies 'below the disjunctive tone',[85] for *c'* to be regarded as *mesē* it is necessary to add an extra string that formed an interval of a tone above it (*d'*): in other words, it was necessary to add precisely the first element of the new *hyperbolaion* tetrachord.

In accordance with this, in these admittedly few lines, Lady Music does not mention anymore the 'twelve strings' that featured so prominently in the earlier verses. By contrast, she laments that she was now 'entirely filled up with wriggling caterpillars, like a cabbage' (ὥσπερ τε τὰς ῥαφάνους ὅλην καμπῶν με κατεμέστωσε), referring to the unprecedented multiplication of notes, semitones and interval sequences that were now available in her *harmonia*.[86]

[85] Cleonides *Is.* 201.18–20; cf. note 70.

[86] The same point is highlighted by the commentator at the end of this passage, who reports that 'other comic playwrights too put on display the strangeness of those who chopped music up in these ways (τῶν μετὰ ταῦτα τὴν μουσικὴν κατακεκερματικότων).

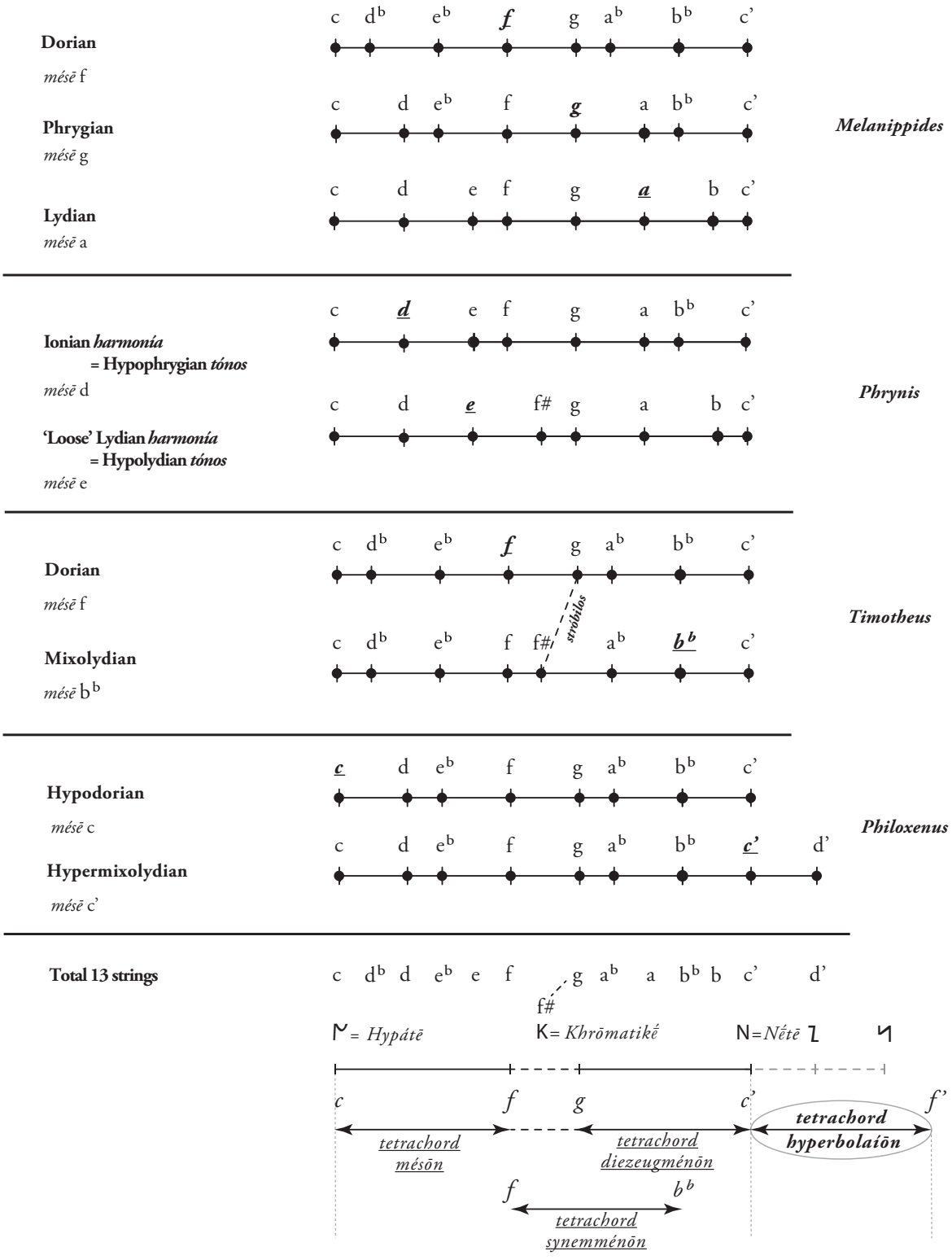

Figure 15: Philoxenus' 'hyperbolic' *harmonia*: Hypermixolydian and Hypodorian/Locrian

But why should we credit this innovation to Philoxenus, given that he is not mentioned directly by Lady Music? Three points make this very likely, in my view. First, in the list of the seven diatonic octave species reported by Cleonides and Bacchius, we are told that the Hypodorian species was also known as *Lokristi*, i.e. the Locrian *harmonia*,[87] and Pollux explicitly tells us that the Locrian *harmonia* had been 'discovered' by Philoxenus.[88] Of course, this statement cannot mean that he literally invented it, because it dated much before his time.[89] What this statement must mean, then, is that Philoxenus found out how to integrate the Locrian within the modulating system of lyre *harmoniai*, just as Damon had 'found' a way to include the 'Loose Lydian'.[90]

Secondly, an Aristoxenian fragment preserved once again by the Pseudo-Plutarch (1142f) describes in some detail the harmonic progression of one of Philoxenus' most famous compositions, the *Mysians*, and tells us that the first part of this composition was precisely in Hypodorian/Locrian, the intermediate in Phrygian and Hypophrygian/Iastian, and the closing section in Dorian and Mixolydian.[91] In other words, this dithyramb employed the whole range of the seven *harmoniai* contained in the tuning we have reconstructed on the basis of the Pherecrates fragment, embodying a new apex of musical *paranomia*: moving from the lowest *tonos* (Hypodorian *mesē c*) to the highest one, the Mixolydian (*mesē* $b^{\flat}$) on one and the same instrument.[92]

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[87] Cleonides 198.10–13 Jan (ἕβδομον τὸ ὑπὸ βαρυπύκνων περιεχόμενον, οὗ πρῶτος ὁ τόνος ἐπὶ τὸ βαρύ […] ἐκαλεῖτο δὲ κοινὸν καὶ λοκριστὶ καὶ ὑποδώριον), Bacchius 309.7–9 Jan (ἕβδομον δὲ οὗ ἕβδομος […] ἐκαλεῖτο δὲ ὑποδώριον καὶ κοινὸν καὶ λοκριστί). As we have seen earlier, the Hypodorian octave species was identical to the Hypermixolydian, which therefore is not included in the list. On the surface, the testimony of Heraclides of Pontus may seem to contradict Cleonides and Bacchius, since he identifies a Hypodorian *melos* with a different *harmonia*, the Aeolian (Ath. *Deipn.* 14.624f). But the contradiction is only apparent. As I will argue in greater detail elsewhere, Heraclides is referring to a different understanding of the suffix *hypo-*: unlike the Aristoxenian usage (*hypo=mesē* a fourth lower), the suffix *hypo-* is employed here to indicate a *tonos* that is placed 'immediately below' the Dorian – a usage that, as Heraclides says himself, stems from the practical approach of aulos-players (14.625a) and leads to a multiplication of *tonoi* unrelated to octave species. The same correlation between the use of the suffix *hypo-* and the aulos-based approach followed by earlier *harmonikoi* appears in Aristoxenus' *Elementa Harmonica* (47.1–16), a passage that attacks precisely the haphazard method followed by his predecessors and, significantly, preserves the only occurrence of the suffix *hypo-* to characterise different *tonoi* in genuine Aristoxenian writings. The same conceptual approach informs also the term Hypermixolydian, which indicates a *tonos* whose *mesē* (c') is 'the next one immediately above' the Mixolydian ($b^{\flat}$; if 'higher' Mixolydian, *b* – Cleon. *Is.* 203.7–10 Jan) and not one that is a fourth above it.

[88] Poll. *Onom.* 4.65: Λοκρική · Φιλοξένου τὸ εὕρημα.

[89] See e.g. Her. Pont. *ap.* Ath. *Deipn.* 14.625e, who says that the Locrian was employed by contemporaries of Pindar and Simonides; Pind. fr. 140b Snell-Maehler and some scholia to Pindar (*schol. vet.* to O10, 17k and 18b) ascribe its invention to the seventh-century aulete Xenocritus of Locri (cf. also Ps.-Plut. *De Mus.* 1134b–e).

[90] Cf. note 68 above.

[91] This passage confirms that, after Timotheus' unique re-interpretation of the *strobilos* as a tool to 'loosen' *paramesē g*, it was not necessary to 'rectify' the tuning before the end of the piece, since Dorian *mesē f* was available even when coupled with the Mixolydian mode.

[92] In the specific case of the *Mysians*, the instrument should be an *aulos*, not a *kithara*, and this explains why the Hypermixolydian mode is not mentioned: in fact, the extra note *d'* would go above the upper limit of Classical modulating *auloi* (Dorian *nētē c'*, N), i.e. the highest boundary of the Aristides scales (Hagel 2010, 34–8). More

Finally this tuning covers a gamut of a ninth, which corresponds to the range posited for the classical *kithara*[93] and, most importantly, comprises 13 *mesai*: that is to say precisely the number of *tonoi* comprised in the Aristoxenian system.

In his seminal monograph on the *Science of Harmonics in Classical Greece*, Andrew Barker highlighted how Aristoxenus, in introducing the topic of *tonoi*, 'hints at a connection of some sort between them and the *systēmata'* he had previously associated with the ancient *harmoniai*:[94]

> 'The fifth part concerns the *tonoi* in which the *systēmata* are placed when they occur in melody' (37.8–10). The remark suggests that the *tonoi* somehow map out pitch-relations between different forms of *systēma*, and not merely between thirteen instances of the same type. What connection, then, might there be between differences of *tonos* and differences in the 'arrangements', 'forms' or 'species' of the octave and the other concords? It is an exceedingly difficult issue.
>
> (Barker 2007, 223)

If the present reconstruction is not too wide off the mark, Pherecrates' pointed parody of the New Musicians' musical *paranomia* provides us with vital evidence to unravel this crucial, if remarkably complex, issue.

By multiplying the number of the *kithara* strings, the New Musicians succeeded in emulating the harmonic flexibility of the aulos, and this process went hand in hand with the development of a harmonic theory that could make sense of such a complex system of modulations and incorporate them within the formal constraints of lyre tunings. Combining an auletic, *tonos*-based approach, based on *mesai* set at different pitches, with a lyre-based approach that conceived lyre *harmoniai* as different 'forms' (*eidē*) or 'arrangements' (*schēmata*) of the octave,[95] the New Musicians managed to make the *kithara* once again 'the most polychord instrument', once again matching the aulos' astounding *polyphōnia.*

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generally we know that the 'New Musicians' composed both kitharodic *nomoi* and auletic dithyrambs (e.g. Arist. *Poet.* 1448a14–15).

[93] Hagel 2010, e.g. 92, 283, 370. The tuning I have reconstructed here is a third lower than Hagel's – an important difference that I plan to discuss in detail elsewhere.

[94] Aristox. *El. Harm.* 11.19–12.13, 46.17–20. Cf. Arist. Quint. *De Mus.* 15.19–20 (περὶ μὲν οὖν συστημάτων, ἃ καὶ ἀρχὰς οἱ παλαιοὶ τῶν ἠθῶν ἐκάλουν […]), 18.5–6 (γίνονται δὲ καὶ ἄλλαι τετραχορδικαὶ διαιρέσεις, αἷς καὶ οἱ πάνυ παλαιότατοι πρὸς τὰς ἁρμονίας κέχρηνται), 19.8–10 (τοιαύτας γὰρ ἐποιοῦντο τῶν ἁρμονιῶν τὰς ἐκθέσεις πρὸς τὰ προκείμενα τῶν ἠθῶν τὰς τῶν φθόγγων ποιότητας ἁρμοττόμενοι), and 22.11–23.6.

[95] See also Barker 2007, 227: 'What this suggests is that the Aristoxenian conception of the role of the *tonoi* was essentially tied up, like Ptolemy's, with their relation to the octave-species'.

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APPENDIX: Pherecrates' *Chiron*, fr.155 *PCG*

<ΜΟΥΣ.> Λέξω μὲν οὐκ ἄκουσα · σοί τε γὰρ κλύειν	I shall not speak against my will; for listening
ἐμοί τε λέξαι θυμὸς ἡδονὴν ἔχει.	will be a pleasure for your spirit, as speaking is for mine.
ἐμοὶ γὰρ ἦρξε τῶν κακῶν Μελανιππίδης,	Melanippides is the one who started off my troubles:
ἐν τοῖσι <u>πρώτοις</u>[96] ὃς λαβὼν ἀνῆκέ με	taking me in the first <manners/modes – *tropoi?* >, he loosened me up
χαλαρωτέραν τ' ἐποίησε <u>χορδαῖς δώδεκα</u>.	and made me slacker with his twelve strings.
ἀλλ' οὖν ὅμως οὗτος μὲν ἦν ἀποχρῶν ἀνὴρ	Yet all the same, this man was still acceptable
ἔμοιγε <φάινεται>[97] ~ πρὸς τὰ νῦν κακά.	for me, at least so it seems next to my current pains.
Κινησίας δέ <γ'>[98] ὁ κατάρατος Ἀττικός,	But Cinesias, that disgusting Attic chap,
ἐξαρμονίους καμπὰς ποιῶν ἐν ταῖς στροφαῖς	making ex-harmonic bends at the turn between strophes,[102]
<μ'>[99] ἀπολώλεχ' οὕτως, ὥστε τῆς ποιήσεως	destroyed me to such a point that in the composition
τῶν διθυράμβων, καθάπερ ἐν ταῖς ἀσπίσιν,	of his dithyrambs, just as in shields,
ἀριστέρ' αὐτοῦ φαίνεται τὰ δεξιά.	his dexterous tricks appear rather sinister.
ἀλλ' οὖν ἀνεκτὸς οὗτος ἦν ὅμως ἐμοί.	But for all that, this man was still tolerable for me.
Φρῦνις δ' <u>ἴδιον στρόβιλον</u> ἐμβαλών τινα	Phrynis, however, shoved in some 'twister' of his own
<u>κάμπτων με καὶ στρέφων</u> ὅλην διέφθορεν,	and, bending and twisting me, destroyed me completely,
<u>εἰς</u>[100] <u>πέντε χορδαῖς δώδεκ'</u> ἁρμονίας ἔχων.	having up to five *harmoniai* in twelve strings.
ἀλλ' οὖν ἔμοιγε χοὗτος ἦν ἀποχρῶν ἀνήρ ·	Yet this man too was still passable to me:
εἰ γάρ τι κἀξήμαρτεν, αὖθις ἀνέλαβεν.	for even if he made a mistake, he took it back again.
ὁ δὲ Τιμόθεός μ', ὦ φιλτάτη, κατορώρυχε	But Timotheus, my dearest friend, was the one who
καὶ διακέκναικ' αἴσχιστα. <ΔΙΚ.>Ποῖος οὑτοσὶ	utterly ruined me and tore me to pieces most disgracefully.
<ὁ> Τιμόθεος; <ΜΟΥΣ.> Μιλήσιός τις πυρρίας.	[JUSTICE] Who is this Timotheus, then? [MUSIC] Some Milesian redhead.
κακά μοι παρέσχεν οὗτος, ἅπαντας οὓς λέγω	The troubles this man caused me – all the others, I say,
παρελήλυθεν, ἄγων ἐκτραπέλους μυρμηκιάς.	he surpassed by far, leading his deviant ant-hills.
κἂν ἐντύχῃ πού μοι βαδιζούσῃ μόνῃ,	And when, by chance, he found me walking on my own,
ἀπέλυσε[101] κἀνέλυσε <u>χορδαῖς δώδεκα</u>.	he slackened me up and loosened me asunder with his twelve strings.

καὶ Ἀριστοφάνης ὁ κωμικὸς μνημονεύει Φιλοξένου καί φησιν ὅτι εἰς τοὺς κυκλίους χοροὺς *** μέλη εἰσηνέγκατο. ἡ δὲ Μουσικὴ λέγει ταῦτα ·

Aristophanes too, the comic playwright, remembers Philoxenus and says that he had introduced *** melodies into the circular choruses. Whereas Music says what follows:

<u>ἐξαρμονίους ὑπερβολαίους</u> τ' ἀνοσίους	[with] ex-harmonic, hyperbolic and immoral
<u>καὶ νιγλάρους</u>, ὥσπερ τε τὰς ῥαφάνους ὅλην	whistly trills, he filled me all up, like cabbages,
καμπῶν με κατεμέστωσε.	of wriggling caterpillars.

καὶ ἄλλοι δὲ κωμῳδοποιοὶ ἔδειξαν τὴν ἀτοπίαν τῶν μετὰ ταῦτα τὴν μουσικὴν κατακεκερματικότων.

Other comic playwrights too have put on display the strangeness of those who chopped music up in these ways.

[9696] ἐν τοῖσι πρώτοις codd. : ἐν τοῖσι πρῶτος Meineke: τρόποισι πρώτοις vel πρώτοις τρόποισιν fortasse legendum est, cf. Aristox. *El. Harm.* 29.18–19.

[97] Cf. e.g. Eur. *Bacch.* 629.

[98] Cf. e.g. Eur. *Fr.* 344, 544, *Or.* 406 et passim. <μ'> add. Meineke.

[99] MSS ἀπολώλεκέ με οὕτως.

[100] εἰς West : ἐν MSS

[101] ἀπέλυσε MSS : ἀπέδυσε Wyttenbach.

[102] Cf. Xen. *De re equestri* 7.15–17.