

Contents

Preface	i
1 Musical Structure in the <i>Symposium</i>	1
1.1 Structuring a Dialogue	5
1.2 Ancient Greek Music: Three Key Ideas	6
1.3 Plato's Symbolic Scheme	8
1.4 Harmony and Consonance, Disharmony and Dissonance	10
1.5 Sevenths and Mixture	11
1.6 Quick Guide to the Strongest Evidence	14
1.7 Methodology and Responses to Possible Objections	19
2 An Emphatic Pattern in the Frame	27
2.1 A Theory of Music	28
2.2 Recurring Clusters of Features in the Frame	29
2.3 A New Kind of Commentary	31
3 Making the Musical Structure Explicit	47
3.1 Phaedrus	48
3.2 Pausanias	54
3.3 Eryximachus	66
3.4 Aristophanes	74
3.5 Agathon	86
3.6 Socrates and Diotima	96
3.7 Alcibiades	124
4 Parallel Structure in the <i>Euthyphro</i>	149
4.1 The Same Scale and the Same Symbolic Scheme	149
4.2 Quick Guide to the Strongest Evidence	151
4.3 The Sevenths	152

PM 8070
→

PM 8071
→

The Musical Structure of Plato's Dialogues

– A Quick Guide to the Strongest Evidence –

J.B. Kennedy

The Musical Structure of Plato's Dialogues

– A Quick Guide to the Strongest Evidence –

J.B. Kennedy

But, friend, when you grasp the number and nature of the intervals of sound, from high to low, and the boundaries of those intervals, and how many scales arise from them, which those who came before handed down to us, their followers, to call 'harmonies,' and when you grasp the various qualities inhering in the motions of the body, which they said must be measured with numbers and named 'rhythm' and 'metre,' and when you apprehend that every One and Many should be so investigated, when you have grasped all of that, then you are wise ...

Plato, *Philebus*, 17c11-e1

Nothing is so characteristic of the Pythagorean philosophy as symbolism (to symbolikon), a kind of teaching which mixes speech and silence as in mystery rites ... what they signify is immediately lucid and clear for those who are accustomed to it, but dark and meaningless to the inexperienced... with the Pythagorean symbols what seems to be affirmed is really being concealed, and what seems to be concealed is discerned by the mind.

Plutarch in Stobaeus, iii.i.199 (Wachsmuth and Hense)

Our discussion will be adequate if it has as much clearness as the subject-matter admits of, for precision is not to be sought for in equal degree in all arguments ... it is the mark of an educated mind to look for precision in each kind just so far as the nature of the subject admits; it is evidently equally foolish to accept probable reasoning from a mathematician and to demand demonstrative proofs from a rhetorician.

Aristotle, *Nicomachean Ethics*, 1094b11 ff. (after Ross)

Preface

The results of a general analysis of Plato's dialogues, which found extensive evidence for an underlying musical structure, were reported in the journal *Apeiron* and in a lecture at Manchester University. The following in-depth case-study marshals comprehensive evidence for the same, regular pattern of musical symbols in two dialogues, and outlines the implications of this discovery for the history of Greek philosophy, music, and mathematics.

Strong claims require strong evidence. The conclusions reported earlier rest upon a broad base of novel evidence and novel methods. This guide aims first at accessibility and simplicity. By reducing historical background and interpretative analysis to a minimum, it exposes the heart of the case. At the same time, it aims at strength and depth. The same, subtly varied symbolic pattern is shown to occur repeatedly and at regular intervals throughout two dialogues. To achieve these aims, the evidence is presented here in a format which exhibits the musical symbols and structures alongside clarifying annotations. This eliminates the hard work of checking and verifying the evidence.

A strong, self-contained case for the central claims is already established in the opening sections of chapter one. The analysis that follows in chapters two and three shows that the methods introduced there lead to a comprehensive and consistent rereading of the entire text of the *Symposium*. Chapter four shows that the same structures and patterns exist in the *Euthyphro*. This preface briefly surveys some earlier scholarship which laid the foundations for this research.

Some time ago, Milman Parry transformed the way Homer is read. Though the poems had long been intensively studied, Parry's empirical studies of living traditions of oral poetry surprised scholars by showing that many puzzling features of Homer's style and narrative could be explained in a

new way. Here, recent advances in several fields not usually at the centre of Plato studies converge in revisionist readings of his dialogues. Although the evidence presented below is self-contained and will stand on its own, some acquaintance with these developments is essential to appreciating the real plausibility and even the naturalness of my arguments.

First, our knowledge of early Pythagoreanism has finally been placed on firm, critical foundations by Walter Burkert and the two monographs on Philolaus and Archytas by Carl Huffman. They have separated the accretions of late and suspect testimony from the genuine fragments, and in particular have worked to distinguish the doctrines of the early Pythagoreans from the innovations that lie behind Plato's own philosophy. This work makes it possible here to reassess the vexed question of the Pythagoreanism attributed to Plato by his followers.

Second, the renaissance in specialist studies of Greek music theory during the last generation, led by West, Barker, and others, and now culminating in Barker's *The Science of Harmonics in Classical Greece*, enables us to understand the debates over music in the central chapters and concluding myth of the *Republic*. The musical structures analysed here are firmly grounded in musicological history.

Third, stimulated perhaps by the discovery of the Derveni papyrus, which provides an unprecedented glimpse into the philosophical use of literary symbolism, there has been a wide-ranging reappraisal of the use of symbolism and allegory in ancient Greek literature, religion, and philosophy. Works like Ford's *On the Origins of Ancient Literary Criticism*, Struck's *The Birth of the Symbol*, and Sedley's *Plato's Cratylus*, which all re-evaluate Plato's views, have shown, in short, that the use of symbolism and allegory was far more common than previously thought and, in particular, was a topic of debate in the circles around Socrates. Those reading Plato in philosophy departments today may be unfamiliar with the strength of the consensus in classics departments that symbolism, allegory, and the kind of etymological analysis parodied in Plato's *Cratylus* were, from the classical period onwards, prominent and mainstream themes of ancient religious and intellectual culture.

Another work in progress devotes considerable space to examining these three literatures, as well as the historical context and interpretation of the musical patterns. During the last generation, controversy has continued about various approaches to interpreting Plato: analytical, dramatic, literary, 'third way,' developmental, unitarian, stylometric, and Tübinger. The

relation of the claims made below to these approaches will also be considered there.

The origins of the research presented below were in part fortuitous. I was teaching an advanced course in Manchester University's philosophy department on Plato's *Republic*, and therefore had to review the extensive literature on the structure of its narrative. I lectured on the debate between the so-called 'separtists' and 'unitarians' over whether the *Republic* was composed of disparate, shorter pieces written at different points in Plato's development. At the same time, I was teaching courses on the history of mathematics, and was therefore familiar with recent research on Pythagorean mathematics and music theory. I had not expected these two literatures to form such a combustible mixture, but a cascade of insights led, over several years, to the results reported here.

The direction this line of research took would not have been possible without my teachers. At Princeton, while specialising in mathematics and computers, my sometime advisor, Carlos Baker, made me take a course in literature nearly every term. For four years, I was at least exposed to the rigours of the art of close reading in the preceptorials of the English and Comparative Literature departments, and became acquainted with the various structures used by writers such as Dante, Spenser, Mann, and Ashbery to unify their compositions. Later, while working on a Ph.D. in philosophy at Stanford University with Nancy Cartwright, Peter Galison, and John Dupre, and specialising in the history and philosophy of science, I also studied Greek philosophy with Julius Moravcsik, Wilbur Knorr, and Jean Hampton. Although more of my time was spent with Aristotle's physical and cosmological treatises, Wilbur Knorr was kind enough to debate his research on structure in Plato's *Laws* with me.

I would like to thank two Plato scholars here in Manchester who encouraged this work in its early stages. The late David Melling was the first to say, in a scrawl across a draft, 'The patterns that you see exist.' Harry Lesser greeted me after reading another draft with a mischievous smile and said 'It's just the kind of thing Plato would do.'

This work has been supported in the first place by my friends and colleagues at Manchester University whose critical enthusiasm and encouragement survived a long series of draft papers, several formal and informal lectures, and many animated conversations. I would like to thank the Centre for the History of Science, Technology and Medicine, especially the director Michael Worboys and the former director John Pickstone, the administrator Gillian

Mawson, Vladimir Jankovic, Ian Burney, Jeff Hughes, Simone Turchetti, Elizabeth Toon, Carsten Timmermann, and James Sumner, for providing a welcoming home for this research; the philosophers who read my drafts, Harry Lesser, David Melling, John Shand, Michael Rush, and Thomas Uebel; and the Philosophy and Classics departments for their hospitality over the years. My former friends and colleagues in the philosophy department at Notre Dame encouraged me to teach courses on Aristotle, and I would especially like to thank Bill Ramsey, Marian David, Leopold Stubenberg, Patricia Blanchette, David O'Connor, Don Howard, Lynn Joy, Ken Sayre, Paul Weithman, Chris Hamlin, David Burrell, and Ernan McMullin.

The excellent John Rylands Library at Manchester University provided unstinting support, but thanks must also be given for essential online resources such as JSTOR, the Thesaurus Linguae Graecae, The Internet Archive, and the Perseus Digital Library. Several open-source software projects were key: the TeXShop Latex program from the University of Oregon, the Python programming language from the Python Software Foundation, and the Unicode Consortium.

For their conversations, support, and encouragement during these busy years I would also like to thank Melanie Horton, H.P. Tinker, Amanda Williamson, Andrew Read, Steve Gingell, Andrew Grose, Sylvia Berryman, Mim Kennedy, Scott Kennedy, Dan Kennedy, Jennifer Bush, Andrew Kaufman, Nathaniel Dahl, Michael Tippner, Chris Scarlata, Evelyn Donegan, Lilian Crascall-Kennedy, John Crascall-Kennedy, Carole Crascall, John Crascall, and Louise Crascall.

Contents

Preface	i
1 Musical Structure in the <i>Symposium</i>	1
1.1 Structuring a Dialogue	5
1.2 Ancient Greek Music: Three Key Ideas	6
1.3 Plato's Symbolic Scheme	8
1.4 Harmony and Consonance, Disharmony and Dissonance . . .	10
1.5 Sevenths and Mixture	11
1.6 Quick Guide to the Strongest Evidence	14
1.7 Methodology and Responses to Possible Objections	19
2 An Emphatic Pattern in the Frame	27
2.1 A Theory of Music	28
2.2 Recurring Clusters of Features in the Frame	29
2.3 A New Kind of Commentary	31
3 Making the Musical Structure Explicit	47
3.1 Phaedrus	48
3.2 Pausanias	54
3.3 Eryximachus	66
3.4 Aristophanes	74
3.5 Agathon	86
3.6 Socrates and Diotima	96
3.7 Alcibiades	124
4 Parallel Structure in the <i>Euthyphro</i>	149
4.1 The Same Scale and the Same Symbolic Scheme	149
4.2 Quick Guide to the Strongest Evidence	151
4.3 The Sevenths	152

4.4	The Connection to Music	153
4.5	Another Kind of Evidence: Parallels Between Dialogues . . .	156
4.6	Marking the Notes	158
5	Extracting Doctrine from Structure	211
5.1	Aristotle on Virtues and Means	212
5.2	Stichometry and The Divided Line	213
5.3	Reading the Dialogues in Parallel	216
5.4	The Logic of the Argument and its Consequences	218
6	Some Implications	221
6.1	Interpreting the Dialogues	221
6.2	Problems with Anonymity and Intentionality	222
6.3	Interpreting Plato, Pythagoras, and Socrates	224
6.4	History of Music and Mathematics	226
6.5	History of Literature and Literary Theory	228
6.6	Ancient Book Production, Papyrology, Textual Studies	229
6.7	The Forward Path	229
A	Structure in Agathon and Socrates' Speeches	233
B	Markers Between the Major Notes	235
C	The Central Notes	243
D	Systematic Theory of the Marking Passages	247
E	OCT Line Numbers for the Musical Notes	263

Chapter 1

Musical Structure in the *Symposium*

This guide is aimed at two sorts of readers, or rather two phases of studying Plato's symbolism. The first want a quick introduction to the main claims and the key evidence that supports them, and begin with a very natural scepticism. They are aiming to make a preliminary judgement about whether the claims could be true. The second have passed through that phase and are ready to make their own thorough, critical assessment of the case – they want the substance of the claims and evidence laid out *in extenso*.

This chapter is designed for readers of the first sort. It introduces Plato's symbolic scheme, concisely surveys the strongest evidence, and briefly responds to a number of common questions and objections. At this stage, it may be helpful to refer to passages in the *Symposium* where the symbolic structure is most clear. To facilitate occasional forays into the text in chapters two and three, the annotations there have been kept as self-contained as possible (and so sometimes repeat material). For reasons explained below, preliminary evaluations of the evidence should begin with the more striking evidence highlighted in this chapter, rather than by proceeding at once through the dialogue from the beginning. After this chapter, these readers should turn directly to chapter four, which quickly shows that the same symbolic scheme recurs in the *Euthyphro*. These introductory chapters, one and four, make a strong *prima facie* case for musical structure in the two dialogues.

The next stage in assessing the case is to proceed through the two dia-

logues, traversing the embedded musical scale note by note and examining the range of symbols used to mark them in the text. The novel format in which the dialogues are presented here places the clusters of symbols at the centre of each left-hand page. Probably for the first time since antiquity, the dialogues are published with the uniform columns of text which throw the musical structure into relief. The annotations on the right-hand pages briefly characterise and interpret the symbols for each musical note in the scale.

Today most readers of Plato, Aristotle, Kant, and Russell are not also readers of Dante, Spenser, Joyce, and Mann. That is, symbolic and allegorical literature is out of fashion, and not only its methods and pleasures but its very motivation have become obscure. A generation ago, A. Kent Hieatt, a professor at Columbia University, discovered that Spenser, a prominent Renaissance Platonist, had built elaborate mathematical and astronomical structures into one of his best known poems, the *Epithalamion*. Although his poems may not quite have been studied as intensively as Shakespeare's, this mathematical structure should have been noticed earlier: the poem has 365 lines (one for each day) broken into 24 stanzas (one for each hour).¹ In the controversy that at first greeted Hieatt's claims, historians devoted much energy to recalling and explaining the motivation for an entire genre of literature. Richard Neuse, for example, said:

... Mr. Hieatt's discovery of a complex symbolism in the *Epithalamion*'s stanzas and line numbers is of capital importance... this framework of an ideal time fits in exactly with a cardinal feature of the Pythagorean aesthetic, namely the hidden or implicit harmony which the artist was supposed to impose upon his work. Thus the numerical-symbolic structure of the *Epithalamion* serves, in Pythagorean fashion, to express its secret affinity with the mathematical order of the universe ...²

The existence of numerical and other symbolic patterns in Spenser's poetry has since been widely accepted and incorporated into undergraduate curricula.³ Some of the preliminary objections to the methods and theses

¹Fowler quipped 'but humanists can't count.'

²Neuse [?, p. 161].

³For the initial discovery and debate see Hieatt [?] and Fowler [?]. Two volumes by Heninger are of special note. In *Touches of Sweet Harmony: Pythagorean Cosmology and Renaissance Poetics* [?] he surveyed Renaissance Pythagoreanism and its impact on the arts of the day; in *Spenser and Sidney* [?] he gave a close reading of the Pythagorean structures of a range of poems. By the 1990's, authoritative review articles endorsing

advanced below simply register the relative obscurity of allegorical literature today.

The central claim of this chapter is that certain patterns of musical symbols are repeated at regular intervals through Plato's *Symposium* and mark out the notes of a known musical scale.

More specifically, the evidence below will show that passages containing subtle constellations of symbols are located at each twelfth of the way through the text of the *Symposium*. That is, clusters of terms with symbolic meanings are located at one-twelfth, at two-twelfths, and so forth.

The ancient Pythagoreans reportedly held that the cosmos had an underlying musical or mathematical structure. This was believed, at various times and for various reasons, to be extremely subtle and accessible only to those advanced in philosophy. Plato was thought by many of his contemporaries and followers to have been influenced by the Pythagoreans, and the commentary below will claim that Plato, adhering to a 'Pythagorean aesthetic,' built a similar, musical structure into his dialogues.

Plato used the underlying scale as an outline for his dialogues. Arguments and episodes fill out one or more of the intervals between notes. Major concepts or turns in the arguments tend to be located at the notes. Shifts in the narrative, such as the beginnings and ends of speeches, tend to occur near musical notes. Thus there are two major kinds of evidence for the underlying scale: the clusters of symbols at the locations of the musical notes and the correlations with important features of the narrative.

The first section below explains how it was possible for an ancient author to structure a long literary composition. The next section introduces a few ideas from ancient Greek music which are needed to understand the symbolism. The following sections survey several different kinds of evidence.

Many or most writers who use literary symbolism aim both to conceal and communicate: to use subtlety in a way that at first puzzles and then seduces readers into unearthing the deeper meanings of their works. Plato's idiosyncratic symbolism has been rendered doubly subtle over time. Not only was he writing in another language and culture, but the musical ideas he used are distant from our own.

the claims of Hieatt, Fowler, and others appeared in the *Spenser Encyclopaedia*[?]. See the articles 'number symbolism, modern studies in,' 'number symbolism, tradition of,' 'pun,' etc. See also textbooks such as *The Yale Edition of the Shorter Poems of Edmund Spenser* [?].

There is a report in Vitruvius, in the first century BCE, that ‘Pythagoreans’ mathematically organised their writings.⁴ The following provides evidence that Plato was such a Pythagorean. The lengths and structures of Plato’s dialogues have already been examined by scholars in a range of small-scale studies, but these depended upon hand-counts and were riddled with errors.⁵

The so-called neo-Pythagoreans, also from about the first century BCE, claimed that Pythagorean doctrines were symbolically embedded in Plato’s dialogues. Tarrant summarises the fragmentary remains of these neo-Pythagoreans (*italics original*):

All this suggests [their] belief that Pythagorean doctrines are *hidden* in Plato, who for one reason or another is reluctant to reveal them, and *that true Pythagoreanism can be teased out of Platonic texts by in-depth interpretation*. Like Thrasyllus, [other Neo-Pythagoreans like] Moderatus, Numenius, and Numenius’ friend Cronius were all supposed to have written on the first principles of Plato and Pythagoras in such a way that they had somehow anticipated Plotinus... So it would seem safe to say that something quite esoteric is regularly being detected beneath Plato’s text, concealing details of the allegedly Pythagorean metaphysic that Pythagoreans, almost as a matter of faith, supposed to exist there.⁶

Thrasyllus, the editor of Plato’s works and court philosopher to Tiberius, is paraphrased at length in Theon’s *On the Mathematics Useful for Reading Plato*. This work has puzzled historians because it reviews topics which seem to have little connection to the dialogues. In particular, it discusses at length a musical scale of twelve, regularly spaced notes which is nowhere mentioned by Plato.⁷ The author of the pseudo-Plutarchian *De Musica*, parts of which may also date from the first century, also explicitly associates

⁴*De Arch.*, V, *Prol.* 5.

⁵Manual stichometric studies of Plato’s dialogues have been carried out in various ways by Birt, Schanz, Harris, Dodds, Berti, and others, but were primarily aimed at inferring the lengths of the lines and columns on the papyrus sources of surviving manuscripts. See Birt [?, p. 440, etc.], Schanz [?], Harris [?], Dodds [?, p. 46], Berti [?]. This is apparently the first report of computer-based, stichometric investigations of Plato’s dialogues. This lacuna is surprising in an era when computerised, stylometric studies have been undertaken by a number of scholars (reviewed in Brandwood [?]).

⁶Tarrant [?, pp. 84 – 85].

⁷Hiller pp. 47.18 – 49.5 = Tarrant T13, Hiller 85.8 – 93.11 = Tarrant T14a.

a scale based on the number twelve with Plato.⁸

1.1 Structuring a Dialogue

To structure the *Symposium* by locating symbolic passages at regular intervals, Plato needed a way of counting or measuring the lengths of long speeches.

Classical Greeks counted the number of lines in their literary works in ways perhaps similar to the way we count the pages in a book or the words in an essay. The practice of counting lines, ‘stichometry,’ has been carefully studied by scholars of ancient book production and by papyrologists interested in piecing together works from their fragments. As Plato mentions in the *Laws*, the Homeric line (hexameter) was used as the conventional unit.⁹

There is evidence that classical literary papyri were typically produced with uniform columns each of which had a uniform number of lines.¹⁰ Thus, when it came time to pay a scribe or purchase finished papyrus rolls, the total number of lines was easy to count. Library catalogues recorded these line counts, and they were used to check that their copies, which could extend over several rolls, were complete. The evidence presented below indicates that Plato used this everyday practice of stichometry to structure his dialogues.

The uniform lines and columns of classical papyri would have made detecting Plato’s regular symbolism easier. Later copies, perhaps from the time of the library at Alexandria, generally did not have uniform lines and columns, and this would have made Plato’s subtle symbolism even more obscure. Our Stephanus pages and paragraphs have irregular lengths and occasional gaps (as, for example, between books in the longer dialogues). Thus, from sometime around the Hellenistic period until the invention of the word processor, it was effectively impossible to discover Plato’s stichometric structure.

⁸Ps.-Plutarch, *De Musica*, 1138 = 120,26 ff. and 120,33 ff. Laserre.

⁹The standard work on stichometry, Ohly’s *Stichometrische Untersuchungen*, finds evidence (too extensive to be reviewed here) that the practice was already common during Plato’s lifetime. Ohly finds the earliest reference to measuring texts in heroic lines in Plato’s *Laws*, and concludes from a variety of pieces of evidence that ‘... in Platos alter wurde also der Hexameter bereits als Maßeinheit verwandt ...’ *Laws* 958e9-59a1 is discussed at Ohly [?, p. 93].

¹⁰For pictures and an introduction for non-specialists, see, for example, Thompson [?].

The dialogue below is presented with uniform ‘columns’ and thus restores an approximation of the classical format.¹¹ Even without the commentary, careful readers might notice that passages with similar structures recur in the middle of every column.

1.2 Ancient Greek Music: Three Key Ideas

Plato used a simple, mathematically regular musical scale in his dialogues. It may therefore be introduced without reviewing much of the theory and terminology of ancient Greek music.¹²

The Scale. Plato’s Socrates distrusted mere appearances and knowledge based on the outer senses. In the *Republic*, Socrates criticises the scales used in the music of his time for being based upon mere sensation and custom.¹³

The Pythagoreans famously discovered that pairs of notes blended in a pleasing, harmonious way when they were produced by pairs of strings whose lengths had simple ratios such as 1·2, 2·3, and 3·4 (the octave, fifth, and fourth). These harmonies will be produced when a long string is sounded together with another string of half, or two-thirds, or three-quarters of its length. Since twelve has many factors, it is convenient to choose a long string with a length of twelve units so that the harmonies will correspond to ratios between integers (6·12, 8·12, and 9·12).

This leads naturally to the idea of a scale of twelve notes produced by strings with lengths corresponding to the integers from one to twelve. In the *Symposium*, symbolic passages are located at each twelfth of the dialogue, and these will be associated here with the integers 1 to 12. The midpoint of the dialogue is therefore note 6 in the musical scale. The beginning of the dialogue will be note 0.

¹¹Locations of passages within each dialogue were measured here by stripping out everything but Greek letters from files containing the Oxford Classical Text editions of the dialogues, counting the letters, and inserting markers in the original files. That is, ‘invisible characters,’ punctuation, indications of changes in speaker, and spaces were deleted. Plato’s autographs probably used little or no punctuation, but there is not universal agreement about this. It is sufficient, given the fundamental limitations on accuracy caused by the many minor corruptions in the text, just to count Greek letters.

¹²West [?], Barker [?], etc.

¹³e.g., 530d6 ff.

Quarternotes. There was a debate from the classical period onwards, mentioned in the *Republic*, Aristotle's *Metaphysics*, and Aristoxenus, about the smallest, audibly distinguishable intervals appropriate to musical scales.¹⁴ One view was that scales should include notes separated by a quarter of a whole interval (or 'tone'). The literature sometimes calls these intermediate notes 'quarternotes' and makes the interval between them a 'quarternote.' These terms will be adopted here.

In the *Symposium*, symbolic passages are also located at quarter-intervals between each of passages marking the notes from one to twelve. Thus, for example, in addition to the symbolic passage at wholenote 6, at the midpoint of the dialogue, there are similar symbolic passages at 6 and 1/4, at 6 and 2/4, at 6 and 3/4, and so on.

Relative Consonance. The theory of relative consonance plays a major role in Plato's symbolism.¹⁵ Each note in the scale has a property which depends upon its relation to the twelfth note. If a note blends well with the twelfth note, then it is more 'consonant'; if it blends less well then it is more 'dissonant.' There were several algorithms for calculating the precise relative consonance of notes in ancient times,¹⁶ but the different approaches agreed

¹⁴*Resp.* 531a4. Aristotle makes the quarternote (*diesis*) the principle of measurement in music (*Met.* 1053a12, 1087b33). Aristoxenus said in places that the ear and voice could distinguish no intervals smaller than the smallest *diesis* (*Harm.* 1.14, 20), and made it the smallest unit for music:

Let [a tone] be divided in three ways, and the melodious parts of it be the half, the third, and the fourth [*tetartion*, i.e., the quarternote]. Let the intervals less than these all be unmelodic. Let the smallest [the quarternote] be called the 'smallest enharmonic diesis' ... (*Harm.* I.21,22-28, cf. II.46,1-17)

Aristoxenus goes on to criticize some of his predecessors, the 'Harmonists,' who made 'close-packed diagrams' of scales with all the quarternotes marked, i.e., the *dieses* (I.28,1 ff., cf I.7,25 ff., II.38,4 ff., etc.). Barker reconstructs such scales using later evidence from Aristides Quintilianus: '[The Harmonists's] diagrams apparently took the form of a line divided into equal segments, each representing a quarter-tone' (Barker [?, p. 188]). West interprets Aristoxenus as criticizing those who would make an octave consist of twenty-four quarternotes [?, p. 79], which is consistent with representing an octave as the six intervals from 6 to 12. See Barker [?, pp. 188, 195].

¹⁵Theories of relative harmony are attested in the fragments of Archytas, Plato's contemporary, and were associated by later tradition with the Pythagorean preference for ratios between numbers in the *tetraktys*. See Huffman [?], etc. Relative consonance is not discussed in Barker [?].

¹⁶In one way of ranking the notes, the ratio with twelve was reduced to lowest terms, which were then added together. Then two was subtracted, and this produced a number which was regarded as the measure of relative consonance. For example, note 6 has a

that notes which formed small whole number ratios with note twelve were consonant:

More Consonant: 3, 4, 6, 8, 9

Similarly, notes which formed awkward ratios with note twelve were dissonant:

More Dissonant: 5, 7, 10, 11

Other notes, such as note 2, were relatively neutral.

There is some uncertainty about how Plato calculated the relative consonance of the quarternotes, but some general trends are apparent. For example, quarternotes between consonant wholenotes tend to be more consonant, and those between dissonant notes tend to be more dissonant.

1.3 Plato's Symbolic Scheme

At each point in the text of the *Symposium* corresponding to a musical note, Plato included a passage with a special structure. To maintain a balance between concealment and communication, he varied the content of these passages. If they were all the same or obviously similar, the underlying musical structure would be too apparent.

The scheme for varying the passages accords well with Platonism. Generally speaking, a Platonic form is recognised when a similarity between different particulars is recognised. A red hat and a red ball share a similarity, and this shared element is the 'form' of their colour. In the dialogues, the passages marking the notes have different contents but are also similar. Recognising the similarity of the disparate passages, and thus the regular pattern which forms the musical scale, requires grasping their common form. In short, the notes are marked by passages containing concepts that are many species of an over-arching genus.

All the genuine dialogues and some of the so-called spuria use the same musical scale and the same scheme for varying the marking passages, but the genus differs from dialogue to dialogue. To take a hypothetical example, it is as if a dialogue mentioned roses at one-twelfth, lilies at two-twelfths,

1:2 ratio with twelve. One plus two, minus two, is one. Thus note six has a relative consonance of 1 (lower numbers are more consonant). See West [?], Landels [?], etc.

violets at three-twelfths, and so on. Recognising the musical scale depends upon observing that the species of the genus 'flower' are mentioned at regular intervals. The pattern of repetitions is itself a form with the same structure as a musical scale with twelve regularly spaced notes. Another dialogue might, hypothetically, mention different species of colour (red, yellow, orange ...) at the twelfths.

In the *Symposium*, the notes are marked by various species of *harmonia*, i.e., by instances of the general notion of 'fitting together.' The Greek word may have a wider range of meanings than the English 'harmony.' Its musical use was only one specialised sense.¹⁷

A theory of harmony appears in the *Symposium* itself, in Eryximachus' speech, and is key to understanding the various marking passages (the dialogues typically discuss the genus of the concepts used to mark their notes). For Eryximachus, *harmonia* has already become a philosophical term of art and means the blending of two opposites. Eryximachus emphasises that two opposites cannot 'harmonise' while they differ or disagree. Thus 'harmony' means a thorough kind of blending in which different ingredients are so 'homogenised' that they somehow overcome their individual distinctiveness.

There are three important Greek words for blending ingredients. 'Harmony' is used when the emphasis is on the ingredients fitting together. 'Krisis' connotes a blending or fusion. 'Synthesis' just means 'putting together.' In Greek generally, as well as in the *Symposium*, the overlapping meanings of these words were recognised, as in the definition reported by Aristotle:

... a harmony is a *krasis* and *synthesis* of opposites.¹⁹

Eryximachus' speech explicitly associates harmony and *krasis* (188a4).

The following list surveys various species of harmony used to mark the musical notes in the *Symposium*:

- Verbal Agreement (*homologia*)
- Acceptance of an Invitation (a kind of agreement)
- Unanimity or Likeness of Mind (*homonoia*)

¹⁷The Greek word *harmonia* originally applied to a wide range of things 'fit together.' Its special musical sense slowly became more pronounced during and after the fifth century.¹⁸

¹⁹The whole sentence is 'Some say the soul is a harmony, for a harmony is a *krasis* and *synthesis* of opposites.' *De Anima* (407b30-32)

- Logical Agreement (*homologia*)
- Krasis or Blending
- Erotic Partnership
- Beauty (called a ‘harmony with the divine’)
- Participation (of particulars in forms)
- Musical Harmony (*harmonia*)

1.4 Harmony and Consonance, Disharmony and Dissonance

Things fit together to different degrees. A smooth and thorough blend is more harmonic; a rough, tense, or unstable blend may be termed ‘disharmonic.’ As the *Timeus* says,

... insofar as sounds are faster and slower, they appear higher and lower; sometimes their movements are disharmonic (*anar-mostoi*) on account of the dissimilarity of the motion they make in us, and sometimes their movements are harmonic (*ksumphōnoi*) on account of similarity (*Ti.* 80a3-6).

This spectrum, from more to less harmonic, was put to use in a remarkable way in Plato’s musical scheme.

The more consonant notes in the scale are marked with more harmonic combinations. For example, Hephaestus’s offer to weld together the two lovers, to fuse and so ‘harmonise’ the soulmates forever, marks a consonant note. Conceptual *krasis* marks musical consonance.

On the other hand, the more dissonant notes are marked by disharmonic combinations. The Socratic elenchus, for example, is an ‘agreement’ (and so a kind of harmony) that the interlocutor has been self-contradictory (a kind of disagreement with one’s self, or disharmony). Aristotle simply calls an elenchus a ‘combination of opposites’ (*sunagōgē*, *Rh.* 3.9.8). The conclusion of Socrates’ elenchus of Agathon, for example, is located at a dissonant note. Here, cognitive dissonance marks musical dissonance.

The structures of Plato’s dialogues have often been found puzzling. The literature on the *Phaedrus* and the *Republic*, for example, has criticised

their disjointed and sometimes meandering narratives. The *Republic* has even been thought, since the Nineteenth Century, to be a combination of separate tracts loosely stitched together.²⁰

If it is possible to generalise, literary, philosophical, and even musical compositions often build through a series of secondary climaxes or complications to a final climax and denouement. Though Plato's dialogues pioneered discussion of literary form, they themselves seem to fail to correspond to this or any other clear scheme. They often seem to reach major conclusions and then to move onto other, secondary subjects – or simply to peter out in dubious myths.

The underlying consonance and dissonance of the musical notes accounts for the peculiar structure of Plato's dialogues. Major advances, the conclusions of arguments, and dramatic highlights tend to occur at consonant notes. Refutations, discussions of Hades, and portraits of tyrants mark dissonant notes.

In the *Symposium*, the good-humoured whimsy and benevolence of Aristophanes' speech stretches across a range of consonant notes. The two dramatic highlights near the end of Diotima's speech, the begetting with beauty and the vision of the great ocean of beauty atop her 'ladder,' mark the two most consonant notes in the musical scale.

Agathon is a promiscuous poet whose speech is criticised by Socrates for failing to tell the truth. Alcibiades is a failed philosophy student who notoriously went on to betray his country. Their speeches occupy the two most dissonant ranges of notes in the musical scale.

In the following, 'consonance' and 'dissonance' are always terms from musical theory, and measure the relative consonance of a musical note (combination with the twelfth wholenote is always presumed). 'Harmony' and 'disharmony' have the broad range of meanings listed in the last section, and indicate a more or less successful 'fitting together.'

1.5 Sevenths and Mixture

In the *Symposium*, the major notes in the twelve-note scale, the wholenotes and the quarternotes, are marked with various degrees of harmony or dis-

²⁰See, for example, Rutherford [?] on 'separtists' vs. 'unitarians,' Lear [?], Lesser [?], and Krohn [?] on the *Republic*.

harmony. There are other locations in the text, however, which are marked by different symbols. The passages located after each seventh of the way through the text, that is, at one-seventh, two-sevenths, and up to sixth-sevenths, are very dissonant and are marked with the opposite of ‘harmony.’ To understand these passages, a few ideas from the Greek theory of mixture are needed.

Greek philosophers developed theories of how physical objects were combined, and tended to distinguish thorough blending from a mere ‘mechanical mixture’ in which the ingredients retained their original characteristics. Thus blending a bucket of yellow paint with a bucket of blue paint to produce green paint was distinguished from mixing a bag of yellow marbles with a bag of blue marbles to produce a bigger bag of yellow and blue marbles. Combination without blending will here simply be called ‘mixture’ or ‘mere mixture.’²¹

Aristotle analysed the process of blending in some detail, and his theory clarifies a point made in Eryximachus’ discussion of harmonisation. In particular, blending for Aristotle continued until the ingredients were all homogenised, i.e., until their contrasting qualities altered and converged on some common, intermediate quality (as the yellow and blue paints each became green paint). Thus, in blending, the initially different becomes the same.²² This is the point Eryximachus is making when he criticises Heraclitus for seemingly confusing harmony and mere mixture:

It is quite absurd to say that a harmony differs or consists of things still differing. [Rather, harmony arises] out of high and low sounds which at first differ, and then later are made to agree by the art of music. A harmony, [in contrast,] would indeed not consist of high and low sounds still differing. (2/7) A harmony is a *symphōnia* ... (187a6-b4).

This passage may seem common-sensical but, in the context of Greek phys-

²¹The distinction between a harmony, *krasis*, or synthesis of ingredients, on the one hand, and a mixture, on the other, is common but the Greek terms used to describe these kinds varied, as Aristotle’s shifting usage shows. In the *De Anima*, for example, he uses ‘synthesis’ and ‘mixture’ loosely, and sometimes slides from one to the other (e.g., 408a13-8). In *De Generatione et Corruptione*, in contrast, he uses ‘mixture’ to mean ‘a thorough blend,’ and ‘synthesis’ to mean a mere co-location of ingredients (327a30 ff., e.g., 328a8-9). For Aristotle’s loose terminology, see Joachim [?, pp. 175 ff., 185] and Polansky [?, pp. 105 ff.]. Here, ‘synthesis’ is always a synonym for ‘harmony,’ and ‘mixture’ implies combination without such blending.

²²See for example, *Gen. corr.* 328a28 ff.

ical speculation, it makes the theoretical distinction between harmony and mixture explicit in the *Symposium*.

In the *Symposium*, the major notes are marked by passages which contain harmonies and disharmonies, i.e., partially or wholly successful blends of opposites. The sevenths, on the other hand, are marked by examples of mere mixture, temporary combinations in which the differing components commingle without blending and can emerge unchanged.

The traditional Greek lyre had seven strings,²³ and it is probable that the notes at the sevenths correspond to a scale used by such lyres. The semi-legendary musician Orpheus, for example, was associated with a seven-stringed lyre.²⁴ Within the scale of twelve-notes used in the *Symposium*, notes at the sevenths would all be very dissonant, i.e., when played together with the twelfth wholenote,²⁵ and this is the likely justification for marking them by mixtures.

The passage from Eryximachus' speech quoted above, for example, is located two sevenths of the way through the text (the point is marked by the '2/7' in the above quotation). That is, an explicit reference to mechanical mixture and its distinction from harmony marks a seventh note.

Although the interpretation of a single passage cannot be confirmed without studying a range of similar examples, the passage at one-seventh of the way through the *Symposium* provides a concise example of the way Plato could use symbols to mark notes. Phaedrus says there:

Orpheus the son of Oeagrus was (1/7) sent out of Hades unfulfilled, receiving a mere phantasm of the woman he came to get – she herself was not given – because he seemed too cowardly (inasmuch as he was a lyre-player²⁶) and did not dare to die for

²³For a general discussion, see West [?].

²⁴For the traditional seven-string lyre, see the Homeric *Hymn to Hermes*, l. 20 – 67, the Aristotelian *Problemata*, 19.32, and Horace's *Ode* 3.11. For the association of the seven-string lyre with Orpheus, see, e.g., Nichomachus of Gerasa's *Harmonics* in Jan [?, p. 266, l. 1 ff.].

²⁵The ratio between a note at one-seventh and the twelfth note is just $1 \cdot 7$, and this is not a small whole number ratio (nor is seven in the Pythagorean tetraktys). The seven-seventh is the same as the twelfth note on the musical scale, and would therefore be in harmony or 'unison' with it. Thus, only the first through the sixth sevenths are marked by mixture.

²⁶*kitharōdes*. West [?, p. 51]: 'There is no doubt that by *kithara* they meant a box lyre, as used by citharodes ...'

the sake of his love ... but schemed to enter Hades while still alive. (179d2-6)

Here, at one-seventh, we have a reference to the musician Orpheus, who had Pythagorean associations,²⁷ and a reference to a musical instrument which often had seven strings. Comparison to the other passages at the sevenths shows that the key idea here is that Orpheus was among the dead in Hades while still alive and later emerged unscathed. This is an example of a mere, temporary mixture between opposites which, together with the negative tone of sneering derision, marks this dissonant note. Juxtaposing references to Orpheus' music with an example of mixture is a fairly heavy-handed way to draw the attention of anyone counting lines to this passage.

Since the distinction between mixture and harmony was well-known, recognising that the sevenths are marked by mixtures constitutes another kind of evidence that harmonies mark the wholenotes and quarternotes.

There are other locations between the wholenotes, quarternotes, and sevenths which are marked by symbolic passages. For example, each interval between quarternotes is broken into eighths, and the end of each of these is typically marked by a brief phrase. In the following, the note located at the end of each such eighth will be called an 'octad,' for want of a better term. The brevity of the marking passages at the octads and at other locations between the major notes makes them difficult to interpret rigourously and so their discussion, except in a few cases, is avoided here.

1.6 Quick Guide to the Strongest Evidence

An evaluation of the evidence for the musical structure in the *Symposium* should start with the strongest evidence listed here, and not proceed at the outset from the beginning of the dialogue. There are several reasons for this. First, the passages marking the first few notes are emphatically marked with a complicated structure which is not typical of the rest of the dialogue. Second, wholenote two is neither very consonant nor very dissonant and thus is marked in a neutral way. Thus it is best to begin with the highlights selected here.

The next section examines various objections to the following evidence and the conclusions drawn from it.

²⁷Burkert [?, p. 125 ff.].

A simple notation for the musical notes will be used. The wholenotes in the scale are numbered with the integers 0 through 12. For brevity, the quarternotes between the wholenotes are numbered 1 through 3. For example, note 6.3 is the third quarternote after wholenote 6, and 3.0 is just wholenote 3.

The cogency of the following evidence can be simply sampled by comparing a handful of key passages. This approach also uses a bare minimum of music theory: just the well-known fact that the Pythagoreans associated small whole number ratios like 2:3 and 3:4 with ‘harmonies.’ The first step is to examine passages at locations in the *Symposium* (in chapter three) that correspond to fractions composed of small whole numbers: say two-thirds and three-quarters (i.e., notes 8.0 and 9.0). These passages are strongly positive and treat of topics such as beauty, love, and the forms. The second step is to compare these with locations that do not correspond to such fractions, such as ten-twelfths and eleven-twelfths (i.e., notes 10.0 and 11.0). These passages are strongly negative and treat of pain and rejection in a disharmonious relationship. If these two correlations, positive passages at small whole number ratios and negative ones elsewhere, seem coincidental, the same notes in the text of the *Euthyphro* in chapter four may be sampled.

The following sections surveys some of the stronger evidence. The first is restricted to objective features of the *Symposium*’s narrative; the second shows how harmonic theory is intertwined with content.

Narrative Structure Reflects Musical Structure

Plato uses the underlying musical structure as an outline for the dialogue. Major shifts in the narrative, such as changes between speakers, tend to occur at or near musical notes. Episodes fill out the intervals between notes and, within speeches, major developments or new topics occur at the notes.

Here and below, a passage is *at* a note when it is within two or three lines of the calculated position of the note in the Oxford Classical Texts edition of the dialogues; it is *near* a note when it within five or six OCT lines. In the *Symposium*, there are typically about forty OCT lines between quarternotes.

Dramatic Climaxes at Notes. The rhetorical and philosophical peak of Socrates’ speech, the vision of the form of Beauty in the great ocean of beauty at the top of Diotima’s ladder, lies *at* three-quarters of the way through the *Symposium*. This single fact is sufficient to establish a *prima*

facie case for some underlying structure. It may, of course, be an accidental coincidence. The probability of this can be reduced by adducing more evidence. For example, the secondary peak of Socrates' speech, the begetting with beauty, lies *at* two-thirds of the way through the text. Together, these two passages, at notes 9.0 and 8.0, are strong, initial evidence for the underlying musical structure.

Lengths and Locations of the Speeches. Another kind of simple, objectively measurable evidence is the lengths of the speeches and their alignment with the musical scale. The *Symposium* provides a good introduction to these features because of the many changes in speakers. The locations of the notes themselves are marked with passages describing a harmony or disharmony, and the speeches tend to begin or end on either side of these marking passages.

Aristophanes' speech ends at note 5.0. Agathon's speech begins at the next quarternote 5.1. Thus the intervening banter between Socrates and Agathon fills a quarter interval. Agathon's speech ends near note 6.0, and thus lasts for the three quarter-intervals from 5.1 to 6.0.

The banter between Agathon and Socrates that follows Agathon's speech also lasts a quarter-interval. Socrates agrees to make a speech at 6.1 and begins his cross-examination of Agathon there. Socrates finishes his speech at note 9.1. Socrates' speech thus lasts for the three whole intervals from 6.1 to 9.1, or one fourth of the entire dialogue.

It may, again, be a coincidence that Socrates' speech has such a length, but that its beginning and end are also aligned with notes in the scale requires two such coincidences.

The Musical Scale as Outline. Aristophanes' speech clearly shows how the major sections and developments in the speeches are organised by the underlying musical scale. Each major step in his speech is lodged at a musical note:

- At 4.0, the three primitive wholes are introduced (male, female, androgyne)
- At 4.1, they are cut apart by Zeus to restore virtue.
- At 4.2, the halves are seeking re-unification through love.
- At 4.3, Hephaestus envisages the unity or 'harmonisation' of the lovers.

Episodes Fill Out Musical Intervals. Episodes or unified sections of the *Symposium* tend to occupy an integral number of quarter-intervals. For a further example, in the second line of the dialogue, the narrator begins to recollect an earlier request to recount the events at Agathon's party. This passage of recollections lasts from the opening of the dialogue to the first quarternote, and thus fills one quarter-interval.

Octads. The musical structure is closest to the surface of the dialogue at the climax of Diotima's speech. As mentioned above, the quarter-intervals between the major notes are broken into eight short sections whose ends are each marked with a brief phrase. Diotima's ladder is a particularly clear example of these 'octads.' Each step up the ladder is located at an octad. The ascent begins at a quarternote and the steps are equally spaced in the text:

- Step 1 at Quarternote: Love a single body (8.3)
- Step 2 at Quarternote: General form of beauty in bodies (8.3)
- Step 3 at Octad 1: Beauty in the soul
- Step 4 at Octad 2: Beauty in activities and customs
- Step 5 at Octad 3: Beauty in branches of knowledge
- Step 6 at Octad 4: Ocean of beauty: philosophy
- Step 7 at Octad 5: The vision of the final end or telos of erotics

The description of the form of beauty that follows stretches from the fifth octad until the peak at 9.0.

Similarly, when Agathon ticks off features of Eros, his beauty and virtues, each of these is located at an octad:

- Octad 2: Beauty
- Octad 3: Justice
- Octad 4: *Sōphrosunē*
- Octad 5: Courage
- Octad 6: *Sophia*

In both these examples, the equal spacing of the key phrases as well as their alignment with the musical structure militates against the possibility that these structures are accidental.

Sevenths. As mentioned above, Orpheus, who was known for his typically seven-stringed lyre, enters one-seventh of the way through the dialogue. Comparison with the passages at the other sevenths suggests they describe mere mixtures of opposites: live with dead, wise with foolish, etc. Just such a mixture, wherein things are combined ‘while still differing,’ is discussed at the second seventh.

Musical Symbols: the Correlation with Harmonic Theory

Not just the lengths and positions but the content of the speeches is carefully co-ordinated with the underlying musical scale. This correlation is surprisingly consistent.

Harmonies. The two climaxes of Diotima’s speech with their rarified praise of beauty are at two of the most consonant notes (8.0 and 9.0). Beauty is, she says, a kind of harmony with the divine, and this makes beauty an appropriate marker for these consonant notes.

Another form of harmony is a *krasis*, the thorough blending of once distinct elements. Hephaestus’ offer to weld together the two lovers permanently is the most vivid example of a *krasis* marking a consonant note (4.3).

Eryximachus’s explicit definition of ‘harmony’ in music, erotics, and medicine marks a consonant note (3.2), and is part of a series of consonant notes marked by passages describing kinds of harmony:

- Harmony at 3.0: Heavenly Eros leads to virtue (participating in goodness).
- Harmony at 3.1: Medicine harmonises bodily forces.
- Harmony at 3.2: Definition of musical harmony.
- Harmony at 3.3: Prophecy harmonises gods and humans.

Disharmonies. In contrast, disharmonies mark the dissonant notes. For example, the passage at note 7.1 describes the opposing virtues and vices Eros inherited from his parents, Resource and Poverty. The negative traits are lodged at the note and his discordant character marks this dissonant note. Here, the opposing elements are permanently harnessed together, but they remain an unhappy combination of positive and negative.

Socrates’ elenchus of Agathon marks note 6.3. This is, again, an agreement (harmony) that assertions have been contradictory (disharmony), and this

combination is a ‘fitting together’ in a negative or jarring way – which is disharmonious.

The interval between the tenth and eleventh notes contains many of the most negative and vivid passages in Plato’s dialogues. This is the location, for example, of the *Phaedo*’s tour of the underworld and the *Republic*’s account of the tyrant’s vices. In the *Symposium*, this quite dissonant range of notes is devoted to Alcibiades’ frank retelling of his scandalous, failed attempt to seduce Socrates:

- Disharmony at 10.0: Socrates is compared to an ugly, piping satyr (killed by Apollo)
- Disharmony at 10.1: Alcibiades runs away from Socrates (breaking agreements, relationships), and again compares him to the satyr.
- Disharmony at 10.2: Alcibiades’ first advances are rejected (disagreement), he feels distress and aporia (inner disharmony)
- Disharmony at 10.3: Alcibiades’ awful offer to exchange sex and his patronage for Socrates’ moral help
- Disharmony at 11.0: Alcibiades is again rejected by Socrates and feels extreme distress and dishonour.

This dissonant range of notes is a sharp contrast to the consonant ranges surveyed above.

These highlights make a powerful, *prima facie* case for existence of musical structure in the *Symposium*. In the following chapters, the annotations to all the notes in the musical scale show that the scheme introduced here is applied consistently throughout entire dialogues, and provides new evidence for the depth and richness of Plato’s creation.

1.7 Methodology and Responses to Possible Objections

This guide, as mentioned at the outset, takes a direct route to the key evidence. Another monograph, in preparation, devotes considerable space to historical context, methodology, and the interpretation of the musical patterns. The following briefly responds to a few points which commonly

come up in discussions, but these can only serve as starting points for debate.

Interpolations, corruptions, and omissions have so altered Plato's texts during their transmission from ancient times that no accurate measure of location is possible.

There is a consensus among textual critics that Plato's dialogues are in surprisingly good shape, although there are thousands of problematic passages. For this reason, the measures used here can only claim an approximate, statistical accuracy.

Several factors operate to improve the reliability of the measurements. First, the important musical relationships are all relative. This means that only relative measures and not absolute locations are important here. That is, it is essential in this study to locate the approximate midpoint of the dialogues, but whether or not the total number of lines on either side of that midpoint differs appreciably from Plato's autographs is not important. Second, a fairly uniform distribution of textual corruptions will compensate for each other (they will 'average out'), and not significantly affect relative measurements. If smaller omissions and interpolations are scattered evenly through the text, they will not shift, for example, the measured midpoint of a dialogue. Thirdly, chapter five shows, surprisingly, that the 'error' in the measured position of the locations of passages can itself be measured. It is possible to measure 'how corrupt' our texts are, and so to re-calibrate and correct the measurements of relative location.

Careful study shows that the measurements of relative location reported here are generally accurate to within a fraction of a percent.

Plato had no motivation for hiding things in his dialogues.

The question of motivation is complex and made more so by sceptical worries about the inaccessibility of 'authorial intention.'

The debate must start, however, with the historical research on the common practice of 'reserving knowledge' in ancient religions, cults, s, and fraternal societies. It was then normal, as Burkert says,²⁸ to conceal knowledge of doctrine, ritual, practical techniques, etc. This had, among other things, the sociological function of reinforcing the cohesion of groups by emphasising the distinction between insiders and outsiders. Secrets had a 'mystique.' Before

²⁸Burkert [?, pp. 7 ff., 45 ff., etc.].

modern institutions like copyright, patents, and tenure created a culture which rewarded sharing information, withholding it was the norm.

The so-called Pythagoreans in particular were regarded in later antiquity as a sect which reserved its knowledge and used secret or cryptic ‘symbols’ of various kinds. The tales of persecution associated with the sect may have been one motivation for such concealment.²⁹

The core of Platonism, as it is generally understood, is a distinction between appearance and reality, between sensible things and the underlying forms. To say that Plato gave his dialogues a hidden musical structure is merely to say that he gave them the kind of structure he regarded as common to all things. Platonism itself is sufficient motivation.

Aristotle was in the Academy together with Plato for some twenty years. If there were symbolic layers of meaning in the dialogues, there would be some evidence for it in his treatises. But Aristotle’s Politics, for example, which discusses Plato’s Republic at length, never treats it as a symbolic text.

Aristotle’s comments on the sect he styles the ‘so-called Pythagoreans,’ especially the fragments collected by Ross[?], show that Aristotle was a knowledgeable outsider. He can contemptuously mock their scientific theories (e.g., at *Met.* 989b29 ff.) and generally treats their lore as mere myth. There is no indication in Aristotle’s writings that he was especially favourable to Pythagoreanism or an initiate.

Although Aristotle expresses admiration for Plato, there is little or no evidence in his treatises of any close relationship with Plato (who was some forty years older). Most of Aristotle’s information about Plato comes from reading the dialogues or public lectures. Perhaps motivated by Aristotle’s failure to succeed to the headship of the Academy, there were ancient rumours of hostility or some rupture in the relationship between Aristotle and Plato.

Aristotle did emphasise, like other members of the early Academy, that Plato followed the Pythagoreans, but there is no reason to think he would have been privy to any reserved knowledge.

The claims made here are a version of the ‘unwritten doctrines’ school of interpretation, but that was refuted long ago by Cherniss and Vlastos.

The view that there were esoteric, orally transmitted ‘unwritten doctrines,’

²⁹Burkert [?].

which has been advocated by Gaiser, Krämer, and others associated with the Tübingen school, was widely rejected by anglophone philosophers. More recent writers, however, have found a middle position. Dillon, Kahn, and Sayre, for example, agree that there was much discussion in the Academy about Plato's mathematical or Pythagorean metaphysics, but disagree that there was any sustained effort to withhold these views or transmit them orally alongside the 'exoteric' dialogues.

The theses advanced here should be sharply distinguished from claims about any putative unwritten doctrines. In short, the claim made here is that there are structures hidden *within* the dialogues using various kinds of symbols.

However, the structures found here in the dialogues do tend to accord with and corroborate the ancient reports of Plato's Pythagorean metaphysics, which are accepted by Dillon, Kahn, and Sayre, and which form part of the motivation for Tübinger interpretations.

If there were a musical scale embedded in the text, it would have been discovered before.

If a census were taken, it would probably be found that, from first-century Neo-Pythagoreans to Renaissance Neo-Platonists, the dominant view was that Plato used symbols to conceal deeper meanings of his dialogues. For most of history, Plato was the arch-allegorist. Much of the Western tradition of allegorical literature was avowedly inspired by Plato (Dante, Spenser, etc.). The turn away from this view, at first by Eighteenth Century theologians trained to read scripture literally, needs more study. Many of the early allegorical interpreters asserted that they themselves would not reveal the dialogues' deeper secrets. This was doubtless often claptrap, but will now need to be carefully re-evaluated.

The fragments of the early Neo-Pythagoreans, in particular, seem to combine an insistence on the presence of symbolic meanings in the dialogues with an emphasis upon the twelve-note scale (not just the well-known 6-8-9-12 schema for the octave). This could be a coincidence, but it is a striking one.

The argument is circular. Evidence is taken from the dialogues, used to construct theories, and then used to 'confirm' these same theories.

Philosophers have clarified the way that evidence-based, empirical theories generally emerge from a virtuous circle: patterns are abstracted from data

and generalised into theories, these are tested on broader sets of data, more refined patterns are abstracted, then more detailed or more exact theories are constructed, and so on. Theories generally rest on patterns abstracted from the evidence. The critical point is that new or broader sets of evidence are used in ever more general tests of the theory.

This is exactly what happened here. The patterns were first noticed in the *Republic*. In that longer dialogue, the passages marking the notes are longer and stand out in the somewhat meandering narrative. The question of whether the pattern was general was tested by examining all the genuine dialogues in turn. This is the reason that two dialogues are analysed here. The quite specific theory of the *Symposium*'s structure will be shown to fit the *Euthyphro* too.

A widely discussed criterion for the cogency of evidence-based theories is 'falsifiability.' Some theories, such as Marxism or Freudianism are elastic enough to accommodate any data: they cannot be proved wrong (or so their critics claim). A good theory should be stringent enough to fail. It should be incompatible with some data.

The present theory that there are musical patterns in Plato's dialogues is falsifiable in this sense. There are some ten dialogues, transmitted from antiquity, whose authenticity has been disputed. They are similar in content and style to the dialogues agreed to be genuine but are thought to be imitations or forgeries. As discussed in a separate essay [?], about half of these so-called spurious dialogues were found to have the twelve-note musical structure and about half not. This is important because it shows that the musical patterns are specific, stringent, and testable.

Thus the present theory is successful because it matched novel, more general sets of evidence and because, as might be expected, it failed to match some of the spurious dialogues.

The evidence consists of a series of coincidences.

All inductive theories are verified by matching theory to evidence, i.e., upon 'coincidences.' This is no fault in itself. Inductive theories are accepted when it is judged that the coincidences they rest on are not mere accidents. Although any single case may be an accidental coincidence, inductive theories generally proceed by accumulating so many 'coincidences' that the assertion that they are mere chance accidents becomes empty scepticism. The strategy here is therefore to provide an abundance of evidence, first

by collecting particularly striking instances and then by showing that entire dialogues accord with and thereby confirm the musical patterns.

Patterns are being imposed on rather than discovered in the text.

The claim here is that the patterns exist in the texts and are as objective as any observable pattern. Although it is sometimes fashionable to deride literary criticism as subjective, no sensible interpreter would deny that Dante, Spenser, or Joyce use symbols or allegories in their compositions (however much the detail may be debated). The argument here is that Plato should be considered a similar writer – or, indeed, a progenitor of that tradition.

The class of concepts supposedly marking the locations of the musical notes, the genus of ‘harmony,’ is so wide and loose that anything might count as a marker.

Two phases of inquiry should be distinguished: the first seeking to establish that the dialogues have a musical and stichometric structure, and the second seeking a comprehensive interpretation of the passages at every musical note.

In the first phase, the various kinds of strong evidence surveyed above are sufficient. Among these, there are clear instances in which species of harmony coincide with the locations of notes: such as Eryximachus’ discussion of musical harmony (3.2) and Hephaestus’ vision of the united lovers (4.3). In addition to these, there are other kinds of evidence for the underlying scale, such as the correlations with features of the narrative, which do not depend upon precisely delimiting the genus of ‘harmony.’

The problem of finding rigorous criteria for distinguishing among less clear cases of what counts as ‘harmony’ affects the second, ‘mopping up’ phase. The approach taken here has been to follow the explicit connections made in the dialogue. For example, beauty is said to be *harmostos* with the divine before note 8.0, and this is why beauty counts in this dialogue as a species of harmony. Similarly, rehearsing or practising speeches is said to foster the participation of mortal in the immortal after note 8.2, and so counts as a ‘harmonisation.’ It is true, however, that problematic cases remain – as might be expected in all literary interpretation.

Plato could not have inserted so many symbols without awkwardly disturbing the surface narrative.

It does require great ingenuity to write at several levels at once, but this is common in allegorical literature. In this regard, Plato’s writings are not

exceptional.

A musical scale of twelve, equally-spaced notes was not known to ancient Greek music.

It was not a common scale and may not have been used by musicians in performance. However, as the references above show, this scale and its near-variants were well-known to music theorists. Moreover, it is just the kind of scale the Socrates of Plato's *Republic* would embrace: its intervals are mathematically regular and are not determined by the limitations of our outer senses.

