Peripatetic Philosophy is divided into four thematically arranged main chapters ("Individuals", "Logic and Ontology", "Ethics", and "Physics"), and each main chapter consists of several subchapters. This user-friendly structure mirrors the layout of the *Hellenistic Philosophers* (1987) by A. A. Long and D. L. Sedley. However, in terms of typography, *Hellenistic Philosophers* is easier to consult because its commentary parts are printed in smaller font than the original passages, whereas in Sharples's book it is sometimes difficult to distinguish where the ancient text ends and the commentary begins, which affects the readability. In sum, *Peripatetic Philosophy* is a useful introductory sourcebook that demonstrates Robert Sharples's meticulous scholarship.

Iiro Laukola

Stefan Hagel: *Ancient Greek Music. A New Technical History*. Cambridge University Press, Cambridge – New York 2010. ISBN 978-0-521-51764-5. XIX, 484 pp., 115 figs. GBP 65, USD 115.

In 1992 Martin L. West (who passed away earlier this year at the age of 77) published *Ancient Greek Music*, which soon became a classic. Almost 20 years later Stefan Hagel has published a book with the same title as West's work, but his contribution, subtitled "A New Technical History", is not meant to challenge its predecessor. The main difference between these two books is their target audience. While West's book is an overview of its subject written in order to be accessible also to people without special knowledge of music, Hagel's book could be seen as an advanced sequel to West's work or any other elementary manual about ancient Greek music. Hagel himself clarifies his aim stating that "[…] this book does not claim to present some new key that unlocks the doors to all secrets. Instead, it keeps very much to the paths that have been opened by previous research, while trying to fit some previously unconnected pieces together, and in some respects suggesting (I hope) a more coherent view" (pp. xv–xvi). A strength in Hagel's approach to Greek music and musical instruments is the fact that he has practical experience of the subject as he has himself reconstructed *lyrai* and *auloi*, and, naturally, also learned the gentle art of playing them. Thus he is certainly the right person to search for a solution of the enigma: What was the relationship between ancient Greek musical theory and practice?

In the first chapter ("The Evolution of Ancient Greek Musical Notation") Hagel introduces his vision about the original conception of ancient Greek notation and its early evolution. As no first-hand evidence has survived on the subject, this chapter largely presents the author's own speculation based on internal structure of Greek notation and on clues offered by extant documents of ancient Greek music. One of his major aims here is to point out that there is nothing wrong with the fact that Lydian and Hypolydian *tonoi* are in an eminent role in the notation and that Dorian, which usually holds the central position in Ancient Greek musical theory and practice, is marginalised.

The second chapter ("Notation, instruments and the voice") deals with the ranges of different musical instruments and human voice and explores how these pitch ranges can be connected with *tonoi*. The author proceeds by observing, e.g., the different selections of *tonoi* that were associated with different kinds of music (e.g. *aulos* or citharodic music). He also investigates the ranges of *lyrai* and *kitharai* by analysing the physics of their strings based on materials that were used for manufacturing them and exploits the iconographical evidence on relative string lengths. He also

studies the relation between notation symbols and absolute pitches and offers a suggestion on how they should be connected.

Chapter 3 ("Notation in the handbooks") is a brief look at the notation included in the works of Boethius, Gaudentius, Alypius, Bacchius and in Bellermann's Anonymi. As in earlier chapters, the author emphasises once again the primacy of the Lydian *tonos* by underlining the fact that it regularly maintains a primary status also in these treatises.

In Chapter 4 ("Strings and notes"), the author focuses on *lyra* and *kithara* tunings and on the nomenclature of their strings. First he deals in a more general way with 'thetic' (modern equivalent 'by position') and 'dynamic' (modern equivalent 'by function') note names, i.e., the concept that is known solely from Ptolemy. He goes on by studying the question whether ancient sources are talking about 'thetic' or 'dynamic' *mesē* when they are referring to the melodic primacy of the note in question. He also deals with the document known as the '*koinē hormasia*', which seems to be a tuning procedure for the *kithara*, and the chapter ends with a brief general overview of the lyra tunings.

In Chapter 5 ("Fine-tuning"), the author examines the myriads of fine-tuning systems known from Greek musical treatises. He begins with some general considerations and considers the restrictions concerning the Greek scale systems. Then he discusses ancient approaches to fine-tunings, focusing on, e.g., the writings of Philolaus, Aristoxenus, Thrasyllus, Nicomachus, 'Timaeus Locrus' and Boethius. The latter part of the chapter concentrates on superparticular (*epimoric*) ratios, which can be formed with the mathematical formula: n+1:n (e.g., 3:2, 4:3, etc.) and deals with the evidence offered by Archytas, Eratosthenes, Didymus and Ptolemy.

In Chapter 6 ("Going beyond Ptolemy?"), the author speculates further about the questions that can be raised concerning Ptolemy's evidence. He takes a closer look at modality by discussing the focal notes (e.g., tonal centre, typical starting and final notes, etc.) and also considers the intervallic structure of Greek melodies. He offers some new evidence on this subject as he studies the question of how frequently individual notes occur in preserved ancient Greek musical documents, and in this way it becomes clear which notes are more often used than others, i.e., have a more important role in melodies.

Chapter 7 ("Assisted resonance") is on the resonators that Vitruvius describes in his *De architectura*. These sets of tuned resonating jars reinforced certain pitches and were placed in semicircles in the auditoriums of Greek stone theatres. The author compares here the numbers of resonators for each note with the occurrences of the notes in extant musical documents from the Roman era.

In Chapter 8 ("The extant musical documents"), the author moves yet more firmly from theoretical to more practice-related evidence by analysing the ancient Greek musical documents that have been preserved. He does not print the texts of these musical fragments here, but they can all be found in the *Documents of Ancient Greek Music* by E. Pöhlmann – M. L. West (Oxford 2001).

In Chapter 9 ("Aulos types and pitches"), the author deals with different types of *auloi* (and also *hydraulis*) and observes their pitches and scales. He arrives at his conclusions by analysing the iconographic evidence and instruments found in excavations of which most are, unfortunately, highly damaged. He also compares *aulos* scales with *tonoi* and extant musical documents, and, moreover, brings out practising musician's approach to the subject.

In Chapter 10 ("Before Aristoxenus"), the author concentrates on pre-Aristoxenian notation and harmonic theory. Furthermore, he contemplates the dating of the *harmoniai* known from Aristides Quintilianus (Aristid. Quint. 1,9) and offers a hypothesis on how these scales (and the

spondeion scale) could have been played on early *auloi*. Other subjects dealt with in this chapter are the 'enharmonic' intervals, lost 'modes' and the hypothetical early pentatonic phase of Greek music.

In Chapter 11 ("Synthesis"), the author offers an overview of the themes that he has considered in the earlier chapters. Finally, he proposes a new way of transcribing ancient Greek notation to modern note names and stave notation by stating that actually it is Lydian *tonos* (not Hypolydian as the traditional approach suggests) that should be considered to be equal with our natural scale. This concluding chapter is followed by a copious bibliography and indices of ancient passages cited, manuscripts, inscriptions, musical documents and personal names.

In general, one can say that the line of thought of this book is a little difficult to follow because it does not proceed in a chronological order and the chapters do not seem to be arranged according to a clear logic. The author himself justifies this solution by stating that "a purely chronological treatment would inevitably obscure the argument" and that "[t]he nature of the argument prohibited a nicely systematic arrangement of the chapters" (p. xvii). Still, the reader inevitably gets the impression that some of the chapters may have originally been meant to be published as separate contributions, because in this form the book resembles rather a collection of articles than a coherent whole. However, Hagel's bold way of connecting bits and pieces of evidence from various fields of research is admirable, although he occasionally seems to make over-the-top suggestions based on speculation rather than on actual hard evidence and in some cases it thus seems that his proposals do not stand on firm ground. Nevertheless, despite the fact that in some points Hagel's hypothesis might seem to be a bit far-fetched, his expertise in the field cannot be doubted and in many cases his conclusions are easy to agree with.

All in all, it seems clear that Hagel's *Ancient Greek Music. A New Technical History* is not the best choice for those not already familiar with the basic essentials of Greek musical theory and are looking for a general introduction to the subject. However, this book is a true cornucopia of fresh (and certainly thought-provoking) approaches to the subject and is thus warmly recommended to all those doing research on ancient Greek music.

Kimmo Kovanen

David Creese: *The Monochord in Ancient Greek Harmonic Science*. Cambridge University Press, Cambridge – New York 2010. ISBN 978-0-521-84324-9. XVI, 409 pp. GBP 65.

This book focuses on the most famous scientific instrument used in ancient Greek harmonic science, the monochord. As the name implies, it is an instrument that contains a single string whose pitch is adjusted with movable bridges. The monochord also includes a graduated rule, which is useful when the correlations between the string lengths and the musical pitches are observed. The invention of the monochord made it possible to analyse also visually the phenomena that were usually detected mainly by aural perception and mathematical reasoning. Thus it was ideal for demonstrating the theorems about the arithmetical ratios on which musical sounds are based and, naturally, also for scientific experimentation. In this book, the aim of the author is to contextualise the monochord and its use on four levels: 1. mathematical harmonics, 2. Greek harmonics more broadly, 3. Greek mathematics, 4. Greek science more broadly.