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.

The book begins with a compelling introduction (entitled "The geometry of sound") in which the author guides the reader gently into the realm of Greek harmonic science. Alongside the overview on the subject he presents his aims and the structure of the book in great detail.

In the first chapter ("Hearing numbers, seeing sounds: the role of instruments and diagrams in Greek harmonic science") the author attempts to clarify the role of the monochord in Greek scientific discourse and method by comparing it with other mathematical and scientific tools used by ancient Greek scientists with which it shares some affinities, e.g., the abacus, the armillary sphere, the parallactic instrument, and also diagrams and tables. The most significant aim of this chapter is to show how the monochord sits between the disciplines of arithmetic and geometry. The basic concept is that the monochord can be considered an audible diagram with which it is possible to demonstrate geometrically (i.e. by adjusting the length of a string) the relationships between numbers and sounds.

Chapters 2–6 proceed in a more or less chronological order from the first appearance of the monochord to Ptolemy's *Harmonics* (second century AD). In Chapter 2 ("Mathematical harmonics before the monochord"), the author establishes a *terminus ante quem* for the first appearance of the monochord and explores the achievements of 'pre-canonic' mathematical science. In Chapter 3 ("The monochord in context"), he wishes to point out how the introduction of the monochord (especially its use in the treatise known as the *Sectio Canonis*) was prepared by advances in harmonics, acoustics and mathematical argumentation in the fourth century. Chapter 4 ("Eratosthenes") is devoted solely to Eratosthenes (third century BC), who is credited (by Nicomachus [Nicom. *Harm*. 260, 12–17]) with producing a "canonic division" (*kanonos katatomē*), but the question examined here is whether Eratosthenes needed the monochord in his experiments at all when he created his tetrachordal divisions. Chapter 5 ("Canonic theory") deals with the period between Eratosthenes and Ptolemy. It concentrates on the appearance of the new science known as "canonics" (*kanonikē*) and explores what it involved. Chapter 6 ("Ptolemy's canonics") focuses on the role of the monochord and related instruments in Ptolemy's approach to harmonic science.

In summary, this book is the most thorough study on the monochord so far and thus it is obviously an important contribution to the field of ancient Greek harmonic science. Moreover, this work will also benefit the study of Greek mathematical science in general, because it also offers a diverse range of information on scientific instruments and their use in sciences other than harmonics. All in all, David Creese certainly has the talent to write with ease on complex topics and thus this book can also be recommended for those who are not already familiar with Greek harmonic science. Lastly, a tip for those who desire to explore mathematical harmonics also in practice, but do not have an opportunity to construct the monochord by themselves: nowadays it is possible to buy one, e.g., via Amazon.com, and to begin to follow the footprints of ancient Greek canonicists.

Kimmo Kovanen

Ioanna Patera: *Offrir en Grèce ancienne. Gestes et contextes*. Potsdamer Altertumswissenschaftliche Beiträge 41. Franz Steiner Verlag, Stuttgart 2012. ISBN 978-3-515-10188-2. 292 pp. EUR 59.

Unlike the title *Offrir en Grèce ancienne* might suggest, Ioanna Patera's work is not an overview of offering practices in ancient Greece, but instead examines offering from selected points of view