

HAGEL, (S.) *Ancient Greek music : a new technical history*. Cambridge: Cambridge University Press, 2010. xix, 484 p. £65.00 / \$115.00. 9780521517645.

Hagel's overwhelmingly brilliant book is the most important treatment of Greek musical technicalities since Ptolemy. With the humanities under attack, it shows clearly the triumphs possible when a great intellect is granted unbroken concentration. Hagel traces the evolution of Greek tonal systems and instrument design from the earliest written and archaeological evidence (Classical period, with literary fragments relating to the earlier centuries) down to latest notated scores. Hagel's treatment of written sources exhibits the highest level of philological competence in every area. But in fulfilling the ideals of *Altertumswissenschaft*, Hagel also establishes a methodological milestone for the emerging field of music archaeology, with consistent and authoritative reference to iconography, material finds of instruments, statistical analysis (especially on surviving scores and harmonic data from theorists), impressive experimental reconstruction of instruments (delighting conference audiences for years), a superabundance of complex but illuminating diagrams, and judicious use of ethnographic analogy. *A priori* positions, a weakness of many past (even recent) studies are largely avoided, sometimes refuted (e.g. pentatonic substrate), and if adopted generally supported by independent lines of argument. This holistic approach reveals the benign influence of Ellen Hickmann's International Study Group on Music Archaeology, with its most fruitful meeting of disciplines. The work thoroughly refutes the charges of naivety which musicologists have leveled at Classicists engaged in ancient musical studies. Indeed the techniques developed by Hagel could well be emulated by musicologists and ethnomusicologists generally.

It is the evolution of the *aulos* especially that emerges as a master key to unlock long-standing mysteries. Hagel shows repeatedly how peculiarities of the notation, theoretical classifications of tonal material, and note-distribution within surviving scores, are directly related to the abilities and limitations of *auloi* at different periods. The ancient core of the Greek notation derives not from some epichoric alphabet, but consists of abstract signs chosen for ease of writing and ability to be rotated unambiguously, thus forming the sign-triads upon which the older instrumental notation is constructed. This latter feature is related to the auletic practice of half-stopping holes to produce various intermediate notes to match those available on the lyre, as well as other microtonal shadings peculiar to the *aulos*. Various strata in the notation's evolution are uncovered on the basis of internal patterns and steady reference to early *harmoniai*, *tonoi* systems, and instrument finds. The original 'natural' key is shown to be Lydian, not Hypolydian as generally assumed, and Hagel accordingly calls for a new convention of transcribing ancient scores a fourth lower than customary—thereby also largely overcoming the problem of absolute pitch, generally considered about a third lower than transcriptions indicate. That this central key is called Lydian rather than Dorian, even as it presents what the theorists would identify as a Dorian structure, is given a convincing diachronic explanation: an original set of Classical *tonoi* were 'remapped' as the notation system expanded in order to avoid 'accidental' signs as much as possible. Hagel also shows how the notation and *tonoi* systems fueled the development of the *aulos* itself, which was continuously remodeled as composers expanded their harmonic horizons. This development is traced from the simple archaic *auloi*, with a handful of holes, to classical-era instruments (like that of Pronomos) bored with additional holes to allow several *harmoniai* to be played simultaneously, down to the sophisticated chromatic instruments of Hellenistic and Roman times, equipped with rotating sleeves and 'remote-operated' levers. Of many converging lines of evidence, one may note Hagel's concise analysis of Vitruvius' bronze theatre resonators: the architect's scheme is closely matched by note range and distribution in extant scores. Throughout Hagel discovers many specifics of aulos construction and playing technique, e.g. how two pipes were bored to complement each other, and that melodies were sometimes necessarily shared between the pipes. Hagel has practically resurrected the Greek art of the aulos, although of course many gaps remain in the evidence.

The central Lydian was favored until late antiquity for notating simpler melodies for lyre and *aulos*, while additional keys were needed rather by professionals devoted to increasingly extensive modulation. This explains the predominance of Lydian in the later extant fragments, theoretical

handbooks, instrumental ‘exercises’ accompanying Bellerman’s *Anonymi*, and the *koinê hormasia*. This last is shown to be a tuning procedure for the mature nine-stringed lyre (so strung already in the fifth century, when *hyperypatê* was added). The ‘confusion’ of Lydian and Dorian also helps explain the citharodic tunings of Ptolemy, which Hagel shows to contain startlingly accurate information about contemporary practice. Equally, however, the rapid rate of musical change is glimpsed from discrepancies between Ptolemy’s positions, later musical scores, and even the not-much later commentary of Porphyry, who apparently misunderstood several basic details of Ptolemy’s exposition. Hagel’s assertion that quite high overtones are capable of influencing modality and fine-tuning on the lyre is eventually made convincing by the correlation of Ptolemy’s figures for microtonal lyre-shadings on the one hand, and an analysis of note-distribution within the musical scores of Ptolemy’s era (after Ptolemy’s own novel terminology is convincingly explained against the history of notation/*tonoi*).

While Hagel advances our knowledge far beyond any previous study, and expects the reader to be familiar with sources and controversies, nevertheless his exposition is so lucid, and so richly illustrated, that some who have been perplexed by past technical studies may now finally understand the Greek notation, *tonoi*, etc. One must thank Hagel for the additional labor of presenting these difficult arguments in English, since they will reach the widest possible audience. Only rarely does his graceful and charming usage obscure the surgical precision of his intellect (the unfortunate copy-editor was presumably too bewildered to intervene).

Upon completing his masterful *Mode in Ancient Greek Music* (1936) R. P. Winnington-Ingram wrote: ‘I doubt if anyone has ever completed a book upon Greek music without feeling acute dissatisfaction both with his subject and with himself’ (p. viii). But S. Hagel has every reason to feel the highest satisfaction with both.

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