

Part 3, 'From Anger to Glory: Testing and Legitimizing', further explores the thesis that Hera is a gatekeeper, whose approval must be won by any illegitimate child of Zeus's who seeks admission to Olympus, with emphasis on Heracles and Dionysus. Particularly explored here is the importance of Hera's milk; according to what P.-D. and P. call the 'law of Eratosthenes' (citing *Cat.* 44), there is no possible way for Zeus's children to gain access to Olympus without being suckled or otherwise adopted by Hera. Here again, more discussion of the exceptions to the otherwise convincing case, such as Polydeuces and for that matter Helen, whom some traditions count as a goddess after her death, would have enriched the authors' analysis.

If I quibble with P.-D. and P. on some points, it demonstrates how deeply their fascinating arguments engaged, and by and large convinced, me. The book is erudite in the best sense of that word – full of ideas that are backed up by copious references to ancient texts or archaeological materials. Immediately after reading *The Hera of Zeus*, I reworked the lecture on Hera that I was about to give to students in my Greek myth course, and I foresee that it will significantly impact my research as well.

The Ohio State University

SARAH ILES JOHNSTON
sarahilesjohnston@gmail.com

READING HERCULANEUM POPYRI

FLEISCHER (K.) *Die Papyri Herkulaneums im digitalen Zeitalter. Neue Texte durch neue Techniken – eine Kurzeinführung.* (Hans-Lietzmann-Vorlesungen 21.) Pp. xii + 136, b/w & colour ill. Berlin and Boston: De Gruyter, 2022. Paper, £38, €41.95, US\$47.99. ISBN: 978-3-11-076623-3.

doi:10.1017/S0009840X23001130

This slender volume, the first introduction to Herculanum papyrology in German, concerns the extraordinary circumstances, challenges and opportunities of the Herculanum papyri. F. narrates the story of the discovery of the papyri and the harrowing efforts employed early on to reveal text on the scrolls. We are reminded that the discipline of papyrology was pioneered by Neapolitan scholars who laboured over scarcely legible carbonised papyri. The results, unrolled painstakingly with a machine developed by Antonio Piaggio, a Vatican librarian, turned out in the main to be philosophical works of Philodemus. They were a disappointment to European intellectuals, who longed instead for the recovery of grand literary works. This early history of the Herculanum papyri (Chapters 2–4) has been told before in other languages, but the story is told particularly well here, and F. continues the narrative where older accounts left off. The next two chapters orient readers to the known contents of the collection (G. Houston, *Inside Roman Libraries* [2014] also contains a fine treatment of this) and acquaint readers with the physical characteristics of the papyri and the nature of the pencil drawings (*disegni*) made not long after their unrolling. Chapter 7 provides a superb history of the editions of Herculanum papyri.

In the rest of the book F. is chiefly concerned with new frontiers of text from Herculanum. One of those is naturally the Villa dei Papyri, from which the library of Philodemus was once excavated by tunnel. New excavations in the 1980s (and limited

ones in 1996–98 and 2007–8) revealed that at least two floors existed below the structure known from the excavation in the 1700s. Only a very small portion of the villa has been explored. Presumably more scrolls lie hidden there, and their recovery could lead to nothing less than a ‘zweiten, kleinen Renaissance’ (p. 71). F. articulates the hope that at least small excavations could be carried out that target the unexplored rooms adjacent to the room in which Philodemus’ library was found. Could the rolls be read if they were found? Unopened scrolls from the excavation carried out in the 1700s will provide the test, and they are currently the object of study by scientists. F. rightly decries the ‘Oslo Method’, the last systematic attempt at dismantling the scrolls (1984–2000). It failed to produce much text, although some of the recovered text spectacularly proved that Virgil was an addressee of Philodemus’ *On Vices*, confirming the biographical tradition of Virgil’s Epicurean commitments. Now the goal is to unroll the scrolls virtually using data from tomographic scans. F. seems correct in saying that the leading work is that of computer scientist Brent Seales, whose research combines data from tomographic scans with machine learning to train an algorithm to recognise letters. Seales demonstrated proof of this concept by virtually ‘unwrapping’ a small scroll from Ein-Gedi, which revealed an extract of Leviticus, but the Herculaneum scrolls present a far greater challenge, since their ink contains less metal, and they are structurally more complex. F.’s suggestion of using a modern Piaggio machine to mechanically unroll the scrolls if they cannot be read virtually seems to me unlikely to find favour. The hope of virtual unrolling, and finally surmounting the destructive techniques of the past, already has a strong hold on imaginations.

Another frontier for new text, if less thrilling to contemplate, is the imaging of the papyri that have already been unrolled (Chapter 10). The images made by Brigham Young University at the turn of the millennium, called ‘multispectral’ (MSI) but in reality only capturing the papyri in the near-infrared range (950 nm), have proven a vast help to editors, their one defect being the tendency to obscure the problem of the layers. RTI imaging, employed by J. Hammerstaedt and K. Piquette (2014) on limited papyri, captures well the three-dimensionality of the papyri. F. focuses on hyperspectral imaging. He speaks from personal experience, since HSI employed in 2018 revolutionised his study of the *Index Academicorum*, a treatise in which Philodemus narrates the history of Plato’s school. The new imaging has enabled F. to read the back of the papyrus roll, which had been mounted on cardboard. In this rarest of cases, the back contains revisions of the text on the front, enabling us to see the work in progress. The new text gives us a great deal of new information on the prosopography of the Academic school, ranging from details of Plato’s own biography to the state of the school in Philodemus’ day, for which he provides information on his own authority. We learn from F.’s new discoveries that Philodemus was a friend of Antiochus of Ascalon, head of the Academic school, and his pupils. Philodemus’ philosophical friendships thus extended beyond the Garden. Finally, the index contains a large (six column) verbatim quotation from Apollodorus’ *Chronica*, the text of which is substantially improved from the new readings. These various discoveries, just outlined in this book, figure in multiple publications of F.’s. This section of the book can serve as a kind of index for those publications. HSI has not been applied to other Herculaneum papyri, but the team of Brent Seales is currently re-imaging all the previously opened papyri. This imaging will no doubt capture the three-dimensionality of the papyri as well as the traces of ink.

Following a thorough introduction to digital tools needed for editing Herculaneum papyri (Chapter 13), the last part of the book (Chapters 14–15) presents two case studies from F.’s research on the *Index Academicorum*. In the first, using fragmentary German sentences, he demonstrates the process of supplementing a Herculaneum papyrus. This

clever and insightful exercise for non-specialists (no Greek required) shows how a Herculaneum papyrologist must balance evidence provided by various sources: damaged papyrus, pencil drawings of the papyrus made before it deteriorated but often erroneous, and digital images that may flatten the problem of layers and consequently deceive the viewer. Sometimes, as F. shows, even the recovery of a small amount of text can result in a cascade of newly discovered text. His final case study illustrates the progress of his edition of the *Index Academicorum* by comparing an extract of his text with earlier editions and explaining the various improvements. It is a biography of his textual progress. This case study, in contrast to the previous one, requires a knowledgeable Greek reader.

F.'s book is a useful, up-to-date summary of the history of the Herculaneum papyri, a practical guide for reading and editing them, and a thoughtful reflection on current and future challenges in dealing with them.

Baylor University

JEFFREY FISH
jeff_fish@baylor.edu

EVIDENCE FOR ANCIENT MUSIC AND DANCE

MARGANNE (M.-H.), NOCCHI MACEDO (G.) (edd.) *Musique et danse dans le monde gréco-romain: L'apport des papyrus*. (Cahiers du CeDoPaL 10.) Pp. 121, b/w & colour ills. Liège: Presses Universitaires de Liège, 2022. Paper, €14. ISBN: 978-2-87562-331-7.

doi:10.1017/S0009840X2300094X

This slim volume published in French comprises four impressive chapters by specialists in ancient Greek music and dance. E. Pöhlmann, whose work on the few dozen surviving notated musical fragments has been invaluable to students and scholars for decades (notably in his collaboration with the late M.L. West on the authoritative 2001 publication *Documents of Ancient Greek Music*, abbreviated *DAGM*), gives a brief outline of scholarly investigations into ancient Greek music from their beginnings in the Renaissance to modern times. S. Perrot offers a fresh examination, with transcription and colour photograph, of a papyrus of unknown provenance, now in Yale, with musical notation (*DAGM* 134–7) that came to light in 1996, with a stimulating if inevitably inconclusive discussion of what can be surmised about the transmission and purpose of such papyri. M.-H. Delavaud-Roux asks whether ancient musical papyri were created with dance in mind, focusing on papyri containing portions of tragic texts. Finally, M. Kaisin discusses fourteen papyri from Oxyrhynchus that provide a range of evidence for the presence, repertoire and activities of actor-singers in Graeco-Roman Egypt in the first few centuries CE.

Much of the value of the book lies in the description and close analysis of the papyri, including some that have come to light since the publication of *DAGM*. While the purpose of notated musical documents on papyrus remains hard to establish, they will have had a more practical aim than the handsome musical inscriptions on stone that have contributed significant epigraphic data for understanding and realising the sounds of ancient Greek music. Pöhlmann helpfully extends his survey beyond the papyrological focus of the book's title to introduce the latter (with accompanying photographs): that is, the inscription of the Delphic peans of Athenaeus and Limenius from the late second century BCE and the