

Without Geometry: Mathematical Practice in Plato's Dialogues and the Early Academy

From a cohort of mathematicians associated with Plato's Academy arose a set of practices which came to dominate Greek mathematics so completely that they are now paradigmatic. These practices, exemplified by Euclid's *Elements* and similar works, include characteristic terminology, methods of proof and problem-solving, and conventions for presenting formal results. The network of Greek intellectuals who adopted and transmitted these practices came to act as a kind of professional school (recently named the "systematist school"), similar to schools of philosophy or medicine (Winters 2020). But while it is clear that this school was, in its earliest stages, closely tied to Plato's students and associates, the formation of its mathematical practices is more difficult to trace.

This paper attempts to contextualize the early history of the systematist school in the broader intellectual and mathematical landscape with which the Academy was interacting. Passages from three of Plato's dialogues (the *Meno*, the *Republic*, and the *Laws*) show Plato grappling with the practices of other mathematical traditions (Babylonian, Egyptian, and Pythagorean) (Fowler, 1999)—some of which would be adopted into systematist mathematics, and some of which would contribute to the methods of the primary Greek rivals of the systematist school. Surprisingly, the one methodological style that is not attested in the dialogues is that which became the characteristic mathematics of the Platonists: the systematist geometry of Euclid.

Though Plato does not seem to have been more than an educated amateur mathematician, his influence on Greek mathematics was far-reaching—to the point both that his insistence on mathematical education became the stuff of legend, and that later systematist mathematics was so closely entwined with Platonism as to be nearly indistinguishable. Proclus (*In prim. Euc.*)

calls Euclid himself a Platonist. By following the ways in which Plato receives and assesses the various mathematical practices attested in his dialogues, we can gain a better understanding not only of the philosophical and social issues at stake in the formation of early Greek mathematics, but also of the development of the Academy's early intellectual culture, which swept so powerfully through the ancient world as a whole.

Bibliography

Fowler, D. H. *The Mathematics of Plato's Academy: A New Reconstruction*. 2nd ed. Oxford:

Clarendon Press ; Published in the U.S. by Oxford University Press, 1999.

Proclus. *In Primum Euclidis Elementorum Librum Commentarii*. Edited by Gottfried Friedlein.

Leipzig: Teubner, 1873.

Winters, L. "Schools of Greek Mathematical Practice." Durham, NC: Duke University, 2020