Why Does Formal Deductive Logic Start With the Classical Greeks?
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Many ancient peoples studied “logic” in the broad sense of persuasion, but the study of formal deductive validity starts with the classical Greeks alone. For some reason, the only person to invent a study of deductive validity in virtue of form was Aristotle, and all other logicians, everywhere in the world, have had his example to follow. How can this be? We argue that formal deductive logic emerged in classical Greece as a result of two crucial factors—on geographical, the other political. First, unlike other regions in the ancient world, classical Greece had a geography that favored small states, dominated by large urban crowds. The ease of navigating the Mediterranean Sea caused the commercial classes in the Greek cities to grow, and the small size of these states—a consequence of the many mountains and islands of Greece—meant that these same commercial crowds ended up dominating the politics of the classical age. As a result, political questions were settled, not by kings or small groups of nobles, but in mass meetings like the Athenian Assembly. And the mechanics of these meetings put special emphasis on public argumentation. Second, these same crowds, when called to make political decisions, often behaved irrationally. Such crowds had dominated the Athenian Assembly, but when Athens lost its long war against Sparta, and then followed this loss with the execution of Socrates, a reaction among intellectuals led to the development of formal logic. Philosophers focused increasingly on the difference between rational argumentation and irrational, and this theme, first developed by Plato but later expanded by Aristotle, culminated in the world’s first known system of formal deductive logic. We attribute a change in intellectual history to aspects of political history, and we draw our argument from our recent book.

Negation and truth in Greek mathematics and philosophy
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Historians of mathematics assume classical semantics and classical theory of truth in their studies of Greek mathematics. However, there is no trace of any concept of negation in the Pythagorean version of arithmetic, even in its elaborate expositions by Neo-Pythagorean authors (Nicomachus, Theon, and others). This concerns affirmative sentences stating something ‘positive’ that can be confirmed by means of the construction of some configuration. No statements postulating the existence of a number identified by a negative property (or lack of a property), or statements asserting the impossibility of a construction is ever formulated in the extant sources [Vandoulakis 2010].

Negation is neither found in the texts of Hippocrates of Chios on the quadrature of the lune, quoted by Simplicius. Hippocrates’ visual mode of notation, that does not actually names geometrical objects, but serves as an index or marker indicating concrete geometrical objects is not compatible with an abstract concept of negation. Nor is found in Book II of Euclid’s Elements, which is considered of early origin.

Negation is also alien to Parmenides. His ontological universe is a positive true Being, lacking negative facts. It was Plato who first examined the structure of simple statements and defined negation in a way close to the concept of logical negation, irrespectively of their linguistic expression by the two Greek words: me or ou. Euclid in his Elements deliberately uses both these forms as logical negations in the style of Plato. Consequently, we have to adopt the periodization
standardly used in history of Greek philosophy to define a period of early Greek mathematics in sharp distinction to the subsequent classical Platonic era. During this period, both mathematics and philosophy lack a concept of negation and negative fact, and thereby a classical theory of truth, that were later developments by Plato and Aristotle [Wolenski 2004].

References

Redundancy and the Stoic Themata
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The most striking aspect of the Stoic notion of validity is their claim that redundant arguments are invalid. This, interpreted correctly, means that the consequence relation approximating the stoic notion of validity is not only non-monotonic, but anti-monotonic. Adding a single premise, relevant or irrelevant, to an otherwise valid argument results in an invalid argument. This claim is so alien to modern logicians that reconstructions of the proof system of the Stoics have either ignored it, claimed that the ancient sources on Stoic logic (largely opponents like Diogenes Laertius or peripatetics like Alexander of Aphrodisias) were simply mistaken, or significantly weakened the restriction, claiming only that the Stoics had some notion of relevance in mind.

I think that each of these courses is mistaken. I introduce the basics of the Stoic notion of validity, argue for a straightforward and literal interpretation of the rejection of redundant arguments against other interpreters, show how prior reconstructions violate this constraint, show how to give a partial reconstruction which accommodates all the evidence we have as to the nature of Stoic logic, and discuss some problems in understanding the Stoic notion of validity. I draw no firm conclusions about the Stoics’s notion of validity, but suggest some reasons to think that comparisons with modern conceptions of validity are misleading. And I close by putting forward two more plausible, though not unproblematic, interpretations of Stoic validity---one in terms of the notion of in virtue of or grounding, the other tied to a formal dialectical game---and argue that fruitful research on Stoic validity will proceed down one of the two paths.