



Aristotle's Syllogistic Underlying Logic: His Model with His Proofs of Soundness and Completeness

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This book presents a (new) attempt to apply the notion of an underlying logic to Aristotle's *Organon* and certain passages of the *Metaphysics*. The author situates his approach as part of a 'deductionist' school of interpreting Aristotle's logic in terms of inference, a school including such scholars as Smiley, Corcoran, and Ebbinghaus.¹ The main contention of the book is that Aristotle, just like a modern mathematical logician, had a theory of syntax, semantics, and deduction, and that the *Organon* can be understood as a modern mathematical project in which each of these domains is distinguished and worked out systematically.

As contemporary students of ancient logic know, the modern mathematical interpretation of the syllogistic began with Łukasiewicz's attempt to reconstruct the valid moods of Aristotle's syllogistic (as well as the rules of conversion) as true implications. The axiomatic interpretation of Aristotle's syllogistic took the first-figure syllogisms as axioms and the syllogistic itself as a demonstrative science of the valid syllogisms in the other two figures (*Łukasiewicz 1957*, 77–99; *Patzig 1963*, 137ff.). This interpretation involved assuming that certain elementary theses of propositional logic are presupposed in the syllogistic, theses such as:

- (1) $(p \supset q) \supset ((q \supset r) \supset (p \supset r))$
- (2) $(\sim p \supset p) \supset p$
- (3) $(p \supset \sim p) \supset q$

The idea was that these theses constitute a theory of deduction upon which the syllogistic is supposed to rely (*Łukasiewicz 1957*, 80). But Aristotle never discusses these theses. And so on this interpretation, Aristotle's system has a 'fundamental flaw': it relies on theses of propositional logic it cannot theorize. The axioms of the syllogistic are merely instances of true propositions of a system of propositional logic it cannot account for, for it is based on the false assumption that all propositions must be analyzed in terms of subject and predicate (*Łukasiewicz 1957*, 44). The deductionist interpretation as elaborated by the late John Corcoran sought to save Aristotle from this particular fault. Corcoran argued that the syllogistic indeed does have a theory of deduction, and that we need not supply one for it. This interpretation takes the syllogisms of the syllogistic to be 'models' upon which the theory of deduction operates in order to develop a theory of the 'underlying logic' of demonstrative sciences (*Corcoran 1974*, *Corcoran 2018*). The *Prior Analytics* present on this reading the theory of all deductive sciences. Aristotle's logic is not a science itself but a 'metascience' (*Corcoran 1974*, 87).

Boger's monograph picks up Corcoran's project and seeks to expand it to include the entire *Organon* (xiv). It contains six chapters. The first chapter lays out the deductionist interpretation

¹ *Ebbinghaus 1964*, *Smiley 1973*, *Corcoran 1974*. Ebbinghaus was the first to formulate an interpretation of Aristotle's syllogistic in terms of deduction rules, but his work is studiously ignored in the publications of Corcoran and, unfortunately, in the book under review. Ebbinghaus' work is surely known to any informed person working in the history of ancient logic: *Patzig 1963*, ii n. 2 cites it in connection with his second thoughts about reconstructing the syllogistic (with *Łukasiewicz 1957*) as an axiomatic system of propositional logic.

adopted in the book and its relation to the claim that Aristotle developed an ‘underlying logic’ as a system of deduction. The second chapter presents a ‘naturalistic ground for syllogistic epistemics’, by which the author seeks to establish a distinction between certain epistemic principles for recognizing deductive validity in Aristotle, and certain other ontic principles which underpin validity itself (49). This includes some rather controversial readings which are not justified at any length, e.g. the thesis that Aristotle’s discussion of the Principle of Non-Contradiction in *Metaphysics* Γ constitutes an endorsement of the Principle of Explosion (61–64). Chapter 3 presents translations of the *Prior Analytics* (A1–2, 4–6, 7, 23, 25, 30, 45) which are supposed to make clear that these texts are part of a ‘metalogical’ discourse concerning components which make validity evident. Chapter 4 presents ‘metasystematic analysis:’ the author attributes to Aristotle here a thoroughgoing formal syntax and semantics to complement his theory of deduction. Chapter 5 contains ‘metatheoretical results’, the theory of deduction. The sixth and final chapter contains remarks on Aristotle’s theory of sophistical argumentation; here the thesis is pressed that the theory of fallacies is to be read in the light of Aristotle’s syllogistic and the *Prior Analytics*. There are, unfortunately, no indices.

The topic of this book is treated by the same author in an extensive encyclopedia article in the *Handbook of the History of Logic* (Boger 2004). It would have been helpful to know how that article relates to this book. Boger begins the book by advertising that he has made several new discoveries since Boger 2004. He does not specify them. In any case, the book under review ignores important studies on Aristotle’s logic since 2004 which are relevant to his project. For example, Malink 2013 is congenial to the author’s approach at least insofar as one part of the *Organon*, namely the *Topics*, serves to supply the semantics for Aristotle’s modal syllogistic. But there is no reference to this and many other recent significant contributions to our understanding of the syllogistic. The book is also without reference to relevant contributions in the older scholarship. There is no mention of difficult questions about the relationship between the different parts of Aristotle’s *Organon* which have exercised the literature for many decades. To name just one such question: though we find the definition of a συλλογισμός at the outset of the *Topics*, Aristotle does not use this notion in his approach to finding rules of inference in the core books of the *Topics* (Maier 1900, 78 n. 3), leading one to ask if the *Topics* could have been written as they were if their author had been aware of the *Analytics*. This question constitutes a real problem for the approach of the author, but I could not find it addressed. The interpretative approach is a bit like that of a medieval commentary, where it is simply assumed that the *Organon* was conceived as one whole project (though it was the product of later editing). This assumption with respect to the entire *Organon* is simply no longer plausible, and it hasn’t been for almost two-hundred years (at the latest since Brandis 1835).

The anachronistic interpretation of Aristotle’s *Organon* as treating an underlying logic with precisely those components studied by the modern mathematical logician is implausible. But it is not therefore useless for gaining a better understanding of Aristotle’s logic. It yields in this book some interesting ideas. Anachronisms can be profitable. It gave this reader pause, however, to find certain desired results of interpretation simply baked into the translations themselves, as when Boger translates the phrase τινῶν τινῶν in the definition of the συλλογισμός as ‘certain protaseis having been supposed’ (110). Such renderings do not build trust in the presentation.

Finally, there is a whole in the heart of the argument. If Aristotle set out to construct an underlying logic of deductive sciences, we might expect the modal syllogistic to be an important part of that project, since knowledge-conducive demonstrations operate with necessary (i.e. modally qualified) premisses. And yet the book shuns Aristotle’s modal syllogistic. Perhaps the author would accept the opinion of Smith 2016 that the modal syllogistic was not developed with the *Posterior Analytics* in view, and that Aristotle’s theory of demonstration does not

require a modal syllogistic. But this in turn would seem to put pressure on the interpretation of the syllogistic as a thoroughgoing ‘metascience’. In any case, a comment on this issue would have been helpful.

Still, anyone who attempts to treat the *Organon* with a view to reconstructing it as one complete and coherent logical theory deserves recognition for trying something which – as this study amply shows – is very hard.

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