

Woods, John (2001). *Aristotle's Earlier Logic*. Oxford: Hermes Science, xiv + 216 pp. ISBN 1-903398-20-5.

Aristotle's best known contribution to logic is the theory of the categorical syllogism in his *Prior Analytics*, a theory which has been part of the teaching of logic for the intervening 2,300 years. Historians of logic largely ignore his earlier logical writings, the *Topics* and *Sophistical Refutations*. On the other hand, theorists of argumentation find in those writings much grist for their mills. The list of *topoi* or 'places' in *Topics* II-VII inspired Toulmin's (1958) concept of a warrant and Perelman's closely related concept of an argumentation scheme (Perelman and Olbrechts-Tyteca 1958). The dialogue game of refutation described in *Topics* VIII is the original system of Hamblin's (1970) formal dialectic. And the canonical list of 13 fallacies in the *Sophistical Refutations* originates what Hamblin (1970) calls the 'standard treatment'.

In contrast, John Woods finds in this pioneering study of the *Topics* and *Sophistical Refutations* a broad logical theory, with logical concepts used as inputs to a deductive system, about which metalogical results are generated. This theory of 'syllogisms-as-such' is the basis of the mature logic of the *Prior Analytics*, with its sweeping metalogical results. It also forms the basis in the early logical writings for theories of four types of syllogisms-in-use: demonstrations, refutations, examination arguments, instructional arguments.

Woods starts from Aristotle's definition of a syllogism, which he loosely translates (6) as follows: 'A *syllogismos* rests on certain propositions such that they involve necessarily the assertion of something other than what has been stated, through what has been stated.' (*Sophistical Refutations* 165a1-3) At the core of this definition is the concept of an argument as a discourse in which a conclusion is asserted on the basis of one or more premisses. The class of arguments is then narrowed down by the requirement that the premisses must 'involve necessarily' the assertion of the conclusion—in contemporary terminology, that the argument must be valid. It is narrowed down further still by the requirement that the argument be composed of what Aristotle calls 'propositions', a requirement that Woods takes to apply to conclusions as well as premisses of syllogisms, on the ground that the conclusion of any syllogism can be the premiss of another. A proposition, as Aristotle defines it, is a statement which predicates one thing of one thing, i.e. in contemporary terms a statement free of logical connectives other than negation and quantification. Woods suggests two possible reasons for this restriction: Aristotle's incorrect view in *On Interpretation* that all statements can be reduced to such propositions in a way that preserves their content, and his focus in the *Topics* on the use of syllogisms for the discussion of problems of determining whether some 'predicable' (i.e. a genus, accident, distinctive property, or definition) belongs to some subject, i.e. whether some proposition is true.

As to the condition that syllogisms are valid, Aristotle nowhere explains what he means by 'involve necessarily'. Undaunted by this lack of textual evidence, Woods invokes a methodological principle of simplicity: 'Keep the account of validity as simple as is consistent with its obligations in the theory of syllogisms.' (36) He takes this principle to imply that the relation of 'involving necessarily' conforms to Gentzen's (1969/1935) structural conditions for deductive consequence: it is reflexive, transitive, and monotonic, and obeys the cut rule. Further, the relation is classical, in the sense assumed by so-called 'classical' first-order logic (36). It may of course be doubted whether classical validity is simpler than, for example, intuitionist validity. Woods is on firmer ground in declining to build into Aristotle's conception of validity the other features of his definition of syllogisms-as-such: elementary non-circularity, minimality, and multiplicity of premisses. Why

would Aristotle mention these conditions in his definition unless they were additions to the requirement that syllogisms are valid?

Elementary non-circularity, the condition that the conclusion of a syllogism must be ‘other than’ any premiss, would be superfluous if validity were irreflexive; thus, the independence of the elementary non-circularity condition from the validity condition implies that validity is non-irreflexive, and it is simplest to take it as reflexive: any proposition necessarily follows from itself, in the sense that it is impossible that the proposition is false while being also true.

Minimality, the condition that the conclusion results ‘through’ the premisses (i.e. not through some proper subset of them), would be superfluous if validity were counter-monotonic, in the sense that any addition to the premisses of a valid argument would make it invalid; thus, the independence of the minimality condition from the validity condition implies that validity is not counter-monotonic, and it is simplest to take it as completely monotonic: a valid argument remains valid when further information is added to the set of premisses, i.e. when it acquires a redundant or irrelevant premiss.

Multiplicity of premisses, implied by the use of the plural of ‘certain propositions’ in the definition of syllogisms-as-such, would be superfluous if no valid argument had just one premiss; hence the independence of the multiple-premiss condition from the validity condition implies that at least some one-premiss arguments are valid, and it is simplest to assume that validity imposes no restriction on the number of premisses, even taking as a limiting case valid ‘arguments’ with no premisses—i.e. logically true statements like ‘Every human being is a human being.’

A further desideratum of Aristotle’s definition of syllogisms-as-such, Woods asserts, is that each of the three conditions of elementary non-circularity, minimality, and multiplicity of premisses is independent of the other two when applied to valid arguments. Unfortunately, Woods’ discussion of their mutual independence is marred by logical confusions. He takes independence of each condition from the other two to be shown by finding a valid argument which satisfies that condition but fails the other two (38). In fact, it is shown by finding a valid argument which *fails* that condition but *satisfies* the other two; only thus can one show that the condition in question adds something to the requirement that the other two be satisfied. Woods compounds his misconstrual of the independence relation by misreporting (39) the results of applying it. On a correct construal of the independence relation, correctly applied, elementary non-circularity is not independent of the other two conditions: if a valid argument has more than one premiss and none of its premisses is redundant, then its conclusion cannot be identical to any premiss. Minimality and multiplicity of premisses are however each independent of the other two conditions.

Despite his slips, Woods raises the correct interpretive question: Should we take multiplicity of premisses as part of Aristotle’s definition of syllogisms-as-such? On both Woods’ misconstrual of independence and the above correction of it, elementary non-circularity and minimality are independent additions to the requirement of a valid argument, if we do not require syllogisms to have more than one premiss. And these two conditions have additional textual support. Elementary circularity is an obvious begging of the question, which means that there is no syllogism (*Sophistical Refutations* 167a36-39, 168b25-26), and a superfluous premiss invites commission of the fallacy of taking non-cause as cause (*Sophistical Refutations* 167b21-36, 168b23-25). On the other hand, the *Sophistical Refutations* cites many one-premissed arguments whose fallaciousness is quite independent of their failure to have more than one premiss (see Hitchcock 2000). Thus the plural in

Aristotle's early definition of syllogisms-as-such may be an unintended restriction; perhaps only the developed theory of the *Prior Analytics* requires that a syllogism-as-such have more than one premiss.

Thus, on this initial reading, Aristotle conceives of a syllogism-as-such as (1) an argument with any finite number of premisses (including zero), (2) which is valid in the sense that it has no counter-model, (3) whose premisses and conclusion each contain no logical connectives other than negation and quantification, (4) whose conclusion is not identical to any premiss, and (5) which is invalid if any premiss is omitted. The point of the last three constraints, according to Woods, is to transform a theory of implication (i.e. of validity) into a theory in which inference (i.e. belief-revision) can be modelled. The distinction between the two, Woods claims, is an important discovery by Aristotle which should be heeded by contemporary proponents of non-classical logics, whether relevantist or intuitionist or non-monotonic. Contemporary theories of belief updating, he urges, should use classical logic as their base and impose additional constraints to get a theory of inference. He finds contemporary arguments against various principles of classical logic inadequate for their confusion of inference with implication.

Woods' initial interpretation of syllogisms-as-such unfortunately implies that no argument whose conclusion is a necessary truth is a syllogism. Consider the argument: all squares are rectangles; all rectangles are four-sided; therefore, all squares are four-sided. It remains valid if its premisses are omitted, since the conclusion 'all squares are four-sided' cannot be false. Since Aristotle regards demonstrations as a species of syllogisms-in-use, and all demonstrations have necessary conclusions, some adjustment to the initial interpretation is required. Woods' solution is to replace the minimality condition (5) with what we might call a 'no-terms-from-outside' condition (5'): Each term in the conclusion has an occurrence in at least one premiss and every premiss contains at least one term which occurs in the conclusion. He justifies this replacement by the gloss in the *Prior Analytics* of 'resulting because of them' as 'needing no further term from outside in order for the necessity to come about' (24b21-22).

The replacement of the minimality condition by the no-terms-from-outside condition is in my view triply misconceived. First, the gloss in the *Prior Analytics* tells against either condition as an interpretation of the 'because of' clause. For the gloss is a requirement that a syllogism have no unstated premisses, not a requirement that it have no superfluous premisses with totally extraneous terms. Woods takes it to imply that a syllogism *contains* no term from outside which is *unnecessary* for the necessity to come about; in fact, it requires that a syllogism *lacks* no term from outside which is *necessary* for the necessity to come about. Second, as Woods himself recognizes, abandonment of the minimality condition admits useless self-predications as premisses of syllogisms unless they are in some unsatisfactory *ad hoc* fashion ruled out as propositions (135-136). Third, arguments with more than one term between the subject and predicate terms of the conclusion would be arbitrarily ruled out as syllogisms—for example, the argument: vertebrates are warm-blooded; mammals are vertebrates; whales are mammals; therefore, whales are warm-blooded.

Woods' re-interpretation depends on the assumptions that an argument can have no premisses and that any such 'argument' whose 'conclusion' is a necessary truth is 'valid'. These assumptions may be logically elegant and simple, but it carries Woods' methodological principle too far to attribute them to Aristotle. Aristotle always treats arguments as having not only a conclusion but also one or more premisses. And in his earlier logic he explicitly recognizes demonstrations of necessary

truths as syllogisms (*Topics* I.1.100a27-29, cf. *Posterior Analytics* I.2.71b9-19); hence if syllogisms must meet the minimality condition, it is not sufficient for a conclusion to follow necessarily in Aristotle's sense that the conclusion be necessarily true (or otherwise the above demonstration of the four-sidedness of a square would not be a demonstration, since it would have one superfluous premise). If one defines an argument as a discourse in which a conclusion is drawn from at least one premiss and provides a narrower account of following necessarily (i.e. validity), then there is no need to replace the minimality condition with the no-terms-from-outside condition, since demonstrations still count as syllogisms. Alternatively, one can abandon the minimality condition, for which the textual support is not great. The phrase 'through what has been stated' in the definition of a syllogism can be construed as a gloss on 'involve necessarily', i.e. as indicating that the premisses are logically sufficient to derive the conclusion; compare the explanation of the parallel phrase 'resulting because of them' at *Prior Analytics* I.1.24b20-22. In his discussion of the fallacy of treating as cause what is not a cause, Aristotle explicitly says that arguments with a superfluous premiss are 'not absolutely unsyllogistic' (*Sophistical Refutations* I.5.167b334-35); they are only unsyllogistic with respect to the added premiss, which cannot be taken to have been refuted when an inconsistency is deduced without using that premiss.

Woods further complicates his account with an inconclusive discussion of whether syllogisms-as-such must have appropriate premisses, in the sense that they belong to the same discipline as the conclusion, or whether the condition of appropriateness applies only to certain sorts of syllogisms-in-use. This discussion is triggered by Aristotle's remark that it is not a medical argument to use Zeno's argument against motion as a basis for concluding that it is not better to take a walk after dinner, for this argument is general (*Sophistical Refutations* 11.172a8-9). Woods takes Aristotle to be saying that it is a bad dialectical argument, but in fact what Aristotle says is that it is not a medical argument, i.e. not a demonstration. It is not the fact that it is of general application that makes the Eleatic physician's reasoning contentious or eristic; rather, it is the flaws in Zeno's arguments against motion. There is no basis in the early logical writings for treating premiss appropriateness as a condition of any type of syllogism other than a demonstration. Nor is there any basis in them for Woods' speculation (174-191) that for Aristotle the law of non-contradiction has exceptions, only not exceptions within one and the same discipline; this speculation rests on a misinterpretation of a passing reference of Aristotle's (at *Metaphysics* IV.4.1008a10-11) to an *opponent* of the law of non-contradiction who thinks that it applies to some cases but not others.

The deductive system which Woods detects in Aristotle's early logical writings is rather thin. It consists of one rule, called 'argumental conversion': 'To convert <an argument> is to destroy one of the things granted <as premisses> by taking the reverse of the conclusion along with the remaining things asked for <as premisses>; for, if the conclusion is not <true>, one of the premisses must be destroyed, if when all <the premisses> are posited the conclusion must be <true>.' (*Topics* 163a32-36, my translation; cf. *Sophistical Refutations* 182b37-183a2 [not cited by Woods]) This rule might better be called 'argumental contraposition', by analogy with the contraposition of a conditional statement. Woods shows (95-96) that it preserves both validity and syllogisticity. A consequence of argumental contraposition, Woods argues, is that the premisses of a syllogism must be consistent, for 'any argument whose premisses are inconsistent with each other will have a circular converse' (87). This seems a bit quick. If the inconsistency consists in having two mutually contradictory premisses, contraposition of one of them will indeed produce a circular argument. But

not so if the inconsistency is constituted by two contrary premisses (such as ‘all whales are fish’ and ‘no whales are fish’) or by a self-inconsistent premiss (such as ‘no whales are whales’). Nor, it seems, is there any valid device, still less one recognized by Aristotle, by which one could infer from the assumed syllogisticity of an argument with such premisses the syllogisticity of a circular argument. The correct result seems to be that for Aristotle syllogisms cannot have mutually contradictory premisses.

Aristotelian refutation is on Woods’ account a type of syllogism-in-use, a sociolinguistic system for which Aristotle gives a set of pragma-dialectical rules. Woods makes two interesting proposals concerning this system.

The first is to construe any one-premiss direct refutation as question-begging. A direct refutation of a thesis is a syllogism whose conclusion is the contradictory of the thesis. Woods advances a proof by cases (157-158) that no single premiss of such a syllogism either is inconsistent with or implies or is implied by the thesis. Unfortunately, the proof contains a logical blunder in the treatment of the crucial case of the contrary of the thesis, a blunder which Woods himself recognized before the book was printed. In a revised version which the publisher refused to print, Woods (personal correspondence) argues that no multi-premiss argument with such a premiss is a syllogism (since it violates the minimality condition) and that a syllogism with just that premiss is not a refutation because it is question-begging, because it is obvious that the contradictory of the thesis follows immediately. One might however be sceptical both about the claim of obviousness and about its relevance to whether the syllogism is a refutation. If the argument is successful, it shows that any refutation of a thesis has more than one premiss. But this, Woods insists, is a condition on this particular species of syllogisms-in-use, not a condition on syllogisms-as-such. Only in the later logic of the *Prior Analytics* does it become a condition on syllogisms-as-such.

Woods’ second proposal is a dialectically minimal account of how someone can get a refutation to stick. The fact that the premisses of the refutation are inconsistent with the thesis shows merely that not all these propositions are true; it does not by itself show that the thesis is false. A dialectically maximal account (160) builds into the rules that the answerer is forbidden to retract any proposition granted in response to a questioner’s request, with the consequence that only the initial thesis can be rejected once its contradictory is derived from the granted premisses; such a no-retraction rule is an idealization of the limit in real-life argument on the extent to which interlocutors can retract their statements. A more logical account (160-161) uses the supposed theorem which I questioned three paragraphs back, that all syllogisms have consistent premisses. It defines the proposition refuted by a refutation as the intersection of the maximal consistent subsets of the propositions in the answerer’s commitment store which are excluded by the refutation (in the sense that they do not syllogistically imply the refutation’s conclusion). Such an account requires only a dialectically minimal account of a refutation, as consisting of propositions granted by an answerer from which the questioner deduces syllogistically the contradictory of the answerer’s thesis; there is no need to require a no-retraction rule.

On either construal, Woods points out, refutations do not prove that the thesis refuted is false. Oddly, he claims that *reductio ad absurdum* arguments do prove the assumption false from which the contradiction is derived. In fact, the same principle applies to *reductio ad absurdum* arguments; they show that at least one of the premisses from which the contradiction is derived is false, but they do not by themselves tell us which one. In general, refutations are not proofs but are *ad hominem*

(*Metaphysics* XI.5.1062a2-3; cf. IV.4.1006a15-18). Only when the premisses of a refutation are known to be true does the refutation falsify the refuted thesis (162-163).

Woods draws the important corollary from his dialectically minimal account of making a refutation stick that no set of rules for the transaction of question-answer discussions could tell the whole truth about refutations. Most of the truth about them will be told in the logic, which in Aristotle's case is the theory of syllogisms-as-such. By implication he sets himself against the analysis of fallacies by Hamblin (1970), van Eemeren and Grootendorst (1984, 1992) and Hintikka (1987) as violations of specifically dialectical rules for the conduct of argumentative conversations.

Three features of the book make it more difficult to use than it needs to be. There is no index of passages cited from Aristotle. There is no list of Woods' often idiosyncratic abbreviations, which sometimes recur after an interval of many pages. Nor are these abbreviations included in the index, which is too skimpy.

Further, the production and marketing of Woods' book provide strong reasons for authors to avoid using the publisher, Hermes Science. The publisher provided no reports from manuscript reviewers, printed a penultimate version of Woods' manuscript rather than his final version, and did not send page proofs for the author to correct (Woods, personal correspondence); as a result, there are numerous typographical errors, extending to the incorporation of the bulk of one footnote into the body of the text. Further, this reviewer found it impossible to order the book from any bookseller, because the publisher demanded payment in advance and no bookseller was willing to provide it; in order to buy a copy of the book, it was necessary to go to a bank, buy a money order in euros, and mail it to the publisher in France. Authors should not use a publisher which is going to make purchase of their book so difficult.

It would be churlish, however, to end a review of this pioneering work on a complaining note. The book is a treasure trove of sophisticated logical explorations of the ideas in Aristotle's early logical writings, the *Topics* and the *Sophistical Refutations*, in touch with a wide range of contemporary formal work as well as of work in the theory of argumentation. Students of Aristotle's logic and theory of argumentation should find themselves consulting it frequently. And there are important lessons in it for contemporary scholars, whether they be logicians or theorists of argumentation. Woods' confessedly anachronistic reconstruction shows how sophisticated positions in philosophical logic can be extracted from reflection on ancient logical texts when the resources of contemporary logical theory are brought to bear on them.

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