

## History of Logic from Aristotle to Gödel

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### Selected Bibliography on the Logic of Eudemus of Rhodes and Theophrastus of Eresus

#### CRITICAL EDITION OF THE FRAGMENTS OF EUDEMUS OF RHODES (c. 350 BC - 290 BC)

1. Wehrli, Fritz, ed. 1955. *Eudemos Von Rhodos*. Basel: B. Schwabe & C.  
The standard collection of Fragments, abbreviated W. in the citations; second edition 1969.

#### SELECTED BIBLIOGRAPHY ON THE LOGIC OF EUDEMUS

1. Alexander, of Aphrodisias. 1999. *On Aristotle Prior Analytics 1.8-13 (with 1.1736b35 - 37a31)*, *Ancient Commentators on Aristotle*. London: Duckworth.  
Translated by Ian Mueller with Josiah Gould.  
On the modal logic of Eudemus of Rhodes see pp. 59ff. with notes on Alexander 124.11 ff.
2. Bodnár, István, and Fortenbaugh, William W., eds. 2002. *Eudemus of Rhodes*. New Brunswick: Transaction Publishers.  
Contents: Preface VII; Contributors IX; 1. Dimitri Gutas: Eudemus in the Arabic tradition 1; 2. Hans B. Gottschalk: Eudemus and the Peripatos 25; 3. Tiziano Dorandi: Qualche aspetto controverso della biografia di Eudemo di Rodi 39; 4. William W. Fortenbaugh: Eudemus' work *On Expression* 59; 5. Pamela M. Huby: Did Aristotle reply to Eudemus and Theophrastus on some logical Issues? 85; 6. Robert W. Sharples: Eudemus' physics: change, place and time 107; 7. Han Baltussen: Wehrli's edition of Eudemus of Rhodes: the physical fragments from Simplicius' commentary *On Aristotle's Physics* 127; 8. Sylvia Berryman: Continuity and coherence in early Peripatetic texts 157; 9. István Bodnár: Eudemus' Unmoved Movers: fragments 121-123b Wehrli 171; 10. Deborah K. W. Modrak: *Phantasia*, thought and science in Eudemus 191; 11. Stephen A. White: Eudemus the naturalist 207; 12. Jørgen Mejer: Eudemus and the history of science 243; 13. Leonid Zhmud: Eudemus' history of mathematics 263; 14. Alan C. Bowen: Eudemus' history of early Greek astronomy: two hypotheses 307; 15. Dmitri Panchenko: Eudemus fr. 145 Wehrli and the ancient theories of lunar light 323; 16. Gábor Betegh: On Eudemus fr. 150 (Wehrli) 337; Index of ancients sources 359-383.  
"This volume of Rutgers University Studies in Classical Humanities, no. XI in the series, is the third devoted to Theophrastus' colleagues, pupils and successors, i.e., those Peripatetic philosophers, whom Fritz Wehrli brought together under the label *die Schule des Aristoteles*. Volume IX focuses on Demetrius of Phalerum, who was Theophrastus' pupil and for ten years the ruler of Athens. Volume X has Dicaearchus of Messana, Theophrastus' fellow-pupil within the Aristotelian Peripatos, as its subject. The present Volume, no. XI, concentrates on Eudemus of Rhodes, who, like Dicaearchus, studied under Aristotle and alongside Theophrastus. This concern with *die Schule des Aristoteles* will continue with the next two volumes: Lyco of Troas and I Hieronymus of Rhodes will be the subjects of Volume XII, and Aristo of Ceos will be featured in Volume XIII. All three belong to the post-Theophrastean Peripatos. Like Volumes IX and X, so Volumes XII and XIII will present the ancient sources with translation as well as discussion by various scholars. Volume XI is different in that it is entirely composed of articles which discuss Eudemus from differing points of view." (from the Preface by the Editors)
3. Fortenbaugh, William W. 2002. "Eudemus' Work on *Expression*." In *Eudemus of Rhodes*, edited by Bodnár, István and Fortenbaugh, William W., 59-83. New Brunswick: Transaction Publishers.  
"Eudemus of Rhodes wrote a work entitled *On Expression, Peri lexeos*. It was at least two books or rolls long and was the subject of a lost treatise by Galen. Apparently the work was not only substantial but also full of interesting material. It is therefore regrettable that we have only a few fragments from which to judge the content of the work. Five fragments, nos. 25-9, are assigned to the work by Wehrli, but that may

be too generous. In what follows, I intend first to consider Wehrli's five fragments and then to ask what we can conclude concerning the content of *On Expression*." p. 59

4. Gottschalk, Hans B. 2002. "Eudemus and the Peripatos." In *Eudemus of Rhodes*, edited by Bodnár, István and Fortenbaugh, William W., 25-37. New Brunswick: Transaction Publishers.
5. Gutas, Dimitri. 2002. "Eudemus in the Arabic Tradition." In *Eudemus of Rhodes*, edited by Bodnár, István and Fortenbaugh, William W., 1-23. New Brunswick: Transaction Publishers.  
Reprinted as Chapter VIII in D. Gutas - *Greek philosophers in the Arabic tradition* - Aldershot, Ashgate, 2000. see IV. *Logic* pp. 9-11.  
"The information on Eudemus of Rhodes that can be recovered in Arabic sources falls into three categories: there is a full collection of sayings (Section II below and Appendix), some incidental biographical notices that mainly state his relation to Aristotle and Theophrastus (Section III), and a number of references to his views on logic which lie held in common with Theophrastus (Section IV). No work of his is reported to have been translated into Arabic or is known to be extant. Apart from the sayings, therefore, Eudemus has no independent persona or presence in Arabic but rides on the coattails primarily of Theophrastus. This is hardly surprising, given the little information on Eudemus that was available even in Greek at the time of the rise of Islam." p. 1
6. Huby, Pamela M. 2002. "Did Aristotle Reply to Eudemus and Theophrastus on Some Logical Issues?" In *Eudemus of Rhodes*, edited by Bodnár, István and Fortenbaugh, William W., 85-106. New Brunswick: Transaction Publishers.

## SELECTED BIBLIOGRAPHY ON THE LOGIC OF THEOPHRASTUS

1. Barnes, Jonathan. 1983. "Terms and Sentences: Theophrastus on Hypothetical Syllogisms." *Proceedings of the British Academy* no. 69:279-326.
2. ———. 1985. "Theophrastus and Hypothetical Syllogistic." In *Aristoteles. Werk Und Wirkung, Paul Moraux Gewidmet, I: Aristoteles Und Seine Schule*, edited by Wiesner, Jürgen, 557-576. Berlin: de Gruyter.  
Reprinted in: W. W. Fortenbaugh, P.M. Huby, A. A. Long (eds.) - *Theophrastus of Eresus. On his life and work* - New Brunswick, Transaction Books, 1985, pp. 125-141.  
"In *APr* 1.44 Aristotle considers "arguments on the basis of a hypothesis." He deals first with arguments that are "agreed to by way of a compact," and then with those that "reach their conclusion by way of the impossible." The chapter ends with a promise: "Many other arguments reach their conclusion on the basis of a hypothesis. We should consider them and mark them out clearly. We shall say later what varieties of them there are and in how many ways arguments can rest on a hypothesis" (*APr* 50 a 39-b2).  
Alexander of Aphrodisias (*In APr* 389, 31-390.9) (1) comments on that passage as follows:  
Having talked about arguments on the basis of an agreement and arguments by *reductio ad impossibile*, he says that "many others reach their conclusion on the basis of a hypothesis." He postpones discussion of them, as though intending to deal with them more carefully; but no book of his on the subject is in circulation. Theophrastus, however, refers to them in his own *Analytics* -- and so do Eudemus and some others of Aristotle's associates.  
Aristotle presumably has in mind those arguments which proceed by way of a continuous proposition (or a connected proposition, as it is also called) together with the additional assumption, and those which proceed by way of a separative or disjunctive proposition -- and perhaps also those which proceed by way of a negated conjunction, if they are indeed different from the ones already mentioned. (2)  
In addition to those we have mentioned, there will also be arguments on the basis of proportion and those which they call "qualitative" (i.e., arguments from what is more so or less so or equally so) and whatever other varieties of arguments based on a hypothesis (3) there are (they have been discussed elsewhere).  
In addition to those we have mentioned, there will also be arguments on the basis of proportion and those which they call "qualitative" (i.e., arguments from what is more so or less so or equally so) and whatever other varieties of arguments basal on a hypothesis' there are (they have been discussed elsewhere).  
Those paragraphs are of some importance for the history of logic: the present paper is a commentary on them."  
1. The passage is F 29 in A. Graeser, *Die logischen Fragmente des Theophrast* (Berlin / New York 1973), and frag. 33c in L. Repici, *La logica di Teofrasto* (Bologna 1977).  
2. Wallies, in the *CIAG* edition, punctuates so as to begin a new sentence with the clause "if they-already mentioned." The result is ungainly and obscure. In my translation I gratefully adopt a suggestion made by David Sedley: his punctuation gives perfect sense and makes better Greek. (It leaves an unpleasant asyndeton. Perhaps we should insert a particle and begin the new sentence at 390.6 with *para de tous*.)

3. I excise *protaseon* (390.9): the phrase "propositions based on a hypothesis" is strange, and even if it may be allowed as a variant on "hypothetical proposition," it is out of place; Alexander is enumerating types of hypothetical *arguments*, not types of hypothetical *propositions*.
3. Bobzien, Susanne. 2000. "Wholly Hypothetical Syllogisms." *Phronesis. A Journal for Ancient Philosophy*:87-137.  
Traces the history in Aristotelian commentators of the type of syllogisms called "wholly hypothetical" -- that is, those consisting in two conditionals as premisses, with a third as the conclusion -- and sets forth the deductive system on which the logic of this syllogism was grounded. There was no unique prevalent understanding of the logical form of these arguments, but rather a complex development in their understanding, starting from a term-logical conception and leading to a propositional-logical one. The roles of Theophrastus, Alexander of Aphrodisias, and Porphyry (*via* Boethius) in the transmission and transformation of this problematic are investigated."
  4. Bochenski, Joseph. 1947. *La Logique De Théophraste*. Fribourg: Librairie de l'Université. Reprinted New York, Garland, 1987.
  5. Brunschwig, Jacques. 1982. "'Indeterminé" Et "Indefini" Dans La Logique De Théophraste." *Revue Philosophique de la France et de l'Étranger* no. 172:359-370.
  6. Fortenbaugh, William W. 1991. "Theophrastus, Fr. 65 Wimmer: Is It Important for Understanding Peripatetic Rhetoric?" *American Journal of Philology* no. 111:152-156.  
Revised reprint in: W. W. Fortenbaugh, *Theophrastean Studies*, Wiesbaden: Franz Steiner, 2003, I Section: Logic: pp. 15-21.
  7. ———. 1995. "Theophrastus, No. 84 Fhs&G: Nothing New Here!" In *The Passionate Intellect: Essays on the Transformation of Classical Traditions*, edited by Lewis, Ayres, 161-176. New Brunswick: Transaction Publishers.  
Revised reprint in: W. W. Fortenbaugh, *Theophrastean Studies*, I Section: Logic: pp. 22-34, with the subtitle: *Did Theophrastus oppose Aristotle and accept quantification of the predicate?*.
  8. ———. 1998. "Cicero: *On Invention* 1.51-77; Hypothetical Syllogistic and the Early Peripatetics." *Rhetoric* no. 16:25-46.  
Revised reprint in: W. W. Fortenbaugh, *Theophrastean Studies*, I Section: Logic: 51-67.
  9. ———. 2000. "Teofrasto Di Ereso: Argomentazione Retorica E Sillogistica Ipotetica." *Aevum* no. 74:89-103.  
Revised English version in: W. W. Fortenbaugh, *Theophrastean Studies*, I Section: Logic: pp. 89-103 with the title: *Theophrastus of Eresus: Rhetorical Argument and Hypothetical Syllogistic*.  
"To appreciate Theophrastus' contributions to the study of rhetorical argument, we should consider his accomplishments in the field of logic, for it is Theophrastus and other members of the second generation of the Peripatos who developed hypothetical syllogistic. Many of the illustrative arguments in Aristotle's *Rhetoric* (esp. in chapters on the enthymeme, the *koiné* and topics) take the form of a mixed hypothetical syllogism. Aristotle promised to discuss such syllogisms, but he never did. That task fell to his successors, among Theophrastus will have made the connection with rhetoric."
  10. Gottschalk, Hans B. 1987. "Did Theophrastus Write a *Categories*?" *Philologus* no. 131:245-253.
  11. Huby, Pamela M. 1977. "Apuleius and Theophrastus' Fifth "Indemonstrable" Mood." *Liverpool Classical Monthly* no. 2:147-148.  
An interpretation of Apuleius *Peri hermeneias* chapter 13.
  12. ———. 1979. "A Neglected Fragment of Peripatetic Logic." *Liverpool Classical Monthly* no. 4:207-210.  
Discussion of an account of hypothetical syllogisms appended in an 11th cent. ms. (Laurentianus 72.5) to Aristotle's *Posterior Analytics*. The account may represent the views of Theophrastus."
  13. ———. 1989. "Theophrastus and the Criterion." In *The Criterion of Truth. Essays Written in Honour of George Kerferd, Together with a Text and Translation (with Annotations) of Ptolemy's on the Kriterion and Hegemonikon*, edited by Huby, Pamela M. and Neal, Gordon, 107-122. Liverpool: Liverpool University Press.
  14. ———. 2002. "Did Aristotle Reply to Eudemus and Theophrastus on Some Logical Issues?" In *Eudemus of Rhodes*, edited by Bodnár, István and Fortenbaugh, William W., 85-106. New Brunswick: Transaction Publishers.
  15. Lejewski, Czeslaw. 1961. "On Prosleptic Syllogisms." *Notre Dame Journal of Formal Logic* no. 2:158-176.  
As a rule modern textbooks of traditional logic distinguish only two kinds of syllogism: the categorical syllogism, which has originated with Aristotle, and the hypothetical syllogism, which goes back to the early Peripatetics and to the Stoics. Rarely, if ever, is mention made of the third kind of syllogism namely the *proseptic* syllogism. Yet, the *proseptic* syllogism, for which we seem to be indebted to Theophrastus,

appears to have been regarded at least by some logicians in later ages of antiquity as a legitimate part of logical theory.

Like the expressions 'categorical' and 'hypothetical' the expression 'proseptic' is a technical term and its full significance can only emerge at a later stage of our enquiry. At this stage suffice it to say that 'proseptic' is meant to render the Greek expression *kata prolepsin* in its adjectival use.

Although the proseptic syllogism has not played as important a role in the development of logic as the other two kinds of syllogism, it deserves our attention particularly for the following two reasons. First, the validity of proseptic syllogisms is based, as we shall see, on certain logical notions which in modern logic find their expression in the use of the universal quantifier. Secondly, the theory of proseptic syllogism bears witness to the resourcefulness of Theophrastus as a logician.

In what follows I propose to reconstruct the theory of proseptic syllogisms to the extent to which the scarcity of textual evidence permits, and to examine it from the point of view of modern logic."

16. ———. 1976. "On Proseptic Premisses." *Notre Dame Journal of Formal Logic* no. 17:1-18.  
Galen claimed that proseptic premisses, used for the first time by Aristotle and treated systematically by Theophrastus, were equivalent to appropriate categorical premisses. This claim can only be sustained with substantial qualifications. The paper carries out a detailed examination of equivalence relationship between the two kinds of premisses within the framework of axiomatized Aristotelian syllogistic, which had to be suitably extended for the purpose by additional assumptions. The results of the enquiry differ from those obtained by William and Martha Kneale in their paper on "Proseptic propositions and arguments" in "Islamic philosophy and the Classical tradition", edited by S. M. Stern and others, Cassirer 1972."
17. Lorenzen, Paul. 1969. "Theophrastische Modallogik." *Archiv für mathematische Logik und Grundlagenforschung* no. 12:72-75.
18. Maróth, Miklos. 1979. "Die Hypothetischen Syllogismen." *Acta Antiqua Academiae Scientiae Hungaricae* no. 27:407-436.  
Étude des syllogismes chez Aristote, dans l'école péripatéticienne (Théophraste) et dans le stoïcisme. Malgré de nombreux éléments individuels, Galien s'insère plutôt dans le courant péripatéticien. C'est également de ce dernier, et non de la théorie stoïcienne, que s'inspire la logique arabe."
19. Mignucci, Mario. 1965. "Per Una Interpretazione Della Logica Modale Di Teofrasto." *Vichiana*:227-277.  
Les innovations de Théophraste correspondent à une conception de la nature et de la fonction de la logique, qui n'a plus dignité de science autonome et indépendante, visant à l'analyse des connexions formelles du réel, mais qui devient de plus en plus instrument de la recherche scientifique."
20. ———. 1998. "Theophrastus' Logic." In *Theophrastus. Reappraising the Sources*, edited by Ophuijsen, Johannes Van and Raalte, Marlein Van, 39-66. New Brunswick: Transaction Publishers.
21. ———. 1999. "La Critica Di Teofrasto Alla Logica Aristotelica." In *Antiaristotelismo*, edited by Natali, Carlo and Maso, Stefano, 21-39. Amsterdam: Adolf M. Hakkert.
22. Repici, Luciana. 1977. *La Logica Di Teofrasto. Studio Critico E Raccolta Dei Frammenti E Delle Testimonianze*. Bologna: Il Mulino.  
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"This is the second collection of Theophrastus' logical fragments to appear within four years and it is very similar to that of Andreas Graeser, published with a German commentary in 1973. The similarity is not surprising, for the majority of passages which can be attributed to Theophrastus with confidence can also be assigned with confidence to one of his commentaries, if we may so call them, on Aristotle's works, the *On Affirmation and Denial*, which, according to Boethius, followed the lines of Aristotle's *De Interpretatione*, the *Prior* and the *Posterior Analytics*, and the *Topics*. Since, further, most of these passages occur in later commentaries on Aristotle, and are linked with particular sections of his work, there is not even much doubt their order, and with only three exceptions, of minor importance, the order given here is the same as that of Graeser.  
Since so much is well established, these two editions are likely to remain the only ones for many years. Graeser's is marred by many inaccuracies, and this one is much better on that score. Miss Repici has also taken the trouble to translate every passage into Italian, which is sometimes very helpful, and she gives a survey of much earlier work on Theophrastus' logic." (Pamela M. Huby - Review of the book - *Mind*, 1979, pp. 448-450)
23. Rose, Lynn. 1968. *Aristotle's Syllogistic*. Springfield: Charles C. Thomas.  
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figures 16; IV. The non-use of rules 27; V. Validation by reduction 34; VI. Invalidation by counterexample 37; VII. The syllogistic system 53; VIII. The Fourth Figure and the indirect proof 57; IX. Subalternation 80; X. Premise order 81; Appendix. I. The square of opposition 99; II. The mnemonic lines 102; III. The perfection of Aristotle's First Figure 104; IV. Theophrastus and the indirect moods 109; V. The diagrams of the three figures 133; VI. John Locke's criticisms of Aristotle and the syllogism 137; Bibliography 144; Index 147-149.

"Traditional "Aristotelian" logic recognizes four figures of the syllogism, including five "indirect" moods of the first figure.

The usual account of the origin of these is that Aristotle himself developed the first, second, and third figures, that Theophrastus added the indirect moods of the first figure, (2) and that the fourth figure was added later on by someone else, probably Galen. (3)

I shall attempt to show that the five argument forms added to the first figure by Theophrastus were in fact not the indirect moods of the first figure that became part of the traditional "Aristotelian" logic. They were, rather, argument forms corresponding both to the later indirect first and to the later fourth figure moods, but not recognizing any distinction between the two. From the modern (i.e., traditional) point of view, it is just as accurate, and just as wrong, to say that Theophrastus added the fourth figure as to say that he added the indirect first. In a sense he did both; in a sense he did neither. For in the later logic the indirect first moods are carefully distinguished from the fourth figure moods. But Aristotle and Theophrastus had no formal basis for distinguishing the indirect first from the fourth. They attached no significance to premise order. (4)" pp. 109-110

(2) The main evidence for this is the statement of Alexander, *Alexandri in Aristotelis Analyticorum Priorum Librum I Commentarium*, CAG, edited by Maximilian Wallies. Berlin, 1883, vol. II, part I, pp. 69.26-70.21 and 109.29-110.21. See also *Boetii De Syllogismo categorico libri duo*. In *Patrologiae Cursus Completus*, Series Latina, edited by J.-P. Migne. Paris, Bibliothecae Cleri universae, 1891, vol. LXIV, 814C-816C.

(3) The best known source for this is Averroes. Two recent and full treatments of the history of the fourth figure and of reports about it are in A. I. Sabra: A twelfth-century defence of the fourth figure of the syllogism. *Journal of the Warburg and Courtauld Institutes*. XXVIII: 14-28, 1965, and Nicholas Rescher: *New light from Arabic sources on Galen and the fourth figure of the syllogism*. *Journal of the History of Philosophy*, III: 27-41, 1965.

(4) For Aristotle on premise order, see Chapter X above. We shall see in this Appendix that there seems to be no reason to suppose that Theophrastus had any conventions regarding premise order either.

## RELATED PAGES

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