

History of Logic from Aristotle to Gödel

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History of Ancient Logic in the Hellenistic Period

THE SUCCESSION OF THINKERS AND SCHOOLS

The history of ancient philosophy covers about eleven centuries, from Thales who lived during the sixth century B.C. to Boethius and Simplicius who flourished at the beginning of the sixth A.D. From the point of view of the history of formal logic this long epoch may be divided into three periods.

(1) The pre-Aristotelian period, from the beginnings to the time at which Aristotle started writing his *Topics* (about 340 B.C.). There is no formal logic during this period, i.e. no *study* of logical rules or laws; but some of them are *used* consciously since Zeno of Elea, and Plato tries, if unsuccessfully, to build up a logic.

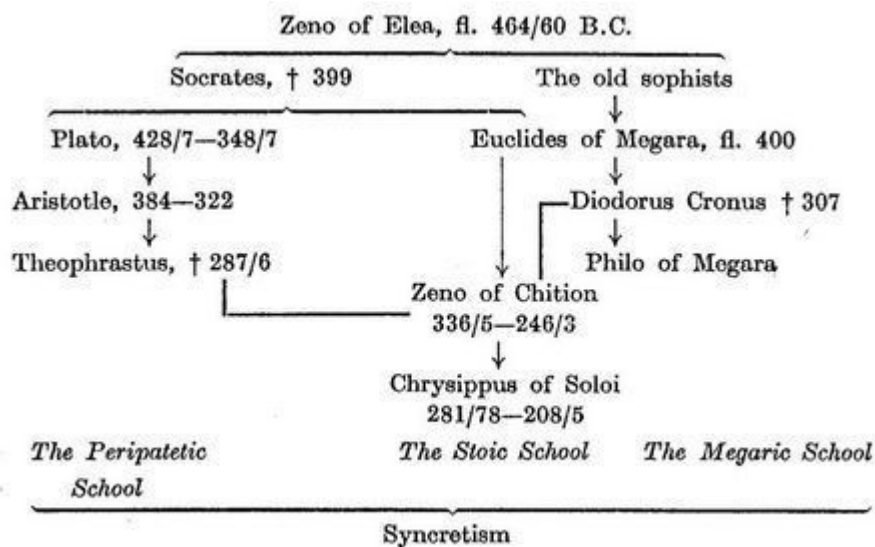
(2) The creative period, from the time of Aristotle's *Topics* to the death of Chrysippus of Soloi (205/8 B.C.). During this period Logic was founded and considerably developed.

(3) The period of schoolmasters and commentators, from the death of Chrysippus until the end of Antiquity. In that period no more creative work is done, as far as we know; moreover, a continuous decline of formal logic seems to take place. Boethius and Simplicius who are considered as the last ancient philosophers are also the last ancient logicians.

It appears, consequently, that out of the eleven centuries mentioned above only about 150 years are of real importance; but those years are of enormous importance -- they are, indeed, among the best years of logic in the whole history of humanity until now.

The succession of different trends of logical thought -- for there were several such trends -- can be briefly stated in the following terms. If Zeno is, according to Aristotle, "the inventor of dialectics", Socrates seems to have been the real father of formal logic ; at least both Plato and Euclides, the head of the Megaric School, claim to be his disciples. Plato was the teacher of Aristotle, the founder of formal Logic; Aristotle was succeeded by Theophrastus, Eudemos and some others, who, if far less important than he, are nevertheless productive logicians. This is one line of development of logic, the peripatetic. The other line starts with Euclid of Megara and in the second generation after him bifurcates into the properly Megaric School, with Diodorus Cronus, and Philo of Megara his pupil, as most important logicians on one hand -- the Stoic School founded by Zeno of Chition and having as chief thinker Chrysippus of Soloi on the other. After Chrysippus' death one hears no more of the Megaricians, and, later on, a syncretism of the Peripatetic and Stoic-Megaric Schools appears.

Here is a scheme which may help in comparing the respective dates and mutual influences; it contains only the most important names:



From: I. M. Bochenski, *Ancient Formal Logic*, Amsterdam: North-Holland 1951, pp. 9-10.

FIRST PHILOSOPHY AND ONTOLOGY

"Let us begin then -- according to our program -- with the question: What, in the Greek philosophy, is the relation between *First Philosophy* and reflexion on language?

Why -- to put the question directly -- did *ontology* become the *First Philosophy* at that time rather than *philosophy of language*? From our historical distance and level of reflexion one could consider the last question as somewhat curious, and one might answer it by calling attention to the fact that language as a condition of knowledge is much more difficult to grasp and to analyze than the realm of things given by the senses. At first -- one might say -- attention focuses on what can be shown in unreflective experience, in the so called *intentio recta* or *prima*; later one comes to reflect -- within the so called *intentio obliqua* or *secunda* -- on cognition itself as function of consciousness and, finally, one may reflect on the function of language as a condition of the possibility and intersubjective validity of knowledge.

Certainly, this answer is not false; we will even accept it as a guideline for understanding the sequence of periods in the history of philosophy. However, it must be stressed, that Greek philosophy itself went through this cycle of stages in a way. In the age of Socrates and the Sophists it already turns away from ontological questions about the nature (φύσις) and origin (ἀρχή) of things, and raises questions as to the correctness of names (ορθοτεες ονομάτων), the function of speech (λόγος) and the meaning of words as concepts or definitions (όροι, δρισμοί). Plato, through whom we know about these discussions, already achieves the insight, that the truth is not to be sought in the quality of single names but that it is a function of their connection into a statement (λόγος) (5). And Aristotle especially in his "De Interpretatione" laid the foundations of a philosophy of grammar, which was further elaborated by the Stoics and thus decisively influenced the grammar of the schools in the western world up to the present day.

But why did not Plato already, as Wittgenstein suggests, look for the rule of the use of words in order to find an answer to the famous questions of Socrates into *what* courage or justice is? And why did he not see in his own definition of thinking as a voiceless dialogue of the soul with itself a clue to the fact that thinking is to be considered as a function of communication by language? And Aristotle, who so often opens his questions about the essence (σύσια) of being (όν) by an inquiry into the use of the words -- why did he not consider the possibility that his ontological categories are relative to the Greek language?

The answer to these questions, in my opinion, has to be a twofold one: On the one hand Plato and Aristotle would have had good reasons for being dissatisfied by doctrines which claim to "reduce" their question as to the *essence of things* to mere question about the *use of words*. (...) On the other hand, however, we must not overlook that Plato and Aristotle did not have a concept of language adequate to enable them to see that their very questions, not to speak of the answer, were dependent on the learned use of a certain language.

The classical philosophy of the Greeks had at its disposal essentially four concepts for comprehending the essence of human speech or communication: όνομα (name), σύμβολον, σημειον (symbol or sign), δρος; (concept) and λόγος; (speech, oratio, ratio, statement, etc.) (It is worth mentioning that it had no concept of a special language. Only the Romans had the word "lingua latina".) (7) By means of these four concepts it was

impossible to grasp that meaning is essentially a function of a language. For these four concepts form two clusters between which the problem of linguistic meaning slips through: λόγος (ratio) and δρος (concept) were a priori directed to something universal which was thought to be independent of the use of language; ὄνομα (name) and σύμβολον or σημεῖον (sign), on the other hand, did in fact mean something which differs according to the use of different languages, but for Aristotle, at least, it had nothing to do with the meaning of thoughts; it was only a conventional means of designating, in the service of the "logos". (Perhaps it was precisely this progressive step of no longer asking for the correctness of single names but rather for the truth of statements that caused the Greek philosophers to overlook the cognitive function which languages have by virtue of the determinate meanings of their words and phrases.) (8)" pp. 34-36

(5) Cf. Plato, *Sophist* 261c - 262e

(6) Cf. Plato, *Sophist* 263d

(7) See J. Lohmann, "Über den paradigmatischen Charakter der griechischen Kultur", in: Festschrift für H. G. Gadamer, Tübingen 1960, pp. 171-89; see further J. Lohmann's papers in *Lexis*, I, 1948, pp.49-106, *Lexis*, III, 1, pp. 5-49, *Lexis*, III, 2, p. 169-217, and in: Festschrift für L. Weisgerber, Düsseldorf 1958.

(8) So it is not quite surprising that the Neoplatonist tradition which interpreted Plato's "Cratylus" as defending the theory of the correctness of names had some beneficial influence by preserving the notion that words are not simply sounds arbitrarily used as signs. Finally, the strongest argument of the *θέσει*-theory of names was answered in the Neoplatonist tradition by the fruitful idea that the variety of words standing for the same things must not necessarily be explained by different conventions but could also be explained by a variety of experienced aspects of things. This view may be traced in, for instance, Nicolaus Cusanus, Leibniz and still in W. von Humboldt. Cf. K. O. Apel, "Die Idee der Sprache bei Nicolaus von Cues", in *Archiv für Begriffsgeschichte*, Bd. 1, Bonn 1955, pp. 200-221.

From: Karl-Otto Apel, "The Transcendental Conception of Language-Communication and the Idea of a First Philosophy" in: Herman Parrett (ed.), *History of Linguistic Thought and Contemporary Linguistics*, Berlin: Walter de Gruyter 1975, pp. 32-61.

LOGICAL FORM AND LOGICAL MATTER

"The mediaeval distinction between material and formal consequence derives ultimately, both in name and in substance, from ancient texts. (60)

Form and matter, *eidōs* and *hylē*, are Peripatetic twins, and the mediaeval distinction -- and hence the modern notion of 'formal' logic -- comes in the end from Aristotle.

These claims are indisputable -- but they are vague. If we inquire more closely into the business, dispute and controversy appear. For some historians of logic have claimed that the later Peripatetics, at least, had a clear understanding of the notion of logical form and hence of the essential nature of formal logic; (61) whereas others have maintained, to the contrary, that the modern ideas of formal validity and of the logical form of an argument have no genuine counterparts in the ancient texts. (62) In fact -- and predictably --, the truth lies dully between these two exciting extremes; and if we are to see just how and where it lies, we must proceed by a plodding examination of the relevant texts.

Aristotle himself only once applies the concepts of matter and form to the syllogism: at *Phys* 195a18-19 he observes laconically that "the hypotheses are matter for the conclusion". (By "hypotheses" he here means "premisses".) The later commentators pick up the point. Alexander, it is true, was not happy with it, (63) and he does not make use of it in his own logical writings. But Philoponus had no such qualms: he repeats the idea that the premisses of a syllogism are, as it were, the stuff out of which the conclusion is made (64) Yet whatever we make of *Phys* 195a18-19, the text has nothing to do with the distinction between formal and material validity.

Several other logical applications of the twin concepts are found in the later commentators: thus the modal status or *skēsis* of a proposition is called its 'matter'; (65) or the subject of a proposition stand to the predicate as matter to form; (66) or an unquantified proposition is matter, the quantifier form; (67) and so on. (68) None of these applications of the Aristotelian distinction is illuminating; and none is relevant here.

Alexander preferred to invoke matter and form in a different logical context; and it is his preferred distinction between logical matter and logical form which is to the present point. (69) The idea first appears early in Alexander's commentary on the *Prior Analytics*:

The figures of the syllogism are like a sort of common matrix. You may fit matter into them and mould the same form for different matters. Just as, in the case of matrixes, the matters fitted into them differ not in

respect of form or figure but in respect of matter, so too is it with the syllogistic figures. (*in APr* (6.16-21).

Alexander says no more than this to explain what distinguishes the form from the matter of an argument. Similarly, the distinction enters his commentary on the *Topics* in its first pages (*in Top* 2.1-3.4) -- and again, there is no serious explanation. After their introduction, the concepts are used with frequency and without apology throughout the commentaries.

The twins reappear in the later Peripatetic commentators. Ammonius presents them in a cautious manner near the beginning of his commentary on the *Prior Analytics*:

In every syllogism there is something analogous to [*analogon*] matter and something analogous to form. Analogous to matter are the objects [*pragmata*] themselves by way of which the syllogism is combined, and analogous to form are the figures. (*in APr* 4.9-11).

As this passage suggests, Ammonius does not greatly like the term *hyle*; and to convey the Alexandrian distinction he will in fact more often employ the word *pragma*. (70) But his pupil Philoponus was content with the term *hyle* and he simply equates *pragmata* and *hyle* as though nothing turned on the point (*in APr*9.6.)

(...)

Thus the later authors used a variety of linguistic turns. But it would be rash to look for any substantial difference behind the linguistic facade. Boethius and the later Greeks adopted and deployed an established and apparently uncontroversial distinction. How the distinction was referred to and by what names it was called were questions of taste and style.

Alexander too had taken the thing for granted; and we must infer from his commentaries that earlier Peripatetics had applied the concepts of matter and form to logic. On independent grounds we may believe that Alexander's teacher, Herminus, (75) had probably spoken of the form and matter of arguments. (76) As far as I know, there is no other evidence for the use of matter and form in logical theory before Alexander: it is not found in Aristotle's own works; nor is there any text ascribing it to Theophrastus or Eudemus, or to Boethus or Aristo. But the silence proves little, and Alexander's attitude shows that by his time it was already thoroughly familiar. (77)

If we ask *why* some Peripatetic scholar thought to apply matter and form to logic, we can give no worthwhile answer. Was the idea part of a general attempt to systematise Aristotle, so that his customary analytical concepts should be applied in every part of his philosophy? Was it rather reflexion on the *Analytics* themselves (perhaps on the sense and function of Aristotle's dummy letters (78) which encouraged the invocation of matter and form? Was it the influence of the Stoics, whose own distinction between a *logos* and a *tropos* might have put a Peripatetic in mind of matter and form? (79) There is no evidence from which to answer these questions." pp. 39-43

(60) For the links between the ancient and the mediaeval accounts see esp. Ebbesen pp. 95-101; cfr. Pinborg pp. 74-80. For the importance of the distinction in Arabic texts see Zimmermann pp. XXXVIII-XLI. (But Zimmermann claims too much for Al-Farabi. "Striking an individual note in the very first sentence of his *Commentary* al-Farabi says that the *De Int.* is about the "composition" [*ta'lif*], not the "matter" [*madda*], of propositions. I do not find this opposition of terms, which recurs as a kind of leitmotiv throughout the work, in the Greek commentaries; and the fact that it is usually in criticizing his predecessors that he invokes it confirms that here we have a new departure in the exegesis of the *De Interpretatione*" (pp. XXXVIII-XXXIX). Not entirely new, I think -- and in any case, the opposition of terms which al-Farabi deploys was thoroughly familiar to the Greek commentators on the *Analytics*.)

(61) Thus the Peripatetic commentators "show us that they had an excellent conceptual grasp of the essence of what is today called 'formal' logic" (Lee, p. 38); and Alexander had "a clear insight into the essence of formal logical laws" (Bochenski, p. 157).

(62) Thus "it seems that neither the Stoics nor the Peripatetics ever say that an argument is valid because of its logical form, which would be strange if they actually had thought that the validity had to be explained as being due to the form. And even when it is said that a certain form of argument is valid for every matter (i.e. for every suitable substitution of the letters), this does not seem to be the same as saying that the validity is due to the form" (Frede, p. 103). (In a note, Frede admits that there are apparent counterexamples to his thesis -- he cites Boethius, *Hyp syl* II ii 4-5, iii 6, iv 2 [see below, p. 42] --, and says that these passages "would have to be dealt with individually" (p. 368 n. 3).) -- I am not sure exactly what Frede concedes and what he denies. But the main point appears to be this: the ancient logicians do not ever say of an argument that it is valid because of its form. Now, taken absolutely literally, this may well be true; at least, I have not come across a text in which a conclusion is said *sunaghestai dia to eidos*. But there are, as Frede allows, a few passages which say something very close to this (e.g. that a conclusion is drawn *dia ten plochen*); and

there are numerous passages which imply something like it (e.g. passages which contrast syllogisms with arguments which conclude *dia ten hylon*). -- My own reasons for qualifying the enthusiastic view exemplified in the last footnote are not Frede's. Rather, first, I hold that the use of the matter/form distinction by Alexander (and the later commentators) is not always coherent [see below, pp. 58-65]. And secondly, I doubt if the ancients had any dear or coherent notion of form. They had (*contra* Frede) a rough and ready notion of formal validity; but (*contra* Lee) they had no precise and rigorous notion. (Of course, if the reflections in the previous Part of this paper are correct, then the ancients were in this respect no worse off than most moderns.);

(63) See the passage quoted by Simplicius, in *Phys* 320.1-10.

(64) See e.g. in *APr* 6.10-14; 32.31-33.2. The idea survived to become a commonplace of traditional logic: see e.g. 59 of Kant's *Logik*

(65) See below, pp. 44 and 48.

(66) E.g. Philoponus, in *APr* 65.11-13; [Ammonius], in *APr* 71.14-16.

(67) E.g. Ammonius, in *Int* 111.19-23.

(68) For yet other uses of matter and form see e.g. [Ammonius], in *APr* 68.33-69.11; Philoponus, in *APr* 6.2-3 (cfr. 10.18); 44.24-26; 66.7-26

(69) On Alexander's use of matter and form in logic see esp. Lee, pp. 38-44.

(70) Alexander too occasionally uses *pragma* (e.g. in *APr* 295.1; 301.12-13); and he takes this usage from Aristotle (*APr* 43b3-4).

(75) On whom see P. Moraux, *Der Aristotelismus bei den Griechen*, vol. II, Berlin, de Gruyter 1984 ("Peripatoti", 6), pp. 361-363.

(76) See [Ammonius], in *APr* 39.32: I say "probably" because [Ammonius] is paraphrasing rather than quoting, and because we cannot be sure of the reliability or the accuracy of his paraphrases. (See below, p. 80).

(77) Bochenski is therefore wrong when he says (p. 157) that "Alexander seems to have been the first to give an explicit account of the difference between form and matter in logic".

(78) See below, p. 51.

(79) See below, pp. 65-66.

Bibliographical note

This list is not a bibliography: it merely gives details of those works which the text refers to more than once.

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LATER ANTIQUITY

"The last period of ancient logic is characterized by the following traits, some of which have already been touched upon (chapter 2 C). First of all, as far as we know, it is no longer a creative period: we cannot quote a single logician comparable -- not only with Aristotle, Diodorus or Chrysippus, but even with Theophrastus. Logic seems to have still been much studied, however, and its knowledge must have been widely spread. At the same time there was the unfortunate phenomenon of the struggle between the Peripatetic and the Stoic Schools. Slowly a mixture of both trends formed. Thus, we hear that Boethus of Sidon, pupil of Andronicus Rhodos, who lived at the time of Augustus and was the head of the Peripatetic School, asserted the priority of the Stoic undemonstrated in regard to the categorical syllogism; syncretism is often met with later on, e.g. in the *Dialectical Introduction* of Galenus. On the other hand there are still some rigid peripateticians who deny any merit to the Stoic-Megaric School; Alexander of Aphrodisias is an

instance. In the long run, however, a kind of commonly received doctrine, composed of rather poor remains of both Aristotelian and Stoic-Megaric doctrines was formed. Yet the work of the commentators and authors of textbooks has not been, as it seems, completely irrelevant to logic -- here and there they probably were able to bring some complements and perfections of the old doctrines. Unfortunately, we know nearly nothing about their work.

The Logicians.

There follows here a (incomplete) list of important logicians who lived during that long period. Ariston of Alexandria is reported to have stated the "subaltern modes" of the syllogism (1); he lived during the II century A.D. Another important logician of the same period is the famous physician Galenus (129 - c. 199 A.D.); his "Dialectical Introduction" is the only ancient Greek textbook of logic preserved; it has been studied by Fr. Stakelum. His contemporary Apuleius of Madaura (125 A.D.) wrote among others a Latin book *Peri hermenias* which seems to be of great interest. Alexander of Aphrodisias, who lived during the third century, is probably one of the most penetrating logicians of the peripatetic School and one of the best commentators of the Organon in history. Porphyrius of Thyrsus (232/3 - beginning of the IV century) is another important commentator of Aristotle, if inferior to Alexander: his Introduction was destined to have a brilliant career during the Middle Ages. Sextus Empiricus (3rd century) our main source for the Stoic-Megaric School can hardly be called a logician, yet he knew logic well and some of his criticisms might be of interest. Later authors - such as Iamblichus of Chalkis c. 330), Themistius (330-390), Ammonius Hermeiou, the disciple of Proclus, David Ioannes Philoponus (died after 640), are of far lesser importance. But at the end of our period we have again some men of interest: Martianus Capella, who wrote between 410 and 439 his celebrated "De nuptiis Philosophiae et Mercurii" with a book devoted to logic; Simplicius, pupil of Ammonius, and the last important Athenian Philosopher (he was driven from Athens by a decree of Justinian in 529) is also an intelligent logician; finally Boethius, himself a not very good thinker, is highly important because of his influence on the Middle Ages, but also because of the mass of information his logical works contain."

(1) *Apul. 193, 16ff.*; there is much confusion in this text.

From: I. M. Bochenski - *Ancient formal logic* - Amsterdam, North-Holland, 1951, pp. 103-104

"Very little is known about the development of logic from c. 100 BCE to c. 250 CE. It is unclear when Peripatetics and the Stoics began taking notice of the logical achievements of each other. Sometime during that period, the terminological distinction between *categorical syllogisms*, used for Aristotelian syllogisms, and *hypothetical syllogisms*, used not only for those by Theophrastus and Eudemus but also for the Stoic propositional-logical syllogisms, gained a foothold. In the first century BCE, the Peripatetics Ariston of Alexandria and Boethus of Sidon wrote about syllogistic. Ariston is said to have introduced the so-called *subaltern* syllogisms (Barbari, Celaront, Cesaro, Camestrop and Camenop) into Aristotelian syllogistic (*Apul.Int.* 213.5-10), that is, the syllogisms one gains by applying the subalternation rules (that were acknowledged by Aristotle in his *Topics*): From "A holds of every B" infer "A holds of some B" From "A holds of no B" infer "A does not hold of some B" to the conclusions of the relevant syllogisms. Boethus suggested substantial modifications to Aristotle's theories: He claimed that all categorical syllogisms are complete and that hypothetical syllogistic is prior to categorical (*Gal.Inst.Log.* 7.2), although we are not told prior in which way. The Stoic Posidonius (c.135-c.51 BCE) defended the possibility of logical or mathematical deduction against the Epicureans and discussed some syllogisms he called *conclusive by the force of an axiom*, which apparently included arguments of the type "As the 1st is to the 2nd, so the 3rd is to the 4th; the ratio of the 1st to the 2nd is double; therefore the ratio of the 3rd to the 4th is double," which was considered conclusive by the force of the axiom "things which are in general of the same ratio, are also of the same particular ratio" (*Gal. Inst. Log.* 18.8). At least two Stoics in this period wrote a work on Aristotle's *Categories*. From his writings we know that Cicero was knowledgeable about both Peripatetic and Stoic logic; and Epictetus's discourses prove that he was acquainted with some of the more taxing parts of Chrysippus's logic. In all likelihood there existed at least a few creative logicians in this period, but we do not know who they were and what they created. The next logician of rank, if of lower rank, of whom we have sufficient evidence is Galen (129-199 or 216 CE), whose greater fame was as a physician. He studied logic with both Peripatetic and Stoic teachers and recommended to avail oneself of parts of either doctrine, as long as it could be used for scientific demonstration. He composed commentaries on logical works by Aristotle, Theophrastus, Eudemus, and Chrysippus, as well as treatises on various logical problems and a major work titled *On Demonstration*. All these are lost except for some information in later texts, but his *Introduction to Logic* has come down to us almost in full. In *On Demonstration*, Galen developed, among other things, a theory of compound categorical

syllogisms with four terms, which fall into four figures, but we do not know the details. He also introduced the so-called relational syllogisms, examples of which are “A is equal to B, B is equal to C; therefore A is equal to C” and “Dio owns half as much as Theo; Theo owns half as much as Philo. Therefore Dio owns a quarter of what Philo owns.” (Gal. *Inst. Log.* 17–18). All relational syllogisms Galen mentions have in common that they are not reducible in either Aristotle’s or Stoic syllogistic, but it is difficult to find further formal characteristics that unite them all. In general, in his *Introduction to Logic*, he merges Aristotelian Syllogistic with a strongly Peripatetic reinterpretation of Stoic propositional logic. The second ancient introduction to logic that has survived is Apuleius’s (second century CE) *De Interpretatione*. This Latin text, too, displays knowledge of Stoic and Peripatetic logic; it contains the first full presentation of the square of opposition, which illustrates the logical relations between categorical sentences by diagram. Alcinous, in his *Handbook of Platonism* 5, is witness to the emergence of a specifically Platonist logic, constructed on the Platonic notions and procedures of division, definition, analysis, and hypothesis, but there is little that would make a logicians heart beat faster. Sometime between the third and sixth century CE, Stoic logic faded into oblivion to be resurrected only in the twentieth century in the wake of the (re)discovery of propositional logic. The surviving, often voluminous, Greek commentaries on Aristotle’s logical works by Alexander of Aphrodisias (fl. c.200 CE), Porphyry (234–c.305), Ammonius Hermeiou (fifth century), John Philoponus (c. 500), and Simplicius (sixth century), and the Latin ones by Anicius Manlius Severinus Boethius (c.480–524) have their main importance as sources for lost Peripatetic and Stoic works. Still, two of the commentators deserve special mention: Porphyry, for writing the *Isagoge* or *Introduction* (that is, to Aristotle’s *Categories*), in which he discusses the five notions of genus, species, differentia, property, and accident as basic notions one needs to know to understand the *Categories*. For centuries, the *Isagoge* was the first logic text a student would tackle, and Porphyry’s five predicables (which differ from Aristotle’s four) formed the basis for the medieval doctrine of the *quinque voces*. The second is Boethius. In addition to commentaries, he wrote a number of logical treatises, mostly simple explications of Aristotelian logic, but also two very interesting ones: (1) His *On Topical Differentiae* bears witness of the elaborated system of topical arguments that logicians of later antiquity had developed from Aristotle’s *Topics* under the influence of the needs of Roman lawyers. (2) His *On Hypothetical Syllogisms* systematically presents wholly hypothetical and mixed hypothetical syllogisms as they are known from the early Peripatetics; it may be derived from Porphyry. Boethius’s insistence that the negation of “If it is A, it is B” is “If it is A, it is not B” suggests a suppositional understanding of the conditional, a view for which there is also some evidence in Ammonius, but that is not attested for earlier logicians. Historically, Boethius is most important because he translated all of Aristotle’s *Organon* into Latin, and thus these texts (except the *Posterior Analytics*) became available to philosophers of the medieval period.”

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Alexander of Aphrodisias (end of 2nd century)

Porphyry (234? - 305?)

Ammonius Hermeiou (c. 435/445 - 517/526)

Simplicius of Cilicia (c. 490 - c. 560)

John Philoponus (c. 490 - c. 570)

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