

The Origins of Logical Hylomorphism*

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We are accustomed to saying that logically valid inferences are valid in virtue of their forms, not their matter. Who first used the concepts of matter and form to characterize logic, and why?

Surprisingly, the father of both formal logic and hylomorphism was not the father of logical hylomorphism. Aristotle applies his distinction between form and matter to logic only once, when he says that the premises of an inference stand to the conclusion as matter to form (*Physics* II.3.195a16-21).¹ What he means is that just as stones are required if a house is to be built, so also the premises are required if the conclusion is to be deduced (cf. II.7.198b7-8). There is no trace of a distinction between “formal” and “material” consequence in any of Aristotle’s works. In fact, the concepts of *form* and *matter* are entirely absent from the *Organon* (Burnyeat 2001, 3).

The first *extant* use of the hylomorphic terminology in connection with logic is in Alexander of Aphrodisias’s commentaries on Aristotle’s logic works (c. 200 A.D., Lee 1984, 39),² but as Sten Ebbesen notes, “Alexander does not give the impression that he is using a terminology of his own invention” (Ebbesen 1981, 1:95; cf. Barnes 1990, 42–3). This use of the terminology is almost certainly the invention of an earlier Peripatetic, but beyond that we know virtually nothing. Nor do we have any evidence that would help us to determine *why* hylomorphic terminology was applied to logic (Barnes 1990, 43). Alexander and the other Hellenistic commentators who use the terminology do not say much to explain its significance or usefulness. They just use it as if it is familiar.

*This paper is a stand-alone version of the Appendix to my Ph.D. dissertation, MacFarlane (2000).

¹For the uniqueness claim, see Barnes (1990, 40).

²In an appendix, I give approximate dates for all of the ancient and medieval writers discussed herein.

The situation is much the same in fourteenth century scholastic logic. The distinction between logical matter and logical form is articulated with great precision, but never justified or motivated. Buridan’s discussion is representative:³

I say that in a proposition (as we’re speaking here of matter and form), we understand by the “matter” of the proposition or consequence the purely categorical terms, i.e. subjects and predicates, omitting the syncategorematic terms that enclose them and through which they are conjoined or negated or distributed or forced to a certain mode of supposition. All the rest, we say, pertains to the form. (TC:I.7.2)⁴

Accordingly, a formal consequence is one in which no categorematic terms occur essentially—one that remains valid no matter what the matter, provided we keep the form the same—while a material consequence is one that fails to hold “in all terms (keeping the form the same)” (TC:I.4.2-3).⁵ What we do not find in Buridan is a discussion of the *point* of these distinctions. What is the *significance* of the distinction between logical form and logical matter, or between formal and material consequence? Why are these distinctions drawn in the way they are? What philosophical purpose do they serve? As with Alexander, the problem is that the scholastics appear to be handing down a distinction that is already well established.

In this case, however, we can locate a probable antecedent: Abelard’s twelfth century distinction between *perfect* inferences, which are valid in virtue of their structure (*complexio*), and *imperfect* inferences, which take their validity from “the nature of things” (*natura rerum*). There is good reason to think that the Abelardian distinction is an ancestor of the fourteenth century distinction between formal and material consequence (W. Kneale and Kneale 1962, 274–5; cf. Stump 1989, 127; Green-Pedersen 1984, 198). And unlike later medievals, Abelard offers a vigorous defense of his

³Unless otherwise indicated, all translations from Greek or Latin authors are my own.

⁴Buridan is even explicit about what features are included in “all the rest,” listing copulas, negations, signs of quantity, number of sentences and terms, order of signs, relations of relative terms, and modes of signification (I.7.2). Given the presence of the last item, Buridan’s distinction between matter and form is not purely syntactic, but it is as close as one could get to purely syntactic without moving to a language more regimented than scholastic Latin. Without it there would be no way to distinguish the forms of “Socrates runs (Sortes currit)” and “a man runs (homo currit).”

⁵Similar definitions can be found in Pseudo-Scotus and Albert of Saxony. In England, the distinction between formal and material consequence is drawn differently (Ockham, Burley), but there is another distinction (*gratia formae/gratia materiae*) that corresponds to Buridan’s. See Formal and material consequence, below.

position against an opponent who would claim that *all* valid inferences take their validity from “the nature of things.” Abelard argues that the inferences he classes as “perfect” do not depend at all on “the nature of things,” and thus provides a compelling rationale for saying that these inferences are good in virtue of their form or construction alone. As I will show, however, Abelard’s argument depends on some characteristically medieval assumptions—assumptions we no longer find plausible.

1 Aristotle and the commentary tradition

Before looking at Abelard’s argument, it will be useful to see how the dialectical framework in which it takes place evolves out of Hellenistic debates over the status of logic.

1.1 Aristotle and formal logic

There are good reasons to acknowledge Aristotle’s categorical syllogistic as the first formal logic. It employs schematic letters for generality, so it is formal in the minimal sense of employing schemata. But it is also formal in the deeper sense of being normative for reasoning about any subject matter whatsoever, no matter what the epistemic status of its premises. Its claim to generality rests on the account of propositional structure on which it is based: any claim about the world, Aristotle thinks, must have one of the four categorical forms and hence be subject to the norms of categorical syllogistic.⁶

In all these respects, the theory of categorical syllogistic differs fundamentally from Aristotle’s earlier vision of the syllogism. It is now generally accepted that “syllogism” does not *mean* “categorical syllogism” in Aristotle, since the *Topics* and *Sophistical Refutations*, which also concern themselves with syllogisms, must have been written before Aristotle developed the categorical syllogistic (Allen 1995, 177–9). Nor does

⁶See MacFarlane (2000) for these senses of formality, there called “schematic formality” and “1-formality.” Note that Aristotle’s logic is not what is there called “syntactic-formal”: as Łukasiewicz (1957, 15) says, it is “...formal without being formalistic” (cf. Mueller 1980, 51). The Peripatetics could never understand the Stoic insistence on the importance of syntactic rules (Frede 1987, 108–110). Alexander rejects Stoic syllogisms like “if it is day, it is day; it is day; therefore, it is day” on the grounds that “...the shape (*schēma*) of the expression is not sufficient to make a syllogism, but it is necessary first that what is signified by the expression be capable of proving something” (*Top*, 19-21).

it mean merely “deductively valid argument” (Frede 1987, 115; Barnes et al. 1991, 21). A syllogism is “...an argument in which, some things having been set down, something other than the things laid down follows by necessity *through the things laid down*” (*Top* 100a25-27)—or, in the *Prior Analytics* version, “*through their being so*” (*AnPr* 24b18-20). The force of the emphasized phrase, which Aristotle glosses as “not needing any term from without (*exōthen*) in order for the necessity to come about” (*AnPr* 24b21-2), is to rule out arguments in which the necessity of consequence depends on unstated assumptions. A syllogism, then, is a deductively valid argument in which all of the assumptions on which the necessity of consequence depends have been made explicit (Frede 1987, 115). So far, the *Topics* and the *Prior Analytics* are in agreement. The crucial difference is that where the *Prior Analytics* offers a *general* theory of the syllogism, applicable to demonstrative, dialectical, and eristic arguments alike, the *Topics* offers a theory of the *dialectical* syllogism: a set of heuristics for constructing arguments from reputable premises, in the absence of specialized scientific knowledge. As Allen (1995) has argued, it is a mistake to assume that the theory of the *Topics* is intended to have *any* application to *demonstrative* syllogizing, even though some of the topical maxims resemble formal logical laws (for example, the maxim of *Top* 111b18-21 is essentially *modus ponens*). Demonstrative reasoning relies not on *Topics* but on the special first principles of specific sciences (*Rhet* II.2.1358a2-35; for interpretation, see Allen 1995, 192–9). In short, prior to the invention of the categorical syllogism, Aristotle has no account at all of the “common logical form” of dialectical and demonstrative syllogisms. The *Prior Analytics* offers the first theory of the syllogism, *as such*.

The theory of the syllogism presupposed in the *Topics* and the earlier strata of the *Rhetoric* cannot be said to be formal in any of the senses in which the categorical syllogistic can be. It does not provide any common norms for syllogisms in the demonstrative sciences: rather, the principles of the particular sciences are themselves regarded as the standards for correct demonstrative syllogism. Even the norms it offers for *dialectical* syllogisms are not completely general. Although the topics include general rules or maxims—for example, “if contrary attributes belong to the genus, they also belong to the species” (cf. *Top* II.4.111a14-5)—Aristotle frequently notes that these rules have exceptions (objections or *enstaseis*: 115b14, 117a18, 117b14, 121b30, 123b17, 124b19, and 128b6, just to name a few).

Before Aristotle’s invention of the categorical syllogistic and his use of it as an account of the correctness of syllogisms *as such*, then, logical hylomorphism would not have been possible. Allen (1995, 191) is right to credit to Aristotle the “insight...that the

validity of an argument is due to its form, not its content, and that this form can be isolated and made the object of systematic study.” However, it is important to recall that Aristotle did not himself characterize his insight in these terms. It was left to later Peripatetics to take that step.

1.2 Logical hylomorphism in the Greek commentaries

At the beginning of his commentary on the *Prior Analytics*, Alexander of Aphrodisias compares the syllogistic figures (*schēmata*) to a “common matrix” (*tupos koinos*) in which many different matters can be molded into the same form (*eidōs*) (*AnPr* 6.16-21). This division of syllogisms into form and matter is echoed in later commentators, such as the neo-Platonist commentator Ammonius:⁷

In every syllogism there is something analogous to 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 (*schēmata*). (*AnPr* 4.9-11, trans. Barnes 1990, 41)

The point of the schematic letters in Aristotle’s exposition is, Alexander says,

...to indicate to us that the conclusions do not depend on the matter (*ou para tēn hulēn*) but on the figure (*para to schēma*), on the conjunction of the premisses (*tēn toiautēn tōn protaseōn sumplokēn*), and on the modes (*ton tropon*). For so-and-so is deduced syllogistically not because the matter is of such-and-such a kind but because the combination (*suzugia*) is so-and-so. The letters, then, show that the conclusion will be such-and-such universally, always, and for every assumption. (*AnPr* 53.28-54.2, translation from Barnes et al. 1991).

The validity of *non*-syllogistic arguments, on the other hand, depends on the particular matter (52.19-25). Among these are syllogisms in the second figure with two affirmative premises in which the terms are all necessarily coextensive (definitions or *propria*, 344.28-31), for example:

⁷Starting with Porphyry, the neo-Platonic commentators accept and expound Aristotelian logic, provided it is not taken as a key to ontology (which must be done in strictly Platonic terms) (Ebbesen 1981, 1:134–9; Ebbesen 1982, 102–127). By this time, Stoic logic had virtually disappeared, except for the traces it left in the scholastic tradition (Ebbesen 1982, 103).

All humans are mortal rational animals.

All humans are featherless bipeds.

Therefore, all mortal rational animals are featherless bipeds.

Here the conclusion follows necessarily from the premises, not on account of the (invalid) syllogistic form, but because of the peculiarity of the matter.⁸

Both Alexander and Ammonius see the theory of categorical syllogistic as an account of the syllogism *as such* (*haplōs*); that is, of the form (*eidōs*) common to demonstrative, dialectical, and eristical syllogisms (Alex. *Top* 2.1-3.4; Ammon. *AnPr* 4.1-7). Alexander observes that the following two syllogisms do not differ from one another in respect of their form (*kata to eidōs*), although (due to the difference in their matter) the first is demonstrative and the second dialectical (*Top* 2.26-3.4; cf. K. L. Flannery 1995, 120–1).

Pleasure is incomplete.

Nothing good is incomplete.

Therefore, pleasure is not good.

Pleasure does not produce good things.

That which is good produces good things.

Therefore, pleasure is not good.

The hylomorphic terminology is also deployed to describe the difference between the two sorts of fallacious arguments: materially defective arguments (*hēmartēmenos para tēn hulēn*, i.e., having a false premise) and formally defective (*hēmartēmenos para to eidōs*, i.e., invalid) ones (Alex. *Top* 20-1; cf. the other passages cited by Ebbesen 1981, 1:95–6).⁹

⁸A similar distinction is made among conversions of categorical propositions, which do not count as syllogisms because they have only one premise (Barnes 1990, 625). For example, universal affirmatives convert to universal affirmatives only in particular material instances (*epi hulēs*, 35.3-4) : e.g., “all humans are mortal rational animals” converts to “all mortal rational animals are human.” But universal affirmatives always convert to particular affirmatives: such conversions “do not depend...on the peculiarities of matter (which is different in different cases) but on the nature of the figures themselves” (35.6-9, translation from Barnes et al. 1991).

⁹Ebbesen notes that this distinction is probably an Aristotelianizing of the Stoic distinction between two kinds of “false” arguments: those with a false premise and those that cannot be reduced to the five indemonstrables (Ebbesen 1982, 125). Commentators on Aristotle use it to illuminate

This evidence suggests that logical hylomorphism was fairly widespread among the Greek scholastics.¹⁰ However, it is too meager to yield confident answers to the questions in which we are most interested. Why do these commentators bring the hylomorphic terminology to bear on logic? Does their use of the concepts of form and matter tell us anything about how they think of logic? Or is it just an unreflective extension of familiar Aristotelian machinery to an analogous case? What is the *significance* of saying that the validity of the syllogism depends not on the matter, but on the form?¹¹

It is clear that Alexander intends something more than *schematic* formality, because he does not think that all arguments that can be presented using schematic letters are syllogistic. In particular, the conclusion of the argument

(GT)

A is greater than B.

B is greater than C.

Therefore, A is greater than C.

follows from the premises “on account of the peculiarity of the matter” (*para tēn tēs hulēs idiotēta*, *AnPr* 344.28-9). In order to see why Alexander does not count this argument as formally valid, we need to understand why he does not count “is greater than” as a feature of the argument’s form (like “belongs to all”).¹²

Aristotle’s division of eristical syllogisms into (a) real syllogisms from premises that are merely apparently reputable and (b) merely apparent syllogisms (*Top* I.1.100b23-6). The distinction between material and formal defect reappears in Michael of Ephesus’s commentary on the *Sophistical Refutations* (*SE* 4.9-13, 4.29-31, 6.31-7.1, 7.9-11, 135.26-7), which was translated into Latin by James of Venice in 1130 (Ebbesen 1982, 108; for the identification of Pseudo-Alexander with Michael, see Ebbesen 1981, 1:268).

¹⁰For general discussions of logical hylomorphism in the commentators, see Lee (1984, 37–44), Barnes (1990), and K. L. Flannery (1995), ch. 3.

¹¹Frede (1987, 103) claims that neither Stoics nor Peripatetics ever say that an argument is valid because of its logical form. He rightly points out that to say that an argument form holds in all matter is not yet to say that its instances are valid *because of* their form. However, the evidence I have cited above suggests that the commentators would make the latter claim as well as the former. For syllogisms are *contrasted* with arguments whose validity depends on their matter, and although syllogisms are not said literally to be valid in virtue of their *forms*, they *are* said to be valid in virtue of their *schēma*, *sumplokē*, or *suzugia*, which surely amounts to the same thing (see Barnes 1990, 40 n. 62).

¹²See Łukasiewicz (1957), pp. 14-15.

Although he never gives a general criterion for what we would call the “logical constants,” Alexander does wonder why *modal* vocabulary is not part of the matter of a syllogism:

For the fact that a predicate belongs in this way rather than in that way is a material difference. Differences of this sort among propositions will seem to bear not on an argument’s being a syllogism *simpliciter* (*haplōs*) but on its being this or that kind of syllogism—demonstrative, say, or dialectical. (*AnPr* 27.29-28.2, translation from Barnes et al. 1991)

His answer is that consideration of the modal vocabulary is “useful” and indeed “necessary” for the methodical study of syllogistic (28.2-4, 18). Propositions convert differently depending on their modes, and so the modes of the premises and conclusion must be taken into account in determining which syllogisms are valid (28.4-13). *Because* the modes must be taken into account in order to give a systematic account of valid syllogisms, they must be “annexed” (“apart from the matter,” *chōris tēs hulēs*) into the form of the propositions (28.13-14). On the other hand, modal words that “do not bear on the generation or differentiation of syllogisms”—for example, “badly,” “quickly,” or “concisely”—are presumably part of the matter (28.20-4, translation from Barnes et al. 1991).¹³

But this criterion is not much use for deciding whether “greater than” should count as part of the form of the argument (GT) or as part of the matter. For what is at stake is precisely whether (GT) *is* a syllogism. In order to determine whether “greater than” bears on the “generation or differentiation of syllogisms,” we have to decide whether (GT) is a syllogism; but in order to decide whether (GT) is a syllogism, we need to know whether “greater than” counts as matter or form. Alexander injects content into the emptiness of this circle by appealing to a characteristic feature of *categorical* syllogisms: all must have a universal premise (344.23-5, 345.19-20). But this move just begs the question.¹⁴

Alexander’s view seems to have been that only categorical syllogisms (and the conversions of categorical propositions) are valid in virtue of their forms. Although other

¹³For a contrasting interpretation of this passage, see K. L. Flannery (1995, 111–14). The passage is also discussed in Barnes (1990, 47–53).

¹⁴Barnes (1990, 52–3) suggests, on slim evidence, that the Peripatetics distinguish the logical constants on the basis of their universal applicability or “topic-neutrality.” I am inclined to think, however, that Alexander had no such general criterion in mind.

inferences may be valid—in the sense that their conclusions necessarily follow from their premises—their validity is based on peculiarities of their “matter” or terms. But Alexander gives no clear account of just what it is that non-categorical arguments lack.

In the later, neo-Platonist commentators, there is a hint of the view that logic is formal. Ammonius attempts to reconcile the Stoic view that logic is a part of philosophy with the Aristotelian view that logic is not a part of philosophy but merely an *organon* (tool). Logic, he says, can be considered in two ways:

If you consider the arguments together with the things (*pragmatōn*), e.g. the syllogisms themselves together with the things that are their subject matter (*meta tōn pragmatōn tōn hupokeimenōn autois*), [logic is] a part [of philosophy]. But if you consider the empty rules apart from the things (*psilous tous kanonas aneu tōn pragmatōn*), it is an *organon*. (*AnPr* 10.38-11.3)¹⁵

The terminology seems to come from Plotinus, who contrasts Platonic dialectic, which is a part of philosophy and concerns itself with real beings and things (*onta, pragmata*), with Aristotelian logic, which provides “empty theorems and rules” (*psila theōrēmata kai kanones*) (*Enn* I.iii.5.10-12, cf.4.18-20).¹⁶ To say that the rules are “empty” is apparently to say that they abstract entirely from relation to real things. Plotinus’s pupil Porphyry (a key influence on all later scholasticism, Greek and Latin) seems to have exploited this view to argue that there is no real incompatibility between Aristotelian logic and Platonic metaphysics (Ebbesen 1981, 1:134–6), since logic says nothing about ontology. Again, however, our evidence is slight. Only Porphyry’s *Introduction to the Categories* and his commentary on the *Categories* survived into the middle ages.

1.3 Logical hylomorphism in Boethius

It is likely that logical hylomorphism passed into the Latin medieval tradition through Boethius. Boethius’ influence on Abelard and his contemporaries was, as we will see, immense. Until the Latin West’s rediscovery of Aristotle’s *Analytics* and *Topics* in

¹⁵Philoponus expresses a similar view, but with “universal rule” (*katholikos kanōn*) instead of “empty rule” (*AnPr* 47.1-5). See Lee (1984, 42–4), K. L. Flannery (1995, 117).

¹⁶I owe the reference to K. L. Flannery (1995, 117 n. 29).

the twelfth century, Boethius' treatises were the main source of knowledge about the syllogism (categorical and hypothetical) (Ebbesen 1982, 105, 122).

Barnes (1990, 42) suggests that much of Boethius' terminology is meant to translate the logical-hylomorphic vocabulary in the Greek commentators:

In his *de hypotheticis syllogismis* he invokes the Peripatetic distinction in a variety of ways: *propositionis ipsius conditio* contrasts with *rerum natura* (II ii 4); *propositionum complexio* with *rerum natura* (II ii 5); *complexionis natura* or *figura* with *termini* (II iii 6; iv 2); *complexionis natura* with *terminorum proprietates* (II iv 3; x 7; III vi 5); *complexio* with *termini* (II xi 1).

Barnes' claim is plausible: *complexio* is cognate to the Greek *sumplokē* (Alex. *AnPr* 53.30; Philop. *AnPr* 321.3, 349.30), *figura* translates *schēma*, and *rerum natura* corresponds to *phusis tōn pragmatōn* (Ammon. *in Int.* 113.13-15, quoted in Barnes 1990, 44). The Boethian terminology turns up again in Abelard, who distinguishes between consequences that take their truth from their construction (*complexione*) and those that take their truth "from the nature of things" (*natura rerum*). Boethius is therefore a bridge between the Greek scholastic tradition and the later Latin one.¹⁷

However, the distinction Boethius draws between hypothetical syllogisms that are valid by virtue of "the construction of their propositions" and those that are valid by virtue of "the nature of the things, in which alone these propositions can be asserted" (*DHS* II.ii.4-5) is not the same as the distinction Alexander draws between syllogisms valid on account of their matter and syllogisms valid on account of their form. Nor is it the same as Abelard's distinction between perfect and imperfect inference. The syllogisms Boethius calls valid "according to terms" are cases of affirming the consequent or denying the antecedent that happen to be valid in all substitution instances *for which the major premise is true*. For example, in the inference "if it is not *a*, it is *b*; but it is *a*; thus it is not *b*," Boethius claims, the major premise can only be true when the terms *a* and *b* are *contraries*, like "day" and "night." But when *a* and *b* are

¹⁷The connection is urged by Green-Pedersen (1984, 198). Note that even Abelard's word "perfect" appears in Boethius (*DHS* II.ii.6). There is another relevant passage at *ICT* 1046, where Boethius distinguishes between the "matter" and "form" of arguments, comparing these to the stones and their arrangement in a wall. To contemplate the matter of an argument is to examine "the nature of the propositions themselves—whether they are true and necessary, whether they are verisimilar, or whether they are used in sophistries." To contemplate the form is to consider "the junctures and composition of the propositions among themselves" (trans. Stump 1988).

contraries, and it is *a*, then it follows that it is not *b*. Hence the inference is valid for all substitution instances in which the premises are true. Where Abelard and Alexander are pointing to a class of inferences that are valid *despite* having formal counterexamples, the syllogisms Boethius calls valid by “the nature of the things, in which alone these propositions can be asserted” are counterexample-free. They are distinguished from syllogisms valid by “the construction of their propositions” not because they have counterexamples, but because their freedom from counterexamples depends on peculiarities of the matter “in which alone” they can be instantiated, not on their “construction.”

In fact, Abelard thinks Boethius’ claim that “if it is not *a*, it is *b*” can only be true when *a* and *b* are contraries is simply *wrong*: “if it is not *a*, it is *b*” can be true, he notes, when *a* is “animal” and *b* is “non-man” (*D* 499). Abelard agrees that some cases of affirming the consequent are valid “due to the terms” (501-2), but he does not mean the same thing by this phrase as Boethius.

Thus, although Abelard is probably taking over Boethius’ *vocabulary*, he is not taking over Boethius’ *distinction*. Nor (as far as we know) did he have any other source for the distinction articulated by Alexander and the other Greek scholastics. In order to understand the background of Abelard’s account of the special character of the syllogism, we must look at two other developments in later antiquity which made the issue of the distinctive character of syllogistic more pressing. The first is the debate over “unmethodical arguments”: valid arguments that cannot readily be fit into the framework of either the (Peripatetic) categorical or the (Stoic) hypothetical syllogistic. The second is the gradual transformation of the Topics from heuristics for argument discovery into inferential norms.

2 Unmethodically conclusive arguments

For both Stoics and Peripatetics, the point of logical theory is not to codify necessary inferences, but to provide a standard for the *explicitation* of inferences. Thus both schools recognize inferences that are conclusive (i.e., in which the conclusion follows necessarily from the premise) but not *syllogisms*. The Aristotelian definition of syllogism requires not only that the conclusion follow necessarily from the premises, but that it follow “through their being so” (*tōi tauta einai*, Arist. *AnPr* I.1.24b20). Aristotle glosses this phrase as “not needing any term from without (*exōthen*) in order for the necessity to come about” (24b21-2): the point is apparently to rule out necessary

inferences that depend on unexpressed premises (at least that is how the later Peripatetics understand it, Alex. *AnPr* 21, 344). Similarly, the Stoics divide conclusive (*perantikoi*) arguments—i.e., arguments in which the premises are incompatible with the negation of the conclusion—into two classes: *sylogistic* (*sullogistikoi*) and merely conclusive (*perantikoi eidikōs*) (Diogenes Laertius *LP* VII.77-8). What distinguishes the syllogistic arguments from the merely conclusive ones is that they can be reduced (using second-order proof reduction rules, *themata*) to the five canonical forms of arguments the Stoics call “indemonstrable” (VII.78). Again, the effect is to rule out arguments that are conclusive in virtue of some unexpressed premise.¹⁸

For both Peripatetics and Stoics, then, syllogisms are not merely necessary inferences, but inferences in which all the assumptions on which the necessary consequence depends have been made explicit.¹⁹ The role of syllogistic theory is to provide a framework for this complete explicitation. Of course, Peripatetics and Stoics find completely different frameworks appropriate for this purpose: the Peripatetic paradigm of a completely explicit inference is the categorical syllogism, whereas the Stoic paradigm is the hypothetical syllogism. Oddly, neither side recognizes the other’s syllogisms as syllogisms (Frede 1987, 100; cf. Mueller 1980). The Stoics and Peripatetics regard term logic and propositional logic, which we see as complementary, as conflicting doctrines.

2.1 The debate over unmethodically conclusive arguments

This conflict comes out most clearly in Alexander’s debate with opponents he calls “the moderns” (*neoteroi*, *AnPr* 390.16-18)—most likely late Stoics.²⁰ Both Alexander

¹⁸Frede (1987, 103) suggests that “...the Stoics thought that every valid argument will turn out to be a syllogism if only we supply the premises which have been taken for granted and formulate them properly...” (cf. Mueller 1980, 179–80). Against this, Barnes (1990, 81) argues that the Stoics may have thought that at least some conclusive arguments—the “unmethodically conclusive arguments,” discussed below—are “untreatable by the science of logic” (hence the name “*unmethodically conclusive*”). The evidence is probably too meager to decide either way.

¹⁹This much is common to the Stoic and Peripatetic understanding of syllogism. There are also some differences: the Peripatetics seem to have thought of syllogisms as *arguments*, not just inferences, and built into the notion of syllogism the requirement that something *new* be proved (Frede 1987, 117), while the Stoics required that syllogisms be in a canonical (linguistic) form, as the Peripatetics did not (Frede 1987, 102–3, Alex. *AnPr* 373.29-35). These differences will not concern us in what follows.

²⁰For discussions of the identity of the *neoteroi*, see Mueller (1980, 58–9), Barnes (1990, 74–5), and Kieffer (1964, 130–3). Ebbesen (1981, 1:113) suggestion of Posidonius is attractive but speculative.

and the *neoteroi* agree that the arguments the Stoics call “unmethodically conclusive”—for example,

(EQ)

A is equal to B.

B is equal to C.

Therefore, A is equal to C.

(GT)

A is greater than B.

B is greater than C.

Therefore, A is greater than C.

—are not syllogisms, because their necessity depends on an additional assumption beyond the stated premises (*AnPr* 22.4-7, 345.13-14, 24-7).²¹ They are, as the Peripatetics would put it, valid because of their matter, not their form.²² Alexander goes through great lengths to persuade us that such inferences can be put into the form of a categorical syllogism by conjoining the premises and adding another, universal premise (344.15-20).²³ On the Stoic side, Posidonius seems to have argued that arguments like (EQ) are valid in virtue of an implicit axiom (*sunaktikoi kata dunamin axiōmatos*,²⁴ Galen *IL* XVIII.8; Kidd 1978, 279; Ebbesen 1981, 1:113). It is common ground between Stoics and Peripatetics that such arguments are not syllogisms.

The disagreement concerns the relation between such uncontroversially *non*-syllogistic arguments and the arguments each party takes to be genuinely syllogistic. The

²¹(EQ) comes from Euclid’s first proposition (*E* I.1; Alex. *AnPr* 20.4-5); (GT) can be found in *E* I.18. For other examples of unmethodically conclusive arguments, see *AnPr* 344.9-346.6, Pseudo-Ammonius *AnPr* 70.10-13, and (GT) above. Discussions of unmethodically conclusive arguments can be found in Mueller (1980, 59–66), Frede (1987, 102), Ebbesen (1981, 1:112–14), and Barnes (1990, §IV).

²²Alexander says that the conclusions of inferences like (GT) and (EQ) follow from the premises “asyllogistically and through the peculiarity of the matter of the [premises] laid down” (344.28-9). And Pseudo-Ammonius writes: “Thus let not the geometers say: ‘Since A is equal to B and B is equal to C, therefore A is equal to C.’ For they deduce truths not because of the combination (*plokē*) but because of the matter. That is why the Stoics call them unmethodically concluding” (*AnPr* 70.10-13, translated in Barnes 1990, 80).

²³The claim is logically naïve (see Mueller 1980, 176; Mueller 1974, 42; Barnes 1990, 101–4), but that is not our present concern.

²⁴Posidonius appears to be using *axiōma* with its Peripatetic sense of “self-evident proposition,” not its Stoic sense of “proposition” .

neoterioi argue that the Peripatetics’ categorical syllogisms are like unmethodically conclusive arguments, and hence not syllogisms at all (Alex. *AnPr* 345.15-18): only hypothetical syllogisms are really syllogisms (260.28-9, 262.28-9). Alexander argues for the converse position: that it is Stoic *hypothetical* syllogisms that are like unmethodically conclusive arguments (i.e., conclusive, but not syllogistic—390.1619, 348.31-2), and that only categorical syllogisms are truly syllogistic. In effect, each party to the debate argues that the inferences the other party considers *formal* are in fact *material* and depend on unstated assumptions, just like unmethodically conclusive arguments.

2.2 The *neoterioi*’s case

Alexander does not say *why* the *neoterioi* think that categorical syllogisms are like unmethodically conclusive arguments; he is interested in rebutting the view, not sympathetically expounding it. We are left to speculate. As we have seen, Posidonius probably argued that (EQ), (GT), and similar arguments get their force from an implied axiom. And in fact, Euclid’s first Common Notion (“Things which are equal to the same thing are also equal to one another,” *E* 155; cf. Kidd 1978), which Proclus calls an “axiom” in his commentary (cited by Heath in Heath 1956, 1:121; cf. Ross 1949, 510–11), is just what is needed to validate (EQ). It is possible that further reflection on the axiomatic basis for the “unmethodically conclusive” arguments used in mathematics led Posidonius to ask whether categorical syllogisms, too, depend on an implied axiom for their cogency (so speculates Ebbesen 1981, 1:113). Galen tells us that Boethus of Sidon, a Peripatetic, allowed that some hypothetical syllogisms were prior (in some sense) to categorical syllogisms (*IL* VII.2; Kieffer 1964 *ad loc.*; Ebbesen 1981, 1:113; Frede 1987, 123). Perhaps Peripatetics began to reflect on the principles of propositional logic Aristotle used in developing syllogistic theory (especially in arguments by *reductio* for the validity of some of the syllogistic moods).

Another tempting conjecture (for which, again, there is no direct evidence) is that the *neoterioi* noticed the formal similarity between arguments like (EQ) or (GT) and categorical syllogisms in Barbara (Bar), phrased in Aristotle’s usual manner:

(Bar)

A belongs to all B.

B belongs to all C.

Therefore, A belongs to all C.

(GT)

A is greater than B.

B is greater than C.

Therefore, A is greater than C.

If (GT) depends for its validity on an assumption about the relation *is greater than*, why don't syllogisms in Barbara depend for their validity on a comparable assumption about the relation *belongs to all*? As Frede (1987, 108) notes,

...it is difficult to think of any satisfactory argument which would have shown that 'belonging to' is in a privileged position and at the same time would not have indicated that other expressions are in the same privileged position and which therefore would have forced the peripatetics to admit arguments as syllogisms which they did not want to count as such. (108)

Such reflections would naturally lead to precisely the kind of argument Alexander attributes to the *neoterói* (cf. Barnes 1990, 76):

1. Categorical syllogisms are relevantly similar to (GT) and (EQ).
2. (GT) and (EQ) depend for their validity on implicit axioms.
3. Therefore, categorical syllogisms depend for their validity on implicit axioms.
4. Hence, categorical syllogisms are not fully explicit.
5. Hence, they are not really syllogisms.

2.3 The Peripatetic response

Alexander parries this argument with a block and a counterpunch. First he argues that categorical syllogisms are *not* relevantly similar to (EQ) and other unmethodically conclusive arguments. Then he argues that in fact it is Stoic *hypothetical* syllogisms that depend, like (EQ), on unstated assumptions.

What categorical syllogisms have that unmethodically conclusive arguments do not, Alexander claims, is universal premises. Without at least one universal premise, there can be no syllogism (345.18-20). The validity of unmethodically conclusive arguments with particular premises rests on the truth of unexpressed universal premises

(345.24-7). It is obvious, however, that this response begs the question. It is true that *categorical* syllogisms require a universal premise, but whether all syllogisms are categorical is precisely what is at issue. Alexander tries to free his argument from this assumption by arguing that no arguments from two particular premises could hold “in all matter” (*epi pasēs hulēs*, 345.20-2) and showing how to construct formal counterexamples to arguments like (EQ) (344.31-345.12, 348.5-12). But what counts as the *matter* in an argument is just as much at issue as what counts as a syllogism. If my conjecture is correct, the *neoteroi* are suggesting that “belongs to all” and “belongs to some” ought to be counted as matter, just as “is equal to” is. And if these are counted as matter—that is, as subject to replacement for the purposes of finding formal counterexamples—then no categorical syllogisms will hold “in all matter.”

Alexander’s counterpunch is more interesting. He attempts to show that (what we would regard as) valid arguments of propositional logic depend for their validity on unstated universal premises. The first he draws from Plato’s *Republic*:

(PR)

If he was the son of a god, he was not greedy.

If he was greedy, he was not the son of a god.

Therefore, he was not both [greedy and the son of a god]. (22.8-9)

The Stoics (and presumably the *neoteroi*) would have counted this argument as syllogistically conclusive. But Alexander says that “it does not conclude through the premises laid down, but by the addition of a universal premise—namely, ‘when from each of a pair of contradictories follows the contradictory of the other, it is impossible for both to belong to the same thing’ ” (22.9-12). In assimilating this argument to “the arguments which the *neoteroi* call unmethodically conclusive” (22.18),²⁵ Alexander is suggesting a criticism of Stoic logic that is the exact mirror image of the *neoteroi*’s criticism of categorical syllogistic: Stoic “syllogisms” are like unmethodically conclusive arguments in that they depend for their validity on an unstated assumption; hence they are not really syllogisms at all.

Similarly, Alexander suggests that the argument

(HS)

If it is human, it is animal.

²⁵I do not think that Alexander’s wording implies that the *neoteroi* themselves call (PR) “unmethodically conclusive.” He says only that the arguments the *neoteroi* call unmethodically conclusive are “of this sort.”

If it is animal, it is substance.
Therefore, if it is human, it is substance.

is not syllogistic (347.18-20), but depends on the true universal assumption “everything that follows from something also follows from that from which the first thing follows” (347.26; Barnes 1990, 114).²⁶ This is not a direct criticism of Stoic logic, since apparently the Stoics would not have counted (HS) as a syllogism (Frede 1974:106). But Alexander’s demand that we state what we would regard as laws of propositional logic as categorical propositions indirectly subverts Stoic logic, by suggesting that the inferences it regards as completely explicit in fact depend on unstated assumptions.

2.4 Galen’s pragmatic alternative

Both parties to the debate, as I have reconstructed it, argue that their opponents’ paradigm syllogisms really have the same status as the unmethodically conclusive arguments: they are conclusive, but only in virtue of some true assumption that they fail to make explicit. One response to this situation—a response I think we can see in Alexander’s contemporary Galen—is to conclude that *all* arguments depend on unstated assumptions. Galen belittles the intolerance of the Stoic and Peripatetic schools; he accepts both categorical and hypothetical syllogisms, as well as arguments like (EQ), which he places in a third category of “relational syllogisms” (*sullogismoi kata to pros ti*, II xvi).²⁷ He criticizes the Peripatetics for trying to force relational syllogisms into categorical form (xvi.1). Though he acknowledges the possibility of putting relational syllogisms into either categorical or hypothetical form by the addition of a self-evident axiom (cf. xvi.11, xvi.5), he sees no point in doing so. On Galen’s view, (EQ) and other relational syllogisms are perfectly good syllogisms as they stand.²⁸ True, “they have the cause of their structure (*sustaseōs*) derived from

²⁶Alexander notes at 373.29-35 that “A follows from B” is equivalent in his usage to “if B then A.” He criticizes the Stoics for distinguishing between what he regards as two ways of saying the same thing and claiming that a syllogism comes about only if the latter form is used. Incidentally, the conditionals in (HS) are expressed with genitive absolutes, not the word “if.”

²⁷All translations from Galen are from Kieffer (1964).

²⁸In xvi.10 Galen calls the axiom a “conjoined axiom” (*sunēmmenou axiōmatos*), which suggests an explicitly added assumption (unless *sunēmmenon axiōma* at xvi.10 means “conditional proposition,” as in the Stoic usage, v.5). But his examples of relational syllogisms (except xvii.3 and xvi.11) do not reflect this, and his claim (xvi.12) that the axiom accounts for “the credibility of [relational syllogisms]’ *structure* and their demonstrative force” suggests otherwise (cf. i.3). Kieffer (1964) proposes, reasonably, that the axiom functions as a kind of argument schema (118), which *can* be

certain axioms” (xvi.5):²⁹ but this does not seem to distinguish them from other syllogisms, since “[n]early all the syllogisms get their structure through the cogency of the universal axioms that are set over them” (xvii.1).

Galen seems to be expressing the view that it is futile to ask when *all* of the assumptions on which an inference depends have been made explicit, and proposing instead that an inference has sufficiently explicated when its structure is determined by a self-evident axiom.³⁰ We *could* privilege hypothetical or categorical syllogisms, but there is no reason to do so; and once we allow them both, we might as well also count as syllogisms a whole slew of inferences that are neither categorically nor hypothetically valid as they stand.³¹ Ebbesen (1981, 1:116) sums up Galen’s contribution as “the idea that all syllogizing depends on self-evident axioms, so that all syllogistic validity can be given a material explanation...” But perhaps it would be more correct to say that for Galen, the line between formal and material is purely pragmatic: one should seek forms of argument that do not *need* further explication (because the axioms on which they depend are self-evident and will not be disputed), not forms of argument that *cannot* be further explicated. For *every* form of argument can be

made explicit, but which Galen thinks there is no *reason*, beyond pedantry, to make explicit (120). Once one accepts the idea that *all* forms of argument depend on axioms, the issue of which axioms to make explicit becomes a pragmatic one.

²⁹Galen attributes the view that relational syllogisms are “conclusive by force of axiom” (*sunaktikous kata dunamin axiōmatos*) to Posidonius. How much of Galen’s view should be attributed to Posidonius has been much debated (Mueller 1980, 62; Ebbesen 1981, 1:113; Barnes 1990, 99 n. 207; Kidd 1978, 113; Kieffer 1964, 28–30).

³⁰In i.5, Galen distinguishes *axiom* (“a proposition carrying conviction of itself to the intellect”) from *premise* (a “statement about the nature of things,” not self-evident, but derived from perception or demonstration). I do not think that Galen means to suggest that axioms are not about “the nature of things”; the distinction is rather an epistemological one (cf. xvii.7).

³¹The text of the last part of the *Institutio Logica* is corrupt, and interpretation is difficult. In particular, Galen’s claim at xvi.5 that by keeping in mind the axioms on which relational syllogisms depend, “we shall be able to begin again more clearly and reduce such syllogisms to the categorical form” threatens to efface the difference between his view and Alexander’s (Barnes 1990, 99 n. 211). In xvi.11, Galen shows how a relational syllogism might be put into both hypothetical and categorical forms. (He shows no greater awareness than Alexander of the logical problems with the latter approach, taking “The man whom someone has as father, of him he is the son” as a universal categorical proposition.)

further explicated,³² if one is willing to descend into needless pedantry.³³

3 The transformation of the topics

Of course, Abelard would not have had access to Galen, the Stoics, or the Greek commentators on Aristotle. He may have known Aristotle's *Prior Analytics*, but probably not the *Topics* (De Rijk 1956, xvi ff.; Ebbesen 1982, 104–9). His main sources for the logic of antiquity were Porphyry and especially Boethius, to whom he refers constantly in the *Dialectica*. But the debate over unmethodically conclusive arguments influenced him indirectly. Galen's view that relational syllogisms are valid in virtue of an unexpressed axiom, which need not be made explicit as part of the argument itself, probably influenced Themistius' "combination of axiomatics and topics" (Ebbesen 1981, 1:117). In turn, Themistius' conception of the Aristotelian Topics was transmitted to the middle ages through Boethius and framed the debates about the source of the validity of the syllogism up to the time of Abelard.

3.1 Aristotle's Topics

Aristotle's *Topics* is a collection of general rules or heuristics for the construction of convincing and "reputable" (*endoxoi*) dialectical arguments on any subject whatever. It is notable that Topical arguments do not have the form of categorical syllogisms: their reputability cannot be read off from their syntactic structure, but depends on relations between terms. It is tempting to think that their reputability depends on Topical "maxims" which function like quasi-logical laws,³⁴ but this is almost certainly

³²This claim would be better supported if we could be sure that Galen's claim at xvii.2 that *all* demonstrative syllogisms depend on axioms is meant to apply to categorical and hypothetical syllogisms. "Unfortunately," as Kieffer notes, "Galen does not expressly say this, and there are no examples given in this appendix of plain categorical or hypothetical syllogisms illustrating the rule" (Kieffer 1964, 123).

³³Galen may have been influenced by the Sceptics' charge that the major (conditional) premise in a syllogism is redundant (Sextus Empiricus *PH* II.159-166). We know that Galen thought that much traditional logic was useless and even considered becoming a Sceptic (Ebbesen 1981, 1:114–15; Kieffer 1964, 1).

³⁴For example, the topical argument "since perceiving is judging, and it is possible to judge correctly and incorrectly, there would also be correctness and error in perception" (*Top* II.4.111a16-18) seems to depend on the maxim "if contrary attributes belong to the genus, they also belong to the species." Many commentators have claimed that the Topics contain quasi-logical laws (Brunschwig

not Aristotle’s view. Aristotle does not seem to think that the acceptability of the particular syllogisms *depends on* the general rules he gives; if he did, it would be difficult to make sense of the fact that he often acknowledges counterexamples or *enstaseis* to the maxims (e.g., at 115b14, 117a18, 117b14, 121b30, 123b17, 124b19, 128b6).³⁵ More likely, the reputability of each particular syllogisms is to be judged case by case.³⁶ Thus it seems best to view the Topics as a collection of practical suggestions for finding reputable arguments in real dialectical disputes, rather than as norms for “material validity” (cf. Allen 1995, 189; Stump 1978, 168–177; Green-Pedersen 1984, 23).

3.2 Topics as axioms

Beginning with Themistius—and probably even earlier³⁷—the Topical maxims began to be conceived as *axioms* on which the validity of dialectical arguments might rest. Themistius’ account of the Topics has survived only in a report by Averroes, but it is evident from that report that Boethius follows Themistius closely in his works on the Topics (*DTD*, *ITC*).³⁸ From Averroes and Boethius, we can reconstruct Themistius’ view as follows:

An Aristotelian *topos* is an axiom, that is, a self-evident, primitive, universal proposition. All arguments derive their force from such axioms. In some arguments the axiom is explicitly stated, in others it is implicit. (Ebbesen 1981, 1:118)

This is certainly a departure from Aristotle, who never describes his Topics as “axioms”—propositions that one must grasp in order to learn anything at all (*AnPo* I.2.72a16-17)—nor as self-evident or primitive, let alone universal (recall his bland acceptance of counterexamples).³⁹ Ebbesen conjectures that

1967, pp. xl-xli; De Pater 1968, 166, 174).

³⁵In fact, at *Top* 155b29-35, Aristotle suggests that in some cases one will have to use instances to establish the general “law” (e.g., that knowledge of contraries is the same) by induction.

³⁶This does not rule out the possibility that a syllogism may inherit some reputability or justification from the *Topos* that generates it, as Alexander seems to have thought (*Top* 126.23-4).

³⁷Ebbesen (1981, 1:117) conjectures that Themistius takes his conception of the Topics from an “unknown third century commentator.”

³⁸The parallel between Averroes’ report and passages in Boethius’ *DTD* and *ITC* was first noticed by Stump (Ebbesen 1981, 1:118, where the Averroes passage is quoted).

³⁹Aristotle associates *axiōmata* with demonstration, not dialectic: see *AnPo* I.7.75a39-42, with Ross’s note (Ross 1949).

...the strange initial identification of topical propositions with demonstrative axioms and the talk about the power (*vis* in Boethius) they lend to the arguments is best explained on the hypothesis that the Themistian theory of topical arguments arose when he or a predecessor saw that Galenic axiomatic proof had many similarities with Aristotelian topical proof. (1981, 1:120)

Such an assimilation of Galenic axioms to Aristotelian Topical maxims would have been quite natural. A commentator persuaded by Galen to give up belief in the primacy of the categorical syllogism might reasonably look to the *Topics* for a source of general principles that might provide the basis for various forms of argument. The word “axiom” would have suggested itself in view of Posidonius’ claim that relational syllogisms are “conclusive by force of axiom” (Galen *IL* xviii.8). Moreover, Galen comments that the syllogism

The good of the better is worthier of choice.
Soul is better than body.
Therefore, [the good] of the soul is worthier of choice than that of the body,

which is nearly the same as one of Aristotle’s Topical syllogisms (*Top* III.2.117b33-9), is similar to his own relational syllogisms, which depend on axioms (*IL* xvi.13; Ebbesen 1981, 1:117).

According to Boethius, the word “Topic” (Latin *locus*) can designate either a “maximal proposition” (*maxima propositio* or simply “maxim”) or a “Differentia” (1185A-1186B). “Maximal proposition” is Boethius’ translation of Themistius’ “axiom” (Ebbesen 1981, 1:120): “...a maximal, universal, principal, indemonstrable, and known per se proposition, which in argumentations gives force to arguments and to propositions...” (*DTD* 1185B).⁴⁰ It is striking that Boethius’ first example of a maximal proposition is “if you take equals from equals, the remainders are equal” (*DTD* 1176C)—precisely the kind of proposition that Galen would have regarded as an *axiom* grounding a relational syllogism.⁴¹ Like Galen’s axioms, Topical maxims can either be contained in arguments as explicit premises or serve as external

⁴⁰All translations from *DTD* are from Stump (1978). Boethius notes that maxims need not be necessary: some are merely probable (*ITC* 1052B; Green-Pedersen 1984, 62).

⁴¹It is also one of Aristotle’s examples of a “common” axiom: *AnPo* I.10.76a41.

“guarantors of validity or of soundness” (Stump 1989, 39; cf. Green-Pedersen 1984, 69, *DTD* 1185B, *ITC* 1051). The Differentiae, on the other hand, are classes into which the maxims are grouped, depending on their terms: for example, “from substance,” “from opposites,” “from the whole,” “from similars” (1186A ff.). They function primarily as a tool for the *discovery* of maxims and intermediate terms appropriate to an argument (Stump 1978, 195, 202; Green-Pedersen 1984, 67).

For example (*DTD* 1188B-C), suppose we want to show that justice is advantageous. We might look to the Differentia “from the whole, that is, from genus,” noticing that the genus of justice is virtue. Using one of the maxims under this Differentia—“whatever is present to the genus is present to the species”—we can construct the following argument for the desired conclusion:

(JA)

Every virtue is advantageous.

Justice is a virtue.

Therefore, justice is advantageous.

In this example, the maxim is not included in the argument as a premise; we must therefore infer that it “supplies force to the argument and makes [it] complete from without” (1185B).

Commentators have wondered how the maxim here can play the role Boethius assigns it, of supplying force to the argument and completing it from without, when (JA) has the form of a valid categorical syllogism (Green-Pedersen 1984, 68–9; cf. Stump 1978, 183–4, Abelard *D* 257.34-258.9).⁴² But the problem only arises if we assume that valid categorical syllogisms are distinguished from other forms of arguments by the fact that they require no external validation.⁴³ And as we have seen, that assumption—dear to Alexander—had already been rejected by Galen. If Ebbesen is

⁴²The example is not unique in this respect, but it is not typical either. Many of Boethius’ examples are neither categorical nor hypothetical syllogisms: for example, “if someone argues that the Moors do not have weapons, he will say they do not use weapons because they lack iron” (1189D). This appears to be a one-premise inference based on the maxim “where the matter is lacking, what is made from the matter is also lacking.”

⁴³Stump (1978, 183), who does make this assumption, proposes an interesting solution to the resulting problem. She notes that all of the syllogisms Boethius says are validated by an external maxim—and dialectical arguments generally—have *indefinite* premises: i.e., premises without explicit determinations of quantity (all/some). Hence, Stump claims, the syllogisms do not in fact have valid categorical forms (184-5), and that explains the need for an external ground. But it is unclear why the indefiniteness of the *minor* premise in (JA) should matter. Traditionally, indefinite

right that Boethian Topical inference is a descendent of Galen’s axiomatic proof, then Boethius’ use of (JA) as an example of an argument validated by a topical maxim is not so surprising. For Boethius as for Galen, Ebbesen claims, “*every* inference owes its cogency to an axiom” (emphasis added):

The implication of the Boethian theory would seem to be that all proof proceeds, implicitly or explicitly, by instantiation and detachment and, as some medievals saw, that a categorical syllogism is not anything *sui generis*, as it depends on a law of inference of the same type as the ones that licence inferences involving other relations than plain predication. (Ebbesen 1982, 112)

It is not clear that Boethius himself accepts all these “implications.” But one can see how eleventh and twelfth century logicians—whose main sources for syllogistic theory were the works of Boethius—might have been led to them.

3.3 Early medieval theories of Topics

What is implicit in Boethius becomes fully explicit in the earliest medieval theories of Topics. In Garlandus Compotista’s *Dialectica*, the theory of Topics is taken to be *prior* to the theory of categorical and hypothetical syllogistic: syllogisms are ratified by topical maxims (*per maximam propositionem syllogismus approbatur*, D 86.13).⁴⁴ For instance, the syllogism

premises are counted as particulars (Aristotle *AnPr* I.4.26a28-30 and Alex. *AnPr* 51.24-30—both of whom explicitly allow arguments of the same form as (JA) as valid first-figure categorical syllogisms). Moreover, Boethius says that “[a]rguments drawn from definition, genus, differentia, or causes most of all provide force and order to *demonstrative* syllogisms” (1195A-B, emphasis added): presumably demonstrative syllogisms will *not* have the indefinite premises characteristic of dialectical arguments, yet Boethius still seems to think that the maxims *from genus* will give them “force and order.” Finally, Galen (*IL* xiii.1) notes that the mood Barbara, which is “most appropriate to scientific demonstrations,” can be expressed in two forms: one with indefinite premises and one in which the quantity is explicitly marked.

⁴⁴Green-Pedersen (1984) shows that Garlandus was anticipated in this view by Abbo of Fleury (945-1004) and other early commentators on the Boethian Topics (144, 152). He summarizes the pre-1100 works by saying that they take the Topics to be an “...‘underlying logic’ which shows or explains why the arguments are valid...” (160).

Every animal is a substance.
Every man is an animal.
Therefore, every man is a substance.

depends on the maximal proposition “that which is universally attributed to the whole is [also universally attributed] to the part” (*quod universaliter attribuitur toti, et parti*, 92.29). More generally, “categorical syllogisms are aided by the Topics *from the whole* and *from the part* and *from an equal*” (114.18). Topics apply to hypothetical syllogisms in two ways: both by providing the conditional major premise and by certifying the transition from the major and minor premise to the conclusion (Stump 1989, 85). The validity of hypothetical syllogisms is secured by the maxims “when the antecedent is affirmed, the consequent is affirmed” (*posito antecedenti ponitur consequens*, 114.11) and “when the consequent is denied, the antecedent is denied” (*destructo consequenti destruitur antecedens*, 114.16)—that is, *modus ponens* and *modus tollens*. Stump sums up Garlandus’s view as follows: “...all inferences, whether in categorical or hypothetical syllogisms, are dependent on the Topics for their validity; and in the case of hypothetical syllogisms, the acceptability of the syllogism [that is, its soundness] is also Topically dependent” (1989, 87; cf. Stump 1982, 277).

Interestingly, Garlandus acknowledges valid hypothetical syllogisms that do not proceed by either *modus ponens* or *modus tollens*: for example,

If it is a man, it is capable of laughter.
But it is not a man.
Therefore, it is not capable of laughter. (129.29-33)

This looks like a classic case of “denying the antecedent.” But the syllogism is valid, in Garlandus’s view, because the terms “man” and “capable of laughter” are “equals” (i.e., coextensive),⁴⁵ and a Topical maxim licenses the intersubstitution of coextensive terms (107.29-30).⁴⁶ Garlandus marks the difference between such syllogisms and

⁴⁵Garlandus seems to be following Boethius here (*ITC* 1132-3). In her note on the passage from Boethius, Stump (1988, 226) writes: “In the case of the inferences involving *man* and *risible thing* mentioned here, the inferences are valid not in virtue of their form but in virtue of the meaning of the terms. In raising these latter inferences in the context of inferences of the first mode [i.e., *modus ponens*], Boethius gives the impression that he has not clearly distinguished these two different ways of warranting inferences.”

⁴⁶“De omnibus similibus, sive proportio sit sive paritas sive simplex similitudo, de similibus idem iudicium.”

standard hypothetical syllogisms by saying that the former conclude “from the force of the terms” (*ex vi...terminorum*, 129.27), while the latter conclude through *modus ponens* and *modus tollens*. But as Stump points out, the distinction is obscured by the fact that in *both* the standard and the exceptional cases, “the validity of hypothetical syllogisms...is guaranteed by maxims” (Stump 1989, 83). If *all* syllogisms derive their validity from Topical maxims, then it is unclear what *significance* the distinction between syllogisms that are good *ex vi terminorum* and those we would regard as “formally valid” can have.

The early twelfth century works on the Topics collected in De Rijk (1962–7) seem to follow Garlandus in taking all syllogisms to be validated by topical maxims. The *Introductiones dialectice Berolinenses*, for instance, takes all syllogisms in the mood Barbara to be licensed by the following topical maxim:

If something is predicated universally of something, then if something else is predicated universally of the predicate, that same thing is predicated universally of the subject. (Stump 1989, 116)

Similarly, *Abbreviatio Montana* presents a topical rule governing each valid syllogistic mood “in the same way it presented rules for the inferences in the preceding sections, assuming apparently that syllogistic inferences are one more variety of Topical inference” (Stump 1989, 125). Stump concludes, on the basis of her reading of these early manuscripts, that Abelard was the first medieval logician to insist that the ground for the validity of categorical syllogisms is fundamentally different in character from the ground of such inferences as “Socrates is a man; therefore, Socrates is an animal:” that syllogisms are valid in virtue of their *construction* and do not depend at all on broadly metaphysical relations among things (1989:128).⁴⁷ After Abelard, on the other hand, the distinction is ubiquitous, though a few commentaries still speak of applying Topics to syllogisms and a few actually argue against Abelard’s distinction (Green-Pedersen 1984, 198–200).

Stump sums up the history nicely:

⁴⁷Besides the absence of this view in earlier writers, there is some direct testimony that Abelard (if he is to be identified with “Master P”) was its originator (Stump 1989, 127; Green-Pedersen 1984, 199–200). Stump suggests that Abelard may not have arrived at his mature view until his final revision of the *Dialectica* (in 1132-6) (130). Green-Pedersen makes the more cautious claim that “Abelard is the earliest author to go into a detailed and comprehensive discussion of the problem” (194).

For Boethius dialectic was largely a corollary of metaphysics. The world has a certain nature, in consequence of which certain things are invariably or at least regularly connected with each other. Because we can know this nature and the variable or regular connections it involves, we can know that certain inferences among propositions preserve truth. In early medieval logic, before Abelard, no significant distinction was drawn between dialectic and the rest of logic in this regard; even logical laws warranting categorical syllogisms are treated as on a par with rules about the relationship between genera and species. Abelard tried to separate certain parts of logic from metaphysics by insisting that certain inferences hold not in virtue of any dialectical relationships but solely in virtue of their form. (1989, 2)

Let us now turn to Abelard's view and arguments.

4 Abelard on perfect and imperfect inferentia

According to Abelard, there are two kinds of *inferentia*, or valid inference.⁴⁸ An inference is *perfect*, he says, when

...from the structure (*complexio*) of the antecedent itself, the truth of the consequent is manifest, and the construction (*constructio*) of the antecedent is so disposed that it contains also the construction of the consequent in itself, just as in syllogisms or in conditionals which have the form of syllogisms. (*D* 253.31-254.1)⁴⁹

As an example of a perfect *inferentia* he offers a conditional formed from a categorical syllogism: “If every man is an animal and every animal is alive, every man is alive” (254.35). An inference is *imperfect*, by contrast, when the connection between antecedent and consequent takes its necessity “from the nature of things” (*ex rerum*

⁴⁸Although Abelard is aware of the difference between arguments and conditionals, he applies the concepts *inferentia* and *consequentia*, as well as the perfect/imperfect distinction, to both (giving examples in both forms).

⁴⁹“Perfecta quidem est inferentia, cum ex ipsius antecedentis complexione consequentis veritas manifesta est et antecedentis constructio ita est disposita, ut in se consequentis quoque constructionem contineat, veluti in syllogismis aut in his hypotheticis quae formas habent syllogismorum.”

natura, 255.7-8), not from the construction of the antecedent and consequent, as in the inference: “If every man is an animal, every man is alive” (255.3). *Both* perfect and imperfect inferences require a necessary connection between antecedent and consequent—indeed, the sense of the consequent must be *contained in* the sense of the antecedent (283.37-284.8).⁵⁰ The difference is not in the strength of the modal connection (255.12-13), but in its ground.⁵¹

4.1 Topics and the grounds of inference

The function of a Topic, according to Abelard, is to confer inferential force on an *imperfect* consequence by grounding it in a real relation among the things to which its terms refer (256.35-257.1).⁵² For example, the imperfect consequence “if it is a man, it is an animal” is justified by the Topic *from species*, since *man* is a species of *animal*, and we know that genus necessarily applies to species (257.4-5).⁵³ Following Boethius, Abelard takes a Topic to have two components: a *locus differentia* and a *maxima propositio*. The *locus differentia* (henceforth Differentia) is “that thing in the relation of which to something else the soundness of the entailment consists” (*ea res in cuius habitudine ad aliam firmitas consecutionis consistit*, 263.7-8).⁵⁴ In the example, the Differentia is *man* (*qua* species of animal). The *maxima propositio* (henceforth maxim) is a general proposition justifying an inference from an antecedent proposition

⁵⁰“...non solum antecedens absque consequenti non potest esse verum, <sed etiam> ex se ipsum exigit...” See W. Kneale and Kneale (1962, 217–18).

⁵¹Abelard claims that the reason for the clause “*per se ipsa*” (a translation of Aristotle’s “through their being so”) in the definition of the syllogism is to ensure that syllogisms are perfect (254). This connects his discussion with the hellenistic debate on unmethodological arguments surveyed above.

⁵²“Cuius quidem loci proprietates haec est: vim inferentiae ex habitudine quam habet ad terminorum illatum conferre consequentiae, ut ibi tantum ubi imperfecta est inferentia, locum valere confiteamur.” Note that Abelard does not think that the Topic *makes* the inference valid or “true.” For he holds that the truth of “if it is man, it is animal” does not depend on the existence of either man or animal: like all true consequences, it is an eternal truth (279.18). But if man and animal did not exist, then (as will be explained later in this paragraph) there would be no *locus differentia* and hence no Topical grounding. So the fact that man is species of animal cannot be the *cause* of the entailment (*consecutio*) but only its *proof* (*probatio*) (265.10-12). That is, the Topic is adduced *ad argumentum*, not *ad causam inferentiae*: the inference is true not *because* man is a species of animal, but *if* man is a species of animal (265.12-13). This suggests that what distinguishes perfect inferences from imperfect ones is a special *epistemic* character: their validity can be known independently of all knowledge about the world.

⁵³“...ex ‘hominis’ habitudine ad ‘animal’—quia scilicet species eius est—valere constat inferentiam.”

⁵⁴Although the Differentiae are things, not relations, they count as Topical Differentiae only insofar as they stand in relations to other things (Green-Pedersen 1984, 167).

containing a term for the Differentia to a consequent proposition containing a term for the thing to which it is related. In the example, the maxim is “of whatever the species is predicated, so is the genus” (*de quocumque praedicatur species, et genus*, 263.18). The function of Topics is to ground imperfect inferences in real relations between things.

So far Abelard’s account of the Topical grounding of inferences accords with Boethius’. Abelard’s strikingly original move is to insist that *perfect* inferences do not stand in need of topical grounding at all.⁵⁵ His reason is that perfect consequences do not “take their truth...from the nature of things” (*veritatem...non ex rerum natura...tenent*, 256.21-2). We can see this independence from things, Abelard claims, by noting that perfect consequences remain true in “...whatever terms you substitute” (*qualescumque terminos apponas*, 255.32-3), whereas an imperfect consequence “depends on the nature of things” and does not “remain true in any terms whatsoever, but only in those which preserve the nature of the entailment” (356.8-10).⁵⁶ For example, the entailment in “if it is man, it is animal” can be destroyed by replacing “man” or “animal” with “stone” (356.15-19).

Therefore those consequences are correctly said to be true from the nature of things of which the truth varies together with the nature of things. But those [consequences] of which the construction preserves its necessity equally in any things at all, no matter what relations they have, take their truth from the construction (*complexione*), not from the nature of things ... (256.20-23)⁵⁷

This is all that later medieval writers typically say about the distinction between formal and material consequence: formal consequences hold “in all terms.”⁵⁸ But Abelard cannot stop here, for the dominant view at the time when Abelard is writing is that categorical syllogisms and other perfect inferences are grounded in Topics:

⁵⁵“...quia ita in se perfectae sunt huiusmodi inferentiae ut nulla habitudinis natura indigeant, nullam ex loco firmitatem habent” (256.34-5).

⁵⁶“Ceterae quoque verae consequentiae, quarum inferentia ex rerum natura pendet, non in quorumlibet terminorum rebus verae consistunt, sed in his tantum quae naturam eius consecutionis servant.”

⁵⁷“Istae ergo consequentiae recte ex natura rerum verae dicuntur quarum veritas una cum rerum natura variatur; illae vero veritatem ex complexione, non ex rerum natura, tenent quarum complexio necessitatem in quibuslibet rebus, cuiuscumque sint habitudinis, aequae custodit...”

⁵⁸See Buridan TC:I.4.2-3, Pseudo-Scotus *In An. Pr.* I.10, 8ff., quoted in Bochenski 1961:30.12, Albert of Saxony *PL* IV.1, 24ra-b, quoted in Bochenski 1961:30.14.

Abelard even attributes this view to Boethius and Porphyry (257.32-258.13).⁵⁹ A proponent of such a view could grant that syllogisms preserve validity in all substitution instances, and maintain either that

1. for each substitution instance, there is a Topic grounding the inference in some relation in “the nature of things” or that
2. there is a single Topic that grounds *all* of the substitution instances in some very *general* features of things.

Abelard offers arguments against both approaches (258-262 in his treatment of inferences, 352-365 in his treatment of conditionals). It is a measure of the success of these arguments, I think, that they do not get repeated: it becomes customary in later medieval manuals to infer from an inference’s being good “in all terms” to its being good “in virtue of its construction” and not in virtue of the nature of things.

4.2 Generality and abstraction from “the nature of things”

Abelard cannot take this inference for granted. In fact, he does not even think that the inference is sound. He claims that the inference “if it is alive, it is alive,” which certainly holds in all substitution instances, is *not* perfect in its construction (*ad inferentis constructionem*): one would have to add the premise “...and everything that is alive is alive” (255.19-27).⁶⁰ And he takes the inference from a conditional to its contrapositive to be dependant on the Topic “from an equal in inference” (351.29-352.11; Stump 1989, 103). Evidently, then, there is more to perfection than mere preservation of validity “in all terms.” Abelard makes this point explicitly in his discussion of the hypothetical syllogisms Boethius takes to be valid by virtue of “the nature of the things, in which alone these propositions can be asserted” (*DHS* II.ii.4-5; see the section on Logical hylomorphism in Boethius, above). After rejecting Boethius’ claim that inferences of the form “if it is not *a*, it is *b*; but it is *a*; thus it is

⁵⁹See the section on Topics as axioms, above.

⁶⁰If Abelard thinks that two premises are always required for *perfectio constructionis*, as some passages suggest (e.g., 255.1-2), then he is going to have trouble with the *conversion* inferences necessary for the reduction of second- and third-figure syllogisms to the first figure. For these inferences—e.g. “all asses are animals, therefore some animals are asses”—have but a single premise. It would be awkward to maintain that the validation of second- and third-figure syllogisms, which are perfect in Abelard’s sense, requires the use of an imperfect inference. (So far as I am aware, Abelard does not discuss this problem.).

not *b*” are valid in any terms for which the major premise can be asserted, Abelard goes on to say that *even if Boethius were right*, this fact would not show that such inferences are syllogisms (and hence perfect):

Even if it were possible, whenever the consequent were affirmed, necessarily to affirm the antecedent *from any property whatever*—nevertheless there would be no form of syllogism in which, the consequent having been affirmed in this way, one could affirm the antecedent, or the antecedent having been denied, one could deny the consequent, since the inference of a syllogism is supposed to be so perfect that no relation of things pertains to it. (502.19-25).⁶¹

To say that an inference is “perfect” is to say that our knowledge of its validity is completely independent of our knowledge of “the nature of things.” Even if Boethius were right that certain hypothetical inferences held in all terms for which the premises could be true, that would not be something we could know without knowing something about “the nature of things”—the relations in which various things stand. That an inference holds in all terms, then, is no guarantee that it abstracts entirely from the things those terms represent.

4.3 Abelard’s arguments that syllogisms are perfect inferences

Let us now consider Abelard’s arguments for the claim that syllogisms do not have Topical grounding. Recall that there are two ways in which one might oppose Abelard’s claim. First, one might argue that the validity of each individual syllogism is grounded in a particular relation between things (the “local strategy”). Second, one might argue that there is a single, very general relation between things that grounds the validity of *all* syllogisms in a particular mood (the “global strategy”). Abelard shows that neither approach will work. In my discussion, I will consider only categorical syllogisms, though Abelard brings similar considerations to bear on hypothetical ones.

⁶¹“Nec si etiam possit consequens positum necessario ponere antecedens ex quacumque proprietate, nulla tamen erit syllogismi forma, in qua hoc consequens positum ponat antecedens vel antecedens destructum destruat consequens, quippe syllogismi inferentia ita perfecta debet esse ut nulla rerum habitudo ad ipsam operetur...”

4.3.1 The local strategy

Given a particular categorical syllogism, the obvious place to look for a Topical Differentia is in the middle term. For example, in the syllogism

All animals are alive.
All men are animals.
Therefore, all men are alive.

one might naturally take *animal* to be the Differentia and apply the Topic *from the genus*, with the maxim “whatever is predicated of the genus is also predicated of the species.” But as Abelard points out, this Topic would only explain the inference from the *second* premise to the conclusion, not the inference from *both* premises together (258.14-17; cf. 356.4-11).⁶²

Even this kind of Topical grounding will be impossible when syllogisms have *false* or *accidentally true* premises, for example:

Every body is colored.
But everything sitting is a body.
Therefore, everything sitting is colored (260.18-27).

In such a syllogism, “none of the propositions by themselves necessarily imply the conclusion” (*nulla propositionum ad conclusionem per se necessario antecedit*, 260.19-20). For there is no real relation in the nature of things that could license the transition from *either* of these premises to the conclusion.⁶³ *Body*, for instance, is not the genus of *sitting thing*, nor is *colored thing* the genus of *body*.⁶⁴ The only relation between terms to which we might appeal here is the relation of *predication*: *colored* is *universally predicated of body*, and *body* of *sitting thing* (cf. 259.1-9). But “A is universally predicated of B” might taken to express either

1. that A is *asserted of* all B (*secundum vocum enuntiationem*), or

⁶²“...non quantum ad inferentiam totius syllogismi locum esse confitemur, non videlicet secundum hoc quod <ex> duabus simul antecedentibus propositionibus consequens infertur, sed quantum ad inferentiam unius antecedentium propositionum ad tertiam.”

⁶³Similar considerations lead Abelard to claim that “if man is a species of stone, then if [something] is a man, it is a stone” is good in virtue of its construction (312). It could not take its necessity from “the nature of things,” because in the nature of things man is *not* a species of stone. (312-3).

⁶⁴Abelard says at 285.20-29 that “if it is body, it is colored” is only accidentally true.

2. that in the order of things, A is *true of* all B (*secundum rerum cohaerentiam*) (353.10-12).⁶⁵

If it means merely (a) that A is *asserted of* all B, then it clearly cannot ground a necessary inference from “every C is B” to “every C is A”:

For who would concede that if “stone” were asserted universally of “man” in some assertion, whether true or false, the consequence which follows [i.e., ‘if every stone is an ass, then every man is an ass,’ 353.5] would be true? This is why we can assert “stone” (or anything else we like) of “man,” but our assertion, which is manifestly false, confers no truth on the consequence. (353.15-19)⁶⁶

If, on the other hand, the relation “A is universally predicated of B” means that A is *true of* all B, then it is of no use in syllogisms with false premises, such as

All men are stones.

All stones are asses.

Therefore, all men are asses (353.5).

Nor is it of any use when it is merely *accidental* that A holds of all B, since valid inference must be necessary (cf. 362.30-1). There are some categorical syllogisms, then, for which no local topical maxim can be found. I trust that no one will be tempted to say that these categorical syllogisms hold in virtue of their construction, while others do not. For once we accept that *one* syllogism in Barbara holds in virtue of its construction, we might as well accept that *all* do (since all have the same construction).

4.3.2 The global strategy

If the validity of categorical syllogisms depends on a Topical maxim, then, it must be a maxim that captures the dependence of the conclusion on *both* the premises. Syllogisms in Barbara, for instance, might be thought to depend on the rule:

⁶⁵For this distinction, see 329.19-35.

⁶⁶“Quis enim consequi concedat ut, si ‘lapis’ de ‘homine’ universaliter enuntietur quacumque enuntiatione, sive scilicet vera sive falsa, vera sit illa consequentia quae sequitur? Unde est quia ‘lapidem’ vel quidlibet de ‘homine’ possumus enuntiare. Sed nihil veritatis enuntiatio nostra consequenti hypotheticae confert, quae aperte falsa est.”

(CS) If B is predicated of A universally and C is predicated of B universally, then C is predicated also of A universally,⁶⁷

where “predicated of” is taken *secundum rerum cohaerentiam*. Might (CS) be a Topical maxim that gives syllogisms in Barbara their inferential force?

Abelard’s strategy here is to argue that (CS), while perhaps a true *rule (regula)*, is not a Topical *maxim*, because it lacks a corresponding Differentia (261.34-5, 265.25-266.2; Stump 1989, 96; Green-Pedersen 1984, 197). The argument that (CS) lacks a Differentia is basically the same as the argument (rehearsed above) that particular syllogisms lack a Differentia. The Differentia would have to be some thing (*res*) that stands in the relation *predicated universally of* to some term in the conclusion. The only obvious candidate is the middle term (B). But the fact that B is predicated of all A could at best explain the validity of the inference from *one* premise of the syllogism to the conclusion (from “every B is C” to “every A is C”), not the validity of the inference from *both* premises to the conclusion. And it explains this only if B is predicated of all A *truly* and *necessarily*: that is, only if A and B stand in some beefier relation than mere predication—say, genus and species (362.26-31). But we need to be able to find a Differentia in arguments with *false* premises, too.

Why should it matter whether or not (CS) has a corresponding Differentia and is thus a true *maxim*? Here Abelard is not as explicit as he might have been, but I think we can reconstruct his reasoning. He is trying to show that syllogisms are grounded in their construction alone, not in “the nature of things.” Apparently, he takes the fact that syllogisms do not depend on any genuine *maxims* to be sufficient grounds for this claim. Thus, although he does not deny that (CS) is true if and only if the syllogism

All A are B.
All B are C.
Therefore, all A are C.

⁶⁷I have used schematic letters to make the principle clearer. Abelard uses pronouns: “si aliquid praedicatur de alio universaliter et aliud praedicatur de praedicato universaliter, illud idem praedicatur et de subiecto universaliter” (261.14-16). There is a corresponding principle for hypothetical syllogisms: “si aliquid infert aliud et id quod inferat existat, id quoque quod infertur necesse est existere” (261.25-6).

is valid,⁶⁸ he denies that this equivalence shows that our knowledge of the syllogism’s validity depends on how things are in the world. In order to understand Abelard’s reasoning here, we need to understand why he thinks that only a genuine Topical maxim—one with a Differentia—can ground the validity of an inference in “the nature of things.”

I propose that Abelard is thinking along the following lines. A Topical maxim gives a rule for inference that is *based on its locus differentia*: that is, on some *thing (res)* in the world.⁶⁹ The inferential force (*vim inferentiae*) which a maxim brings to an imperfect inference comes from the relation in which the Differentia stands to some term in the conclusion of the inference (*ex habitudine quam habet ad terminum illatum*, 256.36-7). For example, in the valid consequence “if it is man, it is animal,” the inferential force comes from the relation (*species*) in which the Differentia (*man*) stands to *animal*. The Differentia, then, is the thing (*res*) in the nature of which the validity of imperfect inferences is grounded.⁷⁰ A *regula* without a Differentia,

⁶⁸In this respect, (CS) fares better than an alternative *regula*, (CS*): “If B is predicated of A universally, then if C is predicated of B universally, then C is predicated also of A universally” (*si aliquid praedicatur de aliquo universaliter, tunc si aliud praedicatur de praedicato universaliter, et de subiecto*, 352.31-3). (CS) and (CS*) are not equivalent, because the law of exportation fails in Abelard’s logic. In fact, Abelard argues, (CS*) and the corresponding *regulae* for other syllogistic moods have many false instances (358.34-362.17). For in order for a conditional to be true, on Abelard’s view, the sense of the antecedent must contain within itself the sense of the consequent (253.28-9, 284.1-2; Martin 1986; Stump 1989, 105). A conditional like “if every man is a body, then every man is colored” fails to satisfy this condition, since the connection between the antecedent and the consequent depends on an accidental truth (that every body is colored), and not merely on their senses. Hence the conditional “if every body is colored, then if every man is a body, every man is colored” must also be false, since it has a true antecedent and a false consequent (361.25, 28-29). But this conditional is just an instance of (CS*). Since there is no comparable argument against the truth of (CS), I focus on it instead.

⁶⁹Green-Pedersen (1984, 167). In the consequence “if it is man, it is animal,” the *locus differentia* is *man*; when Abelard calls the Topic “from species,” giving the *relation* in which the Differentia stands to something else, he is saying “from where the locus comes” (*unde sit locus*, 264.5-34). Green-Pedersen conjectures, plausibly, that Abelard insists that the Differentia be a *thing* and not the relation itself because the latter approach would make the relations (e.g., genus, species) into “independent realit[ies]” and contradict his nominalism (1984, 168).

⁷⁰Cf. 255.7-9, on the consequence “if every man is animal, every man is alive”: “These inferences, although they are imperfect in the construction of the antecedent, nonetheless most often take their necessity *from the nature of things*, just as with [the consequence] which we put down earlier from ‘animal’ to ‘alive,’ since *the nature of animal*, in which as a substantial form *alive* inheres, never allows animal itself to exist without life.” (“Quae quidem inferentiae, quamvis imperfectae sint quantum ad antecedentis constructionem, tamen necessitatem ex rerum natura saepissime tenent veluti ista quam prius posuimus de ‘animali’ ad ‘animatum’, cum videlicet natura animalis, cui animatum ut

then, although it might still be thought to ground the validity of inferences, could not ground it in “the nature of things,” as a maxim does.

To modern eyes, this reasoning appears to make an unwarranted assumption: that the totality of facts about “the nature of things” is exhausted by facts of the form

A is F, or

A stands in the relation R to B.

Given this assumption, it follows from (CS)’s lack of a *Differentia* that (CS) is not a fact about “the nature of things” and must therefore depend for its truth on something else: the *construction* or *form* of the syllogism, the way it is put together in thought and language. But if we relax the assumption and count as facts about “the nature of things” facts with more logical complexity—

A, B, and C stand in the relation Q, or

not both: { (all A are B and all B are C) and not (all A are C) }, or even

for all A, B, and C: A, B, and C stand in the relation Q,

—then there is no longer any reason to think that (CS) is not a fact about “the nature of things,” and consequently no reason to think that syllogisms in Barbara do not depend on facts about the world: more general facts, to be sure, than most Topically grounded inferences, but no less facts about “the nature of things.” Granted, the entailment in a categorical syllogism cannot depend on the real relation of *one* thing to another; but might it not depend on some more complex feature of the world?

This question would become acute for Kant—for whom “the nature of things” consists of just the kind of complex, generalized relational facts Abelard does not consider (e.g., the laws of Newtonian science)—and even more pressing for Frege, Russell, and Wittgenstein, whose new logical notation allowed the question to be raised in a more explicit way. But Abelard doesn’t answer it. He is not even in a position to ask it. In order to do so, he would have to reject the broadly Aristotelian ontology he inherits from his sources and shares with all of his contemporaries. He would have

substantialis forma inest, ipsum animal praeter animationem existere nusquam patitur.”).

to abandon the assumption that all facts about the world predicate “something of something” (*ti kata tinou*).⁷¹ Given that assumption, Abelard is right to deny that syllogisms depend for their validity on facts about the world.

Indeed, the same reasoning that leads Abelard to this conclusion should lead him to accept the inference

(EO)

A is east of B.

B is east of C.

Therefore A is east of C.

as valid in virtue of its construction.⁷² For suppose the premises were false. What would be the *Differentia*? Since the inference is not valid in virtue of B’s relation to something else, Abelard would reason, it must not be valid in virtue of “the nature of things.”

This point reveals the extent to which Abelard’s arguments for the 3-formality of syllogisms are unavailable to us today. Abelard would have to concede that (EO) is valid in virtue of its construction, while

(MA)

A is a man.

Therefore, A is an animal.

is valid in virtue of the nature of *man*. No modern advocate of logical hylomorphism, I take it, would make a principled distinction between these two cases. Similarly, as we have seen, Abelard takes syllogisms in Barbara to be valid in virtue of their construction, while denying the same status to

(Cont)

If A then B.

If not B, then not A.

or

⁷¹On this, see Brower (1998, 623): “According to Abelard, if a statement of the form ‘xRy’ is true, then what makes it true is nothing but individual subjects and their monadic properties.”

⁷²I am not aware of any passages in which Abelard discusses such inferences.

(Id)

A is alive. A is alive.

Again, his views about the basis for logical hylomorphism—views we do not share—lead him to make a distinction of principle where we see none.

To sum up: Abelard does not make the simple-minded argument that because valid syllogisms are valid in all substitution instances, their validity does not depend on the nature of things. That argument would not have been plausible in his historical context. Instead, he takes considerable pains to rebut versions of the view that syllogistic validity is Topically grounded. But in the end, his argument depends on tacit ontological premises about what can count as part of “the nature of things”—premises we no longer accept.

5 Formal and material consequence

Abelard’s arguments seem to have been persuasive: according to Green-Pedersen (1984), the majority of Abelard’s twelfth century successors distinguish between “arguments which rest upon loci [Topics] (*locales*) and those that are valid by their form (*complexionales*)” (200). The distinction persists in the thirteenth century and is a likely ancestor of the fourteenth century (continental) distinction between formal and material consequence (W. Kneale and Kneale 1962, 279), though the lines of influence are obscure. Here I can do little but sketch some of the later developments: more detail can be found in W. Kneale and Kneale (1962), Stump (1982), and Green-Pedersen (1984).

In their practice, thirteenth century writers follow Abelard in drawing a sharp distinction between syllogisms and most other inferences. Sometimes they even make the distinction explicit as a distinction between inferences valid in virtue of their construction and inferences valid in virtue of the terms or the nature of things (Green-Pedersen 1984, 254). Yet after Abelard, no one seems to have cared much about the *basis* for the distinction. At any rate, thirteenth century commentators show little theoretical interest in the question of which arguments are grounded in Topics (Green-Pedersen 1984, 253). They typically see the Topics as instruments for the reduction of enthymemes to valid categorical syllogisms, and no longer as grounding the validity of inferences, but they do not explain why the categorical syllogisms do not *themselves* stand in need of further reduction.

In the fourteenth century, it becomes common to take *all* categorical syllogisms as dependent on the Topic “from a quantitative whole,” which is taken to justify the principle *dici de omni et nullo* (Stump 1982, 293; cf. Green-Pedersen 1984, 256–7, 269). At the same time, Topical arguments begin to be referred to as “consequences” (*consequentiae*), and the role of consequences (e.g., conversion inferences) in syllogistic theory gives the theory of consequences a kind of priority over syllogistic (Stump 1982, 290–3). In short, there is a reawakening of interest in non-syllogistic forms of inference and a blurring of the boundary between Topical arguments and syllogisms.

In this climate, two different distinctions come to be marked by the terminology of “formal and material consequence.” In England, logicians like Ockham and Burley distinguish formal consequences as those in which the antecedent is relevant to (or “contains”) the consequent, as opposed to consequences that are good in virtue of the material impossibility of the antecedent or the material necessity of the consequent.⁷³ A counterpart of Abelard’s distinction between perfect and imperfect *inferentia* is still used (in Ockham’s terminology, inferences valid *gratia formae* and *gratia materiae*), but it retains little of its former epistemic and metaphysical importance. On the continent (Pseudo-Scotus, Buridan, Albert of Saxony), the distinction between formal and material consequence closely resembles Abelard’s distinction between perfect and imperfect *inferentia*, but it is never given the kind of motivation that Abelard offers. The reason, perhaps, is that there is no longer a concerted opposition. After Abelard, it is taken for granted that valid inferences divide into those whose validity can be attributed to their structure and those whose validity depends on their terms and the nature of the things to which they refer.

I do not want to rest much on speculative claims about the influence of Abelard’s arguments on the later tradition. The important point is that Abelard’s defense of the distinction between perfect and imperfect *inferentiae*—the deepest and fullest discussion we have of the basis for the widespread medieval distinction between arguments that are valid in virtue of their structure and those that depend on their terms and the nature of things—has its place in a philosophical framework we no longer share.

⁷³On the later development of this tradition, see Normore (450–51), Ashworth.

6 Time Line

300s	Aristotle, Theophrastus
200s	Chrysippus (Stoic logic)
100s	<i>neoterói?</i> (Mueller 1974:63)
0s B.C.	Posidonius, Boethus of Sidon, Cicero
0s A.D.	
100s	Galen, Alexander of Aphrodisias, Sextus Empiricus
200s	Plotinus, Porphyry
300s	Themistius
400s	Proclus
500s	Ammonius, Philoponus, Boethius
600s	
700s	
800s	
900s	Abbo of Fleury
1000s	Garlandus Compotista
1100s	<i>Introductiones Dialectice Berolinenses</i> , <i>Abbreviatio Montana</i> , Michael of Ephesus, Peter Abelard
1200s	Thirteenth-century commentators
1300s	Walter Burley, William Ockham, John Buridan, Albert of Saxony, Pseudo-Scotus

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