

Chapter 14

The Syllogism as Defined by Aristotle, Ockham, and Buridan

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Abstract This paper discusses and compares a number of influential definitions of the syllogism in the history of logic. We start with Aristotle, and offer a dialogical interpretation of his definition of a syllogism in the *Prior Analytics*. We then briefly discuss Boethius and Robert Kilwardby, and finally focus on Ockham and Buridan's respective definitions. What we observe in these authors over the centuries, especially with Ockham (but with the exception of Boethius), is a diminished focus on the pragmatic dimension of *applying* syllogisms in certain contexts, in particular but not exclusively dialectical/dialogical contexts. We also observe increased focus on the formal properties of the syllogistic system, in particular the notions of figure and mood (though not in Buridan). And thus, taken as a whole, this analysis may be taken to illustrate a general tendency to move away from logic conceived as a tool for specific applications, and towards a focus on logical theories conceived as objects of study in their own right.¹

¹It gives me great pleasure to contribute to this volume in honor of Claude Panaccio. He may not even remember, but Claude played a key role in the development of my career at its early stages. In 2000, I was writing my master's thesis at the Institute for Logic, Language and Computation in Amsterdam; perhaps foolishly, I had chosen medieval logic, and Ockham's supposition theory in particular, as my topic, even though there was no one there with the right expertise to supervise me. Fellow Brazilian philosopher Ernesto Perini put me in touch with Claude, and immediately Claude offered me guidance per email, which turned out to be crucial for the whole thesis-writing process. After this, we stayed in touch, and in 2002 he put me in touch with Luisa Valente, who was organizing the European Symposium for Medieval Logic and Semantics in Rome. Thanks to Claude's introduction, I could attend the Symposium, the first of seven in a row. Claude and I only met in person for the first time a few years later, if memory does not fail me at the European Symposium for Medieval Logic and Semantics in Cambridge (2004). Since then, we had the opportunity to meet on a number of occasions, including two of his yearly workshops on medieval philosophy in Montreal. Throughout, Claude has had nothing but words of support and encouragement, and the occasional well-placed criticism of my work (much welcome!). Besides being a fantastic scholar, Claude is a very generous person, and this reveals itself in particular in his infallible support for young scholars. With his retirement, I suspect Claude will remain as active as always, and I look forward to continuing our conversations on medieval philosophy and other matters. Thank you, Claude!

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The syllogism is without a doubt one of the most crucial concepts in the history of (Western) logic. For more than 2000 years, the syllogistic system developed by Aristotle in the *Prior Analytics* (*APri*) remained the quintessential logical system, even if it would be a mistake to think (as Kant seems to have thought) that there were no other important theoretical developments since Aristotle.

At the beginning of *APri*, Aristotle offers a general definition of the syllogism, which remained very influential. However, throughout the centuries it was variously interpreted and/or rephrased, and the different interpretations say much about how each author (and more generally each period) conceived of logic. In the spirit of the methodology of “conceptual genealogy” that I’ve articulated elsewhere (Dutilh Novaes 2015a), I am interested in the transformations that the concept of a syllogism underwent in more than 2000 years of history; importantly, I am interested both in *change* and in *continuity*.

In this paper, the focus is on how the two great nominalist logicians of the fourteenth century, William of Ockham and John Buridan, each interpreted the Aristotelian definition of a syllogism. (As such, this is but a very limited snapshot of the overall genealogical development of the concept of a syllogism.)² However, in order to appreciate the significance of their considerations, a substantive discussion of Aristotle’s own definition is required. So I begin with a presentation of a dialogical interpretation of Aristotle’s definition, which I submit is the best way to make sense of the numerous clauses contained in the definition. I then briefly discuss two intermediate authors, Boethius and Robert Kilwardby, to prepare the ground for a more detailed discussion of Ockham and Buridan.

What we observe in these authors, especially with Ockham (but with the exception of Boethius), is a diminished focus on the pragmatic dimension of *applying* syllogisms in certain contexts, in particular but not exclusively dialectical/dialogical contexts. We also observe increased focus on the formal properties of the syllogistic system, in particular the notions of figure and mood (though not in Buridan). And thus, taken as a whole, this analysis may be taken to illustrate a general tendency to move away from logic conceived as a tool for specific applications, and towards a focus on logical theories conceived as objects of study in their own right.³

²I’ve benefited greatly from engaging with the work of P. Thom on the topic, in particular (Thom 2016); indeed, there is quite some overlap between my analysis and his.

³Notice however that the study of the (meta-)properties of the system is also undertaken by Aristotle himself in *APri* (though the bulk of the text is dedicated to applications), and applications remain of crucial importance for later authors too.

14.1 Aristotle's Definition

Aristotle's definition of "*syllogismos*"⁴ in *APri* 24^b18-22 is among one of the most commented-upon passages of the Aristotelian corpus by ancient as well as (Arabic and Latin) medieval commentators. He offers very similar definitions of *syllogismos* in the *Topics*, *Sophistical Refutations*, and the *Rhetoric*, but the one in *APri* is the one having received most attention by commentators. In the recent Striker (2009) translation, it goes like this (emphasis added):

A "*syllogismos*" is an argument (*logos*) in which, (i) certain *things* being posited (*tethentôn*), (ii) something *other* than what was laid down (*keimenôn*) (iii) results by *necessity* (*eks anagkês sumbainei*) (iv) because these things are so. By "because these things are so" I mean that it results through these, and by "resulting through these" I mean that no term is required from outside for the necessity to come about.

It became customary among commentators to take *syllogismos* as belonging to the genus *logos* (discourse, argument), and as characterized by four (sometimes five) *differentiae*:

- (i) there are at least two premises which are posited
- (ii) the conclusion is different from the premises
- (iii) the conclusion follows necessarily from the premises
- (iv) the premises imply the conclusion by themselves; they are jointly necessary and sufficient for the conclusion to be produced.⁵

Although Aristotle's definition was typically taken as authoritative, objections were also raised (as noted by Buridan, *SD* 5.1.3), generating a wealth of discussion. In the Latin medieval tradition, the definition received a number of reinterpretations and reformulations, some of which will be discussed below. (For the Arabic tradition, see Thom 2016.)

My starting point is the idea that the best way to understand Aristotle's project in *APri* is as the formulation of a formal theory that could be suitably applied particularly (though not exclusively) in contexts of dialectical disputations. In other words, dialectical (or more generally, dialogical) considerations are always in the background in the development of the theory of syllogistic (as also argued

⁴In what follows I will use the neologism "*syllogismos*" when referring to Aristotle's notion. This is because his own use of the term appears to be broader than what we now understand as a "syllogism" (i.e. covering arguments that do not have the familiar two premises, one conclusion structure, all of which are categorical sentences of the A, E, I, O forms), but it is narrower than our current notion of a deduction. (Striker translates it as "syllogism," Smith as "deduction"; we arguably need something in between.)

⁵This gloss should not be understood in the sense that a *unique* set of premises is what allows for the derivation of a given conclusion; often, alternative sets of premises are equally able to produce a given conclusion. Rather, it should be understood as stating that the set of premises is *sufficient* for the necessary truth of the conclusion (no "hidden premises"), and that the removal of any of the premises from the set would make the conclusion no longer deductively derivable. (I owe this point to P. Thom.)

by Kapp 1975). True enough, he states at the very beginning of *APri* that the framework applies both to *demonstrative* and to *dialectical* syllogisms. (Demonstrative syllogisms are then more thoroughly investigated in the *Posterior Analytics* (*APo*.) In both cases we may think of a multi-agent, dialogical situation,⁶ even if there are important differences between dialectical and demonstrative contexts. However, while the dialectical context is inherently dialogical and multi-agent, the demonstrative context need not be obviously dialogical (Duncombe 2014, 439).

As Aristotle presents it in chapter 1 of book I, the distinction between dialectical and demonstrative syllogisms seems to pertain exclusively to the status of the premises: if known to be true and more primary than the conclusion, then the syllogism will be demonstrative; if merely “reputable” (*endoxa*), then the syllogism is dialectical.⁷ But with respect to the *pragmatics* of the two situations, there are other relevant differences. In particular, demonstrative syllogisms used in the context of teaching will presuppose an asymmetric relationship between the interlocutors (teacher and pupil), whereas in a dialectical context, although questioner and answerer have different roles to play, their statuses are usually analogous – they are peers. Indeed, the overall goals of a demonstration are quite different from the goals of a dialectical disputation, even though both can rely on syllogistic as a background theory of argumentation (as is made clear by extensive discussions of applications both in *APri* and *APo*).

Be that as it may, each of the clauses formulated by Aristotle and numbered above can be given compelling dialogical, if not dialectical, explanations (occasionally I also refer to demonstrative contexts). Let us discuss each of them in turn.

- (i) **Multiple premises.** This requirement excludes single-premise arguments as syllogistically valid. Indeed, in the formal theory subsequently developed in *APri*, the arguments considered are almost exclusively those that we now refer to as syllogistic arguments, namely those composed of two premises and one conclusion, all of which are categorical sentences of the A, E, I, O forms. But as often noted, this definition excludes for example the conversion rules (from AiB infer BiA and vice versa; from AeB infer BeA and vice versa), creating some difficulty to account for the nature of the validity of these rules. Moreover, consider the following description of the general enterprise by Striker (2009, 79):

Aristotle intended his syllogistic to serve as a general theory of valid deductive argument, rather than a formal system designed for a limited class of simple propositions.

⁶See Barnes’ interpretation (1969) of Aristotle’s theory of demonstration presented in *APo*, according to which the primary use of this theory was didactic, thus referring to a teacher-pupil form of interaction.

⁷“It [a *sylogismos*] is a demonstration whenever the syllogismos is from true and primary things or from similar things that have attained the starting point of knowledge about themselves through true and primary things. Dialectical *sylogismoi* syllogise from reputable opinions.” (24^a30–b3, as quoted in Duncombe 2014, 442).

If we accept this conception of syllogistic theory (which I've also defended in Dutilh Novaes 2015b), then the specific features of the theory later developed in *APri* should not be taken to explain the general definition at the starting point: this would amount to putting the cart before the horse, as it were. Indeed, it is the formal theory that is meant to offer a regimented account of the conceptual starting point, which is the general notion of a valid deductive argument. So this specific feature of the formal apparatus (the arguments considered always have exactly two premises) cannot be summoned to explain this aspect of the definition.

What could then explain the requirement that there be multiple premises? As noted by Striker (2009, 79), the verb "to syllogize" originally meant something like "to add up," "to compute/calculate," and so it immediately suggests the idea of putting things together, of a fusion of more than one element.

Plato already used the term "to syllogize" in the sense of "to infer" or "to conclude" (De Strycker 1932), which Aristotle seems to have adopted. Indeed, from a dialectical/dialogical perspective as illustrated in Plato's dialogues, the multiple premises requirement makes good sense. In a typical dialectical situation, the questioner (e.g. Socrates) elicits a number of discourse commitments from the answerer, and then goes on to show that they are collectively incoherent – for example, because they entail something absurd – thus producing a refutation. Typically, a refutation will not come about with only one discursive commitment: it is usually the *interaction* of multiple commitments that gives rise to interesting (and sometimes embarrassing) conclusions.

Notice also the use of the terms "posited" and "laid down," which are also frequently used in connection with dialectic. They seem to introduce the dimension of a speech-act, of an agent actually putting forward premises to an interlocutor or audience, again suggesting multi-agent situations. Later authors such as Boethius will make the multi-agent dimension even more explicit, adding that the premises are not only laid down by the producer, but also granted by the receiver. (We will discuss Boethius' definition briefly below.)

- (ii) **Irreflexivity.** Aristotle's requirement that the conclusion be different from the premises seems puzzling at first sight, since it entails that the consequence relation underlying syllogistic is irreflexive. This is in tension with the currently widely accepted idea that reflexivity is a core feature of deductive validity, i.e. $A = >A$ for all A .

However, here again, taking into account the various contexts of application of syllogistic arguments, irreflexivity makes good sense for each of them (as argued in Duncombe 2014). Indeed, in a demonstrative context, the function of a syllogism is to lead from the known to the unknown, and so obviously premises and conclusion should be different. In a dialectical context, it makes no sense to ask the opponent to grant as a premise precisely that which one seeks to establish as a conclusion; this would amount to an instance of *petitio principii*. So the irreflexivity of the syllogistic consequence relation is exactly what one would

expect, given the applications Aristotle seems to have in mind when developing the theory.⁸

- (iii) **Necessary truth-preservation.** Aristotle distinguishes syllogistic arguments from those whose premises make the conclusion likely but not certain, such as induction (*APri* II 23) or arguments from example (*APri* 69^a) (see Bartha 2013, 3.2). It is in this sense that his main target seems to be the notion of a valid deductive argument understood as pertaining to necessity (Rini 2013). But from the start, necessary truth-preservation will be a necessary but not sufficient condition for deductive validity (in particular, in light of the three other clauses).

There is much to be said with respect to why the “results by necessity” clause makes sense in the different contexts of application of syllogistic arguments in particular demonstrative and dialectical contexts (Castelnerac 2015), but let us keep it brief for the present purposes. In a dialectical context, an argument having this property will compel the opponent to grant the conclusion, if she has granted the premises (the conclusion *must* be true if the premises are), so it is a strategically advantageous property for the one proposing the argument. (In game-theoretical terms, the property of necessary truth preservation ensures that the argument will be a *winning strategy* for the one proposing it; Hodges 2013.) In a demonstrative context, Aristotle’s whole theory of demonstration is premised on the idea of deriving rock-solid conclusions from self-evident axioms (Barnes 1969), and thus again necessary truth-preservation becomes advantageous in terms of ensuring certainty.

- (iv) **Sufficiency and necessity of the premises.** This is perhaps the most obscurely formulated of the four clauses in the definition, and indeed Aristotle goes on to offer a gloss of what he means, which is however still not very illuminating. In the *Topics*, his phrasing is more transparent, as described by Striker (2009, 81):

The definition as given in the *Topics* is clearer in this respect: it has the clause “through the things laid down” instead of “because these things are so.” In this passage, Aristotle adds the remark that this clause should also be understood to mean that all premises needed to derive the conclusion have been explicitly stated.

This clause has been variously interpreted by commentators; some of them read it as a strictly logical requirement, others as a metaphysical requirement. Indeed, some commentators, in particular in the Arabic tradition, have interpreted this clause as the requirement for an essential connection between premises and conclusion (Thom 2016). But the requirement can also be interpreted logically as stating that no premise is *redundant* for the conclusion to come about; all of them are de facto needed for the conclusion to result of necessity. This is indeed

⁸There are issues pertaining to propositional identity arising in connection with this requirement (e.g. are logically equivalent propositions such as AiB and BiA the same?), but we will set those aside for the present purposes.

one of the two main formulations of the requirement of relevance in modern relevant logics, known as “derivational utility” (Read 1988, 6.4), and in this sense Aristotelian syllogistic can very naturally be interpreted as a relevant system (Steinkrüger 2015). This requirement is also often discussed in connection with the fallacy of False Cause, which we will discuss briefly below.

Moreover, as Aristotle’s gloss suggests, this clause can also be read as the requirement that *everything* that is needed for the conclusion to result of necessity has been explicitly stated; there are no hidden premises required (“no term is required from outside”). The demand that all premises be made explicit is arguably what distinguishes the approach in *APri* from the *Topics* (Malink 2015). And so, this clause as a whole may be read as the requirement that the premises laid down are *exactly* those needed for the conclusion to come about; no more, no less.

In demonstrative contexts, this clause is very natural: for Aristotle, a demonstration is an explication unearthing the *causes* of a given phenomenon, and so both redundancy and lack of explicitness go against this desideratum. In dialectical contexts however, both these requirements are less straightforward: the participants may have a fair amount of *endoxa* in common, which could plausibly be taken for granted without having to be explicitly put forward (Malink 2015); and redundancy may be advantageous in purely adversarial contexts, as asking for various redundant premises may serve the strategic purpose of confusing one’s opponent. But in the *Topics*, Aristotle wants to move away from the purely adversarial dialectical disputes (though he also gives advice on how to perform well in such cases – see also the *Sophistical Refutations*, Ebbesen 2011) and towards a more cooperative model – dialectic as inquiry, where two parties together consider what would follow from given assumptions (*Topics* VIII.5). In such contexts, redundancy would be out of place, and relevance comes out as a notion related to cooperativeness.

With this dialectical/dialogical interpretation of Aristotle’s requirements in place, we can now survey some of the transformations that the definition of a *syllogismos* underwent in later authors, leading to Ockham’s and Buridan’s respective conceptions in the fourteenth century.

14.2 Between Aristotle and the Fourteenth Century

As with everything else in logic, the main bridge between ancient Greek logic and medieval Latin logic is provided by Boethius, who translated *APri* (though the translation only started to be read widely in the twelfth century) and wrote a number of texts on syllogistic. In his *De syllogismo categorico*, he engages in the usual practice of explaining the differentiae that makes an *oratio* (his translation of *logos*) a *syllogismus*. Interestingly though, the formulation of the definition that he uses deviates in one important aspect from Aristotle’s:

A syllogism is a locution in which, certain things being posited and granted, something other than what are posited and granted occurs necessarily through the things that are granted.⁹

The key difference is the addition of “and granted” to “posited” in the first clause (notice also that “granted” is repeated no less than three times). Boethius seems to thereby be restricting the notion of a syllogism to dialectical, disputational contexts, whereas Aristotle’s goal was to cover both dialectical and demonstrative syllogisms. Another point worth noting in his subsequent discussion of the different clauses is his description of syllogisms where the conclusion is among one of the premises as “ridiculous,” as it would be absurd to view as granted precisely what is not yet established (the conclusion), and thus in doubt. This raises the question of whether such arguments are syllogistic after all, even if of the ridiculous kind, or simply not syllogistic at all, given that they infringe clause (ii).

Fast-forwarding to the thirteenth century, Robert Kilwardby’s treatment of the syllogism in his commentary on *APri* is relevant for the present purposes because it anticipates some of the features of Ockham’s treatment. In particular, he takes “posited” and “laid down” to refer not to the performative nature of a syllogistic argument (involving the speech-act of stating the premises), but rather to the requirement that a syllogistic argument must be in a figure and a mood. “Laid down” (*keimenôn*) is understood in the sense of a specific *arrangement* of terms and propositions (Thom 2016, 301). Thus, he reads the Aristotelian definition as encoding properties of the syllogism which are fully specified only later in *APri*, such as the notions of figure and mood, and which pertain only to the restricted class of arguments having two premises of the A, E, I, O forms.¹⁰ And so, rather than taking the initial definition to be broad and general, and to view the formal system subsequently developed as having narrower scope than the definition, Kilwardby thinks that the initial definition already aims at the restricted class of arguments that we now refer to as syllogistic arguments, in particular by reading it as implicitly referring to the notions of figure and mood.

Moreover, as argued by Thom (2016, 301),

Kilwardby understands “something other than them” and “from their being so” respectively as identifying two of the fallacies discussed in *Prior Analytics II* – Begging the Question and False Cause – insofar as they are considered as faults against the syllogism as such.

In this respect, Ockham will disagree with Kilwardby in that he will not view these fallacies “as faults against the syllogism as such,” insofar as they correspond to violations of clauses (ii) and (iv). Ockham will say that these fallacies pertain to a fault of the *opponent*, not to the syllogism as such (a distinction already present in the *Topics VIII* 161^b19-33, namely the distinction between an argument in itself vs. an argument as asked).

⁹Boethius, *De syllogismo categorico*, 821A: “Syllogismus est oratio in qua positus quibusdam atque concessis, aliud quiddam quam sint ea quae posita et concessa sunt, necessaria contingit per ipsa quae concessa sunt” (my translation).

¹⁰According to Thom (2016), this approach echoes that of Averroes.

14.3 Ockham

Ockham spends the first chapters of *Summa Logicae* III-1 (dedicated to the syllogism in general, whereas III-2 is dedicated to demonstrative syllogisms) discussing the basic features of syllogisms. (He will then move on to spend most of III-1 discussing modal syllogisms). He begins by mentioning the familiar distinctions between demonstrative and topical syllogisms (which Aristotle referred to as “dialectical”), and between modal, assertoric, and mixed syllogisms. Towards the end of the first chapter he offers his own definition of a syllogism:

A syllogism is a discourse in which, from two premises arranged in figure and mood, a conclusion follows of necessity. For this definition, it does not matter whether the premises are true or false.¹¹

It is immediately apparent that Ockham is deviating considerably from Aristotle’s original definition, in particular by excluding what I argued are dialectical/dialogical components, which Aristotle seemed to view as *constitutive* of syllogisms – i.e. as not only pertaining to the pragmatics of their applications. The only clause that appears unaltered is (iii), pertaining to the necessity with which the conclusion follows from the premises. Ockham also maintains the genus of a syllogism as *oratio*, as translated by Boethius.

Regarding clause (i), rather than stating that *at least* two premises are needed (as Aristotle seems to have done), Ockham says that *exactly* two premises are needed, which is indeed a specific feature of the formal system of syllogistic. Notice also that there is no reference to premises being posited or laid down – let alone that they must be granted, as Boethius had requested. Again, we seem to be quite far away from the dialogical, speech-act-based notion found in Aristotle (on my interpretation at least). Instead, “arranged in figure and mood” comes to replace “laid down.” Moreover, Ockham skips clause (ii) altogether, as no reference is made to the requirement that the conclusion be other than the premises. Indeed, to him this corresponds to a fault of the opponent (more on which shortly), not of the syllogism in itself, which means that the underlying consequence relation as Ockham understands it is not irreflexive (as Aristotle’s is, as argued by Duncombe (2014)). Regarding (iv), no reference is made to redundant or hidden premises. The only part of the definition that is somehow reminiscent of (iv) is his observation that the truth-value of the premises is irrelevant for the validity of the syllogism in general (though not for demonstrative syllogisms, obviously).

Indeed, Ockham relegates the concerns expressed in (ii) and (iv) of Aristotle’s formulation to the (merely?) pragmatic aspects of *using* syllogisms in a debating

¹¹ Ockham, *SL* III-1, c.1, OPh I, 59–61: “Syllogismus est oratio in qua ex duabus praemissis, dispositis in modo et in figura, de necessitate sequitur conclusio. Et ad istam definitionem nihil refert an praemissae sint verae vel falsae” (my translation).

context. In his treatment of the fallacies (*SL III-4*), he draws a distinction between *arguments* being at fault and *arguers* being at fault¹²:

After the fallacies in respect of which it is the arguments that are at fault, being formally faulty, we must speak about fallacies in respect of which it is not sophistical arguments that are at fault but in respect of which it is the opponent who is at fault in arguing against the respondent.¹³

(Notice that he associates this distinction to the distinction between arguments that are formally faulty and arguments that are (presumably) materially faulty.) He goes on to discuss the fallacy of begging the question (*petitio principii*) as the first example:

Of which the first is begging the question, which happens when the opponent, even if he infers the conclusion which he means to, still cannot convince the respondent, because he assumes what he should be proving.¹⁴

Ockham thus indicates what is wrong with arguments that have the conclusion (or some suitably equivalent proposition) among the premises: they are unconvincing, as in such cases respondent is asked to grant precisely that which opponent wants to convince him of. But arguments like this can still be valid syllogistic arguments – albeit perhaps “ridiculous” syllogisms, as Boethius would have it (Thom 2016, 299) – given that the conclusion being different from the premises is not viewed by Ockham as a constitutive feature of a syllogistic argument.

As for the fallacy of false cause, which in the commentary tradition was often associated with clause (iv) (e.g. by Kilwardby, see Thom 2016), it is also one of those pertaining to arguers being at fault, according to Ockham. He suggests that this fallacy only comes about in the case of arguments “leading to the impossible,” i.e. *reductio* arguments (*SL III-4*, c. 16). The narrow understanding of this fallacy thus precludes its use for the discussion of various relevantist requirements, as had been done by a number of commentators – in particular, but not exclusively, in connection with clause (iv). But ultimately, given that his definition of the syllogism narrows it down to precisely those arguments recognized by the formal system of syllogistic, thus having exactly two premises of a very specific kind, concerns regarding redundant premises will not arise. Similarly, concerns regarding relevance will likely not arise either, given that, on the narrow definition, the conclusion of a syllogistic argument will be composed of two terms, one from each premise.

So much for what Ockham *removes* from the Aristotelian definition. What Ockham *adds* to the Aristotelian definition is the requirement that a syllogism be

¹²This seems to be presented as a subdivision of the fallacies *extra dictionem*; one wonders if the distinction would also apply to the fallacies *in dictione*.

¹³Ockham, *SL III-4*, c. 15, OPh I, 2–4: “Post fallacias penes quas peccant argumenta peccantia in forma dicendum est de fallaciis penes quas non peccant argumenta sophistica, sed penes quas peccat opponens in arguendo contra respondentem” (translation by P. Thom).

¹⁴Ockham, *SL III-4*, c. 15, OPh I, 5–7: “Quarum prima est petitio principia, quae tunc accidit quando opponens, quamvis inferat conclusionem quam intendit, tamen non potest convincere respondentem, eo quod accipit quod deberet probare” (translation by P. Thom).

arranged in figure and mood. As we've seen, Kilwardby derives this requirement from the claim that premises are "laid down" in Aristotle's original definition; but Ockham goes a step further, and formulates the requirement explicitly in the very definition. This is a significant departure from Aristotle's definition, which was intended (at least if we follow Striker's interpretation) to aim for a general definition of deductive validity rather than to describe specific features of the syllogistic system. Ockham's definition thus covers a much narrower range of arguments.

What could have led Ockham to state explicitly the requirement that a syllogism must be arranged in a figure and mood? We can hypothesize that, with the advent of general theories of consequence in the fourteenth century (with antecedents in the thirteenth century) (Dutilh Novaes 2016), there emerged an alternative general theory of deductive validity, which in turn meant that syllogistic could be interpreted as a more specific, narrower theory, covering a particular fragment of the language. However, the truth is that the narrower interpretation of the notion of a syllogism was already popular among Latin logicians even prior to the development of fully-fledged theories of consequence (e.g. with Kilwardby). We will see that Buridan rejects this approach.

There is however a class of arguments which were not included in the classical theory of syllogistic (though they would have fallen under the general definition if understood broadly, i.e. as not restricted to the formal system described in *APri*), but which Ockham explicitly recognizes as belonging to syllogistic: arguments with singular terms. Kilwardby had rejected these arguments as syllogistic, pointing out that they possess a figure but not a mood (Thom 2016). Ockham, following a tradition that began much before him, but which suited his nominalistic inclinations quite well (the ontological primacy of individuals over universals), recognizes as valid in particular the so-called expository syllogisms: third-figure syllogisms having a singular term as the subject of both premises (and thus as the middle term). (The conclusion of an expository syllogism will never be universal; it may be singular or particular, according to Ockham, *SL III-1*, c. 13.)

There is much more that could be said about Ockham's conception of a syllogism, but for reasons of space we must stop here. One last aspect worth noting though is his insistence that all syllogisms follow from the principles of *dici de omni* and *dici de nullo* (*SL III-1* c. 2). In this respect Ockham echoes Aristotle's own approach, which (at least on some readings of it) gives pride of place to the principles stating the meaning of "all" and the meaning of "no" in grounding the whole of syllogistic: from these principles, the validity of the first-figure perfect syllogisms is immediately evident. So in this respect at least Ockham remained quite Aristotelian.

14.4 Buridan

Buridan's definition of the syllogism in the *Summulae de Dialectica* (in the main text attributed to Peter of Spain, which he then goes on to comment on, as usual) is much closer to the original Aristotelian definition than Ockham's, both in word and in spirit. The original clauses are arranged in a slightly different disposition, but we have all four of them (numbered below).

A syllogism is an expression in which, (i) after some *things* have been posited, (iii) it is *necessary* for (ii) something *else* to occur (iv) *on account of* what has been posited, as in "Every animal is a substance; every man is an animal; therefore, every man is a substance"; this whole [phrase] is an expression in which after certain things, namely, the two premises, have been posited, it is necessary from something else, namely, the conclusion, to occur, i.e., to follow¹⁵ (emphasis added).

In chapter 5.1.3 Buridan then goes on to discuss three objections that may be raised against this definition: a syllogism appears to be several expressions, not only one; the use of the term "*accidere*" seems to be in tension of the idea of necessity; the definition applies to things other than a syllogism, so it "overgenerates." For our purposes, the two interesting points he makes are: in a syllogism (unlike in a conditional), the premises are posited assertively; and the requirement of the conclusion being different from the premises excludes *exponibilia* arguments from the realm of syllogisms, given that the exposition has the same meaning as what is being expounded.

In his *Questions on the Prior Analytics*, Buridan also discusses whether Aristotle's definition of the syllogism is adequate (question 3, book I). He proceeds in the usual fashion, first raising objections to the definition and then replying to each of them. What he says on how the term "*positis*" must be interpreted is particularly interesting for the present purposes, as it addresses the Kilwardby-Ockham interpretation of "laid down" as pertaining to the arrangement of premises and conclusion in a figure and a mood (which he describes as the "common" view). He says:

Again, you might note that, even though everyone generally says that the words "laid down" should be glossed as meaning "arranged in the right figure and the right mood," so as to exclude induction and many other unarranged inferences, still I believe that that exposition is unsuitable, because what a syllogism is shouldn't be explicated on the basis of its being in a good mood and in a good figure; but which are the right moods and which the useless ones should be explicated from that definition. Nor is it true that all the syllogisms about which determinations are made in this book are in these three figures, as will be seen later. And accordingly I believe that however often from some premises being posited there follows of necessity a conclusion that is not only verbally but also mentally different from those

¹⁵Buridan, *SD*, 5.1.3, 308: "Syllogismus est oratio in qua quibusdam positis necesse est aliud accidere per ea quae posita sunt, ut 'omne animal est substantia, omnis homo est animal; ergo omnis homo est substantia'; hoc totum est una oratio in qua quibusdam positis, scilicet duabus praemissis, necesse est aliud accidere, id est sequi, scilicet conclusionem" (translation by G. Klima).

premises, and from each one of them, there is always then a good syllogism, so long as the inference is formal, as we understand it in this book.¹⁶

Buridan thus seems to endorse (*avant la lettre*, that is) Striker's interpretation of Aristotle's definition of a syllogism as aiming at a general notion of deductive validity, which is then expressed in terms of a formal system that allows for the systematic study of valid and invalid arguments. For him, it is the general definition that has conceptual priority, not the system formulated in terms of figures and moods. One of his reasons to endorse this interpretation is presumably because he is also interested in arguments that do not fit the mold of the three figures, as he says, which thus allows him to study these arguments as well under the syllogistic umbrella. At any rate, he is clearly rejecting the narrower conception of a syllogism endorsed by Ockham (and others) as pertaining to figures and moods. Moreover, he reiterates the requirement that the conclusion must be different from the premises, adding that they must also be *mentally* different, not only verbally different.¹⁷ This requirement excludes for example *exponibilia* inferences, as also noted in the *Summulae*, and presumably can also be read as related to the multiple-premise requirement.¹⁸

However, he does add the requirement that for something to count as a syllogism, it must be a *formal* consequence. As is well known, Buridan endorses a substitutivity notion of formal consequence (which is thus different from Ockham's notion of formal consequence). The fact that syllogisms (narrowly understood, i.e. as arguments in the figures) have the property of remaining valid for arbitrary substitutions of their terms (modulo the requirement that the conclusion must be different from the premises) had been noted by a number of earlier authors, including Alexander of Aphrodisias and Abelard (Dutilh Novaes 2012a); but Aristotle himself does not seem to think that this is a constitutive feature of a valid syllogistic argument (Dutilh Novaes 2012b). Buridan presents it here as a necessary (though not sufficient, and again modulo the requirement that the conclusion must be different from the premises) condition for an argument to be syllogistic, which is arguably not something present in Aristotle's definition as such (but rather is a property of

¹⁶Buridan, *Quaestiones* 1, q. 3: "Item, notetis quod quamuis omnes communiter dicant quod haec dictio 'positis' debet glossari id est dispositis in debito modo et in debita figura, ad excludendum inductionem et multas alias consequentias inordinatas, tamen ego credo quod illa expositio non sit conueniens: quia non debet declarari quid est syllogismus ex eo quod est in bono modo et in bona figura, immo ex ista definitione declarabitur qui sunt modi debiti et qui sunt inutiles. Nec est uerum quod omnes syllogismi sint in istis tribus figuris de quibus determinatur in isto libro, ut postea uidebitur. Et ideo credo quod quotienscumque aliquibus praemissis positis sequitur de necessitate conclusio, non solum uocaliter, sed etiam mentaliter ab illis praemissis et ab unaquaque illarum diuersa, tunc semper est bonus syllogismus, dum tamen sit consequentia formalis, de qua semper intelligimus in hoc libro" (translation by P. Thom).

¹⁷This is again the delicate issue of propositional identity noted above.

¹⁸For example, the conversion rules may be interpreted as non-syllogistic because "No A is B" ultimately means the same as "No B is A," as they are logically equivalent. Other than this, I have not found much in Buridan's discussions pertaining to the multiple-premise requirement.

the formal system). Thus, although he considers a broader range of arguments as syllogistic than Ockham (who insists on the figure-mood criterion), he still gives the formality criterion pride of place (just as Ockham does more explicitly, by emphasizing moods and figures).

At any rate, in his discussions as a whole Buridan does not emphasize much the arguably dialogical nature of Aristotle's definition, even though he does pay attention to the assertive aspect of premises in a syllogism (as opposed to a hypothetical proposition). But unlike Ockham, he maintains the requirement that the conclusion be different from the premises as a constitutive feature of the syllogism (thus not only pertaining to its applications), and rejects the interpretation of "laid down" as pertaining to figure and mood.

14.5 Conclusion

As we've seen, Ockham's definition of a syllogism is quite far removed from Aristotle's own; arguably, the only component that remains unaltered is the necessity clause (iii). Ockham also adds an explicit reference to figures and moods, something absent from Aristotle's definition. Arguably, what he does is to reinterpret some of the pragmatically (dialogically) motivated clauses that Aristotle seemed to view as constitutive of the syllogism as properties pertaining merely to the application of syllogistic arguments by arguers. Buridan sticks more closely to Aristotle's formulation, but dialogical motivations are not perspicuous in his analyses. He does however offer a (compelling, to my mind) rebuttal to the tendency to associate the "laid down" phrase in the original definition to figures and moods, in terms of the conceptual priority of the definition vis-à-vis the formal system – again, something that is arguably already present in Aristotle.

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