

Logic and Interpretation: Syllogistic Reconstructions in Simplicius' Commentary on Aristotle's *Physics*

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Abstract

In this article I explain three puzzling features of Simplicius' use of syllogistic reconstructions in his commentary on Aristotle's *Physics*: (1) Why does he reconstruct Aristotle's non-argumentative remarks? (2) Why does he identify the syllogistic figure of an argument but does not explicitly present its reconstruction? (3) Why in certain lemmata does he present several reconstructions of the same argument? Addressing these questions, I argue that these puzzling features are an expression of Simplicius' assumption that formal reasoning underlies Aristotle's prose, hence they reflect his attempt to capture as faithfully as possible Aristotle's actual mode of reasoning. I show further that, as a consequence of this seemingly descriptive use of syllogistic reconstructions, logic serves Simplicius not only as an expository and clarificatory tool of certain interpretations or philosophical views, but also motivates and shapes his exegetical stances and approach.

Keywords

Syllogism – reconstruction – interpretation – Simplicius – commentary on Aristotle's *Physics*

1 Introduction

The natural answer to the question why logical reconstructions figure in ancient commentaries on philosophical works is that they serve as pedagogical

and exegetical tools. They clarify the argumentative structure of discussions found in the base-text; they lend credence to the philosophical stances found therein by showing that they rest on valid and sound arguments, or alternatively they help expose logical problems and lacunae, thereby giving rise to exegetical and philosophical discussions and debates. They can also reflect the commentators' views about the subject discussed in the based-text and thus serve as a means of expressing and justifying their own philosophical stances and commitments.¹ While these explanations are undoubtedly correct, they are not exhaustive. In Simplicius' commentary (= *In Phys.*), on Aristotle's *Physics* (= *Phys.*), particularly in his more technical discussions where he not only reconstructs Aristotle's arguments but identifies their specific syllogistic figure, we find recurrent puzzling features that give rise to three questions that the above explanations leave unanswered:² (1) Why does he reconstruct Aristotle's non-argumentative remarks? (2) Why does he identify the syllogistic figure of an argument but does not explicitly present its reconstruction? (3) Why in certain lemmata does he present several reconstructions of the same argument? In this article I address these questions. I argue, through a comparison of Simplicius with other commentators, that these puzzling features are an expression of his assumption that formal reasoning underlies Aristotle's prose, hence they reflect his attempt to capture as faithfully as possible Aristotle's actual mode of reasoning. This conclusion brings to light another explanation

1 Catherine Dalimier presents and discusses logical reconstructions that play these roles in Simplicius' commentary on *De caelo*. See Dalimier (2000, 377–386). In view of the present discussion of Simplicius' use of syllogistic reconstructions in his commentary on the *Physics*, her claim that the commentators' ways of handling premises in reconstructing Aristotle's arguments is never innocent is overstated (384). All the reconstructions that I discuss and refer to here are descriptive and do not serve as a means of presenting the Simplicius' own philosophical views. Similarly, her claim that syllogistic reconstruction is above all a method of analysis in the sense of returning to the principles of demonstration finds no echo in Simplicius' commentary on the *Physics* (385). None of the reconstructions that I found in this commentary can be classified as either demonstrative or tekmeriodic, namely inferences from posteriors to priors that according to Simplicius are the type of proofs that suit the subject matter of physics (*In Phys.* 14.30–16.7).

2 I focus on Simplicius' commentary on the *Physics* not because these features are exclusive to it but because comparative examination is crucial for understanding the use of those logical reconstructions whose role is not evident from Simplicius' text alone. This commentary can be compared to two other extant interpretations and contains significantly more syllogistic reconstructions than Simplicius' commentary on the *Categories*, which is the only other commentary whose authorship is uncontested that can also be compared to other extant commentaries. Simplicius' commentary on Aristotle's *On the Heavens* can be compared with Themistius' paraphrase of this work, extant in Hebrew and Latin translations, but due the difference in genre and the absence of another commentary on this work, this comparison may not yield conclusive results.

of the relation between logical analysis and interpretation in this commentary. It shows that, as a consequence of this seemingly descriptive use of syllogistic reconstructions, logic serves Simplicius not only as an expository and clarificatory tool of certain interpretations or philosophical views, but also motivates and shapes his exegetical stances and approach. In the first part of this article I explain why these three questions arise; in the second I answer the first two questions; and in the third I clarify the relation between logic and interpretation in this commentary through an examination the third question.

2 The Questions

The immediate challenge arising from a survey of the syllogistic reconstructions found in Simplicius' commentary on the *Physics* is to explain why they appear in certain lemmata and not in others. This 1366 pages long commentary contains about 30 syllogistic reconstructions, of which I found only two whose role is evident since they are directly motivated by the lemmata being commented on. In both cases, Simplicius clarifies Aristotle's remarks about the validity of other thinkers' arguments. In one case, found in the commentary on *Physics* I.3, he elaborates on Aristotle's claim that Melissus' argument, "if what has come into being has a beginning, then what has not come into being has no beginning" is fallacious (*In Phys.* 186a10–11), showing through an invalid second figure syllogism from two negative premises that the argument cannot be saved from Aristotle's charge (104.27–105.12).³ In the second case, found in the commentary on *Physics* IV.10 (701.4–8), he presents an invalid second figure syllogism from two affirmative premises in explaining why Aristotle regards as simplistic (*euēthikos*) the view of those who infer that time is the heavenly sphere from the assumptions that all things are in time and that all things are in the heavenly sphere (218b5–9).⁴ Regarding Simplicius' other reconstructions, it is difficult to find a regularity or clear pattern that can explain why he

3 All references to Simplicius' commentary on the *Physics* are to H. Diels (ed.) 1882–1895. *Simplicii in Aristotelis Physicorum libros octo commentaria*, CAG vols. 9 / 10. Berlin: Reimer. The exact reconstruction of this argument is unclear because the syllogism presented in the text is incomplete. On this difficulty see Huby & Taylor (2011, 90, n. 15). Philoponus too understands Melissus' argument as a second figure syllogism from two negative premises of the following form (*in Aristotelis Physicorum* 52.24–26). The references to this commentary are to H. Vitelli (ed.) 1887–1888. *Ioannis Philoponi in Aristotelis Physicorum libros octo commentaria*, CAG vols. 16 / 17 Berlin: Reimer. On Simplicius' and Philoponus' different approaches to Melissus' argument see Brémond (2019, 99–101).

4 Philoponus understands this argument in the same way (*in Aristotelis Physicorum* 709.33–710.1).

chooses to present them. While some feature in lemmata devoted to establishing major theses, such as that nature is a principle of motion and rest (*In Phys.* 266.5–32), nature is a form (279.27–29), or time is a number (713.23–25), others appear as forced attempts to syllogize brief non-argumentative remarks. The following example illustrates the difficulty in understanding the motivation behind the latter reconstructions:⁵

In *Physics* III.1 Aristotle clarifies his claim that the substrate is different from its capacities through the following example:

This is clear from the case of contraries: the capacity of being healthy and the capacity of being ill are different – for otherwise to be ill and to be healthy would be identical – but the substrate and that which is healthy and that which is ill, be it either moisture or blood, is one and the same.⁶

Phys. 201a34–b3

In his commentary on this lemma, Simplicius finds in this passage a second figure syllogism:

And the whole syllogism he uses in proving that the substrate is one thing and the potentiality is another is of this kind, namely a categorical in the second figure; and it has been evidently inferred with regard to contraries: The substrate of potential contraries is one and not different; the things that [the substrate] is capable of doing are different from one another, if indeed the actualities are different; therefore, the substrate being in actuality is not identical to the things that it is capable of doing. And if it is not identical it is different; for everything that is not identical is different.

In Phys. 425.4–9

Here Simplicius reads a clarificatory example as an argument and goes to great lengths to show that it is the following second figure syllogism:

- (1) Contrary capacities are different from one another.
- (2) The substrate of potential contraries is one and not different.
- (3) Therefore, the substrate is not identical with its capacities.

5 For other reconstructions of brief and non-argumentative remarks see e.g., 416.10–15; 543.2–4; 550.16–18; 706.3–5; 745.17–20; 899.28–900.2; 928.10–15.

6 All translations are mine.

In so doing, he not only understands the claims, (1) contrary capacities are different and (2) the substrate is one and the same, as premises of an argument, he further adapts Aristotle's phrasing to fit his view that this argument is a second figure syllogism. He construes the second claim as a universal negative premise by adding "and not different" to Aristotle's affirmative formulation "is one", and shows that the universal negative conclusion that he derives is equivalent to Aristotle's affirmative formulation, explaining that "not identical" means "different". This artificial attempt to read into the above passage a second figure syllogism highlights the difficulty in understanding the purpose or role of Simplicius' use of certain syllogistic reconstructions. If syllogistic reconstructions aim to clarify the logical structure of Aristotle's argument, why does Simplicius syllogistically reconstruct a non-argumentative clarification?

The second question regarding Simplicius' use of syllogistic reconstructions arises from his habit, which has no parallel in Philoponus' commentary on the *Physics*, to state that arguments are syllogisms of a certain figure without explicitly and accurately reconstructing them. He does so, for instance, in his commentary on *Physics* VIII.4, where he comments on Aristotle's claim that it is impossible to say that when the four elements move naturally they move themselves, because self-motion is a characteristic of life and a property of living things (*Phys.* 255a5–7):⁷

If then these bodies [sc. the elements] are inanimate and things that move from themselves are animate, the former would not move from themselves. The inference is in the second figure.

In Phys. 1209.33–35

Here Simplicius merely states that the inference is a second figure syllogism, but does not explicitly say that it is the following syllogism:

- (1) Everything that moves from itself is animate.
- (2) No element is animate.
- (3) Therefore, no element moves from itself.

Moreover, he gives no indications that point the reader to this syllogistic inference. He presents the minor premise before the major premise, he disregards the quantifiers, "no" and "every", and does not mention Aristotle's remark that self-motion is a property (*idion*) of living things (255a7), from which his readers

⁷ For other cases where Simplicius states that arguments are syllogisms without reconstructing them see, e.g., 335.27; 424.13; 657.2; 705.34; 1184.27; 1256.2.

could learn that the major premise is a universal affirmative and that the syllogism has the form: All A is B; no C is B; therefore, no C is A.⁸ Thus, if syllogistic reconstructions aim to reveal the logical structure of an argument, Simplicius' disregard for the exact logical features of Aristotle's argument gives rise to the question, what is the purpose of his remark that it is a second figure syllogism?

The third question that Simplicius' use of logical reconstructions raises is why he occasionally presents several reconstructions of the same argument. For example, in his commentary on *Physics* 11.1 (192b12–23) he presents three logical reconstructions of the considerations leading to Aristotle's definition of nature as a principle of motion and rest (*Phys.* 266.5–30).⁹ First, he presents the following first figure syllogism:

- (1) Nature is that by which things that are by nature differ from things that are not.
- (2) Things that are by nature differ from things that are not by nature in having primarily by themselves and not accidentally an internal principle and cause of motion and rest.
- (3) Therefore, nature is the principle of motion and rest in the thing [that has it] primarily by itself and not accidentally.

Next, he says that the argument can be reconstructed also as a third figure syllogism:

- (1) Things that are by nature differ from things that are not by nature in having nature.
- (2) Things that are by nature differ from things that are not by nature in having in themselves a principle of motion and rest by themselves and not accidentally.
- (3) Therefore, things that have nature have a principle of motion and rest by themselves and not accidentally.
- (4) Therefore, nature is a principle of motion by itself and not accidentally.

Finally, he quotes a passage from Alexander of Aphrodisias' lost commentary, where this argument is reconstructed as a hypothetical inference:

8 On this reconstruction see also, Bodnár, I., Chase, M. & Share, M. (2012 185, n. 430).

9 For similar cases where Simplicius presents several reconstructions see, e.g. 328.25–29; 373.2–12; 425.4–14.

- (1) If things that are by nature and have nature differ from things that are not by nature in having in themselves a principle and cause of motion and rest by themselves and not accidentally, nature is a principle of motion in those things [that have it] by itself and not accidentally.
- (2) The antecedent is true, therefore the consequent is true.

In his lengthy discussion of this lemma Simplicius says nothing about the role and significance of the possibility of reconstructing Aristotle's argument in several ways. He does not explain why Aristotle's argument admits several logical reconstructions, thereby leaving open the question whether they are aimed to address a logical or an exegetical problem. Accordingly, it is not clear whether his discussion is an attempt to find a valid and sound argument in support of Aristotle's definition of nature or an attempt to address the exegetical question of how exactly Aristotle establishes this definition. This difficulty gives rise to two further questions. First, whether the possibility of reconstructing this argument in three different ways is an indication of the strength or weakness of Aristotle's reasoning, and second, what the criterion of evaluating these different reconstructions is: Is it a logical and methodological criterion which implies, for example, that syllogistic arguments are more probative than hypothetical arguments and that the first figure syllogism is superior to the other syllogistic figures, as Aristotle says in *Posterior Analytics* 1.14 (79a17–18), or is it an exegetical criterion, whereby the different reconstructions are evaluated in light of Aristotle's phrasing and mode of argumentation?

It is difficult to give decisive answers to these questions solely through an analysis of the lemmata in which these and similar syllogistic reconstructions appear. The interpretative and philosophical matters discussed in these lemmata are specific to each case, hence do not provide a general account that can explain why the three features discussed above are recurrent.¹⁰ Accordingly, I infer a plausible explanation of these features from a comparative examination of a syllogistic reconstruction that appears in Simplicius' commentary on the *Physics* and in the two other ancient interpretations of Aristotle's *Physics* that have come down to us: Themistius' *Paraphrase* and Philoponus' commentary

10 Classroom practices could perhaps play a role in Simplicius' use of syllogistic reconstruction, but in view of our limited knowledge of these practices the explanations that they can provide are speculative and too general for the present purpose because, as we will shortly see, within this shared didactic context different commentators use syllogistic reconstructions in different ways. Moreover, these practices are less relevant for the present case because, as Christoph Helmig (2020) argues, the size and complex argumentative structure of Simplicius' commentaries suggest that were not aimed at students.

on this work. This comparison suggests that Simplicius does not regard syllogistic reconstructions as tools for understanding Aristotle's informal argumentation but assumes rather that formal reasoning underlies Aristotle's prose and, therefore, attempts to reveal the exact mode of reasoning that Aristotle employs. This attempt, I argue, can explain the puzzling features of his use of syllogistic reconstruction, thereby answering the three questions that they raise. I begin with the two first questions.

3 Plausible Answers

In *Physics* 11.5 Aristotle argues as follows that things that do not happen by necessity nor for the most part can also happen for the sake of something:

Of the things that come to be some come to be for the sake of something and others do not, and of these some are by choice and other are not by choice but both are among the things that are for the sake of something, therefore it is clear that even among the things that are outside [the classes of] what is necessary and what is for the most part there are certain things to which it is possible to attribute the phrase “for the sake of something”.

Phys. 196b17–21

In their interpretations of this passage Themistius, Philoponus, and Simplicius present the same syllogistic reconstruction of the above argument, but each of them uses it for different purposes:¹¹

Themistius: Let us infer the consequence from the premises. It is assumed that chance is among the things that happen less of the time and it is assumed that it is also among the things that are for the sake of something. What is concluded from these? That some of the things that happen less of the time are among those that are for the sake of something.

Paraphrasis 50.23–26

Philoponus: Taking from the two divisions that chance and spontaneity are both in things that happen less of the time and in things that

¹¹ The references to Themistius' *Paraphrasis* is to H. Schenkl (ed.) 1900. *Themistii in Aristotelis physica paraphrasis*, CAG vol.5.2 Berlin: Reimer.

are for the sake of something, he wishes to infer the conclusion that plainly follows from these [propositions], i.e. that some of the things that happen less of the time are for the sake of something. And the syllogism is in the third figure:

Chance and spontaneity are among the things that happen less of the time

Chance and spontaneity are among the things that are for the sake of something

Therefore, certain things that happen less of the time are for the sake of something

Accordingly, one should not wonder if we say that chance and spontaneity are among the things that are for the sake of something and among things that happen less of the time. But it seems that the syllogism infers the same things through the same things; for we find in the premises that the same thing is for the sake of something and happens less of the time, therefore it seems redundant to try to conclude the same thing that we assumed in the premises. Well, I say that the claim that what happens less of the time is for the sake of something was not taken in the assumptions but that chance and spontaneity both happen less of the time and are for the sake of something, and this is shown partially. Thus the syllogism does not conclude that chance and spontaneity are among the things that happen less of the time and are for the sake of something, but that what happens less of the time is for the sake of something.

In Aristotelis Physicorum 271.26–272.13

Simplicius: Since then he has proven earlier that chance and spontaneity are among the things that happen less of the time, he concludes in the third figure that some of the things that happen less of the time come to be for the sake of something, as he himself indicated through the words “therefore it is clear that among the things that are outside what is necessary and what is for the most part there are certain things to which it is possible to attribute the characteristic “for the sake of something”. And the words “therefore it is clear” denote a conclusion in which he infers that we say that such effects that are among things that happen less of the time for the sake of something are by chance when they come to be accidentally.

In Phys. 335.26–33

As the hortatory subjunctive “*sullogisōmetha*” and the interrogative manner of speech suggest, Themistius uses the logical reconstruction of Aristotle’s argument as an expository or pedagogical tool that helps his readers understand on what premises Aristotle’s argument rest and what is the conclusion that follows from them. Unlike Themistius, Philoponus uses the above syllogistic reconstruction as an exegetical tool. Through an explicit presentation of the argument, he addresses two questions that may undermine Aristotle’s claim: (1) how could chance and spontaneous events be for the sake of something? and (2) does Aristotle beg the question when he assumes that chance and spontaneity happen less of the time and are for the sake of something? Regarding the former, he explicates the grounds on which Aristotle argues that some things that happen less of the time are for the sake of something. Regarding the latter, he shows that “chance and spontaneity” serve as a middle term that connects the predicates of the two assumptions, thereby dispelling the worry that Aristotle both assumes and concludes that chance and spontaneity happen less of the time and are for the sake of something. By contrast, Simplicius’ reference to the syllogistic reconstruction of Aristotle’s argument does not serve any intermediate purpose but is itself the aim of his discussion. He does not present the reconstruction or infer from the arguments’ specific logical structure anything about its validity, soundness, and the thesis it establishes. Instead, he shows *that* a syllogistic inference underlies Aristotle’s text, and does so by quoting the passage that states the conclusion and by explaining that the phrase “*hōste dēlon hoti*” (therefore it is clear) that Aristotle uses in the above passage denotes a conclusion (*Phys.* 196b19).¹²

This is not an isolated case. Simplicius likewise appeals to syllogistic reconstructions with the sole aim of showing that they underlie Aristotle’s prose in other contexts. For instance, in his commentary on *Physics* v.4 he interprets a question as a negative premise in support of his claim that Aristotle’s argument at 229a3–6 that consecutive motions that differ in species cannot be regular is a second figure syllogistic inference (*In Phys.* 899.27–900.1):

Of the premises, he posited first the major premise that says “every uniform and continuous motion can be both regular and irregular”, and last the minor premise that says “how could a motion composed of alteration

12 This use of logical reconstructions can be also contrasted with Averroes’ approach in his commentary on *De caelo*, where, according to Herni Hugonnard-Roche (2000, 393–395), he reconstructs Aristotle’s arguments as hypothetical and negative, which reflects the status of natural philosophy as a hypothetical science.

and locomotion be regular?”, by taking this form of question as equivalent to a negation.

In Phys. 900.2–6

Similarly, in his commentary on *Physics* VII.3 (245b8–246a) where, after saying “he proves that shaping is not alteration, syllogizing in the second figure as follows” (1062.23–24), Simplicius does not present a reconstruction of the inference but a 20 line long paraphrase of Aristotle’s text that ends with a remark that explains where exactly in the text Aristotle presents the premises:

Having established the assumption through many [examples], he concisely sets up the premises, first the minor premise when he says “consequently in respect of shape” etc. and next the major premise when he says “but with respect to affections it is said”, and in this way he draws the conclusion.

In Phys. 1063.13–16

In light of the role played by syllogistic reconstructions in these passages, two of the above-mentioned questions can be readily answered. By implying that one of the aims of Simplicius’ appeal to syllogistic reconstruction is to show that syllogistic reasoning underlies Aristotle’s informal arguments, these and other similar examples can explain why he often reconstructs non-argumentative remarks. Such remarks give rise to the need to reveal the syllogistic or other formal mode of reasoning that, on Simplicius’ assumption, is found therein. These examples can also explain why, in certain lemmata, Simplicius does not explicitly reconstruct the arguments that he construes as syllogistic. If the sole aim of the discussion is to show that Aristotle’s argument is syllogistic it is necessary to indicate where Aristotle presents the premises and the conclusion, but it is unnecessary to reconstruct the argument.

A more detailed examination is required to address the third question, i.e. why Simplicius presents several logical reconstructions of the same argument? To this end, I return to the above example from Simplicius’ commentary on *Physics* II.1 and show that his presentation of three logical reconstructions is another expression of his assumption that formal logical reasoning underlies Aristotle’s prose. Through this examination, I also clarify the relation between logic and interpretation in Simplicius’ commentary on the *Physics*, showing that while exegetical considerations determine his understanding of the logical structure of Aristotle’s arguments, logical considerations motivate and shape his exegetical stance and approach.

4 Logic and Interpretation

In *Physics* 11.1 Aristotle says that he has stated what nature is (193a1–2), but he does not explicitly define nature or say what it is. Instead, he distinguishes things that exist by nature from things that exist by other causes, and by presenting examples of natural objects and artifacts argues that the former differ from the latter in having an internal principle of motion and rest in themselves and not accidentally (192b8–33). This line of reasoning does not immediately lead to the conclusion that Aristotle draws here, i.e. “nature then is what has been stated” (192b32). It entails that natural things have a principle of motion and rest, but not that nature is a principle of motion and rest. The following examination of the logical reconstructions that Simplicius presents in his commentary on this lemma shows that they are different attempts to identify the formal structure that captures as faithfully as possible Aristotle’s actual mode of argumentation, specifically this apparent logical gap. To facilitate this examination, I cite this passage in full despite its length:

It seemed that this [conclusion] is drawn in the first figure as follows: Nature is that by which things that are by nature differ from things that are not; things that are by nature differ from things that are not by nature in having primarily by themselves and not accidentally an internal principle and cause of motion and rest; therefore, nature is the principle of motion and rest in the thing [that has it] primarily by itself and not accidentally.

But it is possible to present the argument in the third figure as follows: Things that are by nature differ from things that are not by nature in having nature; things that are by nature differ from things that are not by nature in having in themselves a principle of motion and rest by themselves and not accidentally; therefore, things that have nature have a principle of motion etc.; therefore, nature is a principle of motion by itself and not accidentally. And the syllogism is similar to this: all [animals] capable of laughter are human beings; all animals capable of laughter are rational and mortal, and the universal conclusion all human beings are rational mortal animals is inferred because of the matter even though the figure infers partial conclusions. And premises that have properties and definitions as predicates although they are universal affirmative convert because the characteristic of the matter is universal. For this reason, although [inferences] in the third figure have partial conclusion from the form, nevertheless the universal conclusion will be true because of the

matter, as he himself says in the *Analytics*.¹³ And the premise “things that are by nature differ from things that are not by nature in having primarily by themselves and not accidentally an internal principle and cause of motion and rest” is clarified through these words “it seems that all these things differ from those that are not constituted by nature” etc.¹⁴

And “it is possible” as Alexander says too, “to present the argument hypothetically as an affirmative (*kataskueastikos*) [that follows] from a conditional [premise] in this way: If things that are by nature and have nature differ from things that are not by nature in having in themselves a principle and cause of motion and rest by themselves and not accidentally; nature is a principle of motion in those things [that have it] by itself and not accidentally. And the first [is true], therefore the second [is true]. And he confirmed through induction that things that have nature differ from things that do not in this respect, by presenting the products of art.

In Phys. 266.5–30

In light of the assumption that Simplicius uses syllogistic reconstructions to describe Aristotle’s actual mode of reasoning, this passage no longer appears as a list of different logical reconstructions but, rather, as a discussion of the question of what logical reconstruction best captures Aristotle’s reasoning. As the verb “*eoiken*” (it seemed) suggests, the first figure syllogism reflects the expectation of finding in Aristotle’s text an argument that straightforwardly leads to the definition of nature, as the concluding statements “nature then is what has been stated” (*Phys.* 192b32), and “it has been stated what nature is” imply (*Phys.* 193a1–2). Accordingly, it supplies the assumption that Aristotle

13 It is unclear to which discussion in Aristotle’s *Analytics* Simplicius refers. Herman Diels comments “nescio ubi”, and Barrie Fleet in his translation (1997, 166, n. 47) suggests that the reference is to *Prior Analytics* 1.7, 29b1–25. However, this passage is irrelevant to Simplicius’ discussion. Here Aristotle discusses the reduction of second and third figure syllogisms to the first figure, whereas Simplicius discusses the conversion of the subject and predicate of universal affirmative propositions whose predicates are properties or definitions. Accordingly, I suggest that the reference is to *Posterior Analytics* 11.4, where Aristotle says that properties and definitions convert with their subjects (91a15–16). I am grateful to Alain Lernould for drawing my attention to this problem.

14 In Alain Lernould’s (2019, 72) translation of this passage this sentence opens the next paragraph where, in my translation, Simplicius presents Alexander’s reconstruction. In view of Simplicius’ habit to point at the sentences where Aristotle’s states the premises and conclusions of his arguments, it is more natural to understand this sentence as a reference to the second premise of the third syllogistic figure’s reconstruction that appears at the beginning of this paragraph. Further, Alexander reconstructs this argument as a hypothetical inference, but this premise is categorical and not hypothetical proposition, as we would expect, if this sentence is related to Alexander’s reconstruction.

does not state, viz. “nature is that by which things that are by nature differ from things that are not”, thereby bridging the gap in Aristotle’s argument. Whereas this reconstruction is a successful attempt to offer a valid argument for the definition of nature, it is not an accurate reconstruction of Aristotle’s argument. As we saw, Aristotle does not deduce the definition of nature from its universal characterization but adduces examples in support of the claim that natural objects differ from artifacts in having an intrinsic principle of motion and rest.

By reconstructing Aristotle’s argument as a *modus ponens* argument, Alexander avoids these discrepancies. He bridges the logical gap in Aristotle’s argument by construing the assumption that natural objects differ from artifacts in having an internal principle of motion as the antecedent of the conditional, and the conclusion that states the definition of nature as its consequent. He also captures the empirical character of the argument with his assumption that the examples of artifacts provide inductive affirmation of the conditional’s antecedent, which entails the affirmation of the consequent.

Simplicius’ third figure reconstruction is even closer to Aristotle’s text. Unlike the first figure reconstruction and Alexander’s hypothetical reconstruction, the immediate conclusion of this reconstruction is not the definition stating that nature is a principle of motion and rest but a claim that Aristotle explicitly makes, namely that things that have nature have a principle of motion and rest (*Phys.* 192b32–33). Moreover, in keeping with his descriptive use of logical reconstructions, Simplicius does not bridge the gap in Aristotle’s argument; he presents one conclusion after the other, without explaining how the definition of nature follows from the first conclusion that things that have nature have a principle of motion and rest.¹⁵

From this examination we may infer that the presentation of several logical reconstructions of the same argument in Simplicius’ commentary is another expression of his assumption that formal reasoning underlies Aristotle’s text. We see that Alexander’s and Simplicius’ reconstructions address not only the logical question of how Aristotle’s discussion of the definition of nature can be formally reconstructed but also the question how Aristotle actually establishes this conclusion. In view of the latter aim, the criterion of evaluating each reconstruction is not logical but exegetical. Alexander’s and Simplicius’ attempts to find an alternative to the first figure syllogism do not arise from logical considerations but from an exegetical concern over the discrepancies between this reconstruction and Aristotle’s actual mode of argumentation.

15 In the next lemma he explains how the second conclusion follows from the first, saying that Aristotle infers the definition of nature from the activities of things that have nature (*In Phys.* 269.21–22).

However, this use of syllogistic reconstructions is not merely descriptive. Further examination of the above passage shows that Simplicius' exegetical and logical considerations are in effect interdependent. That is to say, it is not only that exegetical questions shape Simplicius' understanding of the logical structure of Aristotle's argument, but also the other way round: logical considerations determine his exegetical stance.

Its advantages notwithstanding, the third figure syllogistic reconstruction raises a major difficulty. Syllogisms in this figure establish partial conclusions, but Aristotle's argument aims to establish the universal conclusion that all natural objects have an internal principle of motion and rest. In the above passage Simplicius tackles this difficulty by arguing that, although formally the conclusion of this reconstruction is partial, it is universally true because having an internal principle of motion and rest is a property of natural things; i.e. it is an attribute that holds exclusively for its subject and is convertible with it, just as the predicate "capable of laughter" holds exclusively for and is convertible with the subject "human beings".¹⁶ This solution is not purely logical but requires a specific interpretation of the comparison between natural objects and artifacts. Indeed, Simplicius is aware of this consequence and interprets the comparison in light of this solution. Unlike Alexander, who argues, as we saw, that the comparison with artifacts aims to provide an inductive affirmation of the claim that natural objects have an internal principle of motion and rest, Simplicius claims at the beginning of this lemma that this comparison aims to prove that having an internal principle of motion and rest is a property of natural objects (*In Phys.* 265.10–11). Thus, while exegetical considerations lead Simplicius to reconstruct Aristotle's argument in the third syllogistic figure, logical considerations determine in turn his exegetical stance regarding the role of the comparison between natural objects and artifacts.

Logical considerations can also determine Simplicius' exegetical approach. In *Physics* IV.10 Aristotle argues that time is not motion on the grounds that

the change and motion of each thing is in the changed thing itself alone or where the moving and changing thing itself happens to be, but time is similarly everywhere and with everything.

Phys. 218b10–13

16 See *Topics* I.5, 102a18–22.

In his commentary on this lemma Simplicius syllogistically reconstructs this argument:

So Aristotle said accurately that all “change and motion are only in the thing that undergoes change or where the moving thing itself happens to be”. And it is clear that he understands it in this way from the other premise added to this one, which says that “time is similarly everywhere and in everything”. If then motion is not similarly everywhere but only where the moving thing is, and not in everything but only in the thing that undergoes change, it is clear that time is not motion. The inference is in the second figure.

In Phys. 705.27–34

Simplicius’ formulation of the argument that time is not motion is different from Aristotle’s. Whereas Aristotle opens his argument with the words “the motion and change of each thing is in the changed thing itself alone”, Simplicius argues that Aristotle says accurately “*all* motion and change” and adds that the second premise of the argument, “time is similarly everywhere and with everything” justifies this reading. He does not explain how this premise supports this interpretation, but its role as a minor premise in a second figure syllogistic inference clarifies this claim. If Aristotle syllogistically deduces the universal negative conclusion “no time is motion” and posits as a minor premise the universal affirmative assumption that “time is similarly everywhere and with everything”, the major premise should be universal negative (i.e. no change and motion is everywhere and with everything), for otherwise the conclusion does not follow.

The question whether Aristotle posits a universal negative assumption is not merely logical; it is the exegetical point of contention between Simplicius and Alexander. The above passage immediately follows a discussion of the role of the phrase “or where the moving and changing thing itself happens to be” in Aristotle’s argument. There Simplicius rejects Alexander’s view that, through this phrase, Aristotle distinguishes change from locomotion and hence bases his argument on the assumption that change is in the thing that undergoes change, whereas locomotion is in the place where the moving thing is. He argues that the two characteristics, “being in the moved thing” and “being where the moving is” hold for change and motion alike for two reasons: One, locomotion too is in the thing that undergoes change, and two, all types of change – generation, increase, and alteration – are where the moving thing is,

or in his words, “Socrates was born, grew up, and became bald in Athens” (*in Phys.* 705.26–27).

Unlike Simplicius’ and Alexander’s different interpretations of the example of the role of artifacts in Aristotle’s discussion of the definition of nature, this debate is not rooted in these thinkers’ different understandings of Aristotle’s argument but in their different exegetical approaches. Alexander ascribes importance to Aristotle’s phrasing and terminology, and accordingly aims to reveal the theoretical implications of the disjunctive particle “*ē*” (or) that appears at *Phys.* 218b12, and of the consistent repetitions of the conjunctions “change” (*metabolē*) and “motion” (*kinēsis*), and “the moving thing” (*to kinoumenon*) and “the changing thing” (*to metaballon*). In view of this aim, he finds in this lemma the distinction between internal changes (qualitative, quantitative, and substantial changes) and locomotion, which occurs in place and not in the moving thing.¹⁷ By contrast, Simplicius gives priority to logical considerations. In keeping with the assumption that syllogistic reasoning underlies Aristotle’s prose, he accommodates Aristotle’s phrasing to the logical requirement that a valid argument that draws a universal negative conclusion should rest on a universal negative premise, and he considers these terminological distinctions immaterial.¹⁸

In conclusion, this examination of Simplicius’ use of syllogistic reconstructions in his commentary on the *Physics* shows that logical reconstructions serve, not only as exegetical and pedagogical tools, but that they can also play the seemingly descriptive role of revealing the formal structure of Aristotle’s arguments. It shows further that, although reconstructions that play this role may appear forced and superfluous, they manifest a strong interdependence between logic and interpretation: while exegetical considerations shape the understanding of the logical structure of the arguments, logical considerations determine the exegetical stances and approaches.

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17 Cf. Rashed (2011, 256).

18 This interpretation is reasonable regardless of Simplicius’ logical considerations. Themistius (*Paraphrasis* 143.7–10) and Philoponus (*in Aristotelis Physicorum* 710.21–25) show no concern over the logical structure of this argument and take for granted that it holds for motion in general.

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