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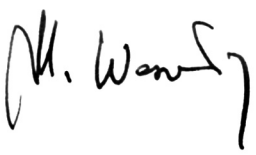
Commentarius Peitho / Examina Antiqua in Instituto Philosophiae Universitatis Studiorum Mickiewiczianae Posnaniensis conditus id spectat, ut in notissimis toto orbe linguis, lingua quoque Latina et nostra lingua Polona minime exclusa, antiquorum philosophorum opera atque cogitationes nec non earum apud posteros memoria longe lateque propagentur. Non exstitit adhuc in Polonia commentarius, quem docta societas internationalis legeret; at nostra magnopere interest gravissimas philosophiae antiquae quaestiones, cultui atque humanitati totius Europae fundamentales, communiter considerari, solvi divulgarique posse. Namque philosophia, Graecorum et Romanorum maximi momenti hereditas, hodie novis scientiarum rationibus et viis adhibitis ab integro est nobis omni ex parte meditanda et disputanda.

Itaque charactere internationali commentarius hic variarum terrarum et gentium hominibus doctis permittet, ut credimus, cogitationes, investigationes, laborum effectus magno cum fructu commutare et instrumentum doctorum fiet utilissimum ad se invicem persuadendum, ut antiquus id suggerit titulus (Latine Suada), quem scripto nostro dedimus. Sed commentarius hic late patefactus est quoque omnibus rebus, quae philo- sophiae sunt propinquae et affines, quae ad temporum antiquorum atque Byzantinorum culturam lato sensu pertinent, quae eiusdem denique philosophiae fortunam aetate renascentium litterarum tractant. In nostra Peitho praeter commentationes scientificas doctae disputationes quoque et controversiae atque novorum librorum censurae locum suum invenient. Itaque omnes, qui philosophiae favent, toto exhortamur animo et invitamus, ut nostri propositi participes esse dignentur.

MARIAN WESOŁY



MIKOŁAJ DOMARADZKI

SPIS TREŚCI

ARTYKUŁY

DYSKUSJE

CONTENTS

ARTICLES

DISCUSSIONS

ARTYKUŁY

Eleatic Ontology in Aristotle: Introduction

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DAVID BRONSTEIN / *University of New South Wales* /

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In the spirit of the Project *Eleatic Ontology: Origin and Reception* (EON), as described in the Introduction to Volume 1 by the General Editor and the driving force of this Project, Nicola Galgano (see his *Presentation* in the Brazilian journal *Anais de Filosofia Clássica* 14 (27), (2020)), we present here the Tome "Eleatic Ontology and Aristotle", devoted to Aristotle's reception of Parmenides and Eleaticism. This volume contains six original contributions (which we briefly summarize below) by outstanding scholars who provide in depth discussions of a wide range of topics, including: Aristotle's account of the relationship between materialist and Parmenidean monism; logical issues in his responses to Parmenides' eristic arguments; his solution to the problem of coming to be; and his responses to Zeno's paradoxes. This volume does not aim at uniformity or exhaustiveness in its treatment of Aristotle's reception of Eleaticism. Rather, our goal, as editors, was to collect new essays that consider a variety of issues in Aristotle's reaction to Parmenides and the Eleatic tradition. Each contribution advances the aim of the EON Project: to clarify the history and influence of Eleaticism. In particular, the essays in this volume help us better understand Aristotle's responses to Parmenides' and Zeno's challenges and the argumentative strategies and logical tools he employed to solve or avoid Eleatic problems. They also reveal important aspects of the ontology that Aristotle developed partly as a result of his confrontation with Eleaticism. The contributors address an array

of philosophical, methodological, textual, doxographic, and historiographic issues and shed new light on difficult passages in both Aristotle and the Eleatics.

Given the nature and scope of the EON project, this volume is appropriately international, with scholars from seven countries on four continents serving as authors or editors. In the same spirit of internationalism we are pleased for these essays to be published in *Peitho: Examina Antiqua* and we offer our sincere thanks to the journal's editor Mikolaj Domaradzki and his colleagues at the Institute of Philosophy at Adam Mickiewcz University in Poland.

The contribution that opens this volume is devoted to an issue that is both characteristic of Eleaticism and controversial as to its origin: monism. In "Monism in Aristotle's *Metaphysics* I.3–5", Thomas Kjeller Johansen begins with the observation that Aristotle sees a significant degree of continuity between Parmenides and the materialist monists. He carefully considers what, for Aristotle, Parmenidian and materialist monism are and how they stand with respect to the theory of the four causes. Johansen's aim is to show that Aristotle's account of his predecessors is "a good deal more cogent and plausible than has been widely acknowledged". Central to Johansen's argument is the distinction between cause and principle. Aristotle's complaint about the materialist monists is not that they recognised only the material cause; it is that they made (a certain kind of) matter the principle of everything. This makes sense of the fact that Aristotle credits the materialists with a limited understanding of both efficient and material causation. Their deficiency was in failing to distinguish clearly among the four causes – or, put differently, their error was in holding that every cause is material (not that there is only the material cause). Johansen also argues that Aristotle sees Eleatic monism as a partial correction of materialist monism: according to Parmenides, if we define being correctly, we will see the impossibility not only of substantial change (as the materialists recognised) but also non-substantial change (or alteration). Parmenides' commitment to what Johansen calls 'formal monism' points the way forward to certain developments in Aristotle's thinking.

The next two contributions consider different aspects of Aristotle's discussion of Parmenides in *Physics* I. In "Aristotle's solution for Parmenides' inconclusive argument in *Physics* I.3", Lucas Angioni uses the technical concept of eristic argument in the *Topics* and *Sophistical Refutations* as the basis for a new interpretation of Aristotle's account of, and solution to, Parmenides' argument for monism in *Physics* I.3 (*Ph.* 186a22–b14). According to this technical concept, an argument is eristic if it has a false premise or is 'inconclusive'. Aristotle asserts that Parmenides' argument has both flaws. He is clear about the false premise: it is the claim that things are said to be in only one way, when in fact they are said to be in many ways (*Ph.* 186a24–25). He is much less clear about the argument's inconclusiveness. Clarifying this aspect of Aristotle's solution (*lusis*) is the task Angioni sets for himself. He proceeds step by step through the notoriously difficult passage (*Ph.* 186a25–b12) in which we are asked to substitute 'white' for 'being' in an argument that allegedly runs parallel to Parmenides' argument for monism. Angioni pays particularly close attention to key Greek terms and expressions, especially ὅπερ ὄν, σημαίνειν, and συμβεβηκός, offering novel interpretations of their meanings in this

passage. By focusing in addition on the concept of 'being one in account', Angioni is able to argue that Aristotle's solution rests on the distinction between what it is to be white and that which has the property of being white. What Parmenides missed, according to Aristotle on this interpretation, is the difference between being and the subject of which being is predicated. Once this distinction is made, the inconclusiveness of Parmenides' argument is made clear and monism is avoided.

In *Physics* I.8 (*Ph.* 191a23–24), Aristotle announces that the Eleatic argument against change can be solved. The argument, in Aristotle's words, is that "nothing comes to be or passes away, because what comes to be must do so either from what is or from what is not, and neither is possible" (*Ph.* 191a27–31). Takashi Oki (in "Aristotle's Refutation of the Eleatic Argument in *Physics* I.8") offers a careful analysis of this chapter and sheds light on Aristotle's difficult anti-Eleatic argument. Oki argues that, for Aristotle, the Eleatics denied the possibility of coming to be from what is *qua* what is and from what is not *qua* what is not. Aristotle agrees with this. However, he argues that they failed to see a third possibility, which Oki understand as follows: something comes to be from what is *qua* what is not – for example, the musical man comes to be from the man *qua un*-musical. This interpretation of Aristotle's solution allows Oki to argue that the sense in which something comes to be from what is is the same as the sense in which it comes to be from what is not: again, something comes to be from what is *qua* what is not. It also allows him to make good sense of several key claims in *Ph.* I.7–8, for example, that the starting-point of coming to be is privation (*Ph.* 191b15), that what comes to be is always composite (*Ph.* 190b11), and that something comes to be 'accidentally' from what is (*Ph.* 191b18) and 'accidentally' from what is not (*Ph.* 191b14–15). Oki closes his paper by putting *Ph.* I.8 in the context of *Ph.* I as a whole: he suggests that the discussion of Eleaticism in I.8 is a way of making the three principles (form, subject, and privation) reached in I.7 more knowable to us, as required by the methodology laid out in *Ph.* I.1.

The final three contributions to this volume focus on Zeno of Elea, Parmenides' most important follower. Zeno is well known in the Ancient World as the inventor of dialectic and the author of several paradoxes that worried not only ancient authors but also modern philosophers and mathematicians, such as Leibniz and Bertrand Russell, as well as writers and poets, such as Paul Valery and Jorge Luis Borges. Barbara Sattler's essay "What about Plurality? Aristotle's discussion of Zeno's Paradoxes" focuses on Zeno's paradoxes of plurality. She notes that we have evidence of several Zenonian paradoxes on three topics – motion, place (*topos*), and plurality – along with the single paradox of the falling millet seed. Aristotle and his ancient commentators are our main sources for all of these, and Sattler begins with an overview of the paradoxes of motion, *topos*, and the falling millet seed, all of which appear in the *Physics* and thus in the context of Aristotle's attempt to found the science of nature. Sattler aims to explain why Aristotle pays so little attention to the paradoxes of plurality as compared to his treatment of the other paradoxes. She focuses on a passage in *Metaphysics* III that contains his only discussion of Zeno on plurality and she compares his perfunctory treatment of the issue to the fuller discussions we find in Plato and Simplicius, arguing that, for Aristotle, the problem of plurality

belongs to metaphysics, not natural science, and that a plurality of individual substances is a starting-point and not something he needs to argue for or derive.

In "Aristotle, Eleaticism, and Zeno's Grains of Millet", Marcelo D. Boeri scrutinizes Aristotle's discussion in *Physics* VII of Zeno's 'millet seed' paradox: since a single grain of millet makes no sound upon falling, neither do a thousand grains. Boeri argues against the view that this is a sorites problem. Rather, he argues that the paradox casts doubt on Aristotle's theory of mathematical proportions, especially his theory of the proportions that hold between the moving power and the object moved. This explains the context in which Aristotle discusses the paradox and the connection he draws between it and two other cases: the stone being worn away by a drop of water and the hauled ship. In this way, Boeri shows how Aristotle's discussion of the paradox is deeply anchored in his theory of continuous magnitudes and mathematical proportions in *Physics* VI and VII. Boeri's contribution also considers the relationship between Aristotelian and Newtonian physics and reflects on the purpose and value of Aristotle's engagement with Eleaticism in the development of his science of nature.

The importance of Zeno for the historical picture of Eleaticism can safely be measured by Aristotle's attempts at solving his puzzles. Michel Crubellier's contribution ("An Ontology for the In-Between of Motion: Aristotle's Reaction to Zeno's Arguments") focuses on Aristotle's reports and criticisms of Zeno's four puzzles in *Physics* VI.9 (*Ph.* 239b5–240a15): the Dichotomy, the Achilles, the Arrow, and the Stadium. Crubellier argues that Aristotle's solutions apply the results of his ontological analysis of motion in Books V–VI. A significant contribution of this paper is a novel interpretation of the Stadium puzzle and Aristotle's solution, an interpretation based on a new reconstruction of the Greek text informed by a careful study of the manuscripts. In addition to offering a close reading of *Physics* VI.9, Crubellier's wide-ranging paper puts Aristotle's engagement with Zeno in the context of the *Physics* as a whole, examining such questions as whether Zeno should be understood as having evinced an interest in ontology, what the nature of Zeno's method was, whether it influenced Aristotle's own method in the final books of the *Physics* (Crubellier argues that it did: both methods are dialectical, informed by *a priori* reasoning, and proceed at a high level of abstraction), what the relationship is, for Aristotle, between locomotion and change in general, and how to understand the analogies he draws between magnitude, motion, and time. Crubellier closes with a discussion of two key issues in Aristotle's ontological analysis of change (which were omitted in Aristotle's discussion of change in Book I): (1) the 'in-between' and (2) the 'before' and 'after'.

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Eleatic Ontology in Aristotle: Introduction

The introduction summarizes the six new papers collected in Volume 1, Tome 5: *Eleatic Ontology and Aristotle*. The papers take a fresh look at virtually every aspect of Aristotle's engagement with Eleaticism. They are particularly concerned with Aristotle's responses to Parmenidean monism, the Eleatic rejection of change, and Zeno's paradoxes. The contributions also focus on the ways in which Aristotle developed several of his own theories in metaphysics and natural science partly in reaction to Eleatic puzzles and arguments.

KEYWORDS

Eleaticism, Aristotle, Parmenides, Zeno, Ontology, Monism, Motion, Time, Magnitude, Infinity

Monism in Aristotle's *Metaphysics* I.3–5

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Introduction

In *Metaphysics* Book I Aristotle reconstructs the early history of his subject. Scholars have often seen Parmenides as entirely opposed to earlier materialistic philosophy.[1] While Aristotle certainly acknowledges important differences between the two camps, what is more striking is the degree of continuity that he sees between Parmenides and the material monists. My main aim here is to try to explain the coupling of Parmenides and the material monists, the better to understand what he takes to be distinctive and problematic with Parmenides' monism.

A secondary aim is to make Aristotle's representation of the monists less implausible than sometimes presented. Few would probably go as far today as to say with L. Tarán that "Aristotle's testimony concerning Parmenides is of almost no positive value."[2] However, there seems to be a general view that Aristotle's account straightjackets the Presocratics into his own categories in ways that cast serious doubts about its historical credentials. I shan't try to defend Aristotle's general status as a historian of philosophy,

[1] Cf. e.g. Kirk, Raven, Schofield (1983: 241): "Parmenides' metaphysics and epistemology leave no room for cosmologies such as his Ionian predecessors had constructed."

[2] Tarán (1965: 291).

whatever that might mean, nor shall I review in any detail the actual views of the monists and adjudge Aristotle's readings. However, I do want to show that Aristotle's account in *Metaphysics* A.3–5 of both the materialists and Parmenides as monists is a good deal more cogent and plausible than has been widely acknowledged, and that, one might think, *prima facie*, raises the chances that it might also be historically correct.

First causes and principles

In *Metaphysics* I.3 Aristotle tries to find the first causes as the principles of wisdom. The point in the first instance is to identify what the possible causes are that could fit this role. He refers back to the four causes in the *Physics* and then attempts to demonstrate that there are no other causes that we need to take into account, since these are the only causes employed by previous philosophers. His survey takes us from the earliest philosophers who operated primarily with the material cause, to those like Empedocles and Anaxagoras who also invoked the efficient cause, to those who had some concept of the final cause, and others who seemed to recognize the formal cause. Parmenides and Melissus also make an appearance as representatives of monism, though Aristotle qualifies their relevance to the discussion.

The identification of the four causal principles is apparently progressive and accumulative: first the material, then also the efficient, then also the final, and at last the formal. However, the attribution to the philosophers of the four causes is not accumulative in the same way. It is not the case that those who acknowledge the causes later mentioned also necessarily knew of the prior ones. So Plato operates with the material and formal cause but makes no use of the efficient. Nor is the attribution of specific causes to specific philosophers always clear-cut. There is a point to this since, as Aristotle says:

> **T1** (...) these people too up to this point touched on two of the causes which we determined in the *Physics*, the matter and the cause from which the change is. However, they did so obscurely and not at all clearly, but like those untrained in battles, for those people too as they move around often strike good hits, but they do not do so from knowledge, nor do these resemble people who talk knowing what they are saying. For they clearly make almost no use of these causes beyond the slightest. (*Metaph.* I.4 985a10–18)[3]

Pointing obscurely and not clearly to one of the causes may be understood as pointing to too little of the cause, not having as it were the full picture. But it may also be taken as indicating too much, that is, taking in under one term both the cause in question and another cause. In any case, Aristotle is not telling us that the earlier philosophers clearly demarcated one or other of the four causes and tried to explain nature simply in terms

[3] Translations of *Metaph.* I are my own, based on Primavesi's (2012).

of this cause so understood. He is saying rather that in their causal talk they hit on one or other of the causes in a way which may involve more or less of what that cause does, if we understand it in the proper Aristotelian way. Ultimately, Aristotle's own view is that none of the causes can be understood in isolation from each other, particularly so in the realm of natural philosophy with which *phusiologoi* were concerned.[4] The material or the efficient cause cannot be understood without the formal, for example. So, Aristotle could not possibly saddle any of the philosophers with using just one of the causes understood in the proper Aristotelian manner. Rather the extent to which these philosophers 'strike a good blow' must, if Aristotle is to be consistent in his view that the causes are explanatorily related, involve also allowing for an explanatory connection with the other causes.

> **T2** But they were searching for these causes vaguely, and in a way all of the causes were stated, in another not at all. For the first philosophy about all things resembles someone speaking inarticulately, because it is both young and at the beginning. (*Metaph.* I.10 993a13–18)

As in *Physics* I.1's example of children who inarticulately call all men 'fathers' and all women 'mothers', the point is not that the predecessors do not manage to refer to causes, but that they do not do so by their proper function. Not all causes are material, just as not all men are fathers, and by referring to matter as the cause, they end up generalising from something playing one causal role to playing other distinct causal roles. But crucially this confusion also relies on an inadequately clear conception of the material cause, from which they generalise. Just as children if they knew what being a father really meant would not call all men fathers, so the materialists would, with a properly circumscribed material cause, not generalise about the role of matter as they do.[5]

Material monism

My focus in the following will be on the materialist philosophers and Eleatics who all appear to say that there is only one thing, that is, they are monists.

> **T3** Well, most of those who first philosophized thought that only the causes in the order of matter were principles of all things. For that from which all beings are and the first thing from which they come into being and the last thing into which they pass away, the substance (983b10) that persists while it changes its attributes, this they say is the element and principle of the things that are. And because of this they think nothing either comes into being or is

[4] G. Betegh (2012: 107) hits the nail on the head: "At the end of the day, the theory of the four causes, properly speaking, turns out to be an all or nothing affair."

[5] Cf. also Aristotle's other example in *Ph.* I.1: "A name, e.g. 'round', means vaguely a sort of whole: its definition analyses this into its particular senses."

> destroyed, since this kind of nature is always preserved. Just as we do not say that Socrates either comes into being without qualification when he becomes fine or musical (983b15) or that he is destroyed when he loses these states, because the underlying thing, Socrates himself, persists, so we do not say it in any of the other cases. For it is necessary for there to be some nature, either one or more than one, from which the others come to be while it is preserved. (*Metaph.* 983b8–18)

On the basis of this passage, Daniel Graham defines material monism (MM) as follows:[6]

> I. Everything arises from and terminates back into one source or principle (*arkhê*).
> II. Everything is in essence identical to that principle, which is a single substance.
> III. There is no (unqualified) coming to be or perishing, but only alteration.
> IV. The source of all things is (a) water or (b) air or (c) fire or (d) the boundless (?) or (e) earth (?).

MM is in Graham's view the position Aristotle attributes to the *phusiologoi*, not, he thinks, the view that the *phusiologoi* actually held. I agree with Graham that MM captures Aristotle's meaning in **T3**, though its formulation calls for some clarification. Claim I, together with IV, says no more than that matter is a terminus from which and to which all things develop. So one might say that man goes from dust to dust but with no implication that man throughout *is* dust. II, however, adds this claim. The subject of change is not just the one matter at the beginning and end of this process, but also during the process. II with III suffers from a scope ambiguity. Is the claim that for each thing there is a single substance, its source, that it is identical with throughout? In this case the substance may be dust for man, milk for ice-cream and cotton for socks. Or is it that there is for all things a single substance, e.g. dust for all things? IV disambiguates in favour of the second reading. So material monism is strict in positing one material substance for all things.

Finally, II makes a claim not just about the identity of the single substance with anything in the cosmos, it says that the single substance is identical in essence with it. This would mean that when you define for any X what X is, you will give the definition of the single substance. For this reason also if and when anything comes to be or alters, the coming to be or alteration does not count as substantial change, because none of the attributes that define that thing will have changed or come to be. MM, then, allows for differentiation and change in the cosmos. One could imagine a substance, rather like the receptacle in Plato's *Timaeus,* taking on a wide array of forms in different regions and at different times while not changing its underlying nature. But if one asked what that thing was in its different shapes and forms the same answer would always come back:

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[6] Graham (2006: 49).

one thing, water or air or earth or some such. That is the force of Aristotle's example of Socrates. Whether he is fine having dressed up for a symposium, or has learned music, as he did towards the end of his life, he remains the same substance, Socrates.

How does MM stand in terms of the four causes? When we are referring to this view as material monism we are ascribing the role of principle to matter of one sort. But what is included or excluded in terms of the four causes by so calling the principle is not clear at all. Indeed, it is the issue at stake for Aristotle when he charges his predecessors with unclarity. As we have seen, Aristotle's analogies with fighting suggest that the predecessors are mixing up the material cause with other causes.

First of all, Aristotle is not committing his monist predecessors to just having one notion of a cause, the material cause. He is committing them to positing one cause, the matter, *as a principle*. As he said in the first of line of **T3**: "most of those who first philosophized thought that only the causes in the order of matter were principles of all things." So there may be other causes, but they do not have the priority that matter has as a principle, or there may be other causes that have in some sense the status of principle (*arkhê*) – all causes are after all an *arkhê* in one sense according to *Metaphysics* V.1, 1013a16–17 – but they will not be principles of all things. As we shall see, Aristotle does attribute to the monists other causal factors than just material. Rather the material monists hold that a single material substance is the *principle* of all things. All beings derive then, directly or indirectly, from the causal properties of the single material substance as their principle. As Graham's clause I. rightly puts it "Everything arises from and terminates back into one principle (*arkhê*)."

Ross summarizes **T3** by saying that "most of the earliest thinkers recognized only material causes, i.e. that out of which all things are generated and into which they pass when destroyed. Because such a substratum persists, they think nothing really is generated or destroyed."[7] Material monism does not say that all causes are material causes, but that the only cause that is a principle is a certain kind of matter. That the thesis in this way is more restricted may sometimes not be obvious from Aristotle's discussion, as it develops into a discussion of the causes that the early philosophers recognized and which we therefore need to take account of as candidates for Aristotelian *first* causes or principles. However, Aristotle reminds us sufficiently often that the material causes are discussed in the context of the claim that they are principles.[8] Even when Aristotle's interest is directed towards the more general question of which of the four causes the predecessors recognized and finds their answers on this matter insufficiently clear, one way, indeed the central way, in which the predecessors would be unclear about the distinction between the four causes is exactly the way they deploy these causes as principles of everything there is. Their failure to unravel the application of the four causes in this basic area shows their muddleheadedness about the four causes in general. For to understand the differ-

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[7] Ross (1924: 125).

[8] E.g. Arist. *Metaph.* 984a13, b8, 985b4, b25, 986a15.

ence between the four causes is also to see how they each can play the role of principle, of first cause, in the relevant contexts. When any of the four causes works as a principle you also see its irreducibility to the other causes, and so also its distinctness as a certain kind of cause.

Another way of putting the point about their muddleheadness is in terms of an ambiguity in the expression 'material cause'. When we talk of matter as a cause, do we mean that there is some matter which is a cause in one or other of the recognized senses or do we mean more strictly that matter is a cause as what Aristotle would call a material cause? As we shall see, it is perfectly possible to talk about fire as a cause but not as a material cause, for example, if one wants to talk about fire heating up something in a way Aristotle would recognize as efficient causation. We can refer to the matter as the single principle without implying, implausibly, that it is always a cause as a material cause. This, I think, is also a reasonable way of taking Aristotle's claim in **T1** and **T2** that the predecessors only identify the causes in a fumbling or vague way. They hit on something that is a cause but not the respect in which it is a cause, the *qua*-bit.

Aristotle in *Metaphysics* I.3 talks repeatedly of the first philosophers identifying the cause only *en hulês eidei,* in the class of matter (*Metaph.* 983b7, 984a17, cf. 987a7). But this is ambiguous between finding the cause in the class of things that are matter, like water, and locating it in the class of material cause amongst the four causes. The distinction here is the same as the one Aristotle invokes in his discussion of the final cause: while Anaxagoras and Empedocles talk of Nous and Friendship as causes of good they do not show how they act for the sake of the good. So they do not act as final causes except by accident.[9] Just as there is distinction between being a cause that is material and being a material cause, so there is a distinction between being a cause of something good and being a cause for the sake of something good.

This is of course not to say that Aristotle does not describe the monists' matter as a material cause. He says in **T3** that the matter is that from which all things are and which underlies the changes and affections. And one take on this is clearly as a material cause (cf. *hupokeimenon*, *Metaph.* 983a30 with *hupomenousēs*). However, one cannot say that **T3** unambiguously describes the matter in material causal terms. So when Aristotle says that the matter is underlying he refers to it not as 'matter' but as 'a subsistent substance' (*ousias hupomeinousēs*), while the claim that the matter does not undergo substantial change in the transformations but only alteration is incompatible with the general role of matter qua matter (unlike qua substance) in change. Notice also that the expression 'coming from which' could also be read as efficient causal (*Metaph.* V.24). MM is not then a restrictive claim about the matter *just* being a material cause. Its restrictiveness comes rather from

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[9] Arist. *Metaph.* 988b8–16: "For while those who speak of reason or friendship posit these causes as something good, they do not speak of any of the things that are as being or coming into being for the sake of these but rather of the changes being from these. In the same way too those who talk of the one or what is say that such nature is responsible for the substance, but not that it is or comes to be for the sake of this, so they end up somehow both saying and not saying that the good is a cause. For they speak [of it] not in a simple way but by accident."

taking a single kind of matter to be the only principle of all things, and so having to derive all other properties from this matter.

One reason for stressing the difference between principle and cause is the overall context of Aristotle's argument in *Metaph*ysics I.3–10. The first two chapters have argued that the knowledge we are concerned with, wisdom, is not just knowledge of causes, or even principles broadly understood, but knowledge of first principles (*Metaph.* 982b9), which is also the most universal knowledge. The discussion of causes is subservient to this aim. Hence Aristotle begins I.3, as in **T3**, by pointing to causes, like matter, that have been taken as principles of all things; his description is motivated by finding a view that at least at the first blush fits his determination in I.2 of the sort of principle, first and universal, that wisdom should have as its object.

Another advantage of stressing the difference between being a material principle and being a material cause is that it makes better sense of Aristotle's presentation of the evidence of the earliest monists. So his evidence for Thales' identification of the principle with water reads like a ragbag of opinions, most of which hardly illustrate material causation. According to Aristotle, Thales believed in water as the principle of all things (*Metaph.* 983b21–27) thinking that the earth rests on water, that the nutriment of all things is moist, that the hot itself arises from the wet and that animals live by this, and that the seeds of all things have a wet nature. It makes no sense to think that water is just a material cause here, whether it is as supporting the earth or nourishing animals. Some acknowledgment of the efficient causal power of water must be assumed. But as we have seen, Aristotle is not in the business of accusing his predecessors of acknowledging only one cause. Rather he takes them as not distinguishing them clearly and making some single matter the principle of all things. Thales can take water to be the principle while also thinking that water as water can have efficient and other causal functions.

Other causes than the material

To see more clearly how the material monists, on Aristotle's story, draw on other causes let's skip to the end of Aristotle's discussion of the atomists in I.4:

> **T4** Just as those who make the underlying substance one generate the other things by means of its affections (*pathēmata*), when positing the rare and the dense as the principles of the affections in the same way these people too claim that their differences are the causes of the other affections. They say, meanwhile, that these differences are three: shape, order and position. For they say that being differs only by form, mutual contact, and turning. Of these, form is shape, mutual contact is order and turning is position. For A differs from N by shape, AN and NA by order, and Z from N by position. Concerning change, from where and how it belongs to the things that are, this these people too carelessly neglected, like the others. Concerning,

then, the two causes, as we are saying, it seems that the earlier inquiry went this far. (*Metaph.* 985b10–22)

Here Aristotle compares the rare and the dense in the monists – one thinks primarily of Anaximenes – with the three kinds of differences between the atoms, shape, order and position. He says that these are the differences by which the monists 'generate the other things'. I take this to be another way of saying that, according to them, the underlying substance generates the other things. Differences such as the rare and the dense would clearly qualify as opposites, a positive attribute and its privation, according to Aristotle's account in *Physics* I.7:

T5 Thus, clearly, from what has been said, whatever comes to be is always complex. There is, on the one hand, (a) something which comes into existence, and again (b) something which becomes that – the latter (b) in two senses, either the subject or the opposite. By the 'opposite' I mean the 'unmusical', by the 'subject', 'man', and similarly I call the absence of shape or form or order the 'opposite', and the bronze or stone or gold the 'subject'. (*Ph.* I.7 190b12–17, Oxford transl.)

Aristotle himself approvingly made the identification of the monists' differences with the contraries in *Physics* I.6:

T6 If then we accept both the former argument and this one, we must, to preserve both, assume a third somewhat as the substratum of the contraries, such as is spoken of by those who describe the All as one nature – water or fire or what is intermediate between them. What is intermediate seems preferable; for fire, earth, air, and water are already involved with pairs of contraries. There is, therefore, much to be said for those who make the underlying substance different from these four; of the rest, the next best choice is air, as presenting sensible differences in a less degree than the others; and after air, water. All, however, agree in this, that they differentiate their One by means of the contraries, such as density and rarity and more and less, which may of course be generalized, as has already been said into excess and defect. (*Ph.* I.6 189a35–b12, Oxford transl.)

Air, water, earth and fire are material substances, and as such themselves composites in some sense of form and matter, though it is notoriously difficult for Aristotle to say just what the matter of the four simple bodies is. But it is not in question that they are treated by the earlier philosophers as substances with definite natures, and so for Aristotle having distinctive forms. As to what constitutes this form the simplest answer seems to be those opposite qualities that are typical for this kind of substance, hot and dry, say, in the case of fire.

Now what makes the philosophers in question materialists is that they take this substance, *ousia* as **T3** called it, which counts as matter in relation to all other things, because everything somehow comes from them, to be their only principle of being, and

not also the form of the things they give rise to, as Aristotle and Plato for example would say. However, while not making form a principle the material monists, like the atomists, are still free to use a range of formal differences in their preferred material substance to differentiate other things in the cosmos, for example, the four elements can be differentiated, as water, fire, air or earth, by their degree of density or heat.

This point makes a difference when we turn to the question whether or not the material monists engaged with efficient causes. The answer here is parallel to the answer just given about formal causes. Aristotle is not denying that the monists gave the underlying matter an efficient causal role. So in **T4** he said that "those who make the underlying substance one generate the other things by means of its affections (*pathēmata*), when positing the rare and the dense as the principles of the affections in the same way these people too claim that their differences are the causes of the other affections." To say this is clearly to assign efficient causal powers to the one substance by way of its affections. Moreover, the efficient causes are the same affections which we might consider the formal aspects of the material substance, dense and rare, hot and cold, etc. So we stand within range of Aristotelian orthodoxy: agents of change act in virtue of possessing the form which they convey to the patient. Fire heats up what is cold because it is hot. Again, however, and this is the key point, we are not going beyond the attributes that the material substances have qua fire, water, air or earth. Because the efficient attributes are just aspects of the underlying matter as such, they do not, I shall suggest, represent an efficient causal *principle*.

The failure of the first philosophers to recognise the distinction between material and efficient cause is noted in the *Generation of Animals*:

> **T7** So far as the regular, definite products of nature's hand are concerned, whatever a thing may be as regards its quality, the reason why each thing is of such or such a quality is not because it gets formed such while it develops; the truth is that things get formed such because they are such, for of course the process of formation takes its lead from the being, and is for the sake of that; the being does not take its lead from the process. The old physiologists, however, thought the opposite, because they did not see that the causes were numerous; they recognized only the material cause and the efficient cause (and even these they did not clearly distinguish), whereas they paid no attention to the formal cause and the final cause. (*GA* V.1 778b7–12, transl. after A.L. Peck)

Aristotle does not mean himself to deny that there are contexts in which material and efficient cause work together. Indeed, he spends much of the rest of *Generation of Animals* V using this combination of causes to explain phenomena, such as variation in eye-colour. However, before doing so he is keen to point out that in the general course of nature the formal and final cause together has priority. Being comes before becoming where nature is generally such as to bring about a certain result. Material and efficient causation may, as in the case of eye-colour, explain differences between individuals of the same species, but when it comes to the attributes that all animals of one species share,

formal and final causation take precedence. The error of the early natural philosophers was not that they did not use efficient causes, they did, but that they just used the properties of their matter as such as efficient causes. So, they ended up explaining all natural attributes from the bottom up, as if the attributes were accidents, like eye-colour.

The point, again, is that they have not grasped the formal or efficient cause as anything over and above the material cause because it is the same attributes that qualify the material substrate as such which makes for its formal and efficient causal attributes. If you ask for example what makes this tea wet, the answer will be the water in it or more precisely the wetness of the water, the opposite that characterises it as water. Here material, efficient and formal explanation are present together, but it would be hard to state just how saying that the water makes the tea wet differs when taken as a claim about the water as a material cause (the tea is wet because it is made out of water) or as an efficient cause (the wetness of the water acts on the tea to make it wet) or even as a formal causal claim (the form of the water, its characteristic wetness, enters into that of the tea). As Aristotle said in **T7**, they did not distinguish these causes clearly.

Discerning the efficient cause

In *Metaphysics* I.3 Aristotle explains the shortcomings of the materialist monist approach that led subsequent thinkers to introduce the efficient cause:

> **T8** From these considerations some might come to the view that the cause that is mentioned in the order of matter is the only one. But as they advanced in this way, the subject matter itself guided them and helped force them to continue inquiring. For if indeed all corruption and coming-into-being are from some one thing or even several things, why is this the case, that is, what is the cause? For it is certainly not the underlying itself which makes itself change. I mean, to give an example, neither the wood nor the bronze is responsible for either of them changing, and neither does the wood make a bed nor the bronze a statue, but it is something else which is responsible for the change. To search for this is to search for another principle, as we would say, the principle of the change 'from which'. (*Metaph.* 984a16–27)

Aristotle's examples of the bed and the statue are taken from the crafts. In craft, unlike in nature, the efficient cause typically lies outside the patient. So one might object that Aristotle is making his point about the distinctness of the efficient cause by reference to a case that is not appropriate to natural substances, where the efficient cause exactly would be internal. If nature is an *inner* cause of motion, as Aristotle says, one might expect the form to emerge from the matter itself. However, in at least two ways this objection misses the point. One is that Aristotle is introducing Empedocles, Anaxagoras (and Parmenides) as thinkers who were led to a notion of the efficient cause, and these all took the efficient cause to be an external mindlike entity. So historically the craft examples look appropriate. But more importantly for my purposes, the key point is not whether

the monists employed some sort of efficient cause (or formal cause), as clearly they did, but whether they had the right conception of it, and so could use it as a distinct principle to explain how other things come to be, the bed out of the wood, or the statue out of the bronze in Aristotle's examples.

A famous passage in *Physics* II.1 helps make the point:

> **T9** Some identify the nature or substance of a natural object with that immediate constituent of it which taken by itself is without arrangement, e.g. the wood is the 'nature' of the bed, and the bronze the 'nature' of the statue. As an indication of this Antiphon points out that if you planted a bed and the rotting wood acquired the power of sending up a shoot, it would not be a bed that would come up, but wood – which shows that the arrangement in accordance with the rules of the art is merely an accidental attribute, whereas the real nature is the other, which, further, persists continuously through the process of making.
>
> But if the material of each of these objects has itself the same relation to something else, say bronze (or gold) to water, bones (or wood) to earth and so on, that (they say) would be their nature and essence. Consequently, some assert earth, others fire or air or water or some or all of these, to be the nature of the things that are. For whatever any one of them supposed to have this character – whether one thing or more than one thing – this or these he declared to be the whole of substance, all else being its affections, states, or dispositions. Every such thing they held to be eternal (for it could not pass into anything else), but other things to come into being and cease to be times without number. (*Ph.* 193a10–28)

Here Aristotle reconstructs the reasoning behind material monism in a way that makes it clear that while the matter has causal powers – the wood can sprout more wood – it has no ability as such to generate any of the forms, like that of a bed. In nature all the other attributes of things, gold, bones, are simply accidents of the underlying matter, and so do not constitute natures in their own right. In this it is clear that while the matter has the power to work as an efficient cause, its power is restricted to reproducing the properties it already has: the wood sprouts wood, the hot heats, the water moistens and so on. Put differently, since the nature of everything is just the material substance it is the character of *this* substance, or properties that necessarily follow from having this character, that reproduces itself in nature. Everything else is accidental.

Let's return to **T8:** 'it is certainly not the underlying itself which makes itself change. I mean, to give an example, neither the wood nor the bronze is responsible for either of them changing'. This reads then as a claim about the limitations of the material substrate as an efficient cause. From the point of view of the wood, becoming a bed would be a mere accident. There is nothing in the wood as such to generate specifically a bed. The wood will in the language of *Metaph*ysics IX.7 allow the imposition of a form by a craftsman, and in that sense the wood is potentially a bed, but it is not itself such as to generate one. The fact that the efficient cause, like a craftsman, is an entity other than the elements organized clearly shows that it is a distinct causal principle. Yet what matters from the

Aristotelian viewpoint is not so much whether the efficient cause is external or not, but whether it brings with it causal attributes over and beyond just those possessed by the matter as such.

In this context, to have a proper notion of an efficient cause is then to have a notion of a cause that is such as to bring about a change in the matter so that the matter becomes something it was not already as a function of the sort of matter it is. It is in other words, to appreciate that the efficient cause can have the status of principle in addition to matter. The matter does not suffice to explain efficient causation, not because the matter as such is inert, nor because it cannot exert efficient causation, but because the attributes it can generate include only those that already characterize it as the sort of matter it is. Or as we might add, it cannot generate other attributes except *per accidens*, but this is exactly the situation that talking of a cause as a principle is supposed to rule out. If the matter were to act as an efficient causal *principle* of the various entities in the world, it would have to be *not* by accident.

On this reading, Aristotle's claim that the material monists only posited the matter as a principle is not quite as causally impoverished as it might appear. The claim of MM is that only matter is a principle because only causal properties, including formal and efficient, that can be derived from the nature of a single material substance count as causes of being for anything else in the natural world.[10] In contrast, to posit a distinct efficient causal principle or a formal causal principle would be to posit causal properties that are not reducible to the properties of matter as such, which are not bestowed by matter as such but which enable its possessor to change or organize matter so that it has other properties than those that belong to it *qua* that matter. But to see the inadequacy of matter as a principle is also to concede that efficient and formal causes have distinct causal roles, which may be prior to that of matter.

An efficient cause, properly understood, has then to be a cause that can impose itself on matter. This is why Aristotle thinks it a first, albeit insufficient, step towards a clear notion of efficient causation to distinguish between two kinds of material substance:

> **T10** But those who make [the universe] more [than one], have more freedom to speak, such as those who make it hot and cold or fire and earth. For they treat the fire as having a moving nature, and water and earth and such things in the opposite way. (*Metaph.* I.3, 984b5–8)

The freedom comes from allowing one element to be active in relation to another. This element then can impose its attributes on the other. However, the move is inadequate insofar as it just passes the buck to the other active substance. In the case of the single substance it was hard to see how it could initiate a change given that it was already qualified by its own attributes; at least when there are two distinct elements we can see how the passive element comes to acquire attributes from without which it did not possess

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[10] There is of course nothing in material monism to exclude that human agency can produce other things.

before. But the range of attributes that can be acquired in such change is still limited to those that characterize the agent substance as the matter it is, and so gives no answer to how material substances can acquire other attributes or enter into more complicated arrangements.

For Aristotle the key move to understanding efficient causation is to link the efficient cause to form rather than matter. The efficient cause can only emerge as a principle, can only acquire priority as a first cause, when it is linked to form, because its role is to impose a form on matter that the matter does not already possess. So to try to carve out a notion of efficient cause based on the properties that matter already possesses is bound to fail, and *a fortiori* so when one only accepts one kind of matter. This then, to repeat, is not to say that the material monists could not conceive of matter as having efficient or formal causal attributes, only that these attributes will be derivative from the matter in a way that goes against the proper Aristotelian conception of the efficient and formal causes' priority over matter. And so efficient and formal properties of matter as such cannot rise to the status of principles.

Aristotle continues from **T10** to highlight the inadequacy of the material substances as final causal principles

> **T11** After these people and those sorts of principles, since the principles were not sufficient to generate the nature of beings, people were again forced by the truth itself, as we put it, to pick up the search for the next principle. It is not likely that equally either fire or earth or any other of this sort of thing should be responsible for certain entities being good and fine and others coming to be so, nor is it likely that those people should have thought so. Nor again is it likely to entrust so great a matter to spontaneity and chance. (*Metaph.* 984b8–15)

Aristotle's point here lies in extension of what he has said about material principles and efficient causes. The efficient causality of a material element or elements is insufficient to generate the variety of attributes we find in natural beings. Or, to the extent that they can generate these attributes it is by accident. But what is caused by accident is not a regular feature of the natural thing. Rather like variation in human eye-colour, it is a matter of accident. Here the features Aristotle homes in on are the good and the fine. Given their regularity in nature, these cannot be accidental, but require per se causes, final causes, which material elements cannot provide. Failing to be a per se cause of the good, matter does not give us a final causal principle.

The general point, then, in all these criticisms of the material monists is the inadequacy of matter as such to play the role of a principle, as an irreducible per se cause, be it either as an efficient, formal and final cause.

Parmenidean monism

Parmenides is only dealt with in passing in *Metaphysics* I. There is nothing to compare with the extended discussion of the Eleatics in *Physics* I.3–4. Aristotle's reference back to the *Physics* rather suggests that he is content to rely on that earlier discussion.

It is striking how Aristotle in *Metaphysics* I.3 presents the Eleatic denial of change as a continuation of material monism:

> **T12** To search for this [the efficient cause] is to search for another principle, as we would say, the principle of the change 'from which'. Some latching on to this method right from the beginning and claiming that the underlying was one had no misgivings, but some at least of those who say that it was one, as if worsted by this inquiry, say that the one is changeless and the whole of nature is not only [changeless] with respect to coming into being and decay but also with respect to all other change. (*Metaph*. 984a25–b1)

The Eleatics here appear as a subgroup of the larger monistic clan, the other being the material monists. The impression created is that the Eleatic denial of change is a consequence of failing to find a distinct efficient cause, given the same starting point as the material monists.

It is not difficult to see a basis in Parmenides' poem for Aristotle's diagnosis:

> **T13** But not ever was it, nor yet will it be, since (*epei*) it is now together entire,
> one, continuous; for what birth will you seek of it?
> How, whence increased? From not being I shall not allow
> you to say or to think: for not to be said and not to be thought
> is it that it is not. And indeed what need could have aroused it
> later rather than before, beginning from nothing, to grow?
> (DK 28 B8.5–10, J.Palmer transl. slightly altered)

Lines 5–6 here ('it is now together entire, one, continuous') could plausibly be read as a description of the monist's single substance, including the material monist's. Taken as material, there is only ever properly one thing, water, say, and as everything is water, everything is continuous, and everything is together as water. Taking this as a premise (*epei*) we can then ask why such a thing being single and self-same should cause any change in itself at any time, sooner or later. Asking for a cause in this way, one that would explain the occasion of the change, is of course to ask in Aristotle's terms for the efficient cause. The parallel seems clear then with Aristotle's *aporia* in **T8** 'if indeed all corruption and coming-into-being are from some one thing or even several things, why is this the case, that is, what is the cause? For it is certainly not the underlying itself which makes itself change.' There is nothing in the one substance, be it Eleatic or Ionian (or both), that

is unable to explain efficient causation. But it falls to Parmenides to conclude that monism leads to the abolition of all change.

Later, in *Metaphysics* I.5, Aristotle again presents the Eleatics as one branch of a monism with material monism as the other:

> **T14** There are some who made claims about the universe as being one nature, but they did not all do so in the same manner either when it comes to how well they spoke nor when it comes to being in accordance with nature. The account concerning these people in no way fits into our current investigation of the causes. (For they were not like some of the natural philosophers who when hypothesizing being as one nevertheless generate [things] from the matter of the one, but these people speak in another manner. For while those people in addition posited change, *generating* the universe, these people say it is changeless.) Nevertheless, this much at least is appropriate to our current investigation. For Parmenides seems to touch on the one in the sense of the account (*logos*), while Melissus touches on it in the sense of matter (that is also why the first says that it is limited, but the other that it is unlimited.) (*Metaph.* 986b10–21)

Not all monists speak equally well or in accordance with nature. It is on the question of nature (*phusis*) in particular that natural philosophers (*phusiologoi*) and Eleatics differ. For the natural philosophers at least tried to generate things, while the Eleatics denied change, and so by implication did not posit causes of change or generation. The Eleatic denial of change is what makes them less relevant to our current investigation of the causes.

Nevertheless, Aristotle thinks that what Parmenides says about being 'one in account' is worth noting. He suggests Parmenides touches on the one in *logos* and for that reason makes everything limited.[11] There are two ways, at least, one can take this according to one's reading of *logos*. *Logos* may refer to 'reason' or 'reasoning'.[12] However, this does not give a natural contrast with Melissus' 'one in matter', since surely he too would present his material oneness as identified through reasoning. A better contrast emerges if we take *logos* in the sense of form.[13] However, if we specify 'form' it is most natural to take Aristotle's choice of *logos* rather than *eidos*, to indicate his interest in form as what answers to the definition. Aristotle already glossed the formal cause as *logos* and essence when he introduced the four causes in I.3.[14] Aristotle's thought seems then to be that Parmenides attempted to give an essential definition of his substance as one. For Aristotle an essential definition of substance gives us the strongest kind of unity

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[11] Taking *to pan* to be implicit subject.

[12] In that case it is natural to see a reference to Parmenides DK 28 B7.5–6: "judge by reason (*logos*) the much-disputed refutation (*elenkhos*) spoken by me."

[13] With Alexander of Aphrodisias, *pace* Schofield (2012: 159–160).

[14] Arist. *Metaph.* 983a27–28: "one cause is the substance and the essence (*to ti ên einai*) (for the primary 'because of what' is brought back to the ultimate account (*logos*))."

available.[15] If, then, as a monist your concern is to show the oneness of your preferred substance, to seek to establish the oneness *in definition* of this substance is a reasonable move for Aristotle, even though your initial monism is of course misguided by Aristotle's lights.[16]

Oneness in definition here would correspond to the third of the three notions of 'one' that Aristotle distinguishes in his critique of Parmenides and Melissus in *Physics* I.2. This reading, that all being for Parmenides is one in definition, also fits with the focus of a large section of Aristotle's discussion in *Physics* I.3, where he discusses the implications of saying that being is one in definition. As in **T14,** Parmenides' position in *Ph.* I.3 is distinguished from that of Melissus. There are several arguments aimed specifically at Parmenides. One is that even if there is only one thing it will admit of different definitions, just as 'whiteness' and 'what is white' will have different definitions, even if there is only one white thing. To block this objection, Aristotle says,

> **T15** It is necessary for him, then, to assume not only that 'being' has the same meaning, of whatever it is predicated, but further that it means what being is (*hoper on*) and what one is (*hoper hen*). For (1) an attribute is said of some subject, so that the subject to which what is (*to on*) is attributed will not be, as it is something different from what is. So it will be something not being. Hence what being is will not belong to anything else. For it will not be possible for it to be a being, unless being means several things, in such a way that each is something. But ex hypothesi being means one thing.
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> If, then, what being is is not attributed to anything, but (2) other things are attributed to it, how will what being is mean what is rather than what is not? For let what being is be also white. The being of white is not the same as what being is (for it is not even possible to attribute being to it). So the white will be not being – and that not in the manner of a certain not being, but in not being entirely. Hence what being is is not being; for it is true to say that it is white, which we found to mean not being. If to avoid this we say that even white means what being is, it follows that what is has more than one meaning. (*Ph.* 186a32–b12)

Here Aristotle considers two scenarios on the assumption that being has just one meaning and is the same as what it is to be. On the first scenario, we consider being as an attribute. Then if what is is what being is, then what being is, the definition of being, does not belong to the subject as it belongs to the attribute. If it belonged to both, subject and attribute would be defined in the same way, and they would not be different, and the attribute would not be said of the subject. On the second scenario, we reverse the argu-

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[15] Arist. *Metaph.* V.6, 1016b1–6.

[16] To say that Parmenides 'touched on' is consistent with Aristotle's general metaphor of the predecessors' fumbling, and so does not imply that his account of the oneness of being fully meets the Aristotelian criteria of an essential definition.

ment and consider the subject as what is. If so, the attribute, white is the example, is not what it is to be and so is not being. (Indeed, the first scenario has shown that we cannot attribute being to white as a predicate.) Hence if say that what is is white we are saying that being is not being, which is absurd.

The two scenarios together form a dilemma which excludes any sort of predication of attributes that are not identical with the definition of what is. Put differently, any predication will involve saying that being either as a subject or as a predicate is not in a way that attributes the opposite of being (not being entirely) to what is. The basic premise here is the identification of what is with the definition of being, which means that anything that doesn't match the definition of being, by having some other account, will not be any sort of being, any instance of what is.

Now this line of argument in *Physics* I.3 seems to be what Aristotle has in mind when in *Metaphysics* I.5 he refers back to the *Physics*:

> **T16** But Parmenides seems to some extent to be speaking with more insight. For as he, next to what is, views what is not as being nothing, he necessarily thinks that what is is one, and nothing else. (We have spoken more clearly about this in the *Physics*.) But being forced to follow the appearances, and taking there to be the one thing according to the account (*logos*)[17] and many things in accordance with perception,[18] he posits two causes and again two principles, hot and cold, as he refers to fire and earth. Of these he ranges the one [the hot] with what is and the other with what is not. (*Ph*. 986b27–987a2)

Aristotle refers back here to the ground covered in *Physics* I.3, particularly the identification of what is not what it is to be with what is nothing (not a being entirely) and the impossibility of predicating anything of what is ('what is is one and nothing else'). There is only one thing that satisfies the definition of being and whatever does not satisfy that definition is not, given the identification of what is and what is to be.

What role does the notion of 'one' play in this argument? There are at least two ways to view the matter. First, oneness can be seen as an internal demand on the definiens. Nothing particularly follows about there being one thing in the world from this requirement. So, when Aristotle himself uses the notion of 'one in definition', he clearly does not want to exclude that there are many different kinds of substance with many different definitions but each a unity. What makes Parmenides' approach different is that he takes being itself, what being is, to be the definiendum, rather than cat or dog or some

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[17] Clarke (2019: 179–182) argues for a 'psychological' reading of *logos* as reason here. If so, as Clarke acknowledges, *logos* is used in a different way from the 'ontological' notion of *logos* a few lines above in T14. I prefer to translate 'account' in both cases, taking Aristotle particularly to have oneness in definition in mind. This does not commit us to the 'cosmological' reading to which I think Clarke rightly objects.

[18] Omitting, with Primavesi, Christ's supplement, *to on*. Clarke (2019: 182) translates "holding that the One exists *kata ton logon*, but that more things exist *kata tēn aisthēsin,*" while Schofield (2012: 158) offers "he makes the hypothesis that there is one thing in reason but a plurality in sensation." Schofield's reading captures better than Clarke's the contrast between the monist claim, that there is just one thing, and the pluralistic option.

other substance. Moreover, it seems that if something has being so defined, it cannot have it accidentally. This is a condition which Aristotle himself would agree with in his natural philosophy: if something has an attribute essentially nothing else has the same attribute accidentally. It follows, then, that as the definition of being is of one thing, and nothing else has being so defined, only that one thing, what is or what being is, is. The oneness of definition ensures, then, that the being that is defined is a unity in a strict sense, which nothing else can partake of, any more than non-cats for Aristotle can partake of the defining features of cat. As in the closing lines of **T15**, this impasse sets up Aristotle's own treatment later in the *Metaphysics* of being as said in many ways, that is, with no single definition.

On this analysis Aristotle cannot be taking Parmenides' monism to be the sort of predicational monism that allows for many different kinds or types of being, cat, blackbird, carp, etc.[19]As being is of one kind for all beings, one in definition, we cannot have different attributes in the account of what it is for different kinds of being. Still the analysis may be said to leave open a pluralism of essentially identical tokens of being. Some have of course seen atomism as exactly such a theory, consistent at least in intention with Parmenides' position.[20] However, Aristotle's presentation of Parmenides' position does not obviously leave room for any accidental differences between tokens of being either. As we saw the argument of *Ph*. I.3 also seemed to exclude accidental predicates, e.g. white, as involving the ascription of not being. Aristotle's Parmenides seems, then, to be both a predicational and numerical monist.[21]

On this reading, the import of the claim that Parmenides is 'forced' by appearances to posit two causes and principles is to contrast the appearance with what must hold true essentially of what is, that it is one and changeless. What perception forces upon us is at odds with the rational truth of the world. The cosmology of the Way of Doxa cannot then be properly rational, though that does not preclude that Parmenides might try to rationalize appearances, make them as far possible like what is.[22] On those terms, Parmenides might still single out the hot as more like being and the cold like what is not.

To return to the key theme of this paper, the relationship between material monism and Eleatic monism. As we have seen, Aristotle sees Parmenides' position as a monist alternative to material monism. Both positions face the challenge of efficient causation: how one substance can generate out of itself all other entities in the cosmos. The materialist monists take up the challenge and try to account for non-substantial change through the properties of the one matter. Parmenides defies the challenge: by defining all being as the same he denies the being of non-substantial attributes, and so the cogency also of non-substantial change.

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[19] Though Curd (2004) rejects numerical monism as an interpretation of Parmenides, I am indebted to her lucid argumentation in favour of predicational monism. An interpretation of Parmenides is of course not the same as an interpretation of Aristotle's interpretation of Parmenides, of the sort I am engaged in here.

[20] For discussion see Graham (2006: 256).

[21] Cf. also Arist. *Metaph*. III.4, 1001a31–b3. Clarke (2019: 19–57) argues forcefully that *Ph*. I.2–3 shows Aristotle's Parmenides to be a numerical monist.

[22] For this sort of reading of Parmenides, see Johansen (2016).

Parmenides as a 'formal monist'

If we view the relationship between Parmenides and his monist predecessors in the way I have suggested Aristotle sees it, Parmenides' position serves as a partial correction of material monism. His reply to the *phusiologoi* is of the sort: you were right to insist that there is only one substance, and that there is no change with respect to that substance, but if you try properly to define that one substance you will find that it has no accidental attributes, and that no change is therefore possible either in substantial or non-substantial attributes. It is a certain vision of what is involved in defining being that motivates Parmenides' correction. This vision is in itself neutral as to which entity one postulates as one's single substance. For Parmenides' strictures on what is are what we might call formal constraints. In principle, any material (or immaterial) substance could be the one being as long it meets the definitional criteria. So,

> for any X, if X is, X is one, changeless, limited etc.
>
> where X could in principle be any entity: water, air, *apeiron*, fire or whatnot.

If, for a moment, we return to Graham's account of material monism we can now see the differences from and similarities with Parmenides' position:

> I. Everything arises from and terminates back into one source or principle (*arkhê*).
> II. Everything is in essence identical to that principle, which is a single substance.
> III. There is no (unqualified) coming to be or perishing, but only alteration.
> IV. The principle of all things is (a) water or (b) air or (c) fire or (d) the boundless (?) or (e) earth (?).

Parmenides agrees with II, and disagrees with I and III, as he denies the possibility of any change, including alteration. As for IV he is non-committal in the sense that he would allow *in principle* for any of these materials to satisfy the definition of being, if it satisfies the formal criteria, which is of course far from saying that any particular one of them will do so. The key Aristotelian thought is, then, that Parmenides' strictures on what is are formal, definitional strictures. One might, to coin a phrase, call Parmenides' position 'formal monism'.

In terms of philosophical progress, as Aristotle sees it in *Metaphysics* I, Parmenides' step is in the right direction. It is a move towards the priority of form, of what corresponds to the definition, over matter. If his argument had been liberated from the mistake of taking being to be said only in one way and of one thing, it would have opened up not only for an Aristotelian vista of a world with many kinds of substance enjoying different kinds of being, but also for a world where form could take priority over matter. Insofar as this is also the move that would liberate the efficient cause to play its determining role in relation to matter, there would be a path here also to a proper conception of the effi-

cient cause. The materialist monist starting out along the same monist path ends up in a different cul-de-sac, by postulating only one underlying material principle all formal and efficient causation, beyond that following from this principle, becomes accidental.

Formal monism in the text of Parmenides?

Now it is obviously one thing to interpret Aristotle's reading of Parmenides, another to defend this interpretation as a reading of Parmenides' poem. My aim in this paper has been the first. However, it may be worth indicating where Aristotle's reading could gain traction as a reading of Parmenides' text. I have already suggested that Aristotle's impression that Parmenides' denies efficient causation could derive from B8.5–10. Let me add to this now that what I have called 'formal monism' might also seem supported by B8, where it sets out the markers or 'signposts' of being.[23]

A summary (with the relevant line numbers in brackets) of these markers reads as follows:

What is, is
single in kind (*mounogenes*, 4);[24]
altogether, one (*hen*), continuous (5–6);
ungenerated, imperishable (3, 6–21);
whole, unperturbed, complete (4, 38);
it never was, will be, but is now (5);
it is indivisible, all alike, and continuous (22–25, 45);
changeless, motionless (26, 38);
steadfast, limited by Necessity (30);
has nothing else next to it (36);
is complete and equal from every direction, like a well-rounded sphere (DK 28 B.8, 42–44, 49)

The signposts set out 'formal requirements', as Schofield puts it,[25] for any object of thinking. As the Goddess says, the same thing is there for being and thinking (*noein*).

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[23] Cf. Alexander Mourelatos' insightful comment: "In an important sense Parmenides does not attempt to answer the speculative cosmological question directly; he does not take still one more guess about the nature or reality of things. He transposes the question to the critical or reflective level: What exactly is it for something to be the nature or reality of things? (...) The question »What is it?« has become itself the subject of a study that is essentially methodological or conceptual." (Mourelatos 2008: 134).

[24] For this understanding see Curd (2004: 71–73). She also makes the connection with Aristotle: "In the *Metaphysics*, at I.5 (986b18–20 = DK 28 A 24), Aristotle contrasts Parmenides and Melissus, noting that while Melissus was concerned with what is one in matter (*kata tên hulên*), Parmenides »seems to fasten on what is one in account (or: definition)« (...) This unity of definition or account is just what we meet with in lines B8.22–25, and is just what we might expect in lines corresponding to the preliminary announcement that what-is is *mounogenes*" (Curd 2004: 82–83).

[25] Kirk, Raven, Schofield 1983: 249.

The Aristotelian take on this would be to read what is in the strictest sense, as the being or essence of something, and *noein* correspondingly as thinking about essences, what Aristotle himself would call *nous*. The markers are the formal characteristics of what is, the essence, insofar as it answers to the definition of what it is to be. So, to give one illustration, when Aristotle said in **T14** that what is is 'limited', this might correspond in B8 to the *peras* that necessarily constrains what is (30). The limiting would then on Aristotle's reading being a definitional one: the definiendum necessarily having the attribute specified in the definiens. For what the definiendum is essentially, it also is necessarily. The changelessness and eternity of what is follow from the universal truth and necessity of the definition. Other criteria would be read similarly: being single in kind refers to the simplicity of the characteristic defined, what is as such. Further as what is has nothing else next to it: as what is is one and the same as what it is to be there is no being except what is. As we saw, it was the identification of being with what is that seemed to ensure numerical monism. Being whole and complete might mean that nothing is missing from the thing as defined. Again, on Aristotle's reading this makes sense: there are no degrees of substance;[26] what something is essentially it is completely. Accidental attributes might qualify different parts of an entity, but all essential attributes are possessed equally throughout the being that has them. Or as one might say, using Parmenides' spatial image, its being is complete and equal from every direction, "like a well-rounded sphere" (49).[27]

To consider whether Aristotle's account makes sense of the detail of Parmenides' text would be an exercise for another occasion. But I hope that these closing remarks have shown that Aristotle's reading of Parmenides is not unfounded and may even have some 'positive value'.

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[26] Arist. *Cat.* 3b34–4a9.

[27] For the image, see Mourelatos (2008: 124–130) and Curd (2004: 94).

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Monism in Aristotle's *Metaphysics* I.3-5

Scholars have often seen Parmenides as entirely opposed to earlier materialistic philosophy. In this paper I argue that what is more striking in Aristotle's *Metaphysics* Book I is the degree of continuity that he sees between Parmenides and the material monists. I explore this coupling of Parmenides with the material monists to understand better what he takes to be distinctive and problematic with Parmenides' monism.

KEYWORDS

Parmenides, Aristotle, monism, materialism, causes

Aristotle's Solution for Parmenides' Inconclusive Argument in *Physics* I.3

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If you thought that you were making your way to where the puzzles and pagans lay
I will put it together – it is a strange conversation
Beck Hansen ('Jack-Ass'), *modified*.

Introduction: solving an inconclusive eristic argument

In the *Physics*, Aristotle describes Parmenides' arguments as eristic (*Ph.* 185a8–10, 186a6–8). Now, arguments turn out to be eristic if they purposely either assume some premise which seems to be good (i.e., true or acceptable) without being so, or if they seem to deduce their conclusion without doing so – or if they have both flaws (see *Top.* 100b23–26). Aristotle is very assertive about Eleatic arguments (both Melissus' and Parmenides') satisfying both descriptions: they assume false premises (*Ph.* 185a9–10, 186a7) and they are inconclusive (*asullogistoi* – *Ph.* 185a10, 186a8). Aristotle explicitly charges Melissus with a fallacy of conversion – the paralogism of the consequent (*SE* 167b17–20, 168b37–38).[1]

[1] This is right about the paralogism of the consequent, but it is not so clear how Aristotle takes the other Melissus' arguments as fallacious. See Clarke (2019: 62–73), Castelli (2018: 84). About Melissos and Aristotle,

As for Parmenides, it is not so clear what is exactly the argument that is exposed as both having a false premise and being inconclusive.

Aristotle's main discussion of Parmenides' argument is found in the section 186a22–b14 (with what seems to be its main part in *Ph*. 186a23–32). It is not easy to parse Aristotle's train of thought. He never presents a full formulation of Parmenides' argument: he starts with saying what sort of *solution* (λύσις) should be applied to block the argument. But, instead of sticking exactly to the original terms of Parmenides' argument in expounding his solution, Aristotle proposes a parallel argument in which the term 'white' replaces 'being'. The parallel argument itself is difficult to disentangle and parse. Although it is clear which is the main premise that Aristotle takes to be false (since he clearly says so, *Ph*. 186a24–25), it is not so clear how and why Aristotle considers the argument to be inconclusive.

The text runs as follows:

> **T1:** The *solution* is that he assumes what is not true and infers what does not follow. His false assumption is that things are said to be in only one way, when they are said to be in many. As for the invalidity, suppose we say that there are only pale things, and that 'pale' means only one thing: the pale things will be none the less many and not just one. The pale will not be one in virtue of being continuous, nor will it be one in account. For the being of pale will be different from the being of that which has received it. By that I do not imply that anything can be separately apart from the pale: it is not because they can be separated, but because they differ in their being, that the pale and that to which it belongs are different. This, however, is something Parmenides did not get far enough to see. (Charlton's translation, slightly modified)

I have only taken Charlton's translation to start with, for any translation depends on parsing the argument. An important remark is that I replaced 'answer' (which is too general) with 'solution' as a translation of λύσις: I argue that λύσις is employed as the technical term coming from *Sophistical Refutations* (*SE* 179b18–21, 24–26; 176b29–177a6; 170b3–5). Aristotle has depicted Parmenides' argument with two main features that are characteristic of eristic arguments (more on this below). Even if Parmenides' argument is not fully eristic or sophistic in the sense that it does not have the *purpose* of producing a false semblance of being knowledgeable, the fact that it has those two main features allows us to understand Aristotle's solution along the lines he has developed in *Sophistical Refutations*. Now, any interpretation of Parmenides' argument must meet some desiderata – the first of which is, of course, to meet the description of eristic arguments Aristotle has alluded to previously (*Ph.* 185a8–10, 186a6–8). Thus:

> (D1) at least one premise in Parmenides' argument must be false;

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see Brémond (2017: 27–48).

(D2) the argument itself must be inconclusive.

But a third desideratum is to meet Aristotle's explanation in 186a28–31 about what was wrong with the logical steps of the argument or, in other words, Aristotle's *solution* (λύσις) for its inconclusiveness. Thus:

(D3) Parmenides' argument must meet Aristotle's *solution* (λύσις) for its inconclusiveness.

In order to understand desideratum (D3), it is important to stress what a solution consists in – for Aristotle has said very clearly that "not every exposure of a defect [i.e., in an eristic fallacy] constitutes a solution" (*SE* 179b18, Hasper's (2013) translation). There are two sorts of solution: if the argument is conclusive but concludes something false, the solution consists in spotting the false premise(s) on which the falsity of the conclusion depends.[2] But, if the argument is inconclusive, the solution consists in spotting the factor on which the inference has failed – the factor on which the false appearance of an inferential success depends.[3] A solution, in this latter case, does not consist merely in spotting or telling *that* an argument is inconclusive. A solution consists in identifying what is exactly the inconclusive step or, in other words, identifying the logical factor on which the inconclusiveness depends. Thus, one cannot yet be said to have *solved an inconclusive argument* if all she has done was to tell *that* the conclusion is false and compatible with the truth of the premises. In order to solve an inconclusive argument, one has to detect exactly what is the fallacious step or factor on which the inconclusiveness rests.

Let me dwell on that point. Consider the following inconclusive argument (I will employ arguments with syllogistic form just for didactic purposes, without implying that fallacies must have such a form):

[fallacy 1]: every horse is a mammal; every horse is an animal; therefore, every animal is a mammal.

Exposing the inconclusiveness of this argument does not consist in merely spotting that the conclusion is false and that its falsity is compatible with the truth of the premises. One must do more than that: one must identify where exactly the logical mistake lies. In order to support this point, let us take an argument with the same form but a true conclusion:

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[2] See Arist. *SE* 176b35-36. These cases can overlap with those in Arist. *APr*. II.18, 66a16–24.

[3] See Arist. *SE* 176b36, 179b18–21, 24–26; *Top*. 160b23–25, 33–35. See in this direction Smith (1997: 137), Fait (2007: 204), Rossi (2017: 214). I do not take the case described in *Topics* VIII.10 (160b26–33) as equivalent to those in *APr*. II.18, 66a16–24. In the latter case, we have the formal schema of valid arguments with (at least) one false premise. But, in the former case, one of the premises is not merely false, but *deceptive* in the sense of producing a false permission for the inference (ψεῦδος can encode both meanings, 'false' and 'inferentially-deceptive'). Thus, in this case, the solution does not consist merely in rejecting the premise as *false* (in the truth-functional sense) but in *explaining why it is inferentially-deceptive* (*Top*. 160b37).

> [fallacy 2]: every horse is an animal; every horse is a mammal; therefore, every mammal is an animal.

In this case, it is impossible to follow the same procedure to expose the inconclusiveness of the argument, namely, to state that the conclusion is false etc. – for the conclusion is certainly true, although it has not been deduced from the premises. Consider also an inconclusive argument with a different form:

> [fallacy 3]: every mammal is an animal, every horse is an animal; therefore, every horse is a mammal.

Again, in this case too, it is impossible to expose the inconclusiveness of the argument by stating that the conclusion is false – for the conclusion is true. Now, the same general description applies to both fallacy 2 and fallacy 3: their conclusions are true, but have not been deduced from their premises. However, the sort of logical mistake is different in each case. Fallacy 3 is a fallacy of the consequent depicted as a pseudo-syllogism in the second figure. But fallacy 2 is not the same sort of fallacy and is rather represented as a pseudo-syllogism in the third figure. Now, in order to have a *solution* for an inconclusive argument, one has to explain exactly which is the sort of logical mistake that has been performed in the inferential step. (It is immaterial to my point to discuss what the explanation would be in my examples).

Consider the sophistical argument Aristotle has introduced in *Topics* VIII.10:

> [fallacy 4]: "he who is seated is writing; Socrates is seated; therefore, Socrates is writing" (*Top.* 160b26–28).

The first premise (which is the premise on which the deceptiveness of the argument depends; cf. *Top.* 160b28–33) was true at a given context, when it referred to someone who was indeed seated and writing. However, the solution does not consist merely in spotting someone who, by being seated but not writing, makes the premise false. The solution, I submit, consists in explaining that the sophist, taking advantage of the first context (in which the premise was true), has made the premise appear as a general rule about everyone who happens to be seated, as if its content were this: "whoever is seated is writing" or "every seated person is writing".[4]

Now, it is far from clear what exactly Aristotle's *solution* (λύσις) is for the inconclusiveness of Parmenides' argument. My next sections will be devoted to disentangling Aristotle's solution and, consequently, to showing how Parmenides' argument meets the third desideratum.

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[4] On this, see Smith (1997: 137).

The parallel argument with *leukon*

One thing, at least, is clear: one of the premises of the parallel argument is this:

> "'white' signifies one".

But it is far from clear what sort of semantic relation is captured with the expression 'signifying one' (*semainontos henos* – *Ph.* 186a26–27). I will return to this question below, but for the time being I wish to focus on the inconclusiveness of the argument.

What exactly is the argument Aristotle has taken to be inconclusive? And how does it come to be inconclusive? One thing seems clear: the problematic move in the argument is to arrive at the notion of *being one* from the notion of *signifying one*.[5] However, given Aristotle's depiction, it is not possible to reconstruct the argument on the following lines:

> (i) if 'X' signifies one, then X is one;
> (ii) 'white' [or 'being'] signifies one;
> (iii) therefore, white [or being] is one.

To be sure, Aristotle would consider premise (i) as false (for any interpretation of 'signifying one' and of 'X'), but he will take the argument as valid. It would not work to object that Aristotle's logical system has not ascribed any significant role to *modus ponens* and other forms of propositional calculus. For Aristotle's general theory of argumentation (as found in the *Topics* and *Sophistical Refutations*) is perfectly sensitive to those kinds of valid argument.[6]

My proposal starts with getting rid of premise (i) above – for it would play a validating role as an inference permit for the conclusion – and sticking with what remains:

> (1) 'white' signifies one;
> (2) therefore, white is one.

Thus, my proposal is to concentrate on this one-premise invalid sort of inference. As for the sentence "if only the white things were taken" (εἰ μόνα τὰ λευκὰ ληφθείη – *Ph.* 186a26), I can be content either with saying that it is not an actual premise of the parallel argument or, if it is a premise, it is not the most important for Aristotle's solution: the logical mistake does not rest on it (more on this below). What is really important in that sentence is the expression μόνα (only), which tells us that Aristotle is focusing exclusively on white things without paying attention to any other feature that might happen to

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[5] See Castelli (2010: 76), Quarantotto (2019: 95).

[6] This is a modest sample of passages: *Top.* 108b12–19; 111b17–23; 112a16–21; 124b7–14; *APo.* 47a28–35.

accompany white things.[7] His point is highlighted again in 186a29–30: "there will not be any other thing separated apart from the white". The last sentence plays other roles too (more on this below), but it also works as a reminder that the parallel argument, in assuming that the term 'white' is to be applied to one thing, has *not* assumed that that thing would have in principle other features which could be picked up by terms different from 'white', nor has it assumed that there might be other things besides that white thing.

Therefore, if the sentence in 186a26 is not taken as a premise in the argument itself, it would still pay the bill by describing some auxiliary conditions on which the argument is proposed.[8] Its message would be something like this: "let us focus exclusively on the domain of white things, taking it as if it were the *only existing* domain, in order to spot the parallelism with being". But, if the sentence is taken as a premise in the argument, it does not matter for my purposes. For, as I will argue, that sentence does not contain the factor on which the logical mistake Aristotle identifies in Parmenides' inconclusive argument depends – that sentence is not what Aristotle identifies as the factor παρ' ὃ γίνεται τὸ ψεῦδος (*Top.* 160b34; *SE* 176b34; 179b19–20) – so that it is immaterial for Aristotle's *solution* to reject it – even if it is false, as indeed it is (cf. *Top.* 160b23–25, 33–35). Thus, in order to understand Aristotle's solution for Parmenides' argument, I will concentrate on premise (1) above, for that premise is surely the one on which the logical mistake depends.

Another problem for interpreting Parmenides' argument is that Aristotle's objection at 186a28 is double – "the white will not be one in virtue of being continuous, nor will it be one in account" – which might be taken to imply that Parmenides' argument has targeted two different conclusions: that Being is one by continuity, and that Being is one in account. Perhaps these two different conclusions are indeed tracking different claims which can be found in Parmenides' poem.[9] However, there is no room to develop here interesting issues about how these two different conclusions are (or can be) related to each other. As for Aristotle's solution in 186a27–32, I argue that it is most focused on the conclusion that Being is one in account, which is what will motivate the ensuing remarks about signification (*Ph.* 186a32–34). Aristotle's objection in terms of continuity holds in itself, but, as I will show, it does not work as a proper solution for Parmenides' inconclusive step.

Indeed, when saying that "the white will not be one by being continuous" (*Ph.* 186a28), Aristotle can be taken in two ways. He might be arguing that 'white' is applicable to many instances that are not continuous with each other – as, e.g., two white horses are not continuous with each other, nor are they continuous with white walls.[10] Or he might be arguing that any instance of whiteness will be a body and, being a body, will be

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[7] See on a similar direction Castelli (2018: 92).

[8] For other options, see Clarke (2019: 87), Castelli (2018: 87–92), Quarantotto (2019: 96).

[9] See Clarke (2019: 94–97), for this analysis (based on DK 28 B 8.22–25 from Parmenides' poem).

[10] See the same intuition about 'being continuous' in Castelli (2010: 77), Clarke (2019: 105). Aristotle has already made the point about continuity in *Ph.* 185b9–11.

continuous and, being continuous, will be liable to infinite division – even if it were the only white thing in the world. Thus, even if there were only one individual instance of whiteness, the white thing would not be one in the sense required by Parmenides because it would have potentially infinite parts – and having only *two* parts would be enough for generating multiplicity in a way undesired by Parmenides.

This objection to the conclusion that Being is one by continuity would stand on several possible interpretations of what 'signifying one' amounts to in premise (1). If 'signifying one' is taken in terms similar to the notion of reference, the argument might be paraphrased along the following lines:

(1a) 'white' refers to only one thing;
(2a) therefore, white is [only] one [entity] by continuity.

But if 'signifying one' is taken in terms similar to the notion of meaning, the argument could be paraphrased rather along the following lines:

(1b) 'white' has only one meaning;
(2b) therefore, white is [only] one [entity] by continuity.

In that case, it would be claiming that having one single meaning leads to having just one referent (one single instantiation).[11]

But note that the argument might be construed without deciding these options for interpreting 'signifying one':

(1c) 'white' has only one meaning or refers to only one thing (or both);
(2c) therefore, white is [only] one [entity] by continuity.

Now, the three suggested construals – in terms of (1a)-(2a) to (1c)-(2c) – might deliver defensible interpretations of the inconclusiveness of the argument. However, I argue that they do not deliver the best story about Aristotle's *solution* for the inconclusiveness of the argument – and, as I said, there are two different things, first, detecting *that* the argument is inconclusive, second, identifying the logical factor that explains *why* it is inconclusive.

On any of the suggested interpretations, the argument will be moving from a premise that deals with the nature of signification (*whatever* that means) to arrive at a conclusion involving the nature of being as a continuous entity. I am not saying that there is something intrinsically wrong with such an interpretation of the argument. But I believe that

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[11] I have adopted this view in Angioni (2009: 99–100). See also Castelli (2010: 77): "Unity of *meaning* does not imply that there exists exactly one thing which is *denoted* by the term at issue rather than a multiplicity of beings each falling under the concept signified by the term" (my italics). But Castelli (2018: 87–93), has a different story.

Aristotle's *solution* concentrates on the other conclusion, namely, that Being is one in account. Perhaps Aristotle has preferred this other conclusion to expound his solution because, otherwise, he would have to rely on too many extra assumptions – about the nature of the bodies and the nature of the continuous etc. Besides, the interpretations suggested above depict Parmenides' argument as an inference that starts from the nature of signification and claims to attain something involving the nature of bodies or the nature of continuity. Now, signification is a general phenomenon involving our employment of terms to talk about things in the world, but oneness by continuity covers only a *partial* aspect of how things are in the world. Thus, I submit that it is most appropriate for Aristotle's solution to prefer (as his main target) an argument that starts from the nature of signification and attempts to conclude something about how things *in general* are in the world and *in their most general relation to our language*. And this explains why Aristotle prefers the conclusion "white [or Being] is one in account."

Thus, Aristotle's preferred solution concedes (for the sake of the argument) two Parmenidean assumptions in order to rest on what is most important. According to that solution, even if there were just one individual white thing (first concession to Parmenides), with no other feature besides being white (second concession to Parmenides) – and even being indivisible (third concession) – that white thing would not be one *in account* (λόγῳ – *Ph*. 186a28).

In Aristotle's jargon, the dative expression 'in account' (λόγῳ – *Ph*. 186a28) – applied either to 'one' (ἕν) or to 'same' (ταὐτόν) or to its opposites – captures the intensional aspect under which something is being considered within a given situation. Thus, the expression applied in this way usually maps what it is for something to be such and such, where 'being such and such' can point to any feature that something happens to have. In our present context, the expression points to what it is to be white (τὸ εἶναι λευκῷ – *Ph*. 186a29) and what it is to be the receptacle of whiteness ([τὸ εἶναι] τῷ δεδεγμένῳ – *Ph*. 186a29) or, in other words, to be the whatever-it-is that happens to be characterised as white. (And I believe that, in the context of his solution, Aristotle does not need to take this receptacle in terms of being a surface, as he indeed takes it in his positive theory of coloured things etc. All he needs is to take the receptacle as the whatever-it-is that happens to be characterised as white).[12] I suggest that this distinction is Aristotle's solution.[13] And this is what we should expect, for Aristotle says in *Sophistical Refutations* (*SE* 176b36) that eristic, inconclusive arguments must be solved by *distinctions*.

Now, Aristotle cannot just be saying that this distinction is fundamental although Parmenides has ignored it. This distinction is indeed fundamental, and Parmenides

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[12] For a similar point, see Clarke (2019: 110–111).

[13] This distinction is also central in *Ph*. I.7, 190a13–17 and arguably in I.8 too. Although Aristotle does not resort to the locutions λόγῳ and τῷ εἶναι in I.8, I submit that the distinction between the physician *qua* physician and the physician taken κατὰ συμβεβηκός (namely, according to one of her attributes that fails to be the most important for her being a physician) can ultimately be translated in terms of a distinction λόγῳ and τῷ εἶναι. This result depends on my interpretation of what κατὰ συμβεβηκός means, so there is no room to develop it here. For

has indeed ignored it. But Aristotle's solution cannot be just this double statement – for a solution does not consist in just pointing out *that* Parmenides had a false conclusion etc. If Aristotle's insistence on the distinction really works *as a solution of an inconclusive argument*, Aristotle's point must be that, contrary to Parmenides' *inferential* claim, the notion of signifying one (as asserted in the premise) does not entail the notion of being one in account (as asserted in the conclusion) – in other words, the notion of signifying one (asserted in the premise) does not entail the notion of being one in such a way that there will be no distinction between *being white* and *being the receptacle* (i.e., being the whatever-it-is that is characterised as white). Thus, Parmenides' inconclusive step did claim (on Aristotle's construal) that signifying one entails the sort of unity or identity in account that is incompatible with the distinction between *being F* and *being the receptacle of F*.[14] This is, therefore, on the right track to explain how Parmenides' argument meets the desideratum (D3). A reasonable paraphrasis can start along the following lines (but this will not be the end of the story):

(1d) 'white' signifies one (*whatever* that means: has only one meaning or refers to only one thing or both);
(2d) therefore, white is *one in account* (λόγῳ).

In order to understand Aristotle's solution, let us keep our assumptions at the minimum: take only one thing that happens to be white and *only* white (cf. *Ph.* 186a29–30). Even if that thing were an indivisible body (concession to Parmenides), even if that thing had only the characteristic of being white and nothing else (concession to Parmenides), it would still hold that, for that very same thing, being white will be different from being whatever-it-is-that-happens-to-be-white. More importantly, on the counterfactual situation proposed just for the sake of the argument, it will be true that 'white' *signifies one* both as having just one meaning and as having just one referent – but its signifying one in that way would not entail that there is no distinction between being white and being whatever-it-is-that-happens-to-be-white.

Aristotle stresses that the distinction between being white and being its receptacle does not need to rest on any separability between them.[15] As I suggested, the sentence "there will be nothing separated besides the whiteness" (*Ph.* 186a29–30) does double duty: on the one hand, Aristotle thereby reminds us that, for his solution to work, there is no need to take some other feature distinct from being white ("there will be no other feature besides the whiteness"), but, on the other hand, Aristotle stresses that there is no need to

a similar point, see Anagnostopoulos (2013: 251–252). I believe other approaches are not incompatible with that view (Clarke 2015: 140; Kelsey 2006: 338–354; Morison 2019).

[14] Clarke (2019: 115) suggests that '*mounogenes*' in Parmenides' poem can be taken as Aristotle's 'one in account'.

[15] For a similar point see Castelli (2010: 76–77), Quarantotto (2019: 97), Clarke (2019: 113). On this point, I disagree with Bostock (2006: 108).

take the receptacle itself as separate or separable from the whiteness ("there is no need to take something – not even the receptacle – as separable from the whiteness"). Even if that receptacle were destined to be white to eternity, and even if being white were destined to be present only in that single receptacle to eternity – with the result that being white and being that receptacle were mutually convertible – they would still be different from each other. "For the white and what it is present in are different from each other not *as separable* but *in virtue of what they are* (τῷ εἶναι)" (*Ph*. 186a30–31). And this is the most important point Parmenides has not seen.[16]

The solution to an eristic inconclusive argument

How does this distinction work as a solution to Parmenides' *inconclusive step*? Recall that, on my proposal, Parmenides' inconclusive step can be plausibly depicted as if it were a one-premise inference – a fallacy analogous to a fallacious conversion of (e.g.) a negative universal predication:

"No man is oviparous"; therefore, "some oviparous is a man".

If Aristotle were to expose where the mistake lies, if he were to identify the factor on which the fallacious conversion depends, what would he have done? I suggest that Aristotle would have resorted to the *dictum de nullo* and would have explained that whoever has made the fallacious conversion did not understand what exactly the *dictum de nullo* means. Now, the *dictum de nullo* means that, for any *A* said of no *B*, "no *B* can be found of which *A* is predicated".[17] Thus, if someone says that "no man is oviparous", this means that no man can be found of which oviparous is predicated. Now, if there were some oviparous of which man were predicated (as the fallacious conversion claimed), there would be a man of which oviparous were predicated, so that (contrary to what the *dictum de nullo* means) it would *not* be true that no man can be found of which oviparous is predicated (cf. *APr.* 25a15–17). Aristotle's solution would consist in saying that whoever has made the fallacious conversion has employed a notion ('predicating *A* of no *B*') without understanding what it implies or what exactly it amounts to.

I suggest that a similar thing is going on when Aristotle presents his compressed solution to Parmenides' inconclusive step. Parmenides has employed the notion of 'signifying something' without understanding what it implies or what exactly it involves or what exactly it amounts to. Several employments of 'signifying' (σημαίνειν) can be found

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[16] Parmenides' oversight is described with the verb συνορᾶν (συνεώρα at *Ph*. 186a32), the same verb employed several times in *Topics* (e.g. *Top*. 100b30, 105b11, 158a4, 5, 10; 160a29; 163b10) to describe the ability of a dialectical answerer to find an objection and/or to see the consequences of what has been accepted. See also a funny use of the verb in *GA* 756b8.

[17] Striker (2009: 84).

in ordinary Greek and in Aristotle's language.[18] But there is one employment which is central for our passage: signifying as something we do when employing our language to convey something about the world. When we do that, a term – let us take 'F' – is employed in such a way that 'F' points to a given thing that is (taken to be) F. Thus, saying that "the term 'white' *signifies* something" amounts to saying that 'white' is employable to pick out a given thing that is (taken to be) white. And this is enough for Aristotle's solution – for this is what Parmenides did not understand. It does not matter whether that thing has other features besides being white. It does not matter whether that thing is or is not the only white thing in the world. It does not matter whether that thing is a continuous or an indivisible body. If 'white' *signifies* something, 'white' points to a given thing that has the feature of being white. Even if 'white' *signifies* one *single* thing etc., 'white' is pointing to a given thing that has the feature of being white – so that being white and being whatever it is that has whiteness *are distinct in being and count as two in account*. As I will explore below, this fundamental point is stressed in Aristotle's next step (*Ph*. 186a32–34).

What Parmenides did not understand is that terms introducing a given feature such as 'white' (or 'being') introduce it as something different from the underlying thing it is predicated of. Thus, even if the underlying thing and the feature were inseparable (in any way of being inseparable, e.g., physically or conceptually or both etc.), they will still be different from each other in virtue of what they precisely are. A term, such as 'white', in being applied to a given receptacle, means that the receptacle is such and such *without meaning that the receptacle is the very feature of being such and such*. In other words, 'white' as applied to *X* means that *X* is white without meaning (or implying) that what *X* is is exhausted by its being white. In still other words, 'white' as applied to *X* means that *X* is white without meaning (or implying) that *X* is identical to what-it-is-for-something-to-be-white. For, even if *X* and its whiteness were inseparable, being white is still different from being its receptacle *X*.[19] Thus, if 'white' signifies one, this does not entail that white

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[18] Ancient Greek usage of σημαίνειν is complex. The verb σημαίνειν can be assigned to (i) things (like in "smoke indicates fire"), (ii) human agents (cf. *Cat.* 15b30) and (iii) linguistic entities. (i) is irrelevant for our purposes. But a bunch of several relations can be found within the general classes (ii) and (iii). Thus, σημαίνειν can cover (depending of the context): the relation between a word and its meanings (*Int*. 16a17; *Metaph*. 1019b32), the relation between a word and its fixed class of referents, independently of any particular utterance (*Cat*. 1b26; *Top*. 103b27, 31, 33, 35; *Metaph*. 1024b14); the relation between a description and its referent (*Top*. 102a2); the relation between a word and its referent in a particular context (e.g., *Top*. 103a39); the relation between a word, its core meaning and the thing targeted in a given sentence or, in other words, what a predicate says about its subject when it is predicated (*Top*. 103b28 [the first occurrence], 103b37; 132a2; *APo*. 83a24 ff.; *Metaph*. 1006a29 ff.); the relation between a sentence and its general meaning (*Int*. 20b2); the relation between a sentence and its meaning in particular contexts of utterance (e.g., *Top*. 130a20; *SE* 166a25, 28), etc. For a helpful survey, see Castelli (2018: 87–88).

[19] Aristotle's solution does not depend on employing the term 'white' in two different ways and thereby spoiling the validity of the refutation etc. (for this view, see Bostock 2006: 108). Parmenides' conclusion (as represented in the parallel argument) was that "white *is one*". Aristotle's point is that, in asserting the premise, Parmenides must already be committed to the distinction between two different *ways of being white*: being the property of being white, being whatever it is that happens to be white (the awkwardness of the expression is not my fault!).

is *one entity in account* (or in being), as intended in the Parmenidean argument.[20]

And the same will hold for 'being'. The term 'being', in being applied to a given receptacle *X*, means that the receptacle *is a being* (whatever that means) without meaning that the receptacle is the very feature of being a being (or being Being). In other words, 'being' as applied to *X* means that *X* is a being without meaning (or implying) that what *X* is is exhausted by its being a being. In still other words, 'being' as applied to *X* means that *X* is a being without meaning (or implying) that *X* is identical to what-it-is-for-something-to-be-a-being.

There have been discussions about whether Aristotle's point depends on the specific nature of the term employed in his solution ('white') and/ or on the specific sort of predicative tie involved in the employment of that term. Thus, it has been argued that Aristotle's point depends on employing accidental predicates such as 'white' in his solution, and that Aristotle's next remark suggests that Parmenides could have avoided the fallacy (and deduced his intended conclusion) if he had resorted to essential predicates. As I will argue in detail by examining the next step (*Ph.* 186a32–34), Aristotle's solution depends only on the nature of *signifying* as an operation which we do by employing terms to talk about things. Aristotle's solution does not depend on accidental predicates such as 'white'. His solution does exclude some class of statements – i.e., strict identity statements – but it does not exclude essential predicates *in general*. We might be misled into the opposite view by two factors: first, contexts in which Aristotle employs the notion of oneness in account as covering many sorts of essential predicates – it might be argued, for instance, that 'human' and 'animal' are one in account because the latter is an essential predicate of the former;[21] second, the contrast with sumbebekos in the next step of Aristotle's discussion. The latter factor will be discussed more extensively below. As for the former factor, I argue that essential predicates such as animal predicated of human (or human predicated of Socrates) are also affected by Aristotle's solution. Animal is not one in account with human in the relevant sense. For being a human is not the same as being an animal, even if they are essentially related.[22] Thus, being a human and being an animal count as two items in account – or two items in being.[23] Distinctness and multiplicity in account (or in

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[20] If Parmenides objected "but why should we apply the term to a receptacle?", Aristotle would answer that, in refusing to apply terms to things etc., Parmenides becomes a plant. Note that Aristotle does not need to be appealing to his preferred ontology (whatever that is) here: the distinction between *being white* and *whatever-it-is-that-happens-to-be-white* does not imply that the latter item must be an Aristotelian substance. Aristotle's point would equally apply even if the whatever-it-is-that-happens-to-be-white were a bunch of atoms, or an event. Actually, this is my reason for choosing the expression "*whatever-it-is-that-happens-to-be-white*".

[21] See Quarantotto (2019: 99) for such a view.

[22] See Arist. *APo.* I.5, 74b34, where Aristotle explicitly says that *being an equilateral triangle* is not the same as *being a triangle*.

[23] Passages such as *Metaph.* 1016a30–32 are perfectly compatible with my interpretation. To be sure, there is a way in which it can be said that an isosceles triangle and an equilateral triangle are 'one and the same', because both are triangles. But their full *logos* and their *being* are different, so they must be counted as two (in being or in account), as we see also by another passage in the same chapter: "we count as more than one (...) things of which the *logos* is not one" (*Metaph.* 1016b9–11).

being – *Ph.* 186a31) are not restricted to accidental predication (even taking 'accidental' in the broad sense as equivalent to not-included in the essence).[24] They also apply to at least some class of essential predicates. For any S and P such that S is essentially P but P is only part of S's essence, there is no oneness in account (λόγῳ) or in being (τῷ εἶναι, which is the expression found in *Ph.* 186a31). Actually, as I will argue below, distinctness and multiplicity in account will only be avoided in strict identity statements.

How Parmenides could have avoided inconclusiveness (*Ph.* 186a32–34)?

Aristotle's next remark (*Ph.* 186a32–34) sheds a light on Parmenides' inconclusive step.[25] The gist of the remark is this: if, for Parmenides, the notion of *signifying one* (asserted in the premise) is to entail the notion of *being one in account* (as asserted in the conclusion), Parmenides must hold that 'being' can only be employed in making identity statements. In other words, he must hold that 'being', in being predicated of a given thing, means – about that thing it is predicated of (καθ' οὗ ἂν κατηγορηθῇ – *Ph.* 186a33) – that that thing is not only one, but is exactly what-being-Being is and what-being-One is.[26]

Let me clarify how I take the crucial sentence in *Ph.* 186a32–34:[27]

[32] ἀνάγκη δὴ λαβεῖν μὴ μόνον ἕν
[33] σημαίνειν τὸ ὄν, καθ' οὗ ἂν κατηγορηθῇ, ἀλλὰ καὶ ὅπερ
[34] ὄν καὶ ὅπερ ἕν (*Ph.* 186a32–34).

First, I remark on what seems trivial:

– ἕν (*Ph.* 186a32), ὅπερ ὄν and ὅπερ ἕν (*Ph.* 186a33–34) are *all* complements of σημαίνειν;
– τὸ ὄν (*Ph.* 186a33) is the subject of σημαίνειν;

Next, I address what is not so trivial and has been disputed:

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[24] As Clarke (2019: 111, 123) has done.

[25] Aristotle's remark in *Ph.* 186a32–34 is pointing to the 'stronger assumptions' needed in order to avoid Aristotle's solution (see Ross 1936: 474, Charlton 1992: 60, Castelli 2018: 93, Clarke 2019: 110, 116, Quarantotto 2016: 226). This is why I do not agree with Gershenson and Greenberg (1962: 142–143, 150) when they break Aristotle's discussion exactly at 186a32 and say that there are two independent attacks against the Eleatics (for a criticism of them, see Clarke 2019: 119, n. 32).

[26] Perhaps I can be happy with paraphrasing ὅπερ ὄν just as *what-being-is* instead of *what-being-Being-is*. But Aristotle usually employs a predicate expression 'X' in such a way that it stands for *being X* or *having the feature named 'X'* (this is made explicit in *Top.* 133b8–9), with the result that [τοῦτο] ὅπερ X [ἐστι] will be equivalent to "that which *being X* is". Therefore, if *X* is replaced with 'being' or 'Being' (the capital making allusion to the Eleatic notion), [τοῦτο] ὅπερ ὄν [ἐστι] can be accurately paraphrased as *what-being-Being* is. However, in what follows, I will sometimes employ the expression "*what being is*" instead of "*what-being-Being is*" just for the sake of brevity.

[27] I am following what I have done in my Portuguese translation of *Physics* I–II, Angioni (2009).

– the antecedent of the relative pronoun οὗ (*Ph*. 186a33) is not any of the expressions explicit in the surface of the text, but an implied pronoun (τοῦτο or τόδε, as is common in Greek), which stands for the thing to which τὸ ὄν is applied as a predicate.

Next, there are three important issues that are far from trivial. First, the nature and the appropriate range of the semantic notion expressed by σημαίνειν; second, the exact syntax compressed into the expression ὅπερ ὄν (and ὅπερ ἕν); third, the specific employment of the expression ὅπερ ὄν in this context as something related to Aristotle's solution.

Σημαίνειν (in this context)

The semantic notion expressed by σημαίνειν (in this context) ranges over terms employed as predicates applied to a given subject: it is the notion of *meaning (or saying) something about the thing it is predicated of*. And I stress that σημαίνειν has been employed in the same way in 186a26.

My proposal does not collapse into saying that σημαίνειν coincides with the notion of meaning (whatever that notion is) as ranging over terms *considered abstractly*. Nor does it collapse into saying that σημαίνειν ἕν stands for the notion of *having just one meaning or having just one definition*. I claim that σημαίνειν ranges over terms, but not over terms abstractly considered as linguistic entities in a dictionary etc.; it ranges over terms *qua* employed in a given context to talk about a given thing.

Let me develop this point. The term 'white' can be employed in several different contexts: (i) 'white' can be employed as equivalent to 'whiteness' in a sentence such as "white is lighter than purple"; (ii) 'white' can be employed to point to a wall painted with the colour white; (iii) 'white' can be employed to point to a body with pale skin; (iv) 'white' can be employed to point to a voice which sounds clear and is easy to understand (*Top*. 106a25, 107a13). Now, it is not difficult to find *definitions* which capture exactly what is meant in each of those employments:

(i) "white[ness] is a colour that promotes distinguishing" (cf. *Top*. 119a30);
(ii) "'white' means *having a surface coloured in such and such a way*" (cf. *Top*. 107b1–2);
(iii) "'white' means *having pale skin*";
(iv) "'white' means *clearly sounding* [or *easy to understand*]" (cf. *Top*. 107b2).

It does not matter for my purposes whether this list mixes different sorts of definitions – real definitions of properties and nominal definitions of terms etc. Similarly, it does not matter whether those definitions are accurately formulated or not. Two remarks are relevant to develop my point. First, σημαίνειν (as employed in *Ph*. 186a26, 33) covers the semantic relation between a given term, its meaning *and the thing which is the target of the employment of the term*. Second, the expression σημαίνειν ἕν (as employed in *Ph*. 186a32–33) does not encode the notion of *having just one meaning or one definition* but

a different semantic phenomenon, namely, that each employment of a term, being one employment, can mean only *one* thing about its subject.

What σημαίνειν captures in this context is the following idea. Terms (such as 'white') have, indeed, meanings, but their full function is to be employed to pick up things or to talk about things. When we talk about a given thing employing a given term in a sentence, we talk about the thing according to *one* meaning of the term – e.g., if we employ the term 'white' to say something about a given thing, we are assuming what 'white' means as an important criterion to apply the term. But we are precisely talking *about something*, and this amounts to saying that:

– when we employ the term 'white' to talk about something, we are presupposing (and taking for granted) the distinction between *the thing* we are talking about and *the property we are ascribing to that thing.* In other words, we are presupposing (and taking for granted) the distinction between, on the one hand, *being the thing* we are talking about and, on the other hand, *having the property* we are ascribing to that thing. To use the expressions employed by Aristotle in *Ph.* 186a28–31, we are presupposing (and taking for granted) the distinction between *being white* and *being the whatever-it-is-that-happens to be white*.[28]

Why do we presuppose this (and take it for granted)? Because the semantic operation named σημαίνειν (in *Ph*. 186a26, 33) is exactly this: σημαίνειν (in the relevant contexts) ranges over terms as employed to talk about a given thing; more specifically, performing the operation expressed by σημαίνειν is equivalent to claiming that the thing at stake has the property which is picked out when we define the meaning of the term. Thus, saying that 'white' *signifies* (σημαίνει) something amounts to saying that 'white' picks out a given thing which allegedly has the property which defines what 'white' means.[29]

Accordingly, what σημαίνειν ἕν captures in this context (*Ph*. 186a26, 33) is the following idea: when we employ the term 'white' to talk about something, we mean that the thing we are exactly considering is white *in just one way of being white* (among the several ways of being white that the above definitions mark). For instance, if we say that:

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[28] If someone objected: "but do I really need this presupposition?", Aristotle's reply would be: "You have an option: become a plant!". It would take me too long to argue that this distinction is intrinsically involved in Aristotle's insights about what it is to use our expressions to λέγειν τι. But I do believe that this distinction is involved (for instance) in the main argument against the denial of the Principle of Non-Contradiction (*Metaph.* 1006a18–26), and can also be tracked in *Metaph.* 1052b1–14.

[29] I have employed the word 'thing' in my last paragraph (and elsewhere) in a very general way, as corresponding to any item in any ontology. Indeed, 'thing' might refer to processes, events, Aristotelian substances or Democritean atoms, or whatever it is that is 'out there', as the target of our language. As I said in footnote 20, the distinction between *being white* and w*hatever-it-is-that-happens-to-be-white* does not require Aristotle's preferred ontology. The distinction is compatible with different ontologies. The most important point is that, in employing our language, we are conveying something about the world and, thereby, we are taking for granted that there is something 'out there', which, for instance, happens to be white.

"the wall is white",

we mean that the wall is painted with the colour white without meaning or implying either that the wall is at the same time whiteness, or has a pale skin, or sounds clearly etc.

And we cannot mean more than one thing at the same time with the same token sentence or with the same token employment of the term 'white' (of course, jokes and puns apart etc.).

Thus, if we grant that the wall is white, we cannot accept someone arguing that:

– white (i.e., whiteness) is different from a wall (from definition (i));
– therefore, the wall (which is white) is different from a wall.[30]

In a similar way, if we grant that the *Iliad* is an epic cycle (κύκλος), we cannot accept someone arguing that:

– a circle (κύκλος) is a geometric figure;
– therefore, the *Iliad* (which is a κύκλος) is a geometric figure.[31]

The reason why we cannot accept those (sophistical) arguments is that, even if the terms involved have more than one meaning, one cannot mean more than one thing when one actually employs the term in a token sentence to talk about something. We are allowed to mean *only one thing* about the item the term is meant to pick out.

Thus, the expression σημαίνειν ἕν in this context (*Ph.* 186a26–27, 32–33) is not envisaging an abstract relation between the term 'white' and its (possible) meanings; consequently, the premise in the parallel argument is not equivalent to the claim that 'white' has only one meaning (and only one definition). Aristotle is considering a concrete relation between the term 'white' as employed in a given situation and what the term means in that particular situation, namely, *what the term means about the thing it is predicated of in that particular situation*.[32]

Ὅπερ ὄν: the full syntax of the expression

The full syntax of what is compressed into the expressions ὅπερ ὄν and ὅπερ ἕν is this: ὅπερ ὄν and ὅπερ ἕν are elliptical for τοῦτο ὅπερ ὄν ἐστι and τοῦτο ὅπερ ἕν ἐστι, where ὄν and ἕν are the subjects of the relative sentences and ὅπερ is the complement of the

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[30] There is a similar point in *Metaph.* 1007a8–20. See Angioni (2006: 64–66).

[31] See Arist. *SE* 171a9–11 and *APo.* 77b31–33.

[32] Charlton (1992: 60) has somehow hinted at the relevant point: "if to know what the word '*f*' means, is to know what it would be for a thing to be *f*". (However, I do not agree with Charlton's ensuing remarks.)

relative sentences. Thus, "that which being is" (and "that which one is") is, in my view, the more accurate translation. It is important to explain the syntax of the expression and the way in which its syntax allows Aristotle to employ the expression in the several ways he has employed it. Usually, scholars are prone to take ὅπερ just as a shorthand for 'essentially' without explaining what is going on with the expression.[33] This flattening interpretation has consequences when the expression is employed in more complex contexts. This will be clear, so I hope, in my next steps.

The expression "[τοῦτο] ὅπερ ὄν [ἐστι]" is just a particular case of the general pattern "[τοῦτο] ὅπερ X [ἐστι]" or one of its abbreviated forms (where 'X' is replaceable with any term).[34] Now, the pattern is employed by Aristotle in several contexts to mark a specific feature of essential predications, with the term 'X' playing the role of predicate applied to a given subject.[35] The best passage is *Posterior Analytics* I.22 (I use the letters 'P' and 'S' in the translation to make the pronoun references easier to follow):

> Besides, items [i.e., predicates, *P*] signifying essence signify of what they are predicated of [i.e., subjects, *S*] that *S* is what exactly *P* is, or what exactly a particular sort of *P* is [ὅπερ ἐκεῖνο ἢ ὅπερ ἐκεῖνο τι]; but the predicates which do not signify essence but are said of some other underlying subject which is neither what exactly *P* is nor what exactly a particular sort of *P* is, are accidental, e.g. white of human. For human is neither what exactly white is nor what exactly some white is [οὔτε ὅπερ λευκὸν οὔτε ὅπερ λευκόν τι] – but is surely animal; for a human is what exactly animal is. (*APo*. 83a24–30, my translation)

Thus, *animal* as predicated of *human* means (σημαίνει) that *humans* are that which [being an] animal strictly is, whereas white as predicated of human does not mean that humans are that which [being] white strictly is (*APo*. 83a28–30, cf. *Metaph*. 1007a26–33). Aristotle employs the expression 'ὅπερ *X*' in order to stress the relationship holding between the items involved. The point of using the relative clause, with the pronoun ὅπερ as the complement, is to stress that there is something which *being an animal* is (i.e., being a living thing capable of perceiving), so that, when animal *holds* of something *S*, its holding of *S* means that *being S* is essentially connected with what *being an animal* is. The point of using the emphatic pronoun ὅπερ (instead of a mere relative pronoun ὅ) is

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[33] There are exceptions, such as Clarke (2019: 117). Other interpretations (such as Castelli 2018: 93–94) go in a direction similar to mine, but I am not satisfied with the way they explain how the syntax of the expression encodes certain claims.

[34] Gershenson and Greenberg (1962: 143) have said that ὅπερ ὄν (and ὅπερ ἕν) "occur very rarely in the Aristotelian corpus". However, one cannot ignore that ὅπερ ὄν is a case of the expression ὅπερ *X* (where *X* is replaceable with any term), which Aristotle has employed several times.

[35] There are some exceptions. In the highly complicated context of *Metaph*. 1030a3–5, the expression is in a sort of metalinguistical level. The sentence ὁ λευκὸς ἄνθρωπος οὐκ ἔστιν ὅπερ τόδε τι (*Metaph*. 1030a4–5) is not saying that *pale man is not essentially a [substantial] this*, but is saying that the expression 'pale man' does not encode *what a substantial this is*, i.e., 'pale man' cannot be taken as an appropriate definiens of a substance. I have defended this view; see Angioni (2014: 87–90). As for *APo*. 89a35–36 (another highly controversial case), see Angioni (2013: 273–279).

to stress that *animal*, when predicated of S, is stating that the being for S does not consist in anything else significantly different from being an animal (cf. *Metaph*. 1007a27). This is what *signifying essence* (*APo*. 83a24, 29–30), as an operation ranging over predicates qua predicates, amounts to. Aristotle's point is not the mere 'transitivity of predicates' – for transitivity will hold for both sort of predicates under appropriate interpretations of them: thus, if being an animal is exactly being a perceptive living being, it will follow that humans are perceptive living beings; however, if being white is exactly having a surface with such and such a feature (cf. *Top*. 107b1–2), it will also follow that a human (who is white) has a surface with such and such a feature, with the result that *white* as predicated of *humans* means that *humans* have a surface with such and such a feature. Aristotle's point is that humans, in being animals, can be said to be what animal is in a stronger way: being for humans is not something else significantly different from being an animal. In general terms, for any predicate E that signifies essence, being *E either* exhausts what it is for *S* to be what *S* is, *or is at least an important part of it*. But the same will not hold of whiteness. Humans, in being white, cannot be said to be exactly *what being white is*, for being white neither exhausts what is for human beings to be what they are, nor is an important part of it.

Now, the disjunction in my last sentence – which is based on ὅπερ ἐκεῖνο ἢ ὅπερ ἐκεῖνο τι in the *Posterior Analytics* 83a24–25 (cf. *APo*. 83a27, 29) – is really important to understand Aristotle's point against Parmenides. Indeed, for any essential predicate *P*, there are two options: if *P* is an essential predicate of *S*, then *P* either exhausts what it is for *S* to be S *or* is an important part of it. Aristotle does not always mark this distinction (and this has misled scholars), but *sometimes* he does (and *Ph*. 186a33–34 is 'one of those times'). Thus, Aristotle is comfortable using the expression "*S* is [τοῦτο] ὅπερ *P* [ἐστι]" when *P* is only an important part of what it is for *S* to be what S is. This is Aristotle's usual way of talking about the *genus* in the *Topics*.[36] However, on the same conditions – I mean, when *P* is only an important part of what it is for *S* to be what S is – Aristotle *sometimes* says that "*S* is [τοῦτο] ὅπερ *P* τι [ἐστι]", where the indefinite adjective 'τι' means something like 'of a given sort' or 'some'.[37] The addition of the adjective 'τι' in the expression is decisive to mark that *P* is an essential predicate which *does not exhaust* the essence of *S*. By contrast, when *P* exhausts what it is for S to be *S*, Aristotle cannot use the expression "*S* is [τοῦτο] ὅπερ *P* τι [ἐστι]". He can only say that "*S* is [τοῦτο] ὅπερ *P* [ἐστι]". Actually, in some occurrences of the expression "[τοῦτο] ὅπερ *P* [ἐστι]" with no addition of 'τι', the expression is pointing to what is the whole essence of the subject *S*.[38]

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[36] See, for instance, Arist. *Top*. 124a18.

[37] These are some occurrences: Arist. *Metaph*. 1001a27; 1091b25, 27; 1045b1, 3-6, 23; *APr*. 49b7–8; *APo*. 83a6–7, 14.

[38] See Arist. *APo*. 91a39. Note that, a few lines further, in 91b3, the expression ὅπερ τι is used to mark the case in which A is predicated of all *B* without being convertible with it, like animal is predicated of human (*APo*. 91b4–7).

Ὅπερ ὄν as used in Aristotle's solution

What is important for the present case is that Aristotle's employment of ὅπερ ὄν in *Ph*. 186a33–34 is one of those times in which the expression stands for a predicate that exhausts what it is for *S* to be S. This amounts to saying that the expression "[τοῦτο] ὅπερ ὄν [ἐστι]", with no addition of τι, means – when applied to any subject – that the being of its subject *is exhausted by being exactly what Being is*. Therefore, applying the expression "[τοῦτο] ὅπερ ὄν [ἐστι]" (or one of its abbreviated versions) to a given subject amounts to formulating a strong identity statement between that subject and what being (or, rather, Being) essentially is.[39] Now, this is significantly different from saying that a given subject is essentially a being in the sense that being a being is an important part of its essence – and is also different from saying that *S* is exactly what *being a [particular kind of] being is*. Had Aristotle meant the last point, he would have employed the expression ὅπερ ὄν τι instead of the expression ὅπερ ὄν – for, just a few lines later (*Ph*. 186b2, 9), τι is employed exactly in the way I have highlighted: in 186b2, ὄν τι has the force of 'a [particular] being' either in the sense of 'a being of a particular kind' or in the sense of 'a particular token being', so that Aristotle's point (in 186b2, but not in 186a33–34) is that it would not be possible for *what-Being-is* to be the being of a particular kind or a particular token being.[40]

Therefore, the view that 'being' can only be employed in making strong identity statements about Being itself is exactly what Parmenides would need to avoid the inconclusiveness of his argument.[41] Parmenides would not have improved his argument if he had said that 'being' *signifies one* merely in the sense of being a (non-exhaustive) essential predicate of any subject. For, in that case, *being S* and being *what being is* ([τοῦτο] ὅπερ ὄν [ἐστι]) would still count as two items in account, even if they are essentially related – in the same way as *being an equilateral triangle* and *being a triangle* are not the same, even if they are essentially related. In order to avoid the inconclusiveness of his argument, Parmenides should have resorted to the claim that 'being' *signifies one* in the stronger sense of exhausting what being is for any subject it is applied to. In that case, there will be no distinction between *being Being itself* and *being S* (playing the role of whatever-it-is-that-happens-to-be-Being). Only in this case the subject S would not count as distinct in account (or in being) from Being itself. But such a claim amounts to saying that 'being'

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[39] *Pace* Spangler (1979: 98), who believes that Aristotle's employment of the expression in that passage is conveying the idea that being is a genus. For a different view, see Castelli (2018: 93–94).

[40] Similarly, at the end of the chapter, Aristotle asks: "for who understands 'being itself', excepts as being what exactly a given being is?" (τίς γὰρ μανθάνει αὐτὸ τὸ ὂν εἰ μὴ τὸ ὅπερ ὄν τι εἶναι; *Ph*. 187a8–9). The expression is a little bit different: the definite article τό goes with the infinitive εἶναι, and [τοῦτο] ὅπερ ὄν **τι** [ἐστι] works as the complement of the infinitive εἶναι, but the internal syntax of the expression is the same. Aristotle is suggesting that the emphatic expression αὐτὸ τὸ ὂν can only be understood with the force of "being what a *particular* being is".

[41] This is stronger than 'essence monism' (as depicted in Clarke 2018: 68).

could only be employed in one strong identity statement about itself, so that predication will be impossible.[42]

A quick survey of the consequences (*Ph.* 186a34–186b12)

In fact, that predication will be impossible is (among other things) what Aristotle intends to show in his next steps (*Ph.* 186a34–b12): for Parmenides, anything different from this strong view about *Being signifying one* would lead to inconsistency. The gist of Aristotle's discussion is this: let 'being' signify something not in the way suggested in the *Physics* 186a32–34 (i.e., not as meaning that what it is applied to is the same as what-being-Being-is): then, something which is not being will be (*Ph.* 186a34–b4); and Being itself will end up collapsing into non-being (*Ph.* 186b4–12).

In general lines, Aristotle's discussion is as follows. Suppose that 'being' does not signify, about X (= the thing it is applied to), that X is what-Being-is – instead, suppose that 'being' just *accompanies* (συμβέβηκε – *Ph.* 186a35, more on this expression below) that to which it is applied without being one with it – this is what Aristotle expresses with "τὸ γὰρ συμβεβηκὸς καθ' ὑποκειμένου τινὸς λέγεται" (*Ph.* 186a34–35) and "ἕτερον γὰρ τοῦ ὄντος" (*Ph.* 186a35–b1). The conclusion is stated at *Ph.* 186a35: "that to which *being* is applied as a predicate will not be" (ᾧ συμβέβηκε τὸ ὄν, οὐκ ἔσται), for it will be different from being. However, if X is that to which being is applied (or if it is acceptable to apply 'being' to it), then *X* somehow *is*: for, if *X* were nothing at all, it would not be there as something to which 'being' could be applied. Now, if *X* somehow *is* (premise assumed for a Parmenidean *reductio*), then it follows that "there will be some being which is not being" – a conclusion stated with an ironical surprise (marked by the particle 'ἄρα' at *Ph.* 186b1).[43]

Now, in order to avoid this road of contradiction ("there will be some being which is not being"), Parmenides should have taken 'being' as meaning, about the thing it is applied to, that the thing is what-being-Being-itself is – as Aristotle has suggested in the *Physic*s 186a32–34. But the suggestion is tantamount to saying that ὄν is not liable to be instantiated in different sorts of particular beings: "for it is not possible for it to be a certain being" (οὐ γὰρ ἔσται ὄν τι αὐτὸ εἶναι – *Ph.* 186b2). Consequently, let Parmenides get rid of the misleading X: ὄν can only be one, identical with itself – and it can only be employed in one identity statement, "Being is Being" (or "What-Being-is is What-Being-is"). Indeed, "it will not be possible for what-Being-is to be applied to anything else" (οὐ

[42] For a different view, see Clarke 2019: 119–120).

[43] For the ironical use of ἄρα, see Angioni (2009: 106). Quarantotto (2016) has been finely sensitive to Aristotle's humour in these highly abstract discussions.

δὴ ἔσται ἄλλῳ ὑπάρχον τὸ ὅπερ ὄν – *Ph.* 186b1–2).[44]

In *Ph.* 186b4–12, Aristotle develops the second part of the issue: Parmenides's view will not allow anything to be predicated of Being. For predication would entail non-identity (between the subject and the predicate) and non-identity would imply multiplicity. But there is no room here to examine that line of discussion.

Being as a συμβεβηκὸς

What about the συμβεβηκὸς terminology in the passage 186a34–b1? If my interpretation of 186a32–34 is right, συμβεβηκὸς must cover any predicative relation in which subject and predicate are *two in account* – the only exception will be the sort of identity statement in which there is not even an intensional distinction between the subject and the predicate.

This is the passage:

> [34] τὸ γὰρ συμβεβηκὸς καθ' ὑποκειμένου τινὸς
> [35] λέγεται, ὥστε ᾧ συμβέβηκε τὸ ὄν, οὐκ ἔσται (*Ph.* 186a34–35).

On standard interpretations of συμβεβηκὸς, the passage would be translated as follows: "For an accident is said of an underlying subject, consequently, what it is an accident of will not be".

See, for instance, how Ross (1936: 340) has taken the point in his analysis of the passage: "it will not do to suppose that being is an accident; for then what it is an accident of will not be".[45] On this interpretation, Aristotle seems to suggest that, if the Parmenidean view is rejected, we will be left with 'being' as an accidental predicate. Would Aristotle be committed to that consequence, namely, that 'being' is an accidental predicate of whatever it is predicated of (except Being itself)?

Some scholars suggest that Aristotle's solution (*Ph.* 186a23–32) is ascribing to Parmenides the view that being is an accidental predicate – for only accidental predicates, they claim, involve the distinction in being (or in account) between attribute and that which receives the attribute.[46] Now, I have argued that the distinction in being (or in account) needed for Aristotle's solution also works with essential predicates that do not exhaust what it is for their subjects to be what they are. Even if there is an aspect on which *human* and *animal* can be said to be one in account, it is clear that *being an*

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[44] According to Aristotle's solution, Parmenides' claim is stronger than Predicational Monism – i.e., that "each being can only be one kind of thing" (O'Connor 2017: 37) – or 'essence monism' (Clarke 2019: 110, 114); his claim is that it is not possible for any particular being to be, for it will be different from Being itself. This is 'entity monism': only Being *is*.

[45] See also Bostock (2006: 109).

[46] See Quarantotto (2019: 97–98); for a different view, see Clarke (2019: 115).

animal is not the same as *being a human*. Now, given that Aristotle's point in the *Physics* 186a32–b1 seems to involve an exhaustive opposition between identity statements ("*signifying what-Being exactly is*") and being a συμβεβηκὸς of its subject, my proposal seems to imply that even non-identity essential predicates (such as *animal* attributed to *human*) will be covered by συμβεβηκὸς as used in the passage. I will now explain why I am perfectly comfortable with that.

The term συμβεβηκὸς is usually taken in the sense of *contingent predicate* – namely, the sort of accidental predicate that can indifferently belong or not belong to a given subject in different circumstances (as defined in *Topics* 102b6–7). Now, many scholars do not believe that συμβεβηκὸς must be taken in that way in *Physics* 186a34. Most translators have resorted to alternative options (for instance, Hardie and Gaye: 'attribute'; Charlton: 'that which supervenes') and Clarke has remarked that συμβεβηκὸς can be taken in the broad sense of attribute which is not included in the essence of its subject[47]. My proposal goes even further in this same direction.

I do not believe that συμβεβηκός is taken in a *deviated* or *exceptional* sense in 186a34.[48] I have developed my views about συμβεβηκός elsewhere, so I will only retrieve the most important points here.[49] Aristotle uses the word συμβεβηκός (as well as the verb συμβέβηκε with dative) in several ways, but there is an overall coherence in all his uses. First, the word συμβεβηκός covers a relation which seems to be dyadic (with only two relata) but always pressuposes a third item which gives a parameter under which the relation is being taken. Second, the word is highly *context-sensitive*: it has a core meaning, but defined in very general terms, such that more specific contexts of application imprint different forces to it. Third, the core meaning can be characterised with two conditions: one of the relata (let it be *X*) is said to be a συμβεβηκός of the other (let it be *Y*) when, first, *X* accompanies *Y* and, second, *X* is not the most important factor for *Y according to the aspect or parameter under which Y is being considered in a given context*. But, as I will show, there are many contexts, each with a different parameter. Fourth, the most traditional notion of συμβεβηκός, which covers a relation of contingency between *X* and *Y*, is found only in one subset of Aristotle's employment of the expression. Fifth, and most importantly, the employment of συμβεβηκός covering the notion of contingency gives us the (wrong) impression that the relation is strictly dyadic with no presupposed parameter at all – but that impression only arises because the aspect or parameter under which *Y* is being considered in those contexts is *Y itself*, i.e. (unpacking what that means for Aristotle in the relevant contexts), *Y*'s being what it essentially is in itself. The same misleading impression holds for Aristotle's employment of συμβεβηκός in the broad sense of

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[47] Clarke (2019: 111, 123).

[48] I do not agree with Gershenson and Greenberg (1962: 143–144, 148–149), who take the occurrences of συμβεβηκός in *Physics* I.3 as depicting "precisely the meaning of this word for the Eleatics" (Gershenson, Greenberg 1962: 149).

[49] See Angioni (2019: 362–368) for the general story.

a predicate not included in the essence of its subject; but there is an implied parameter, which is what the subject essentially is in itself.[50]

Thus, Aristotle says that *being seated* is a συμβεβηκός of Socrates because (i) being seated accompanies Socrates at a given circumstance, but (ii) being seated is not important for Socrates according to the aspect or parameter under which Socrates is being considered in that context – i.e., being seated is not important for Socrates' being essentially what he is. Now, according to that same aspect or parameter, Aristotle cannot say that *being a man* is a συμβεβηκός of Socrates: for, although (i) being a man accompanies Socrates (actually, in all circumstances), (ii) being a man is indeed important for Socrates according to that aspect – i.e., being a man is important for Socrates' being essentially what he is. *But let us change the parameter*: Socrates now is being considered *as curable*, i.e., as liable to the expert intervention of a physician (cf. *Metaph.* 981a18–20). Then, *being a man* becomes a συμβεβηκός of Socrates. For, according to that aspect or parameter, being a man is far from being the most important factor for Socrates, even if being a man is an essential predicate of his and, furthermore, a *condition sine qua non* presupposed in his being liable to the expert intervention of a physician. Thus, Aristotle is very comfortable in saying that being a man συμβέβηκε to Socrates (*Metaph.* 981a19–20), and this language is far from implying that man is an accidental predicate of Socrates – nor need we say that such an employment of the terms departs or deviates from their normal meaning. For the core definition still holds of this case.

This story could be fleshed out with more examples and details. However, as I have developed it in several places, I allow myself to be short here.

Thus, what is Aristotle doing in *Physics* 186a34–b1? He is not saying or implying that, if we reject Parmenides' view that 'being' can only be used in one strict identity statement, we would be left with taking 'being' as an accidental predicate either in the sense of a contingent predicate that could cease to be true about its subject in a different circumstance, or in the sense of an attribute not included in the essence of its subject. The first view will be odd, indeed. 'Being' is the most trivial predicate, in the sense that, at least on a given interpretation, it cannot be false about any being at all. We might even dare to say that being is a necessary predicate of every being that exists – '*X* is a being' will be necessarily true of any existing *X* etc.[51] Many subtleties could be addressed here, but it is enough for my purposes to stress that contingency or non-essentiality of the predicate 'being' is not the central issue at stake in *Physics* 186a34–b1.

What is the issue, then, when Aristotle suggests that 'being' as predicated of a particular being is a συμβεβηκὸς of that particular being? Aristotle is implying that being *a being* is not the most important factor for any particular being's being what it is. Take a horse

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[50] A further clarification: when Aristotle calls the attribute 2R a συμβεβηκός καθ' αὑτό of the triangle, what he means must be analysed in two steps: (i) first, ask whether the attribute is or is not *included* in the essence of its subject (if it is not included, it is a συμβεβηκός); (ii) second, ask whether the attribute is or is not *explained by* the essence of its subject (if it is, call it a συμβεβηκός καθ' αὑτό).

[51] For a similar point, see Clarke (2019: 87).

as an example of a particular being. Aristotle might comfortably say that *being a being* is a συμβεβηκός of horses, for, although (i) *being a being* accompanies horses in all circumstances, (ii) it is not the most important factor for horses' being essentially what they are. Similarly, picture a physician being called to attend an emergency and asking while she runs to it: "tell me more about the patient". What the physician wants is to consider the relevant features of the patient *qua* patient, which are strictly important for her expert intervention. It would not do to answer the physician with this: "the patient is a human being". Things will not improve if someone insists: "Well, you know, the patient is *essentially* a human being". Given that the expert intervention of the physician is the relevant parameter implied in this context, being essentially a human being is indeed a *sumbebekos* of the patient, for it does not qualify among the most important features of the patient *qua* patient. Similarly, even if there is some aspect on which it is correct to say that a horse is essentially a being, being essentially a being qualifies as a *sumbebekos* of the horse if we are interested in what makes it *a horse* – being essentially a being does not qualify among the most important features of the horse *qua* horse.

A possible objection to my proposal is that συμβεβηκός is explicitly used in the next section of the chapter (which starts at *Ph*. 186b14) both in the sense of contingent predicate and in the specific sense of συμβεβηκός καθ' αύτό (non-included in the essence of its subject). There is no room here to discuss the argument starting at *Ph*. 186b14. But I argue that the context of the *Physics* 186a23–b12 is really different from the context of 186b14–35. Now, συμβεβηκός is indeed used differently in each of those contexts. But scholars are prone to conflate two different issues: on the one hand, the (ultimately sophistical) employment of the same expression with different meanings in a given argument in order to produce a false semblance of validity; on the other hand, the employment of the same expression with different meanings (or different referents, or different forces) within a short string of sentences. No one is allowed to conclude that the *Iliad* is a geometric figure from the premises that the *Iliad* is a κύκλος and that a κύκλος is a geometric figure. However, this gives us no ground to jump to the claim that, if a given expression is employed with different meanings (or different referents, or different forces) within a short string of sentences, then the validity of the argument is lost. One still has to prove that the short string of sentences at stake is tantamount to one and the same argument as the sophistical one about the *Iliad*. Actually, Aristotle has many times employed the same expression with different meanings (or different referents, or different forces) within a short string of sentences without damaging the validity of his arguments. It happens that a short string of sentences can pack several arguments.[52] Therefore, there is nothing

[52] For συμβεβηκός, see Arist. *Metaph.* 1003a25, 30. A small sample for other terms: *anankaion* (*APr.* 47a19, 23); *meson* (*APr.* 44b12, 13); *phusis* (twice in the same line *Metaph.* 1054a10); *horizomenon* (*Top.* 139a28, 30; 147b12, 13; 158a26, 27), *erotomenon* (*Top.* 158a26); *archas* (*APo.* 84a31, 32); *episteme* (*APo.* 79a18, 24); *pragma* (*Top.* 179a37, b5); *genos* (*Top.* 102b30, 39). Do the two occurrences of *semainein* in *Top.* 103b28 have exactly the same force?

to worry about if συμβεβηκός has been used differently in different contexts within the same chapter.[53]

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Aristotle's Solution for Parmenides' Inconclusive Argument in *Physics* I.3

I discuss the argument which Aristotle ascribes to Parmenides at *Physics* 186a23–32. I examine (i) the reasons why Aristotle considers it to be eristic and inconclusive and (ii) the solution (*lusis*) that he proposes against it.

KEYWORDS

Aristotle; sophistical argument; Parmenides; predication; being.

Aristotle's Refutation of the Eleatic Argument in *Physics* I.8

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1.

In *Physics* I.7, Aristotle derives three principles – subject, form, and privation – by analysing how we talk about coming to be and change.[1] On the basis of this analysis, he refutes the Eleatic argument against change in *Physics* I.8, claiming that "the difficulty of the early thinkers, as well as our own, is solved in this way alone" (*Ph.* 191a23–24).[2] In this paper, I show that Aristotle's solution of the Eleatic problem in *Physics* I.8 is based on the idea that "that which comes to be is always composite" (*Ph.* 190b11), which he has stated in the previous chapter, and I explain how his solution in terms of 'what is' and 'what is not' is related to 'inquiry into principles', which is the theme of *Physics* I.

[1] Aristotle's methodology in *Physics* I.7 admits of a number of interpretations, which I cannot examine in detail here. On this issue, see, for example, Charles (2018: 181–182).

[2] The English translations of Aristotle's text in this paper are based on Hardie, Gaye (1984) and Charlton (1970).

2.

The Eleatics, as Aristotle describes them in *Physics* I.8,[3] consider two ways of coming to be and reject both. They say that "nothing comes to be or passes away, because what comes to be must do so either from what is or from what is not, and neither is possible" (*Ph.* 191a27–31). Thus, the two alternatives the Eleatics have in mind are:

(a) Coming to be from what is, and
(b) Coming to be from what is not.

It is obvious that these two alternatives are distinguished on the basis of the two cases of that from which coming to be is supposed to occur. The reason for the impossibility of coming to be of what is is explained by reference to the starting point of coming to be, when it is said that "what is cannot come to be, since it is already" (*Ph.* 191a30). The impossibility of coming to be from what is not, on the other hand, is also explained by reference to the starting point of coming to be, when it is said that "nothing can come to be from what is not, since there must be something underlying" (*Ph.* 191a30–31). By rejecting these two possibilities, (a) and (b), the Eleatics argue for the impossibility of coming to be. As will be seen below, Aristotle agrees with the Eleatics that coming to be is not possible in either of the alternative ways they have in mind, but disagrees with them that these two ways exhaust all the relevant possibilities.

The two horns of the Eleatic dilemma have been subject to various interpretations. Lewis, for example, thinks of coming to be "from the unmusical" as an example of coming to be "from what is not".[4] However, it is important to note that this reading does not make good sense of the Eleatic denial of coming to be from what is not, as is described in the text. If "since there must be something underlying" (*Ph.* 191a31) explains why "nothing can come to be from what is not" (*Ph.* 191a30–31), then "from what is not" (*Ph.* 191a30–31) in the dilemma should be taken to mean, not (e.g.) "from the unmusical", but "from completely nothing", just as Simplicius interprets it.[5]

On the other hand, "what is cannot come to be, since it is already" (*Ph.* 191a30) might be taken to represent either the structure of (e.g.) "[a man] cannot come to be [musical], since he is already [a man]" or that of "[a man] cannot come to be [musical], since he is already [musical]". As will be seen below, Aristotle understands "since it is already" (*Ph.* 191a30) in the Eleatic argument in the former way, and explains why their argument is wrong. This point will be considered more fully later when looking at how Aristotle answers the impossibility claim of coming to be from what is (*Ph.* 191b17–27).

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[3] Here I am only concerned with the question of how Aristotle understands and reports the Eleatic argument in the text.

[4] Lewis (1991: 228–236). For a similar view, see also Waterlow (1982: 15).

[5] Simp. *In Phys.* 236.22.

Loux objects to interpreting (a) and (b) as representing the ways of coming to be which both the Eleatics and Aristotle agree in denying, such as "Socrates comes to be musical from being musical"[6] and "Socrates comes to be musical from not being anything at all", on the grounds that "however problematic these expansions are, they hardly call into question the reality of change since the defender of coming to be is no more committed to their truth than the hardcore Parmenidean".[7] This argument is not convincing. First, the reasons which the Eleatics offer for the impossibility of coming to be, as they are explicitly reported in the text, should be taken into account. For example, if the second horn of the dilemma claims that "nothing can come to be from what is not" (*Ph.* 191a30–31) for the reason that "there must be something underlying" (*Ph.* 191a31), then it is most reasonable to take "from what is not" (*Ph.* 191a30–31) to mean "from nothing", even though neither the Eleatics nor Aristotle accepts coming to be from nothing. Second, if the two alternative ways of coming to be, neither of which the Eleatics and Aristotle accept, were exhaustive, then the dilemma would threaten the reality of coming to be. As will be seen below, Aristotle thinks that the Eleatic argument is based on the assumption that the two alternative ways of coming to be exhaust all the relevant possibilities, and his solution suggests that these two alternatives are not exhaustive.

Before scrutinizing Aristotle's reply to the Eleatics in *Physics* I.8, I shall review another interpretation of the Eleatic problem. Lewis thinks that the Eleatics consider the case in which "the unmusical has become the musical" to be nothing but "the replacement of one entity by another". As he writes, "[b]ut without an account of how the previous existence of the unmusical is relevant to the new existence of the musical, this [sc. Socrates' becoming musical] is the same as saying the musical is created *from nothing*". If this is the gist of the Eleatic challenge with which Aristotle is confronted in the text, then he would be expected to offer as a solution an account that guarantees a certain type of identity or sameness of the entity before and after the process of change. According to Lewis, Aristotle's solution to this kind of problem is based on clarifying that "there is something that endures through the change and also something that gets replaced as a result of the change".[8]

However, this is not a good interpretation of the Eleatic problem as described in *Physics* I.8. For the Eleatic argument against coming to be is based on the classification of those things from which coming to be is supposed to occur, and it is argued that *change does not even begin* in either of the two cases, namely from what is or from what is not. The Eleatics, who argue for the impossibility of coming to be from what is by maintaining "since it is already" (*Ph.* 191a30), would not even question the identity or sameness of an

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[6] This is not a good example of what Aristotle takes to be the Eleatic understanding of "coming to be from what is", but Loux's reason for rejecting it is not persuasive. See below.

[7] Loux (1992: 289).

[8] Lewis (1991: 229–230).

entity *before and after* the process of coming to be. Identity or sameness between that from which a thing comes to be and that which the thing comes to be is presupposed, rather than questioned, when it is said that "it is already" (*Ph.* 191a30).[9] Indeed, as will be seen below, Aristotle's solution to the Eleatic challenge is not based on explaining how the musical after the change is not a mere replacement of the unmusical before the change.[10] Instead, he focuses on the structure of that from which coming to be occurs, and explains what the Eleatics failed to see.

3.

As a clue to the solution of the Eleatic problem, Aristotle points out that "coming to be from what is" and "coming to be from what is not" are in one way[11] not different from "a doctor doing something" (*Ph.* 191a34–b2). Both of them can be spoken in two ways by using '*qua*' (*Ph.* 191b2–4). A doctor builds a house, not *qua* doctor, but *qua* builder, and comes to be pale, not *qua* doctor, but *qua* being dark. On the other hand, he doctors or fails to doctor *qua* doctor (*Ph.* 191b4–6). It is important to note that the relevant similarity Aristotle sees between the two cases is not simply that these two distinct modes of speaking are used in both cases, but that one of the two modes of speaking is used "most properly" (*Ph.* 191b6–7).[12] What he actually says is:

> Now we *most properly* say that a doctor does something or undergoes something or comes to be something from being a doctor, if it is *qua* doctor that he does or undergoes or comes to be this. So clearly also coming to be from what is not means "*qua* what is not." (*Ph.* I.8, 191b6–10)

Aristotle explains that the Eleatic denial of coming to be stems from their failure to draw this distinction (*Ph.* 191b10–13), and suggests his own solution on the basis of the

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[9] This shows in what way Aristotle thinks the Eleatics argue for the impossibility of coming to be from what is: they think, in his view, that "what is is the same as what comes to be" (Simp. *In Phys*. 236.21).

[10] It is true that 'persisting/remaining/enduring' (ὑπομένειν) is at issue in *Physics* I.7, and this might be what leads some scholars to think that Aristotle is confronted with a problem which needs to be solved by resorting to a 'persisting subject' (Loux (1992: 290–293), on the other hand, correctly thinks that Aristotle does not provide such a solution, even though his own alternative interpretation of Aristotle's argument does not seem to me plausible). However, in my view, what Aristotle is concerned to argue by pointing out that, while the man persists, the unmusical does not (*Ph.* 190a17–20) is that what comes to be is always composite (*Ph.* 190b11) and not monolithic. How the composite structure of what comes to be is used in his solution will be explained below.

[11] The second solution on the basis of the distinction between potentiality and actuality is mentioned (*Ph.* 191b27–29) as distinct from the first. This is in harmony with the fact that the first solution, as far as I can see, does not use the potentiality/actuality distinction.

[12] It is important to note that the case of a doctor who does something, etc. (*Ph.* 191a34–b10) is used, not as an example of coming to be or change, but as an example of how '*qua*' phrases are employed, even though it does not stop the case in which a doctor becomes pale, etc. from being an instance of change. Ross (1936: 494) seems to miss this point when he says that "the question whether *x* in general can be generated from *x* or from non-*x* is made simpler if we take the single case in which *x* is a doctor."

distinction he draws in the case of 'what is' and 'what is not' by analogy with the case of 'a doctor'.

> We ourselves too say that nothing comes to be *without qualification* from what is not; but that things do come to be *in a way* from what is not, i.e. *accidentally*. For a thing comes to be from the privation, which in itself is what is not – this not surviving as a constituent of the result. (*Ph.* I.8, 191b13–16)[13]

The question here is how to understand the phrases "without qualification" (*Ph.* 191b14) and "accidentally" (*Ph.* 191b15). These two terms should be interpreted on the basis of the example of "a doctor" (*Ph.* 191a34–b10). Aristotle, I propose, thinks that coming to be from what is not, when stated "without qualification", should be understood "most properly", even though it could be understood in more than one way.[14] In his view, coming to be from what is not should be understood "most properly" as meaning

> (b)* Coming to be from what is not *qua* what is not (*Ph.* 191b9–10)

in just the same way as "a doctor acts" is "most properly" (*Ph.* 191b6–7) to be taken as "a doctor acts *qua* doctor", even though this could be taken in more than one way, as explained in the passage (*Ph.* 191b6–10) cited above. Since Aristotle says that he agrees with the Eleatics that "nothing comes to be *without qualification* from what is not" (*Ph.* 191b13–14), it is not unnatural to take him to analyse (b) "coming to be from what is not" (*Ph.* 191a30–31) in the sense of "coming to be from nothing" as (b)* "coming to be from what is not *qua* what is not". Aristotle thinks that (b)* is impossible for the same reason as that for which (b) is claimed to be impossible.

In light of this, what does Aristotle accept when he says that things do come to be *accidentally* from what is not (*Ph.* 191b14–15)? If "accidentally" (*Ph.* 191b15) is contrasted with "without qualification" (*Ph.* 191b14), as it seems natural to take it, and the latter is to be understood in the way explained above, it is not unreasonable to take "coming to be accidentally from what is not" to mean

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[13] Algra (2004: 116, n. 49) thinks that "οὐκ ἐνυπάρχοντος" (*Ph.* 191b16) expresses the idea of "inasmuch as the privation belongs to a matter" (Ross 1936: 495) and criticizes Ross, who takes "οὐκ ἐνυπάρχοντος" (*Ph.* 191b16) to mean "the privation not surviving in the product" (*ibid.*). I think, however, that Ross's interpretation is more reasonable than Algra's. See also Cherniss (1935: 61–62) and Lewis (1991: 238, n. 24) for a view favourable to mine.

[14] If so, Aristotle does not use "most properly" (*Ph.* 191b6–7) and "without qualification" (*Ph.* 191b14) synonymously or interchangeably.

(c) Coming to be from what is *qua* what is not.[15]

"From what is *qua* what is not" in (c) is contrasted with "from what is not *qua* what is not" in (b)* in just the same way as "a doctor acts *qua* builder" is contrasted with "a doctor acts *qua* doctor". In (c), 'what is not' corresponds (e.g.) to the unmusical and 'what is' corresponds (e.g.) to a man. Aristotle's acceptance of (c), thus understood, is in accordance with his explanation that "for a thing comes to be from the privation, which in itself is what is not" (*Ph.* 191b15–16). For it is in so far as the relevant privation belongs to a thing that the thing is that from which coming to be occurs. A man *qua* unmusical comes to be musical. A statue comes to be from a lump of bronze *qua* something shapeless.

My interpretation of "coming to be accidentally from what is not" is based on Aristotle's analysis of coming to be in *Physics* I.7. There Aristotle writes:

> From what has been said, then, it is clear that that which comes to be is always composite, and there is one thing which comes to be, and another which comes to be this, and the latter is twofold: either the underlying thing, or the thing which is opposed. By that which is opposed, I mean the unmusical, by that which underlies, the man; and shapelessness, formlessness, disarray are opposed, and the bronze, the stone, the gold underlie. (*Ph.* I.7, 190b10–17)

His idea is that a thing at the starting point of coming to be is composite and is made up of what underlies and a privation, which is why it makes sense to consider it to be what is *qua* what is not. It is on the basis of his own analysis of the *composite* nature of things that come to be that Aristotle holds that things come to be *accidentally* from what is not. He thinks that the Eleatics, while only thinking of one way of coming to be from what is not (i.e. in the sense of coming to be from completely nothing, as explained above), fail to grasp such a composite structure from which a thing comes to be.[16]

Thus Aristotle counters the impossibility claim of coming to be from what is not on the grounds that "there must be something underlying" (*Ph.* 191a31), by pointing out that a thing comes to be from what is not in the sense that it comes to be from what is *qua* what is not, rather than from completely nothing.

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[15] The relation between "coming to be accidentally from what is not" and (c) is to be understood here in an analogous fashion to the case in which "a doctor builds a house accidentally" is paraphrased as "a doctor *qua* builder builds a house", without using 'accidentally'.

[16] Simplicius (*In Phys.* 238.4–5) seems right when he explains that "we say that a thing comes to be accidentally from what is not; for it comes to be from the matter, in so far as the privation, which in itself is what is not, inheres to it" (see also Them. *In Phys.* 30.26–27; Phlp. *In Phys.* 178.7–11). The point is, I believe, that a thing comes to be from a composite made up of the matter and the privation. It is important *not* to take Simplicius in this passage as explaining the idea that a thing comes to be from the matter *rather than* from the privation, nor the other way around (*pace* Lewis 1991: 238–239).

4.

As for (a), Aristotle argues that:

> In the same way, we maintain that there is no coming to be from what is or of what is, except accidentally. In that way [i.e. accidentally], however, this too comes to be in just the same way as if an animal came to be from an animal and a certain animal from a certain animal; for instance, a dog came to be from a horse.[17] For a dog would come to be, not only from a certain animal [i.e. a horse], but also from an animal; not, however, *qua* animal, for that belongs already. But if anything is to come to be an animal not accidentally, it will not be from an animal, and if anything [is to come to be] what is [not accidentally],[18] it will not be from what is; nor from what is not either. For we have already said what it means to say "from what is not": it means "from what is not *qua* what is not". Further, we do not subvert the principle that everything either is or is not. (*Ph.* I.8, 191b17–27)

"In the same way", Aristotle claims, "there is no coming to be from what is or of what is, except accidentally" (*Ph.* 191b17–18). So, while accepting coming to be accidentally from what is (or of what is), he denies the possibility of (a)*:

(a)* Coming to be from what is *qua* what is.

As a next step Aristotle explains how something comes to be accidentally from what is with the help of the analogy of a case in which "a dog comes to be from a horse" (i.e. "a horse comes to be a dog"[19]). Being an animal is common to both a horse and a dog, and such a process of coming to be is also that in which a dog comes to be from an animal (*Ph.* 191b21–22). However, it is not in so far as the dog is an animal that it comes to be from an animal (*Ph.* 191b22).[20] For, Aristotle explains, being an animal *already belongs* to the horse

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[17] Here I read the text (191b20–21) without adopting Ross's emendation. If my analysis of his argument is correct (see below), then "the ordinary case of generation of dog by dog or of horse by horse" (Ross 1936: 495) would not serve Aristotle's purpose.

[18] I take "εἴ τι ὄν" (*Ph.* 191b24) to be parallel to "εἰ δέ τι (...) μὴ κατὰ συμβεβηκός" (*Ph.* 191b23–24), and read the former by supplementing it with "not accidentally".

[19] It should be noted that here Aristotle is not talking about a case in which a horse gives birth to a dog.

[20] The qualification, "not *qua* animal" (*Ph.* 191b22), could be taken to qualify either "a dog" (*Ph.* 191b22) or "from an animal" (*Ph.* 191b22). In the former case, "not *qua* animal" (*Ph.* 191b22) would mean "not [a dog] *qua* animal, [but a dog *qua* dog]". In the latter case, it would mean, I suggest, "not [from an animal] *qua* animal, [but from an animal *qua* what is not a dog]". It should be noted that being an animal that "belongs already" (*Ph.* 191b22–23) to that which is at the starting point of the coming to be could be understood as contrasted either with being an animal that also belongs to that which is at the end point of the coming to be, or with being a dog that does not yet belong to that which is at the starting point of the coming to be. This having been said, here it seems more natural to take "not *qua* animal" (*Ph.* 191b22) to qualify "a dog" (*Ph.* 191b22) rather than "from an animal" (*Ph.* 191b22), so that the case in which a dog *qua* dog, and not *qua* animal, comes to be from an animal (*Ph.* 191b21–23) is contrasted with the case in which an animal *qua* animal comes to be from what is not

at the starting point of the coming to be (*Ph.* 191b22–23). But "if anything is to come to be an animal not accidentally", i.e. if anything is to come to be an animal *qua* animal, "it will not be from an animal" (*Ph.* 191b23–24), but from what is not an animal (e.g. instead, from a seed). In an analogous fashion to this, Aristotle thinks, if anything is to come to be what is *qua* what is, it will not be from what is, nor from what is not *qua* what is not either (*Ph.* 191b24–26).

Aristotle's account of coming to be from what is, so understood, accords with his account of coming to be from what is not, as suggested by his phrasing of "in the same way" (*Ph.* 191b17): that is, a thing comes to be from what is, but not from what is *qua* what is, but from what is *qua* what is not. It is not unnatural that Aristotle's accounts of coming to be from what is not and of coming to be from what is are substantially the same. For it is the Eleatics who pose the two horns of the dilemma, while Aristotle's idea is that a thing from which coming to be occurs is a composite made up of what is and what is not, and he does not have to provide two types of answers. Obviously, Aristotle's account of coming to be from what is is again based on his own analysis of the composite nature of what comes to be. By showing that a thing comes to be from what is in the sense that it comes to be from what is *qua* what is not, rather than from what is *qua* what is, Aristotle clarifies that the grounds that "it is already" (*Ph.* 191a30), on which the impossibility claim of coming to be from what is is based, do not apply to what is at the starting point of coming to be.[21]

In the illustration of "a dog coming to be from a horse", being an animal corresponds to what underlies, being a dog to the form, and being a horse (or not being a dog) to the privation. Part of the obscurity of his argument comes from the fact that, while the relation between a dog/a horse and an animal is merely an *analogue*, and not an *example*, of the relation between a form or lack thereof and what underlies,[22] Aristotle uses the former in order to explain the latter in the case of coming to be. If Aristotle used the example of "a statue coming to be from a lump of bronze", instead of "a dog coming to be from a horse", his explanation would be as follows: when a statue comes to be from a lump of bronze, it comes to be not only from a certain form of bronze (i.e. a bar or something that lacks the form of a statue), but also from bronze. But it is not in so far as the statue is bronze that it comes to be from bronze. For being bronze "belongs already" to that

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an animal (*Ph.* 191b23–24). Ross (1936: 496) also takes οὐχ ᾗ ζῷον to go with ὁ κύων, but his interpretation is complicated by his not reading Aristotle's illustration of "a dog coming to be from a horse".

[21] Simplicius (*In Phys*. 236.28–30) explains that "so it is not in so far as the matter is what is that what is comes to be from the matter, but accidentally, for the reason that *not* being what is that comes to be (μὴ εἶναι τοῦτο τὸ ὂν ὃ γίνεται) is accidental to the matter, as the privation of what is that comes to be (τῆς στερήσεως (...) τοῦ ὄντος ὃ γίνεται) is present in the matter". It should be noted that the explanation given here for coming to be accidentally from the matter (sc. from what is) and the one given for coming to be accidentally from what is not at *In Phys*. 238.4–5 are basically the same. Ross's interpretation of Aristotle's solution (Ross 1936: 494–495) appears to be under the strong influence of what Simplicius says here and at *In Phys*. 238.4–5 mentioned above.

[22] Furthermore, when he says that "but if anything is to come to be an animal not accidentally, it will not be from an animal" (*Ph.* 191b23–24), Aristotle is talking about another type of coming to be, "an animal comes to be (from something that is not an animal)".

from which the coming to be occurs. But if anything is to come to be a lump of bronze *qua* bronze, it will not be from bronze, but from something that is not bronze (e.g. from copper, tin, etc.).

What Aristotle does not explicitly say, but presupposes, in the text is that, if anything is to come to be a dog *qua* dog, it will not be from a dog (but from what is not a dog). This explains "a dog coming to be from a horse". Analogously, he thinks that, if anything is to come to be a statue *qua* statue, it will not be from a statue, but from what is not a statue.

Thus, in the case of a statue coming to be from a lump of bronze, being bronze *already belongs* (cf. *Ph.* 191b22–23, 191a30) to that which is at the starting point of the coming to be, and it is not in so far as a statue is bronze that it comes to be from bronze; on the other hand, it is not in so far as a lump of bronze is bronze that a statue comes to be from bronze. It is in so far as a lump of bronze is something that lacks the form of a statue that a statue comes to be from bronze.[23] In Aristotle's view, a statue *qua* statue (and not *qua* bronze) comes to be from bronze *qua* what is not a statue (and not *qua* bronze). If so, then while Aristotle accepts coming to be from what is *qua* what is not (e.g. from bronze *qua* something shapeless), it is probable that he may not accept coming to be from what is not *qua* what is (e.g. from something shapeless *qua* bronze).[24]

If my analysis above is correct, the Eleatic error concerning coming to be from what is, which Aristotle thinks stems from their failure to see the composite structure of what comes to be, corresponds to taking (e.g.) "a man comes to be musical" to mean "a man comes to be musical in so far as he is a man", and not to taking (e.g.) "a man comes to be musical" to mean "a man comes to be musical from being musical". As mentioned above, Loux objects to taking "Socrates comes to be musical from being musical" to exemplify the Eleatic understanding of coming to be from what is, for the reason that, since Aris-

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[23] It is not unreasonable to take Aristotle to accept that a man comes to be musical from the unmusical *qua* the unmusical, since he thinks that it is in so far as a man is unmusical (and not in so far as he is a man) that an unmusical man is that from which a man's coming to be musical occurs. I see no good reason to take Aristotle to be rejecting the statement that "[t]he unmusical *qua* the unmusical comes to be the musical" as false (*pace* Lewis 1991: 231). Of course, Aristotle does not accept coming to be from what is not *qua* what is not, when 'what is not' is understood as completely nothing.

[24] Here at *Ph.* 191b17–27 Aristotle appears to be more concerned with that from which a thing comes to be (e.g. an unmusical man, a shapeless lump of bronze, etc.) than that which a thing comes to be (e.g. a musical man, a statue, etc.). While it is true that he mentions that which a thing comes to be, Aristotle does so in order to explain that that from which a thing comes to be lacks the form of that which is at the end point of coming to be. This is partly because the Eleatic dilemma is based on the classification of those things from which coming to be is supposed to occur, and their impossibility claims of coming to be are made with reference to the starting points of coming to be. But this is also partly because, I think, understanding the structure of a composite made up of a positive form and what underlies in terms of 'what is' is not as clear as understanding the structure of a composite made up of the lack of a positive form and what underlies in terms of 'what is not' and 'what is'. For in the former case "what is *qua* what is" at the end point of coming to be is ambiguous in that it can be taken to correspond (e.g.) to 'a statue *qua* bronze' and 'bronze *qua* bronze' (which do not capture Aristotle's understanding of what comes to be at the end point) as well as 'bronze *qua* statue' and 'a statue *qua* statue', whereas in the latter case "from what is *qua* what is not" unambiguously corresponds (e.g.) to "from bronze *qua* something shapeless". Indeed, Aristotle does not seem to aim at explaining the composite structure of what comes to be at the end point, when he says that "if anything is to come to be an animal not accidentally [i.e. an animal *qua* animal], it will not be from an animal" (*Ph.* 191b23–24).

totle is not committed to the truth of "Socrates comes to be musical from being musical," the impossibility of Socrates's coming to be musical from being musical does not threaten the possibility of coming to be from what is as Aristotle understands it.[25] This requires some comment, because Loux and I both hold that "Socrates comes to be musical from being musical" does not capture the Eleatic understanding of coming to be from what is that is at issue in the text, albeit for different reasons. In my view, Loux's argument is not plausible. Whereas it is true that "Socrates comes to be musical from being musical" is not a good example with which to analyse the Eleatic understanding of coming to be from what is as reported in Aristotle's text (*Ph.* 191a30), the reason why it is not a good example of the relevant case is irrelevant to the fact that Aristotle himself is not committed to the truth of that statement. Thinking that a man who comes to be musical does so in so far as he is a man, which in Aristotle's view is an error, is not the same type of error as thinking that a man who comes to be musical does so from being musical. The latter type of error is not at issue in the text. Aristotle, however, thinks that the Eleatics commit the former type of error in the first horn of their dilemma, while he is not committed to the truth of the statement that a man comes to be musical in so far as he is a man. As seen above, in Aristotle's view, it is legitimate to argue that it is not the case that a man comes to be musical in so far as he is a man on the grounds that being a man "belongs already" (cf. *Ph.* 191b22–23, 191a30) to that from which the relevant coming to be is supposed to occur. From this, the Eleatics draw the conclusion that, therefore, a man cannot come to be musical, while Aristotle draws the conclusion that, therefore, it is not in so far as he is a man that a man comes to be musical.

5.

From the above examination, it is now clear that the following three ways of coming to be are at issue in Aristotle's refutation of the Eleatic argument:

(a) * Coming to be from what is *qua* what is (*Ph.* 191b17–18),
(b) * Coming to be from what is not *qua* what is not (*Ph.* 191b6–10), and
(c) Coming to be from what is *qua* what is not (*Ph.* 191b14–15, 191b18).

Here (a)* and (b)* are the "most proper" (*Ph.* 191b6–7) readings of (a) and (b) in the Eleatic dilemma. These are the "most proper" readings, and the other alternative is not as obvious as these. While taking (a) and (b) in the Eleatic argument to be (a)* and (b)* respectively, Aristotle agrees with the Eleatics that neither (a)* nor (b)* is possible. It is important to note that he understands (a) and (b) in such a way that the reasons which the Eleatics give for the impossibility of each of these, namely "since it is already" (*Ph.* 191a30)

[25] Loux (1992: 289).

and "since there must be something underlying" (*Ph.* 191a31), make sense. However, (a)* and (b)* are not exhaustive. He argues that things come to be *accidentally* from what is not (*Ph.* 191b14–15) and *accidentally* from what is (*Ph.* 191b18), i.e. from what is *qua* what is not. In Aristotle's view, the structure of a thing from which coming to be occurs should be understood, not on the basis of (a)* or (b)*, but on the basis of (c). This idea of the 'accidental' in *Physics* I.8 is based on Aristotle's view that "that which comes to be is always composite" (*Ph.* 190b11), a view which has been gained through his own analysis of things which come to be in the previous chapter of *Physics* I, as explained above.

It is worthwhile, at this point, to clarify the various types of 'what is not' that are used in Aristotle's discussion of the Eleatic problem. The term, 'what is not', may refer to three things:

(N1) nothing;
(N2) the absence of musicality, etc.; and
(N3) an unmusical thing (or what is not musical), etc.

When Aristotle agrees with the Eleatics that "nothing can come to be from what is not" (*Ph.* 191a30–31), by saying that "we ourselves too say that nothing comes to be without qualification from what is not" (*Ph.* 191b13–14), he is best interpreted as talking about coming to be from what is not in the sense of coming to be from completely nothing (i.e. (N1)).

When, on the other hand, he adds "but that things do come to be *in a way* from what is not, i.e. accidentally. For a thing comes to be from the privation..." (*Ph.* 191b14–15), Aristotle accepts coming to be accidentally from what is not in the sense of coming to be accidentally from the privation. The privation might be ambiguous between (N2) and (N3).[26] However, when he says that the privation does not survive as a constituent of the result (*Ph.* 191b15–16), it is more reasonable to take Aristotle to mean by this that (e.g.) the lack of musicality (i.e. (N2)) does not inhere or persist in a musical man, which is the result of the coming to be in this example. Further, when he argues that the privation "in itself is what is not" (*Ph.* 191b15–16), Aristotle seems to explain that (e.g.) the absence of musicality is *in itself* nothing, while he thinks that it is a component of an unmusical thing and that, because of its relation to an unmusical thing, it is to be distinguished from completely nothing.

(N3) and (N2) are related and distinguished from each other in such a way that, while (N3) is a composite, (N2) is a component of which a composite is made up. In Aristotle's view, "what comes to be is always composite" (*Ph.* 190b11), and he thinks that such a composite at the starting point of coming to be is made up of what underlies and the

[26] For instance, Lewis (1991: 238–239) discusses a case in which "the unmusical" in the sense of an unmusical thing is an example of the lack.

absence of a positive form,[27] such as "shapelessness, formlessness, disarray" (*Ph.* 190b14–15). (N2) is the absence of a form, and (N3) is that which possesses the absence of a form. The understanding of 'what is not' in the senses of (e.g.) the absence of musicality and an unmusical thing, as distinct from completely nothing, is made possible through the above-explained analysis of the composite nature of what comes to be.

That from which a thing comes to be is 'what is not' in the sense of (N3) in so far as 'what is not' in the sense of (N2) is its component. As explained above, Aristotle thinks that a thing comes to be accidentally from what is not and accidentally from what is, and I take him to mean by this that a thing comes to be from what is *qua* what is not. His idea can be best understood, I think, by using "from a man *qua* an unmusical thing" and "from bronze *qua* that which lacks the shape of a statue", etc. as examples of "from what is *qua* what is not". On the other hand, it does not make good sense to talk about (e.g.) a man *qua* the absence of musicality, since a man can never be or come to be musicality or the absence thereof,[28] even though a man can lack or acquire musicality, and can be unmusical or musical.[29]

6.

I suggest, on this basis, that the key to understanding Aristotle's solution of the Eleatic problem lies in how the concept of accidentality is used.[30] Aristotle considers the distinction between 'non-accidental' and 'accidental' in various ways, and it is important to distinguish between three types of distinctions used in *Physics* I.7 and 8. These distinctions can be classified in the following way:

(D1) The distinction between 'coming to be of substance' and 'the other changes (qualitative, quantitative, and local)';

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[27] On the other hand, a composite at the end point of coming to be is made up of what underlies and a positive form.

[28] Such cases as that in which one is said *metaphorically* to be (e.g.) musicality incarnate do not constitute counterexamples to my view.

[29] The distinction between (N2) and (N3) should be understood in accordance with Aristotle's insistence on distinguishing between the opposites and what underlies (*Ph.* 190b29–191a3). While (e.g.) the lack of musicality cannot come to be musicality and an unmusical thing cannot come to be musical while remaining unmusical, an unmusical thing can come to be musical in the sense that what underlies unmusicality can acquire musicality in place of unmusicality.

[30] Graham (1987: 137–139) claims that the problem is caused by κατὰ συμβεβηκός descriptions, such as "[t]he doctor builds a house". Waterlow (1982: 17–18) thinks that Aristotle uses "the appropriate description ('κυρίως')" to solve the Eleatic problem. While they disagree over what type of description is problematic and what type of description Aristotle uses to solve the problem, Graham's interpretation of κατὰ συμβεβηκός and Waterlow's interpretation of κυρίως seem both to be in the same wrong direction. In my view, Aristotle thinks that the Eleatic problem comes from thinking of coming to be from what is not and coming to be from what is only in the "most proper" (*Ph.* 191b6–7) fashion, and he explains that the structure of that from which coming to be occurs should be understood as κατὰ συμβεβηκός (*Ph.* 191b15, 18).

(D2) The distinction between 'subject' and 'privation'; and
(D3) The distinction between 'what is not *qua* what is not/what is *qua* what is' and 'what is *qua* what is not'.

In each of these three cases, the latter is accidental while the former is non-accidental. (D1) is a well-known Aristotelian distinction, and it is not unreasonable to think that his discussion in *Physics* I.7 (*Ph.* 190a31–34) is about this. (D2) seems to be mentioned in *Physics* I.7 (*Ph.* 190b25–27). (D3) should be distinguished from both of these.

Some scholars[31] think that Aristotle has (D2) in mind when he says that things come to be accidentally from what is not (*Ph.* 191b14–15),[32] and they base this interpretation on Aristotle's explanation of the contrast between subject and privation in *Physics* I.7 (*Ph.* 190b25–27).[33]

However, there are some problems with this interpretation. First, it is not obvious why arguing that coming to be from the privation is *accidental* (while holding that coming to be from the subject, by contrast, is non-accidental) addresses the impossibility claim of coming to be from what is not in the Eleatic dilemma. Second, interpreting "accidentally" (*Ph.* 191b15) as corresponding to 'from the privation' (as opposed to 'from the subject') does not fit the context of *Physics* I.8. While it is obvious that "accidentally" (*Ph.* 191b15) is contrasted with "without qualification" (*Ph.* 191b14), and that "without qualification" is to be understood on the basis of the "doctor" example (*Ph.* 191a34–191b10), the example does not accord well with the (D2)-based interpretation. For instance, it seems that the contrast between 'a doctor *qua* doctor' and 'a doctor *qua* builder' does not correspond to the contrast between 'from the subject' and 'from the privation'. Third, if coming to be 'from the privation' is taken to be accidental on the basis of (D2), then coming to be 'from the subject' has to be interpreted as non-accidental. However, Aristotle claims in his solution that coming to be from 'what is' (which on this view corresponds to the subject) is also accidental (*Ph.* 191b17–18). Thus, the (D2)-based interpretation renders Aristotle's argument inconsistent. Loux also appears to point out this difficulty, while interpreting Aristotle's solution on the basis of (D2). From that, he concludes that Aristotle's treatment of coming to be from what is is not as careful as that of coming to

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[31] Charlton (1970: 80); Loux (1992: 303–309).

[32] What seems to lie behind the view that, while coming to be from the subject is non-accidental, coming to be from the privation is accidental, is the idea that it is only when X endures that a thing comes to be non-accidentally from X (cf. Lewis 1991: 237; Loux 1992: 302–305. See also Them. *In Phys.* 30.22–26; Phlp. *In Phys.* 178.6–7; Alexander in Simp. *In Phys.* 238.11–14). Supporters of the (D2)-based interpretation of "accidentally" (*Ph.* 191b15) might take Aristotle's remark that "this [the privation] not surviving as a constituent of the result" (*Ph.* 191b16), along with his explanation at *Ph.* 190b25–27, to mean that the relevant 'accidental/non-accidental' contrast lies between the privation and the subject (which, unlike the former, "survives as a constituent of the result"). In my view, however, his remark can be taken to explain that the privation "in itself is what is not" (*Ph.* 191b15–16), and is not particularly in favour of their view.

[33] It is not immediately clear what Charlton means when he says (Charlton 1970: 80) that "[i]t is awkward, therefore, to illustrate non-incidental coming to be by something dark coming to be pale (b5)". One possibility is that he does not clearly distinguish between (D1) and (D2).

be from what is not.[34] However, it is more reasonable to think that "accidentally" (*Ph.* 191b15) as used in Aristotle's solution should not be understood, as Loux does, on the basis of (D2).[35]

7.

Having clarified how Aristotle solves the Eleatic dilemma, I conclude by briefly suggesting an explanation of why Aristotle's discussion of it in *Physics* I.8, unlike his discussion in the previous chapter,[36] is difficult to understand and is not clear. Indeed, it is said that "[a]t this critical point of Aristotle's exposition the text, as we have it, is elliptical almost to the point of unintelligibility, unless supplemented from other sources".[37] Of course, it is not unreasonable to understand, as scholars actually do, 'what is' and 'what is not' in Aristotle's treatment of the Eleatic problem as corresponding to 'a man' (or 'Socrates'), 'the musical', etc. and as corresponding to 'the unmusical', 'the lack of musicality', 'nothing', etc. respectively, since Aristotle actually uses some of these expressions in his discussion in the previous chapter.[38] But it is also important to note that, unlike in the previous chapter, Aristotle now appears to be discussing the problem of coming to be in terms of 'what is', 'what is not', and the combination thereof, without using 'the musical', 'the unmusical', etc. as examples, even though he uses 'a doctor', 'a builder', 'a dog', 'a horse', 'an animal', etc. as analogues of 'what is' and 'what is not'.

What is the point of arguing on the level of 'what is' and 'what is not', rather than on the level of 'the musical' and 'the unmusical' etc., when responding to the Eleatic argument? One possibility is that Aristotle might think that, even if versions of the dilemma supplemented with 'the unmusical', 'the musical' etc. can be easily solved or shown to be innocuous, the original version in terms of 'what is' and 'what is not' would survive untouched. However, if Aristotle should be expected to give a more precise diagnosis of the Eleatic error on the basis of his own analysis of coming to be, and my above reading of his argument is correct, then another explanation[39] suggests itself: his strategy is to bring out that the Eleatics are at most only aware of "what is not *qua* what is not" (*Ph.*

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[34] Loux (1992: 308–317).

[35] It is important to note that, regardless of in what way 'from the privation' is explained to be accidental (as contrasted with 'from the subject' which on this view is non-accidental), the (D2)-based interpretation of Aristotle's solution does not work well.

[36] Aristotle's analysis of coming to be in *Physics* I.7 is well known for its readability, and is sometimes used as an introduction to his works. See, for example, Ackrill (1981: 24); Burnyeat (2001: 113).

[37] Wicksteed, Cornford (1929: 83).

[38] It would not make good sense to consider whether or not (e.g.) coming to be from what is not is possible, while thinking that 'what is not' corresponds to none of 'an unmusical thing', 'the lack of musicality', or 'nothing'.

[39] These two suggestions as to why Aristotle's argument on the Eleatic dilemma in *Physics* I.8 is not clear are not mutually exclusive.

191b9–10) and "what is *qua* what is" (*Ph.* 191b17–18) by showing that their impossibility claims make sense only when understood "without qualification" (*Ph.* 191b14), and, in doing so, to clarify that they fail to grasp the composite structure of what comes to be made up of what is (i.e. what underlies) and what is not (i.e. the privation) (*Ph.* 190b10–17). Aristotle seems to think that this is most clearly done by arguing in terms of 'what is' and 'what is not' rather than in terms of 'a man', 'the unmusical', and so on. Indeed, the source of the Eleatic error cannot, it appears, be exposed merely by stating straightforwardly, against their impossibility claims of coming to be, the view that (e.g.) the musical man comes to be from the unmusical man, even though all three principles are fully loaded in it. I suggest that the manner of Aristotle's discussion in *Physics* I.8 is related to his own method of inquiry as stated in I.1. As for the inquiry into principles, Aristotle says in *Physics* I.1 that "the natural course is to proceed from what is clearer and more knowable to us, to what is more knowable and clear by nature" (*Ph.* 184a16–18), and it is not unreasonable to think that his analysis of coming to be in I.7, which extracts the three principles through the analysis of how we ordinarily talk about coming to be, is based on such a method of inquiry. The principles thus derived are not necessarily clear to us. Solving the Eleatic problem, however, requires an understanding of what comes to be at the level of principles which reveals its underlying structure. Instead of paraphrasing 'what is not' and 'what is' in the Eleatic dilemma into the lack of musicality and a man, etc., Aristotle yet further translates the privation into their expression, 'what is not', by saying that it "in itself is what is not" (*Ph.* 191b15–16), suggesting that what underlies be understood as 'what is', in such a way that his solution is seen to engage with the original version of the Eleatic problem in its own terms. It is in this way that the Eleatics and Aristotle come into a real dialogue with one another.[40]

[40] I would like to thank Jason Carter, David Charles, Lindsay Judson, Yahei Kanayama, Eiji Kunikata, Richard McKirahan, and the editors of this volume for their valuable comments and encouragement. This is a much revised version of my 2008 paper (Oki 2008).

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Aristotle's Refutation of the Eleatic Argument in *Physics* I.8

In this paper, I show that Aristotle's refutation of the Eleatic argument in *Physics* I.8 is based on the idea that a thing at the starting point of coming to be is composite and is made up of what underlies and a privation. In doing so, I clarify how the concept of accidentality as used in his solution should be understood in relation to the composite nature of what comes to be. I also suggest an explanation of why Aristotle's discussion of the Eleatic dilemma in *Physics* I.8, unlike his discussion in the previous chapter, is not clear.

KEYWORDS Aristotle, the Eleatics, the *Physics*, coming to be, change

What about Plurality? Aristotle's Discussion of Zeno's Paradoxes

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1. Introduction

Zeno seems to have been the inventor of the genre of paradoxes as we know it in the Western tradition,[1] even if he did not use the term 'paradoxes' for it. And he seems to have come up with numerous individual paradoxes:[2] according to Proclus in his commentary on the *Parmenides*, there were 40 *logoi*, which Elias reports are supplemented by five arguments against motion; the Suida claims that there were four books by Zeno.[3] While according to these sources, Zeno's oeuvre seems to have been considerable, only some of these paradoxes have been preserved in our times. They can be divided into three series, the paradoxes of *topos*, the paradoxes of plurality, the paradoxes of motion, and, in addition, there is the single paradox of the falling millet seed.[4]

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[1] For a discussion of this claim, see Sattler (2021).

[2] Cf. DK 29 A 15; Kirk, Raven, and Schofield (1983: 264–265) and Barnes (1982: 233).

[3] DK 29 A 2.

[4] The paradoxes of *topos* can be found in DK 29 A 24 and B 4, and Lee fragments 13–18; the paradoxes of plurality in DK 29 B 1–3 and A 21–23, and Lee 1–12; the paradoxes of motion in DK 29 A 25–28, and Lee

Aristotle has a special relationship to Zeno's paradoxes. This can already be seen from the fact that Aristotle (together with his three commentators Themistius, Philoponus, and Simplicius) is our main source for his paradoxes. Moreover, for Aristotle, Zeno's reasoning seems to be the paradigm for paradoxical or eristic reasoning, as can be seen from Aristotle's *Organon*, where on four occasions Zeno's motion paradoxes are used as the only examples for this kind of reasoning: two occurrences discuss inappropriate uses of arguments, such as when Zeno's motion paradox is employed by some people for showing that the diagonal cannot be measured by the side (*APr.* 65b), or when his motion paradox is improperly used in a medical context to argue against taking a walk after dinner (*SE* 172a; Zeno's paradoxes showing motion to be impossible seem to have come in handy for people who didn't want to follow their doctor's suggestion to have some exercise after their meal). The other two occurrences use Zeno's paradoxes as exclusive examples for arguments that clearly present a wrong conclusion or are clearly contrary to common (and in this case true) opinion, but are nevertheless very hard to refute (*Top.* 160b and *SE* 179b).[5] The fact that Zeno's paradoxes of motion are used as well-known and the only examples in each of these cases shows that they were obviously familiar to a wider audience and centrally on the mind of Aristotle.

However, while Aristotle provides the first reports for the paradoxes of motion, *topos*, and the millet seed, he hardly ever mentions the paradoxes of plurality (Simplicius is our primary source for those). Given that Aristotle discusses the other paradoxes of Zeno at some length and comes back to some of them several times, it seems noteworthy that he does not show much interest in Zeno's paradoxes of plurality. Obviously this cannot be due to Aristotle not being interested in paradoxes as such and, as we will see below, it is also not the case that Aristotle did not know them.

With Plato, we seem to get a very different Zeno. When Plato talks about Zeno's paradoxes, he almost exclusively talks about Zeno's plurality paradoxes. The one work where Plato includes Zeno as a *dramatis persona*, namely the *Parmenides*, opens the main scene with a sketch of a plurality paradox of Zeno: if we assume a plurality of things, this plurality has to be like and unlike (Pl. *Prm.* 127e). And also Plato's reference to Zeno in *Phaedrus* 261c–e seems to concentrate on the plurality paradoxes.

In the context of the *Parmenides* dialogue, Plato also tells us more about the relationship between Parmenides and Zeno – most notably, that Zeno's paradoxes were meant to fend off attacks on Parmenides's position, an interpretation which has become one of

fragments 19–36; and the paradox of the falling millet seed in DK 29 A 29, and Lee fragments 37–38. For the division, cf. Lee (1967: 9).

[5] There is a fifth reference to another paradox of Zeno's in the *Organon* that I will deal with below.

the most dominant views on their relationship.[6] By contrast, Aristotle does not seem to be interested in their relationship.[7]

In this paper I want to investigate why Aristotle reacts to those paradoxes of Zeno he does and why, in contrast to Plato and Simplicius, he is almost completely silent on the plurality paradoxes. I will start by looking at the context in which Aristotle discusses the paradoxes of motion, *topos*, and the falling millet seed, in order to see what role these paradoxes play for Aristotle. Subsequently, I will look at the one mention of a plurality paradox we have in Aristotle and its context, as well as at the context in which Plato and Simplicius give us their accounts of the plurality paradoxes, in order to see whether this can help us to understand why Simplicius and Plato deal with the plurality paradoxes while Aristotle ignores them for the most part.

2. The paradoxes prominently discussed in Aristotle

2.1 The Motion Paradoxes

The four paradoxes of motion – the dichotomy or runner paradox, the Achilles, the arrow paradox, and the paradox of the moving rows[8] – are probably Zeno's most famous paradoxes. Aristotle refers to them several times in his discussion of continuity in the *Physics*: to the dichotomy, which he pairs with the Achilles, three times, to the arrow paradox two times, and once he reports the whole complicated set-up required for the moving rows paradox.[9]

He introduces the arrow paradox at the beginning of book VI, chapter 9, just after demonstrating in the previous chapter that, given the continuous structure of motion and rest, there cannot be a first point in time when motion happens, or when a moving thing starts to rest. If we assume as starting point a span of time, then the beginning of motion or rest seems to take place in each part of it, and since we can divide each part further

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[6] It has, however, been doubted in recent literature, so, for example, in Sedley (2017) and Palmer (2009). I will, nevertheless, also assume that Zeno is supporting Parmenides, as does Simplicius; I argue for this in Sattler (2020).

[7] As Richard McKirahan, forthcoming, has recently pointed out. McKirahan argues that Plato's testimony is not trustworthy, because it seems to disagree with Aristotle's and Eudemus's account. I argue against such a strong scepticism towards Plato's reliability with respect to Zeno in Sattler, forthcoming.

[8] There is a problem with the naming of the paradoxes. The name "dichotomy" is also used to refer to one of the plurality paradoxes; and the name "stadium paradox" is used by some scholars to refer to the fourth paradox of motion, to what is here called the moving row paradox (cf. Barnes 1982: 261), and by some to refer to the first paradox of motion, viz., the paradox that in a finite time a runner will either never be able to reach the end of a finite race course or cannot even get started (following Aristotle, *Top.* 160b7). I will stick here to the names given above, as they are commonly used in the discussion (even if the usage of the name "dichotomy" may not be historically correct, cf. Vlastos 1975: 215, n. 2). For further discussion of Zeno's paradoxes, see the contributions to this volume by Beori and Crubellier.

[9] See Sattler (2015).

into smaller parts, there is no real first moment of motion or rest. If, on the other hand, we assume there to be an indivisible now as the starting point, then we face the problem that in an indivisible now there can in fact be no motion or rest, since motion and rest is what happens in between two points of time – if a thing is at rest, it is in the same place in the second now as in the first; if it moves, it is in a different place. Thus, in an indivisible now, a thing is neither in motion nor at rest, rather it is un-moved according to Aristotle (*Ph.* 239b1–2). Having shown this, Aristotle now infers that Zeno's arrow paradox will not pose a problem, since:

> Ζήνων δὲ παραλογίζεται· εἰ γὰρ αἰεί, φησίν, ἠρεμεῖ πᾶν [ἢ κινεῖται] ὅταν ᾖ κατὰ τὸ ἴσον, ἔστιν δ' αἰεὶ τὸ φερόμενον ἐν τῷ νῦν, ἀκίνητον τὴν φερομένην εἶναι ὀϊστόν. τοῦτο δ' ἐστὶ ψεῦδος· οὐ γὰρ σύγκειται ὁ χρόνος ἐκ τῶν νῦν τῶν ἀδιαιρέτων, ὥσπερ οὐδ' ἄλλο μέγεθος οὐδέν.
>
> Zeno reasons falsely: for if, as he says, everything rests [or is in motion] whenever it is in/against what is equal, and what moves is always in the now, the moving arrow is unmoved. But this is wrong. For time is not composed of indivisible nows, nor is any other magnitude (Arist. *Ph.* 239b5–9).

According to Aristotle, we only get into the arrow paradox, if we assume nows to be indivisible and extensionless and time to consist of indivisible, extensionless nows.[10] For only in such a now would the moving arrow be in a place equal to its own size and only if time consisted of nothing but such nows would the flying arrow in every part of its course be in a place equal to its own size and thus at rest. Aristotle has already shown in chapter 2 of book VI that time cannot consist of indivisible, extensionless nows, and he has just shown in chapter 8 that in an indivisible, extensionless now there can be neither motion nor rest (the distinction between rest and not-moving is not yet to be found in Zeno).

In this context, Aristotle also introduces the other three paradoxes of motion (telling the reader that there are four *logoi peri kinēseōs*, which cause so much trouble for those who want to solve them). He has, however, already introduced the runner paradox earlier in his *Physics*, in 233a21–23. There Aristotle showed that his argument for time and space being infinite in the very same way also demonstrates that Zeno's argument makes false assumptions:

> διὸ καὶ ὁ Ζήνωνος λόγος ψεῦδος λαμβάνει τὸ μὴ ἐνδέχεσθαι τὰ ἄπειρα διελθεῖν ἢ ἅψασθαι τῶν ἀπείρων καθ' ἕκαστον ἐν πεπερασμένῳ χρόνῳ.

[10] For a detailed reconstruction of the paradox, see Sattler (2020).

> For Zeno's argument turns out to be wrong (in assuming) that it is not possible to go through the infinite or to touch each single (part) of the infinite in a finite time. (Arist. *Ph.* 233a21–23)

Zeno's argument suggests that something moving over a finite distance in a finite time, first has to cover half of this distance, then half of the remaining distance, and again half of the still remaining distance, ad infinitum. Accordingly, this paradox seems to show that when attempting to cover a finite distance in a finite time, (a) a runner in fact has to pass an *infinite* number of *spatial parts*, and (b) she has to do so in a *finite time*, which seems to be impossible.[11] In the context of this first introduction, Aristotle is only concerned with the second problem, that infinitely many spatial parts seemingly need to be covered in a finite time, so that of the two aspect of motion, time and space, one seems to be infinite, the other finite. Aristotle's immediately preceding discussion has shown that in considering motion, whenever we divide the distance covered, we also have to divide the time taken, so that both are equally infinite. And after the passage just quoted, Aristotle goes on to show that this infinity is unproblematic, since it is infinity of division, which has to be clearly separated from infinity of extension. What is infinite in division can be captured in a finite time. (Finally, Aristotle also shows that we cannot assume one of the two aspects of a finite motion, time or space, to be finite, and the other infinite in extension, since this would get us into inconsistencies).

This paradox is taken up once more in *Physics* book VIII.8, when arguing that under the assumption of a finite universe, only circular motion can be continuous in the sense of going on without interruption ad infinitum. In contrasting the continuous circular motion with linear motion that at some point would have to come to an end in a finite universe and start again, Aristotle gives us an analysis of the mid-points of a continuous motion: if we think of them as on a track passed by a continuous motion, they are only potential points. Once they are actualized, e.g., by the moving thing coming to a halt, then such a mid-point is in fact the end of one motion and the beginning of another, second motion. But if the moving thing travels continuously and does not stop there, then this potential point is not actualized, and we cannot say that the thing moving has arrived at this point or departed from it.[12] In 263a4–11, Aristotle applies this analysis to Zeno's runner paradox. He now gives us also what has been called the 'regressive form' of the paradox, that covering even half of the finite distance would mean that the runner must have already gone through an infinite number of spatial parts; accordingly, the runner cannot even get started. In his reply, Aristotle focuses on the first problem here, that in attempting to cover a finite distance, it seems an infinite number of spatial parts have to be passed (subsequently, he goes through this problem also solely with time – that a finite stretch of time seems to contain infinitely many parts of time). Pointing out that there are

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[11] For a discussion of a potential third problem, namely that an infinite number of tasks needs to be performed in a finite time, see Sattler (2019).

[12] For both of these would take time, and they cannot take place at the same time.

not actually infinitely many parts, but only potentially infinitely many (in the sense that at each point of the run, time, or distance, we could perform a division and thus derive two parts), he thinks he has also dealt with Zeno's first problem.

In *Physics* VI.9, the chapter we started out with for this paradox, Aristotle also sketches the Achilles paradox, only to make it clear that he considers the Achilles to be a variation of the runner paradox, which thus can be solved in the very same way the runner can. And he also sketches the complicated set-up of the moving rows paradox.

References to the motion paradoxes come at important moments in Aristotle's demonstration of the central features of the structure of continua: in the context of showing how to conceive of infinite divisibility; how to understand this infinity; when showing that time, space, and motion, all three, have to be thought of as continua equally; and that there cannot be motion or rest in an indivisible now. Accordingly, Zeno's motion paradoxes seem to be in the background of the whole discussion of continuity (in *Physics* book VI), which for Aristotle is the central structure underlying time, space, and motion.[13]

Since at least the first three motion paradoxes seem to have been the most important challenge posed to the assumption of infinite divisibility of time, space, and motion, which Aristotle presupposes in his account of continuity, we should not be surprised that these paradoxes figure prominently in his discussion of continuity.

2.2 The *Topos* Paradoxes

In the literature, we usually find reference to only one *topos* paradox, namely to DK 29 A 24.[14] I think that fragment DK 29 B 4, which connects *topos* and motion, should, however, also be counted as a paradox of *topos*, since it raises important questions for an account of space and place. It claims that nothing can move where it is, nor where it is not. But since this latter paradox is transmitted to us only in Diogenes Laertius, we will not deal with it here.[15]

The *topos* paradox that Aristotle discusses is the following:

> ἔτι δὲ καὶ αὐτὸς εἰ ἔστι τι τῶν ὄντων, πού ἔσται. ἡ γὰρ Ζήνωνος ἀπορία ζητεῖ τινὰ λόγον· εἰ γὰρ πᾶν τὸ ὂν ἐν τόπῳ, δῆλον ὅτι καὶ τοῦ τόπου τόπος ἔσται, καὶ τοῦτο εἰς ἄπειρον.

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[13] For a detailed discussion of the individual motion paradoxes, see Sattler (2020).

[14] In his *Nachtrag* Diels suggests understanding it no longer as a testimony, but rather as the fifth of Zeno's paradoxes, DK 29 B 5, following Calogero's suggestion in *Studi sull'Eleatismo* (1932). Köhler (2014) argues against understanding it as a fragment rather than a testimony.

[15] Some scholars think it may originally have been part of the arrow paradox.

> Further, if it [*topos*] is itself one of the existent things, it will be somewhere.[16] For Zeno's difficulty demands some explanation: for if everything that exists is in a *topos*, it is obvious that also *topos* will have a *topos*, and this will go on *ad infinitum* (Arist. *Ph.* 209a 23–25).

In outline (and reconstructed also with the help of Aristotle's discussion in 210b22 ff.), this paradox claims that if everything that exists is in something, and whatever is in something is in a *topos*, then if *topos* is also something that exists, it will have to be in something and thus in a *topos*, and this *topos* will in turn need a *topos* in order to exist, ad infinitum.[17] Given that the assumption of the existence of *topos* leads to an infinite regress, the implicit conclusion to be drawn from this is that *topos* does not exist.

Aristotle introduces this paradox at the beginning of his treatise on *topos* in *Physics* book IV.1 as one of the problems a discussion of *topos* has to deal with. As with all scientific inquiry, the inquiry into *topos* first has to establish whether its object exists, and if so, what exactly it is (i.e. what a consistent conception of *topos* would look like). With respect to the question what *topos* is, Aristotle thinks there is just one philosopher who has tried to give an answer, and that is Plato in his *Timaeus*, but he got it all wrong by confusing matter and space. On the question whether it does indeed exist, Zeno poses the clearest challenge so that, unsurprisingly, Aristotle feels the need to reply to it. He gives his reply in chapter 3, after having distinguished eight different senses of 'in', claiming that *topos* may be 'in' something, but not in the locative sense, so that we do not get an infinite regress.

In order to establish a science of nature, which Aristotle claims to be his aim at the beginning of the *Physics*, he needs to show that motion exists and can be consistently conceived, and he needs to do the same for *topos*, in which motion takes place. Accordingly, he has to show that Zeno's paradoxes, which seem to demonstrate that our understanding of motion and *topos* leads into inconsistencies, can be solved.

2.3 The Paradox of the Falling Millet Seed

Aristotle refers to Zeno's paradox of the falling millet seed in *Physics* book VII, 250a19–25, in his discussion of a lower threshold of a force. He establishes that if a force A can move something, say a ship, a distance D in a time T, it does not necessarily mean that force A/2 can move the same ship half the distance in the same time, or the same distance in double the time, as it may be that half the force cannot move the ship at all. Aristotle sees this understanding also as the solution to Zeno paradox of the falling millet seed:

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[16] So Philoponus, Simplicius, Themistius, and Ross. Morison (2002) and Sedley (2007) read ποῦ instead of πού; Sedley translates accordingly "where will it be?" while Morison interestingly translates as a plural "where will they be?".

[17] For a detailed reconstruction and discussion of this paradox, see Sattler, *Conceptions of Space*, chapter 2 .

διὰ τοῦτο ὁ Ζήννος λόγος οὐκ ἀληθής, ὡς ψοφεῖ τῆς κέγχρου ὁτιοῦν μέρος· οὐδὲν γὰρ κωλύει μὴ κινεῖν τὸν ἀέρα ἐν μηδενὶ χρόνῳ τοῦτον ὃν ἐκίνησεν πεσὼν ὁ ὅλος μέδιμνος. οὐδὲ δὴ τοσοῦτον μόριον, ὅσον ἂν κινήσειεν τοῦ ὅλου εἰ εἴη καθ' αὑτὸ τοῦτο, οὐ κινεῖ. οὐδὲ γὰρ οὐδὲν ἔστιν ἀλλ' ἢ δυνάμει ἐν τῷ ὅλῳ.

Hence Zeno's reasoning is false when he argues that there is no part of the millet seed that does not make a sound; for there is no reason why any such part should not in any length of time fail to move the air that the whole bushel moves in falling. In fact, it does not of itself move even such a quantity of the air as it would move if this part were by itself; for no part even exists otherwise than potentially in the whole. (Arist. *Ph.* 250a19–25)

Aristotle does not describe the paradox here – he seems to assume that the paradox is well enough known so that his audience would understand what he is talking about. There is a variant of this paradox in Simplicius's commentary on the passage, whose reliability has, however, been challenged, since it claims this paradox to be in dialogue form and lets Protagoras appear in it as an interlocutor of Zeno. Nevertheless, from both versions the same rough problem can be reconstructed: while one millet seed does not make a sound when falling, a whole bushel does; but a bushel is derived by adding always another millet seed, and yet another, so that one single seed must also make a sound. And hence a single seed does and does not make a sound. Understood like this, this paradox seems to follow a common structure that we find in Zeno's paradoxes: something is both F and not-F, a falling millet seed does and does not make a sound.

While Aristotle himself does not spell out the paradox fully, he shows that his account of a lower threshold also helps to solve this paradox. For given that there are lower thresholds to the ability of forces moving something, the fact that the whole bushel may move the air such as to make a sound need not mean that each individual seed can make a sound.

3. Zeno's plurality paradoxes

We have seen that Aristotle discusses Zeno's paradoxes at various places in his *Physics*, most notably in his discussion of continuity, *topos*, and the lower threshold of a force. But he does not even mention the plurality paradoxes anywhere in his *Physics*. There is, however, one brief passage in Aristotle where one of the plurality paradoxes is mentioned, which shows at least that he is aware of Zeno's plurality paradoxes. In order to figure out why Aristotle hardly seems to engage with the plurality paradoxes, while he does so with the other paradoxes, let us have a brief look at this one instance in Aristotle, and then look at the context in which Plato and Simplicius discuss Zeno's plurality paradoxes.

3.1. Aristotle's Discussion of a Plurality Paradox

It *Metaphysics* III, in the 11th aporia, we find Aristotle discussing the question whether Being and being one (a unity) are the substances of things, a claim Plato and the Pythagoreans seem to have made.[18] He argues against the possibility that these most universal principles can exist separately and *kath' auta* by showing that then no plurality could arise from them at all: if there is Being existing in itself, then everything else would be different from Being and thus would not exist "so that it necessarily follows, according to the argument of Parmenides, that all things that are, are one and this is Being." While assuming that Being exists separately thus leads to the position of Parmenides, assuming being one to exist separately would lead to everything else to be not-one. This is problematic, since to some degree, everything that exists has to be one, for "all things are either one or many, and of the many each is one" (for a many is nothing but many times a one). It is here that Aristotle brings in one of Zeno's plurality paradoxes, seemingly in order to support the point that assuming being one to exist separately, and, following on from this to be indivisible, leads into problems:

> ἔτι εἰ ἀδιαίρετον αὐτὸ τὸ ἕν, κατὰ μὲν τὸ Ζήνωνος ἀξίωμα οὐθὲν ἂν εἴη (ὃ γὰρ μήτε προστιθέμενον μήτε ἀφαιρούμενον ποιεῖ μεῖζον μηδὲ ἔλαττον, οὔ φησιν εἶναι τοῦτο τῶν ὄντων, ὡς δηλονότι ὄντος μεγέθους τοῦ ὄντος· καὶ εἰ μέγεθος, σωματικόν· τοῦτο γὰρ πάντῃ ὄν· τὰ δὲ ἄλλα πὼς μὲν προστιθέμενα ποιήσει μεῖζον, πὼς δ' οὐθέν, οἷον ἐπίπεδον καὶ γραμμή, στιγμὴ δὲ καὶ μονὰς οὐδαμῶς)· ἀλλ' ἐπειδὴ οὗτος θεωρεῖ φορτικῶς, καὶ ἐνδέχεται εἶναι ἀδιαίρετόν τι ὥστε [καὶ οὕτως] καὶ πρὸς ἐκεῖνόν τιν' ἀπολογίαν ἔχειν (μεῖζον μὲν γὰρ οὐ ποιήσει πλεῖον δὲ προστιθέμενον τὸ τοιοῦτον)·ἀλλὰ πῶς δὴ ἐξ ἑνὸς τοιούτου ἢ πλειόνων τοιούτων ἔσται μέγεθος;
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> Further, if the one itself is indivisible, according to Zeno's doctrine, it will be nothing. For that which neither when added makes a thing greater nor when subtracted makes it less, he asserts to have no being, evidently assuming that whatever has being is a spatial magnitude. And if it is a magnitude, it is corporeal; for the corporeal has being in every dimension, while the other objects of mathematics, e.g. a plane or a line, added in one way will increase what they are added to, but in another way will not do so, and a point or a unit does so in no way. But since he argues crudely, an indivisible thing *can* exist, so that the position may be defended even against him; for the indivisible when added will make the number, though not the size, greater. But how

[18] Cf. Menn, *The Aim and the Argument of Aristotle's Metaphysics*, chapters Iβ3 and Iβ4. According to Menn, *aporiai* 9–11 "are supposed to show that the [Platonic] genera cannot be *archai*." He sees *Metaphysics* VII as giving a systematic treatment of *aporiai* 5–11, "fleshing out their difficulties against the physicists and the dialecticians into a full argument that neither the physical nor the dialectical account of the *ousia* of a thing yields *archai* prior to the thing."

> can a *magnitude* proceed from one such indivisible or from many? (Arist. *Metaph.* 1001b7–18, translation by Ross).

Zeno's paradox claims that if something is indivisible it seems to be nothing: if this indivisible thing is added to something, it will not enlarge this thing (presumably either because as an indivisible thing, it would not become a proper part of that to which it is added, or because it would need to be without size to be truly invisible),[19] nor would it diminish the thing if it is then subtracted (again, because it does not seem to be a proper part or it is without size). But if it does not make any difference to whatever it is added to or subtracted from, then it does not seem to be (the idea that what is must be able to make some difference may be a predecessor to the Eleatic Stranger's suggestion in the *Sophist* that we can define being as whatever has the ability to be affected or to affect others). Aristotle immediately points out the implicit assumption this paradox rests on – that the things talked about are assumed to be magnitudes, and more specifically corporeal magnitudes, since only with corporeal magnitudes can we say that they will increase something in size when added, and decrease it in size when subtracted. He makes it clear that already with lower-dimensional mathematical magnitudes, such as lines, this would not be the case, since if we put one line on top of another, we have not increased the size of the initial line.

But such non-bodily indivisibles could increase the quantity of something by increasing the number, even if not the size – I may think about two points in my mind, then add a point to these two and thus get three points, even if I get no increase in size. Accordingly, Zeno's paradox leaves out many cases of indivisible things that would make a difference when added or subtracted, only not in the very restricted way Zeno allows them to make a difference. For Aristotle this is crude (φορτικῶς) reasoning and does not really help with the question whether the one as something indivisible can exist. Accordingly, this plurality paradox is not scientific or sophisticated enough to be included in the discussion of this aporia.

The accusation of crude reasoning fits with the way Aristotle treats paradoxes in the *Organon*, as we can see, for example, in the *Sophistici Elenchi*, chapter 2. But it is in notable contrast to Aristotle's treatment of Zeno's paradoxes in the *Physics*, where Aristotle may call some of them not hard to solve, but never remarks on them being not scientific or sophisticated enough to be discussed.

Interestingly, Aristotle does not take into account the context of this paradox and thus any possible reason for why Zeno may have restricted his argument to corporeal magnitudes. It may be that in arguing against pluralists, Zeno takes up from them the assumption that the plurality they are concerned with is a corporeal plurality. And given that we have other paradoxes of Zeno showing that if we assume such bodily things and

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[19] Obviously, the atomists Leucippus and Democritus later on would not agree to something having to be without size to be indivisible.

ones to be divisible, we get into the trouble of infinite divisibility, he may here simply give us the second horn of the dilemma, that the corporeal one that pluralists have to work with cannot be indivisible either or that bodies cannot be divided into indivisibles, just as they also cannot be divided into what is always further divisible.

By pointing out that Zeno's argument only works for corporal magnitudes, Aristotle implicitly also shows part of the way of how to deal with this paradox. But he is not taking into account whether it may be a good argument against a certain audience. And in contrast to his treatment of the paradoxes in the *Physics*, Aristotle simply puts this argument to the side as being crude without explicitly explaining his solution,[20] while the paradoxes of motion, *topos*, and the falling millet seed at least seem to demand an answer in his eyes, which Aristotle does then spell out.

While in his *Physics*, Aristotle discusses Zeno's paradoxes in order to show that a science of motion is indeed possible, and will not run into these paradoxes, in the *Metaphysics* he seems to bring in a paradox of Zeno in order to show that it is not decisive for the discussion about the separate existence of Being and Oneness and that, accordingly, he does not have to deal with it.[21]

3.2. Plato's Discussion of the Plurality Paradoxes and Plato's methodology

Let us now look briefly at the context in which Plato gives us his account of Zeno's paradoxes in the *Parmenides* and the *Phaedrus*. In both dialogues, Plato is clearly interested in Zeno's plurality paradoxes. Part of the background for this interest may be that Plato's Forms can be understood as displaying essential features of Parmenides's Being (being ungenerated and imperishable, not incomplete, unmoved, the same with itself, initially without any complexity) which allegedly has to be One. But Plato's Forms come as a plurality so that the possibility of plurality may at least require clarification.

The opening of the *Parmenides* shows Zeno as just having finished a reading from his book and Socrates asking whether he has understood it correctly: assuming a plurality of things would lead to these things being both like and unlike and thus to a contradiction; this in fact supports Parmenides' claim that there can only be the One. Plato does not provide any details about the way in which Zeno reached his paradoxical result. A rough sketch of this paradox might go as follows: if things are many, the same thing is both like (to itself) and unlike (to something else). But rather than engage with the concrete content of the paradox here – why the assumption of a plurality would lead each of these

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[20] Not explicitly spelling out a solution to the paradox may also be due to the context of *Metaphysics* B, which is meant to show possible *aporiai*, not yet their solutions.

[21] Menn thinks that Aristotle's reason for introducing the paradox here is "to bring out the impossibility of transition from an indivisible one to continuous magnitudes."

things to be like and unlike – Plato sketches the general structure of the plurality paradoxes and shows that they are meant as a support for monism by attacking pluralism.

We see that this plurality paradox seems to be rather different from the plurality paradox Aristotle deals with, which is part of a group of paradoxes showing that the one required for a plurality of things, the unit, can neither be divisible, for then it would not be one, nor indivisible, for then it seems to be nothing.

While Plato does not tell us how Zeno arrived at this seeming contradiction, in the following lines he lets Socrates discuss the paradox further by pointing out that such a result would be truly contradictory and thus problematic only if it could be shown to hold for intelligible things, like similarity itself, but that it is unproblematic with respect to sensible things: according to Socrates, it is not strange if a sensible thing is similar and dissimilar, since it can partake in both similarity as such and dissimilarity as such. Given this explanation, Plato's background assumption here seems to be that the F itself cannot be not-F in any way, as this would undermine its very being. By contrast, sensible things are complex, they are not just F as such, but can take on being F in one respect and not-being F in another, and thus can be similar and dissimilar in different respects. We find an analogous distinction with respect to the explanation of change already in the *Phaedo*, and that differences in respect do not need to lead to a contradiction, Plato already showed in his usage of the principle of non-contradiction in the *Republic*.[22] Similarly, we are told we should not be surprised that he, Socrates, can be both one and many, since he is one of the seven people in the room, and at the same time many, since we can distinguish his right side from his left side, and his back from his front (Pl. *Prm.* 128e–130a).

The possibility of plurality is also part of what is discussed in the dialectical exercise of the second part, which is explicitly claimed to be based on Zeno's method (Pl. *Prm.* 135d8). Plato here seems to be at least inspired by Zeno's method and indeed, among other things, engaging with it – not only showing the One or the others (and thus also a plurality) to be F and not-F, but also the One or others to be neither F nor not-F.

In Plato's *Phaedrus* we find a reference to Zeno in a rhetorical context. In 261c–e, Plato refers to the 'Eleatic Palamedes', who is usually identified with Zeno,[23] as showing that the same things will appear both as similar and dissimilar (ὅμοια καὶ ἀνόμοια), one and many (ἕν καὶ πολλά), at rest and in motion (μένοντα καὶ φερόμενα), which also covers mainly the plurality paradoxes,[24] again without giving any details. Placing Zeno in

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[22] See Sattler (2018) and (2020), chapter 5 for details.

[23] Cf., for example, *ad locum* in the Cooper edition of Plato's works.

[24] The opposition 'in motion and at rest' may, however, point to one of the motion paradoxes, most likely the arrow paradox. In this case, the series given by Plato may be an attempt to combine the plurality and motion paradoxes by showing that the basic structure is the same in both series: to make the same thing seem both F and not-F. Similarly, in *Parmenides* 128e ff., Plato mentions motion and rest as a central pair of concepts and may thus hint at the motion paradoxes: "»But if someone first distinguishes as separate the forms, themselves by themselves, of the things I was talking about a moment ago – for example, likeness and unlikeness, multitude and oneness, rest and motion, and everything of that sort – and then shows that in themselves they can mix together

the context of practising sophistry and ἀντιλογική τέχνη here seems to fit with the claim we find in Diogenes Laertius VIII.57, that Aristotle called Zeno the inventor of dialectic. It also shows that both Plato and Aristotle considered Zeno as a thinker who is relevant for questions of method.

Let us finally look at the source that provides us with most of the plurality paradoxes we know of, Simplicius's commentary on Aristotle's *Physics*.

3.3. Simplicius's Discussion of the Plurality Paradoxes

Simplicius presents Zeno's plurality paradoxes in his commentary on Aristotle's *Physics* I.3.[25] There Aristotle discusses Melissus and Parmenides when examining the question whether the principles of Being could be one rather than a plurality. While Aristotle discusses arguments of Melissus and Parmenides in I.3, he has already made it clear in the previous chapter that their investigation, whether Being is one and immovable, is in fact not part of natural philosophy – for Aristotle such a question rather belongs to first philosophy, i.e. to metaphysics. Nevertheless, he dips into it here as a kind of metaphysical digression. So it is at a point in Aristotle's *Physics* that explicitly touches upon a more metaphysical problem that Simplicius engages with the paradoxes of plurality. More precisely speaking, it is when Aristotle points out that some atomists yielded both to Parmenides and Zeno:

> ἔνιοι δ' ἐνέδοσαν τοῖς λόγοις ἀμφοτέροις, τῷ μὲν ὅτι πάντα ἕν, εἰ τὸ ὂν ἓν σημαίνει, ὅτι ἔστι τὸ μὴ ὄν, τῷ δὲ ἐκ τῆς διχοτομίας, ἄτομα ποιήσαντες μεγέθη
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> Some gave in to both of these [sc. Eleatic] arguments – to the argument that all is one if Being means one, by saying that non-Being is, and to the argument from dichotomy, by positing atomic magnitudes (Arist. *Ph.* 187a1–3, translation by Furley, slightly modified).

Those who gave in to both arguments seem to be the Academic atomists for Simplicius,[26] given that he introduces Xenocrates and his indivisible lines in this discussion. In the following commentary, Simplicius first explains the extent to which some have yielded to both Eleatic arguments, before he looks separately at Parmenides's claim that all things are one and then at Zeno's dichotomy paradox. He makes it clear that he

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and separate, I for my part«, Socrates said, »would be utterly amazed, Zeno«" (Pl. *Prm.* 129d–e, translation by Gill and Ryan with alterations).

[25] There are also two passages in Philoponus *in Ph.* referring to Zeno's plurality paradoxes, in 42.9 (= DK 29 A 21) which employs an example of one thing being simultaneously many, and in 80.23, which refers to the impossibility of infinite divisibility.

[26] This is also Alexander's and Porphyry's understanding; cf. also Furley (1967: 88, 104–110) and Sedley (2007). Makin (1993: 51), however, understands this passage as referring to Leucippus and Democritus.

agrees with Plato's depiction of the relationship between Parmenides and Zeno in his *Parmenides* dialogue that Zeno's paradoxes are meant to support Parmenides' position. Dealing with Parmenides's claim first, Simplicius shows that Plato gave in to Parmenides in the sense that he agreed with the premise that what is other than Being is not; but that nevertheless, Plato did not agree with the alleged consequence that what is not is nothing, since for Plato it is some particular non-Being.

It is when he is turning to the dichotomy claim that Simplicius introduces most of Zeno's plurality paradoxes. The term 'dichotomy' has been understood to refer to Zeno's first paradox of motion, since in *Physics* 239b22 Aristotle himself calls this paradox 'dichotomy'.[27] However, Simplicius, following Alexander, clearly takes it to refer to an argument against plurality:[28]

> Alexander says that the second argument, the one from dichotomy, is by Zeno, who says that if being had size and were divided, both Being and not-Being would still be many; and through this shows that the One is none of the things that exist (Simp. *In Ph*. 138.4–6).

The point of this argument may be understood as follows: if the one Being had size (as physical things do),[29] then it would have to be divisible, and if divisible, it would have to have parts, and thus not be one any longer but many. This argument prompts Simplicius to discuss the question whether Zeno really does away with Parmenides's One, as Alexander and Eudemus claim. In the context of this discussion, Simplicius introduces what I would count as five other paradoxes of plurality (though it is not always easy to decide whether Simplicius is quoting a new argument of Zeno or whether one of the plurality arguments continues). So in *in Ph*. 138.32 he claims that

> Alexander took from the words of Eudemus the opinion that Zeno did away with the One. For Eudemus says in his *Physics*: 'is it then that One is not this, but it is something? For there was a question about this. And they say that Zeno said that if anyone were to give him whatever One is, he would have the power to say what the things that exist are. And there was a question, it seems, because each of the sensibles was said to be many both by the categories and by division, but the point was supposed to be nothing. For what would neither increase something when added to it, nor diminish it when taken away, was not thought to be among the things that exist.

We see that this fragment questioning the one is connected, at least by Simplicius, with the argument we just saw in Aristotle's *Metaphysics*.[30] Simplicius gives several

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[27] Cf. Zekl's (1987) commentary *ad locum*, and Furley (1967: 82).

[28] Cf. also Ross (1936: 479).

[29] And as Zeno shows in fragments quoted later by Simplicius.

[30] Parts of this report from Simplicius can also be found earlier, in 97.13 ff. and 99.7 ff., where in the context of discussing the Lycophon problem that having many predicates seems to make a subject a plurality, Simpli-

arguments of Zeno that seem to support the idea that Zeno bound existence to physical extension, which seems to be problematic also for a one. At the end Simplicius concludes, however, that this holds true only of a one as presupposed by pluralists. Themistius's claim that Zeno argues positively that Being is one is brought in as support for this conclusion. Finally, Simplicius points out that what Porphyry took to be a dichotomy argument by Parmenides is really, as it seemed already to Alexander, by Zeno. In the course of this discussion, Simplicius gives us 3 of the 4 fragments that Diels and Kranz list as genuine B fragments, and the only verbatim quotations of the plurality paradoxes.[31]

While Simplicius's *in Ph*. 138.2–141.12[32] is the one passage which gives us the most encompassing account of Zeno's plurality paradoxes, we should bear in mind that we get them in the context of the discussion about whether Zeno also does away with the one by tying all existence to corporeal existence and a discussion of Zeno's relationship to Parmenides. Accordingly, Simplicius may give us only a selection of Zeno's plurality paradoxes that are relevant for the question he is discussing here. He may leave out others that could have been tied to a plurality leading to things being like and unlike, as we find it at the beginning of Plato's *Parmenides*.

In contrast to Simplicius, Aristotle is not interested in the question whether Zeno's paradoxes also do away with Parmenides's One; as already mentioned, Aristotle does not seem to connect Parmenides and Zeno very much at all.[33] Accordingly, a discussion, such as we find in Simplicius, of Zeno's paradoxes of plurality that focuses on the question of how Zeno's paradoxes relate to Parmenides's One, is not to be found in Aristotle's *Physics*. Furthermore, for Aristotle, this would also have been a question more appropriate to metaphysics than to natural philosophy, which, as we saw above, Aristotle thus puts to the side in *Physics* I. So presumably it is no accident that the only mention of a plurality paradox we find in Aristotle is in his *Metaphysics*. Why Aristotle does not discuss the plurality paradoxes any further there, neither he nor Simplicius tells us explicitly. But let us see whether we can derive a possible explanation from what we have seen about the context in which Aristotle deals with Zeno's paradoxes.[34]

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cius brings in Eudemus's claim that Zeno also argued against the one. Diels/Kranz give these last two passages together with Aristotle's *Metaphysics* passage as DK 29 A 21 and thus obviously understand them as dealing with the same paradox.

[31] The fourth fragment gives us one of the *topos* paradoxes in D.L. IX.72.

[32] And indeed in part up to 144.18.

[33] Cf. McKirahan and my reply to it.

[34] We do not know, however, whether there were in fact several more substantial paradoxes of Zeno and Aristotle only presents the tip of an iceberg, in which case the plurality paradoxes would not be singled out in the same noteworthy way as being ignored.

4. Conclusion

We saw that Aristotle is mainly interested in Zeno's paradoxes in so far as they are relevant for natural philosophy. By contrast, the plurality paradoxes clearly belong to a metaphysical investigation. The need for a conceptual basis for plurality was clearly raised by Parmenides' poem and Zeno's paradoxes.[35] But judging from Aristotle's treatment of Parmenides and of one of Zeno's plurality paradoxes in his *Metaphysics*, Aristotle does not seem to think that this problem as it was raised by the Eleatics still requires philosophical attention, and presumably took it that philosophers after Parmenides and Zeno had dealt with this challenge sufficiently. These post-Eleatic philosophers not only had come up with (at least more or less) consistent pluralistic systems, but they had also given an account of what grounds plurality – for Anaxagoras it is with the help of mind, which divides the initial undifferentiated mass, that we derive plurality;[36] for Empedocles strife divides the unified Sphairos into separate masses of the four elements;[37] and for the atomists the void is at least one of the reasons for the separation of the atoms. We see that what grounds plurality can be rather different – mind, a force, or a predecessor of space; and at least with Empedocles and the atomists it grounds not only plurality on the phenomenal level, but also on the level of what truly is.

Also Plato assumes plurality on the phenomenal and on the fundamental level. While his *Parmenides* dialogue can be read as including a metaphysical discussion about the possibility of plurality, Plato posits a plurality of Forms without assuming any means that would ground it – the fact that each Form is essentially what it is, seems to be enough to ensure this plurality. This also seems to be the way Aristotle is going with his understanding of plurality – there is no indication that for Aristotle we first have to derive plurality with the help of some means or that plurality would develop from some undifferentiated mass. Rather a plurality of different substances is Aristotle's starting point, and these individual substances are all different from each other, not simply due to force or space, but because of their essences. That Aristotle takes plurality to be unproblematic and not in need of further discussion is also supported by his treatment of the void in *Physics* IV.6–9: the void is used for a variety of tasks by his predecessors, and Aristotle prominently names its function as a condition for motion and as explaining differences in density. While he briefly mentions the void being used also as a separator in order to derive plurality (for example, in *Ph.* 213b22–27), this function is quickly dropped in his discussion, and he concentrates on the other two. He introduces the argument from the Pythagoreans for a void in order to ensure plurality in chapter 6, but it is the only one he does not reply to in chapter 7. Thus Aristotle shows no need to deal with arguments

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[35] And, to a lesser degree, by the material monism of the Milesians, though there it seems to be put forth less as a challenge than as a desideratum that had not been sufficiently dealt with in their theory.

[36] See Arist. *Ph.* 250b24 f., and Simp. *in Ph.* 300.29 f. (= DK 59 B 13).

[37] Emp. *Physica*, I.232–330; though deriving individual things is a more complicated story

concerning plurality, even if the context suggests such a discussion. Presumably, Aristotle thinks that his account of the form of something takes care of the question why we have a plurality of individual things on the metaphysical level and his understanding of the limits of continua in *Physics* VI is enough to make it clear what for him ensures that things are separate from each other on the physical level.

That Aristotle considers the plurality paradoxes as metaphysical questions seems to be clear from the fact that the only time he mentions one of them is in the aporia book of his *Metaphysics*. And it is with the plurality paradoxes on a metaphysical level that Zeno's connection to Parmenides would be most relevant,[38] so we should not be surprised if their relationship is not important for Aristotle.[39] In fact, Aristotle does once mention Parmenides and Zeno together, in his *Sophisici Elenchi* 182b22–27, where he claims that they both share in presenting one, metaphysically very fundamental *logos*, namely that 'being' and 'one' mean the same thing, which allegedly was hard to refute even for experts.

Since questions concerning plurality were intensively dealt with by Aristotle's post-Parmenidean predecessors, Aristotle is not concerned in his *Metaphysics* with establishing plurality;[40] instead he deals with new topics such as the distinction between form and matter, substance and accidence, potentiality and actuality, and so forth.

While for the assumption of plurality Aristotle builds heavily on the basis of his post-Parmenidean predecessors, he clearly does not think that these thinkers have dealt with motion sufficiently. For example, he explicitly claims in *De generatione et corruptione* 33b22 ff. that Empedocles has talked about *kinēsis* in a naïve and unsatisfying way; and he accuses the atomists of never explaining why the atoms move in the first place in his *Metaphysics* 985b: "the question of the origin and nature of motion in things they [the atomists] too ignored, just as blithely as the others."

Furthermore, in Aristotle's treatise on *topos* it becomes clear that a conception of space is not something that has already been established – we have seen Aristotle claiming that apart from Plato nobody has yet worked on it in the sense of trying to show what it is, and Plato got it all wrong. And finally, we have no evidence that the idea of a lower threshold of forces, which is the context of Aristotle's discussion of the falling millet seed paradox, had been a topic dealt with by the natural philosophers before Aristotle.

In his *Physics*, Aristotle attempts to establish a *science* of nature, an *epistēmē physeōs* (*Ph.* 184a15); he is not satisfied with an *eikôs mythos*. For this he needs to demonstrate that motion as the central concept of natural philosophy, as well as important related concepts,

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[38] Even if we assume that some of his plurality paradoxes also question Parmenides' ontology (against which I argue in Sattler 2020).

[39] The paradoxes of motion may also be connected with Parmenides's poem, but here the connection is less striking, and the motion paradoxes can in any case be seen as a challenge for natural philosophy that is independent of any Eleatic background.

[40] Apart from the one brief mention of a plurality paradox in *Metaphysics* Beta we saw above, where he brushes it aside.

such as *topos* and force, can be conceived consistently. Accordingly, he needs to show that possible paradoxes concerning these concepts have no bite.

Aristotle wants to show not only that there is motion – this he seems to take for granted – but that there can be a *science* of motion, a physics, which he is the first to fully establish. For Aristotle there is no similar science of plurality; rather, plurality is an assumption taken for granted in all sciences, and, if at all, discussed in metaphysics. For Aristotle, any scientific inquiry presupposes plurality in assuming that there is a distinction between an *archê* and that of which it is an *archê* – the very first sentence of his *Physics* claims that we know some area or field if we know its *archê* (*Ph.* 184a10 ff).

It seems as if the Zeno of Aristotle and of Plato are very different thinkers. Aristotle hardly connects Zeno with Parmenides, and almost leaves out the plurality paradoxes completely, while these are exactly the two points Plato focuses on. However, the main reason for this difference lies in the different contexts in which Plato and Aristotle discuss Zeno: we saw that Plato takes up Zeno mainly in the context of ontology, which explains his focus on the plurality paradoxes and on Zeno's relationship to Parmenides, while for Aristotle, Zeno's philosophy is most relevant in the context of establishing a science of nature. And we may think Plato is not reacting to the dichotomy problems explicitly, since he is an atomist of sorts. Moreover, while the plurality paradoxes are the most prominent paradoxes for Plato, we also find him referring to some of the other paradoxes as well. We saw that Plato also refers to motion and rest as one pair of opposites that feature prominently in Zeno's paradoxes. And there is also a reference to the *topos* paradox in Plato's *Timaeus* – he does not name Zeno there, but in his discussion of the receptacle, he discusses the idea that *everything* that exists seems to be in a place and space. As a reply to this assumption, Plato claims that in fact there are things that exist but are not in a place, like the Forms; and thus questions one of the main premises of this paradox.[41] Finally, we saw that both Plato and Aristotle are interested in Zeno's method. Thus while Plato and Aristotle seem to give us a very different Zeno, we see that this is mainly due to the different interests with which they approach Zeno, and that their accounts are in fact compatible.

We saw that Plato is interested in Zeno's plurality paradoxes and in the second part of the *Parmenides* he also discusses the possibility of plurality. Aristotle can build on this, and earlier, accounts. The problem that a plurality of things will lead to them being like and unlike can easily be shown to be unproblematic with the help of a principle of non-contradiction according to which x can be like one thing in one respect, and unlike another in a different respect. This is an understanding of the principle of non-contradiction that we do not yet find with Parmenides and Zeno, but that Plato clearly uses in his *Republic*, and that Aristotle explicitly discusses in his *Metaphysics* IV.[42] Thus, Aristotle does not need to deal with these kinds of paradoxes separately. But the paradoxes of

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[41] For details of this hint in Plato, see Sattler, *Conceptions of Space*, chapter 2.

[42] For details, see Sattler (2020), chapters 2, 3, and 5.

motion, *topos*, and the falling millet seed are not sufficiently covered by the Presocratics or Plato, and as they may be conceived as serious obstacles for a science of nature, Aristotle takes them on in his *Physics*.[43]

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[43] I want to thank the St. Andrews work in progress group for feedback on the paper.

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What about Plurality? Aristotle's Discussion of Zeno's Paradoxes

While Aristotle provides the crucial testimonies for the paradoxes of motion, *topos*, and the falling millet seed, surprisingly he shows almost no interest in the paradoxes of plurality. For Plato, by contrast, the plurality paradoxes seem to be the central paradoxes of Zeno and Simplicius is our primary source for those. This paper investigates why the plurality paradoxes are not examined by Aristotle and argues that a close look at the context in which Aristotle discusses Zeno holds the answer to this question.

KEYWORDS

Aristotle, Zeno, Simplicius, Plato, plurality paradoxes, metaphysics, science

Aristotle, Eleaticism, and Zeno's Grains of Millet*

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Aristotle and the Problem of Movement

Both Parmenides and Zeno are quoted by Aristotle in his works several times; as is well-known, he is usually very hostile to them, and his critiques are mainly addressed against Eleatic monism, i.e., the view that "the all is one." If so, Aristotle claims, plurality, such as we perceive it in the natural world, is not possible and hence change is not possible, either. But if change is not possible, nature cannot be accounted for: as Aristotle argues, nature as well as natural entities are defined by reference to motion. Nature is a principle or cause of being moved and of being at rest in that to which it belongs primarily, and natural entities are those that have within themselves a principle of motion and of rest (*Ph.* II.1, 192b13–14; b20–22). It is arguable that if Zeno's paradoxes against motion are sound, Aristotle's thesis that motion is something inherent to nature might be threatened and, what is more serious, the physical world could not be explained. To be sure, Aristo-

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tle takes as a 'basic assumption' (ἡμῖν δ' ὑποκείσθω) that some or all natural things are changing (κινούμενα – *Ph.* 185a12–13; see also *Ph.* 200b12–15; *Metaph.* 1025b20).

The problem that the all is one dates back to Plato's *Parmenides* (*Prm.* 128a–d), where Zeno, within the dramatic framework of the dialogue, claims that if things are multiple, it must follow that the same things are both like and unlike, which is impossible. Thus, if it is impossible for unlike things to be like, and like things to be unlike, it is also impossible for either of them to be many (in fact, if they were many, those impossibilities could not be avoided; *Prm.* 127e). In the dialogue Zeno contends ("against what is generally argued" – *Prm.* 127e9–10: παρὰ πάντα τὰ λεγόμενα) that there is no multiplicity. It is Plato himself who highlights that Zeno wants to be associated with Parmenides not only in friendship, but also by his writings. Indeed, Zeno's arguments lead to the Parmenidean conclusion: there is no multiplicity, i.e. "the all is one", the tenet that Aristotle ascribes to Parmenides everywhere in order to show that being should not be understood in an absolute sense.[1] While Parmenides suggests that "the all is one",[2] Zeno says "it is not many", but both of them say the same thing insofar as Zeno's argument leads to the Parmenidean view that there is no plurality (or this is the way both Plato and Aristotle appear to have interpreted the issue). If this is so, one might speculate that Zeno imagined his paradoxes in order to support Parmenides' view (although, as is well-known, this is highly controversial);[3] but if Parmenides is right, the natural world, which in Aristotle's view is a world of change, cannot be explained.[4] On the other hand, Aristotle famously argues that some people hold that it is not the case that some things are changing, while others are not. What they want to posit is that, even though everything is changing *all the time*,[5] this goes unnoticed by our sense perception (*Ph.* 253b9–11). Aristotle takes the view that *everything* is changing to be false, but just *to some extent* (σχεδὸν (...) ψεῦδος –

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[1] This is a typical Aristotelian view (cf. *Ph.* 186a24–32; 186b4; *SE* 166b37–167a4, and especially 167a2: οὐ γὰρ ταὐτὸ τὸ εἶναί τέ τι καὶ εἶναι ἁπλῶς), which, however, is drawn from Plato (*Sph.* 255c12–13).

[2] Actually, Parmenides does not explicitly say that "the all is one", but that "it [presumably "being"; see ἐόν at v. 3] neither was nor will be (οὐδέ ποτ' ἦν οὐδ' ἔσται), but is now, wholly homogenous, one, continuous (ὁμοῦ πᾶν, ἕν, συνεχές)" (DK 28 B 8.5–6, transl. N. L. Cordero).

[3] As Booth observes (1957: 2), both Parmenides and Zeno are idealized characters in Plato's *Parmenides*, so we are not compelled to believe that Zeno's arguments were designed to endorse Parmenides' theory on the one. For his part, Cordero contends that Zeno must be taken to be an eristic philosopher, not a *disciple* of Parmenides, and that a Parmenidean legacy in Zeno cannot be detected; see Cordero (2004: 181–182). In this paper, though, these details, albeit important, are not decisive, since my focus is on the way Aristotle took Zeno's paradoxes. Anyway, one always can argue that in the *Parmenides* the character Socrates reminds Parmenides that in a way "Zeno has written the same thing as Parmenides", and that Zeno was trying to fool people into thinking that he states something different. Thus, Plato does not emphasize that Zeno is a *disciple* of Parmenides, but he is concerned with showing (in his own peculiar interpretation) that they are saying the same thing (*Prm.* 128a6–b6). For Zeno's picture derived from Plato's *Parmenides*, see the balanced discussion by Curd (2004: 178–179), who suggests three different but related approaches to Zeno.

[4] As a methodological recommendation Aristotle claims that it would be absurd to try to prove that nature exists, as it is obvious that there are *many* things of this kind (τοιαῦτα τῶν ὄντων ἐστὶν πολλά: cf. *Ph.* 193a3–6). This can be taken to be an overall objection to the Eleatic denial of motion.

[5] Aristotle must have Heraclitus in mind (*Ph.* 265a2–12; see also *GC* 318a18–25).

Ph. 253b6–7); despite it being false, he says, it is less opposed to his own investigation, because, as already established in his treatise on nature (he surely refers to *Ph.* 2), nature is a principle both of movement and of rest, and movement also is a natural phenomenon (φυσικὸν ἡ κίνησις – *Ph.* 253b9)

This paper sets out to explore the way in which Aristotle attempts to reject some Eleatic tenets in general and some of Zeno's views in particular that apparently threaten his 'science of nature'. The Zenonian paradoxes are closely linked to the problem of the continuous and infinity; in *Ph.* 6 Aristotle is intent on discussing the continuity and infinite divisibility of magnitudes, motion and time. He states that Zeno tries to prove (based on a false assumption: ὁ Ζήνωνος λόγος ψεῦδος λαμβάνει – *Ph.* 233a21) that it is impossible for a thing to traverse what is infinite or to come in contact with infinite things in a finite time. Aristotle accounts for why Zeno is wrong by resorting to his distinction between potentiality and actuality and to his theory of mathematical proportions as applied to the motive power and the moved object (*Ph.* VII.5). Regarding the perception of spatial magnitudes, Aristotle states, some very small parts of such magnitudes (that constitute larger ones) are perceived, although he clearly points out that they are perceived only in potentiality, not in actuality. That seems to be the reason why he rejects the Zenonian view that a single grain of millet makes no sound on falling, but a thousand grains make sound, which apparently implies (from Zeno's perspective) that a thousand nothings become something, which is absurd. Aristotle's objections to Zeno, I shall argue, are addressed in order to avoid a potential threat to his science of nature; in fact, if Zeno's paradoxes were true, there would be no motion, but if there is no motion, there is no nature and hence, according to Aristotle, there cannot be a science of nature. My chief claim is that Aristotle did not read the millet seed paradox as a sorites problem or as an issue related to the theory of consciousness; what he actually noted in the millet seed paradox is that it apparently casts doubts on his theory of mathematical proportions, i.e., the theory of proportions that holds between the moving power and the object moved, and the extent of the change and the time taken. If this were not so, it would not become clear why Aristotle establishes an analogy between the millet seed paradox, on the one hand, and the argument of the stone being worn away by the drop of water (*Ph.* 253b15–16) and of the hauled ship, on the other. My interest is not focused on explaining the way in which the paradox should be read, but on showing the difficulty Zeno's millet seed argument would involve *for Aristotle* in the context where he discusses it (*Ph.* VII.5).[6]

The paper proceeds thus: in the following section I provide a brief explanation of the way in which Aristotle appears to have read the dichotomy argument and the Achilles; this can be a nice introduction to Aristotle's theory of mathematical proportions. Within the same section I explain how I think Aristotle considered the millet seed argument and how it, if sound, would complicate his science of nature. In the final section, I provide some general concluding remarks and point out some difficulties regarding Eleaticism (as

[6] As I will point out below, Aristotle also notes that the millet seed paradox involves a perceptual problem.

viewed by Aristotle). The general scope of this paper is rather limited as it will try to show how Zeno's tenet on infinite divisibility would affect Aristotle's view on what nature is or, more generally said, how Zeno's paradoxes release plenty of absurdities by questioning our common sense regarding the physical world, a common sense that apparently must match with Aristotle's theory of the mathematical proportions, such as those proportions are presented in *Ph*. VII.5.

A glance at Zeno's Paradoxes on Infinity as a Background to the Millet Seed Paradox

Before focusing on the millet seed paradox, it would be convenient to briefly refer to two of the best known paradoxes: the 'dichotomy argument' and the 'Achilles' (they are helpful in order to show how I think the theory of proportions and the millet seed argument are linked).[7] As Aristotle himself sums them up, they seem to be designed to prove that there is no motion, since a moving object (τὸ φερόμενον) must reach the halfway stage before it reaches its goal (*Ph*. 239b10–14). This account matches well with the Achilles, since, according to Zeno, in order to traverse any distance, one must always traverse half of the distance in question (this shows, in Zeno's view, that there will be no motion because the moving thing should arrive at the halfway point before the end of the journey; cf. *Ph*. 233a21–31).[8] In accordance with the Achilles,[9] the fastest runner can never reach the slowest, because the former must first arrive at the place from which the slowest runner departed, which means (according to Zeno) that this runner will always be a little farther ahead. If this is so, (*a*) in order to reach the tortoise, Achilles must go through infinite points sorted according to the sequence 1/2, 1/4, 1/8...^{n}; but (*b*) it is impossible to go through infinite points in a finite time, from which (*c*) it follows that Achilles will never reach the tortoise. To neutralize this argument and block the conclusion (*c*) Aristotle rejects (*b*) by pointing out that there is a sense in which a finite time *is* infinite. According to him, Zeno accepts a false point of departure since he states that it is impossible for a moving object to traverse infinite things (the text says τὰ ἄπειρα, probably in the sense of 'infinite points') or to come into contact with infinite things

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[7] In addition to the Dichotomy and the Achilles, Aristotle also refers to the Flying Arrow paradox (*Ph*. 239b5–9; 30: it is impossible for an arrow to be moving during a period of time, because it is impossible for it to be moving at an indivisible instant, a 'now' in Aristotle's jargon; this is false, Aristotle contends, because time is not composed of indivisible nows). He also mentions The Stadium, on which see *Ph*. 239b33–240a15. As Aristotle himself observes, the Dichotomy, the Achilles and the Stadium are closely related to each other; so, for the sake of brevity I will omit the details of these arguments.

[8] The argument is summarized by Simplicius as follows: "If motion exists, what is in motion must traverse infinite [points] (ἄπειρα διεξιέναι) in a finite time. But this is impossible; motion, therefore, does not exist" (*in Ph*. 1013.4–6; my transl.).

[9] The only difference with "the dichotomy" is that the magnitude remaining is not divided into halves (Arist. *Ph*. 239b19–20: μὴ δίχα τὸ προσλαμβανόμενον μέγεθος).

individually in a finite time. Aristotle maintains that there are two senses in which the word 'infinite' is applied to distance, time, and in general to any continuous thing: 1) in terms of its divisibility and 2) in terms of its extremes. Thus, while a thing cannot come into contact with quantitatively infinite things in a finite time, it can come into contact with infinite things as to their divisibility. In this sense, time itself *is* infinite (*Ph*. 233a28: αὐτὸς ὁ χρόνος οὕτως ἄπειρος). Thus, it turns out that the time used to traverse through the infinite is not finite but infinite, and contact with infinite things is made not in finite but infinite times. So, Zeno's explanation should be rejected because time contains in itself infinite points, and it is not absurd to suppose that infinite points are traversed in infinite time. Therefore, to the one who poses the difficulty (i.e., Zeno) of whether or not it is possible to traverse infinite points (ἄπειρα διεξελθεῖν – *Ph*. 263b4), whether in time or in extension (ἐν χρόνῳ ἢ ἐν μήκει), one can answer that, in one sense, it is possible, while in another it is not. If points *actually* exist, it is not possible, but if they *potentially* exist, it is possible; for example, if a person is moving continuously, she may accidentally traverse infinite points, but not in a strict sense.[10] To be sure, time is infinitely divisible, so Achilles can traverse an infinitely divisible distance and travel the points that mark its divisions.[11] Aristotle's point is that an infinite magnitude cannot be traversed in an finite time, so the bulk of his disagreement with Zeno is that motion or time (two conspicuous examples of continuous items) have parts only in potentiality, not in actuality.

This brief discussion of these well-known Zenonian paradoxes contributes to better understanding, in my view, the millet seed paradox. Aristotle contends that it is wrong to believe (as Zeno does) that there is no part of the millet that does not make a sound since

> there is no reason why any such part should not in any length of time fail to move the air that the whole bushel moves in falling. In fact, it does not of itself move even such a quantity of the air as it would move if this part were by itself: for no part even exists otherwise than potentially (*Ph*. 250a20–21; Oxford Translation, slightly altered).

As is well-known, the argument was rephrased by Simplicius who represents Zeno as engaged in a fictional conversation with the sophist Protagoras; according to Simplicius, Zeno would have argued that if a bushel of millet seed makes a sound, the single

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[10] It is irrelevant that there are infinite halves in the line, since the nature of the line is different: a line is what is divisible in one dimension (*Metaph*. 1016b26); every line is always divisible and is a finite extension (*Metaph*. 1020a14). Further, the line is not composed of points because it is impossible for a continuum to be composed of indivisibles, and the points are the limit of the line and so indivisible (cf. *Ph*. 234a24–25). If this is so, Zeno's account of division (which starts from the assumption that a finite line is everywhere divisible and hence any such part of it could be divided further) cannot be true, because any process of division will reach some very small parts of the line which are not further divisible.

[11] For more on this cf. Kirk, Raven, Schofield (1991: 269–276). One of Aristotle's main objections to Zeno is that a period of time cannot be the *sum* of the indivisible instants within it (see n.10 above). But as observed by Schofield (Kirk, Raven, Schofield 1991: 273), Zeno's Arrow argument does not assume that space and time are not infinitely divisible, so Aristotle's objection might be based on a wrong assumption.

millet seed and the ten-thousandth part of a seed (ὁ εἷς κέγχρος καὶ τὸ μυριοστὸν τοῦ κέγχρου) will make a sound as well (Simp. *in Ph*. 1108, 27–28). Some scholars maintain that Zeno's paradox is or can be read as a typical sorites paradox.[12] Others suggest that the issue is related to the theory of consciousness rather than metaphysics or that it can be understood as a *colour sorites* problem.[13] Zeno's millet seed paradox has also been read as a critique of perception, since one can rationally prove that the millet seed makes a sound, even though one cannot perceive such sound. Bearing all of this in mind, we turn to Aristotle's mathematical proportions: if half motive power moves half the object moved a certain distance in an amount of time, it is *not* necessary (οὐκ ἀνάγκη) that half the motive power can move twice (e.g., in weight) half the moved object, half the distance in the same time. Thus, if the motive power moves the moved object a certain distance in an amount of time, it does not necessarily follow that half the motive power will in such an amount of time (or in any part of it) cause the moved object to traverse a part of the distance the object has been moved (see the example provided by Aristotle himself regarding the person moving a ship – *Ph*. 250a16–18 – and briefly analyzed below).[14] This bears the same ratio to the whole of the distance moved as the ratio between the motive power and half the motive power (*Ph*. 250a9–12).

Although Zeno is mentioned several times in Aristotle's works, the millet seed paradox is cited, implicitly or explicitly as far as I know, in only three passages: (i) in *Ph*. VII.5, 250a20–25 (ii) in *Sens*. 6, 445b29–446a20, and (iii) (indirectly) in the *Cat*. 5b15. The two central passages are (i) and (ii). Before advancing in my account of Aristotle's disagreement with Zeno on the millet seed paradox, I will briefly explain the contents of passage (i); for the sake of brevity, I shall omit a detailed discussion of passage (ii), although I will refer to it below, since in the *Sens*. 6 passage Aristotle clearly explains how the paradox is related to a problem of perception.

Philosophers and historians of science have thought that in Aristotle's *Ph*. VII.5 we can observe the first formulation of the basic laws of quantitative movement. Some people even take the text somehow to describe the history of the passage from a qualitative consideration of nature (the Aristotelian one) to the new quantitative conception of the physical sciences in Modernity.[15] According to Treder, for both Aristotle and Newton

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[12] Barnes (1982: 203–204). See, however, Barnes (1982: ix), where he retracts from what he had said in the 1979 edition of this book (in fact, a Sorites puzzle always contains a vague term, which is not the case with the millet seed argument, as recognized by Barnes himself on p. 204). Against the soritical reading of Zeno's paradox, see also Barnes (2012: 551), where he argues that Zeno did not proceed by way of a soritical argument, but by the aid of a principle of proportionality. This is the view I shall be defending, i.e. that Aristotle took Zeno's paradox to break his own mathematical proportionalities as applied to the motive power and the moved object.

[13] Mortensen (2007: 17).

[14] Aristotle's point is that, from the fact that several haulers can move a ship, one cannot infer that one hauler can move part of the ship alone. For discussion and Archimedes' objection to Aristotle see Berryman (2019: 119 and especially 187–191).

[15] See Treder (1988: 113–122). For discussion of Aristotle's mathematical proportions (as presented in *Ph*. VII.5) see Wardy (1990: 314–327) and De Groot (2014: 274–281).

every change of state requires a 'sufficient reason'; in Aristotle, Treder insists, the change of state is the place of a body and, according to the Aristotelian axiom of movement, he contends, force and speed are proportional (the reference is probably to *Ph.* 250a1–10, although Treder does not cite here or anywhere else in his study any reference to Aristotle's texts).[16] In Newton, on the other hand, the state is the amount of movement (the impulse) of the body, and its change (as in Aristotle) implies a force that is proportional to the acceleration.

Although it is possible to establish – as Treder suggests – certain structural coincidences between the Aristotelian physics and modern physical science, it must be recalled that Aristotle never sets out to formulate in a *strict* mathematical way his ideas about the relation between the moving power (τὸ κινοῦν) and the moved object (τὸ κινούμενον), the distance traversed and the amount of time taken by the moved object. Regardless, it might be said generally that *Ph.* VII.5 contains Aristotle's 'quantitative formulation of movement';[17] what is clear in this passage is that what is moved is something endowed with weight (*Ph.* 250a25–b27). Further, in Aristotle's view the scope of his 'quantitative laws' of movement extends also to 'qualitative movements'; indeed, when describing what a 'greater power' is (ἡ πλείων δύναμις), he states that it is that which always produces an equal result in less time (and this may be so in the case of heating, sweetening or throwing; *Ph.* 266a26–28). Thus, it is clear that the power that moves something else is not a power that *only* provides locative movement, so while assessing the scope of Aristotle's 'quantitative laws of movement', one should consider the fact that they are valid both for locative and qualitative movement (see *Ph.* 250a8–b7). In his discussion of forced motion (*Ph.* VIII.10) Aristotle concentrates on constant speeds and, as Owen observes,[18] makes no mention of resistance to the medium. In fact, Aristotle's intention seemingly is to make a generalization about *all* kinds of change and not just to focus on locomotion. He assumes that the velocity of motion (regarding the considered cases) is uniform and that the proportions will be those indicated, provided there is no external factor preventing quantities from being related in that way; he also clearly points out that the power of the mover A and the weight of the object moved B are in a similar rela-

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[16] This issue was recently discussed by Rovelli (2015). Rovelli argues that, contrary to what is usually stated, the distinction between a natural and violent motion to some extent survives in the first two laws of Newton. Further, Rovelli even states that "Aristotle is perfectly correct in evaluating the falling velocity as something that depends directly on the weight" (Rovelli 2015: 30). Rovelli takes pains to show that, *mutatis mutatndis*, even though Aristotle's physics is far from being perfect, "*it is similar* to Newton's and Einstein's physics, which are far from being perfect either" (italics are mine; Rovelli 2015: 30; see also p. 32–33, where this suggestion is developed). Indeed, I do not have the competence to assess the scope of this comparison. Still, for someone with limited knowledge of contemporary physics like myself, this kind of assessment of Aristotelian physics, read in the light of Newtonian and Einsteinian physics, is striking.

[17] There are other isolated references to this issue in the *Corpus Aristotelicum* (*Cael.* 274b34–275a10 and *Ph.* 266a13–b24), but such passages contain no mention of weights in motion (a detail that is essential in the discussion of *Ph.* VII.5).

[18] See Owen (1986a: 323).

tion (that is, the strength must be proportional to the weight: ἀνάλογον ἡ ἰσχὺς πρὸς τὸ βάρος – *Ph*. 250a8–9).[19]

But the core of *Ph*. VII.5 is the proportionality between power and speed, not between power and *acceleration*. Aristotle's thesis is that the distance through which an object is moved by a moving power is proportional to that power and to the time in which the power is exerted. Additionally, the distance is in inverse proportion to the magnitude of the object moved; it is not so clear that Aristotle has taken resistance into account, so, unlike what Aristotle believes, it is the motive power which determines acceleration.[20] What he probably ignored is that a minimum power is required to overcome the friction of a body which is at rest, and that such friction is generally greater than that of the body in motion. However, even though he noted the relationship between the moving power and the weight of the moved object (insofar as he notices that if the moved object exceeds the strength of the motive power, the moved object must be moved slowly, and if it is surpassed by the motive power, it is moved quickly; see *GA* 787a15–18), this does not mean that he has taken into account the problem of friction as a theoretical issue that needed to be analyzed in the explanation of locative movement.

In addition, it should be noted that Aristotle did not have the concept of acceleration as it was thought of by Newton and modern physics in general, i.e. the ratio of the change in speed to time; nor was Aristotle interested in explaining the relation between moved object, motive power, and distance traversed in terms of 'laws'. One must not lose sight of the fact that Aristotle's *Physics* is *not* a treatise on physical science in the ordinary sense of the term, but a study analyzing philosophically (by making use of strong metaphysical ingredients, such as actuality-potentiality, matter-form distinctions) all the entities that are in motion. Actually, it is a qualitative physics with some isolated quantitative expressions, such as those found in *Ph*. VII.5.

Now the bulk of the millet seed argument consists of asserting that one should not ascribe to the part the same property that one attributes to the whole. Interestingly, when

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[19] Thus, according to Owen, Aristotle seems to infer quite naturally that the continuous application of a moving power of A (the moving power) on B (the moved magnitude) is sufficient to overcome the resistance of the weight due to gravity, friction and the medium; cf. Owen (1986b*:* 156; 1986a: 330). This, however, is not so clear; in fact, what the text says does not mean that Aristotle has recognized friction (that is, the power that is found in connection with the common limit of two bodies that are in contact, a power that resists the movement of one body with the other) as a separate factor in movement. As suggested by Sambursky, one of the main reasons why the Ancients did not discover the correct laws of dynamics was that, in establishing relations between forces as causes of motion and the resulting motions, they did not take into account the opposing forces of friction; cf. Sambursky (1962: 64–65). More recently, De Groot (2014: 240–241), while commenting on Duhem's interpretation of Aristotle's theory of proportions, points out that Duhem thought to have found in the (Ps. Aristotelian) *Mechanics* Aristotle's principle that, for the same force acting on different bodies, the velocities imparted are inversely proportional to the weights of those bodies. This would show that, if *Mechanics* was written after Aristotle (as it surely was), the Aristotelian theory of proportions (as reconstructed from *Ph.* and *Cael.*) was still valid. Although De Groot deals with the issue of "dragging" (as one of the four movement related to 'being moved by another'; see *Ph*. II.2, 243a17: ἕλξις; De Groot 2014: 287–288), she does not address the problem of friction, which seems so decisive in assessing the limitations of the Aristotelian theory of motion.

[20] It is not entirely clear how Aristotle gets his proportions; he only says that it must be so, otherwise the proportion will not be preserved (ἀνάλογον – *Ph*. 250a3–4, 28 and also *Cael.* 275a7–14).

commenting on the millet seed passage, Philoponus places emphasis upon the fact that if the grain of millet is taken by itself (i.e., as a part: τὸ μόριον καθ' ἑαυτό), it will not produce the part of the whole movement that it would produce if taken with the whole bushel. It moves that way in the whole, but it is *potentially* in the whole.[21] Likewise, a grain of millet and a single individual hauling a ship, in being in the whole as parts, somehow (τι) jointly contribute to the movement *of air* (Philop. *in Ph*. 881.4–5; this detail is relevant for reminding us of the problem of perception, clearly implied in Zeno's paradox according to Aristotle's discussion in *Sens*. 6; see below). Thus, the part, although it is in the whole, is nothing by itself, for it does not work as a mover by itself within the whole, inasmuch as it is only potentially in it. Philoponus compares the parts of a word with the individual hauling the ship:[22] a part will not produce any movement by itself but, in being in the whole as matter, jointly introduces something that contributes to the movement of the whole (*in Ph*. 881.9–16).

For his part, in his commentary on Aristotle's *Ph*. VII.5 Themistius wonders whether the totality will move a weight proportioned to the weight derived from individuals; this means that if each person moves a one-talent weight, it would seem reasonable that one hundred individuals as a whole move a hundred-talent weight. It is not reasonable for it to be less, but to be greater, for it is more reasonable that what is collective and 'ambitious' (τὸ ἀθρόον καὶ φιλότιμον) is also at the same time capable of 'mutual stimulation' (παρορμητικὸν ἀλλήλων), just as horses yoked together achieve more speed when a greater power supervenes because of the intensity of the animals (Them. in *Ph*. 208.15–17); in other words, a collective power is always greater than a divided or 'isolated' power (ἀεί τε ἡ ἀθρόος δύναμις πλείω τῆς μεμερισμένης – Them. in *Ph*. 208.5).[23]

Both commentators concentrate on the fact that a grain of millet, as a part of the whole bushel, is what it is potentially, and if this is so it cannot act as a mover *by itself* within the whole. Further, a grain of millet can stop moving the air that produces the sound a distance equal to the motion made by the whole measure (the millet measure); as Aristotle says, it can stop moving the air (*Ph*. 250a21–22). Proportion is not preserved because a separate unit of the bushel will not move that part of the air it moves when it is a part of the bushel (i.e. part of the whole). In fact, as a part, it only exists in the whole in potentiality.[24]

As just mentioned above, the millet seed paradox also introduces a problem related to perception: according to Aristotle, the tiniest part of millet cannot make a sound since

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[21] Philop. *in Ph*. 881.9–12. The part, Aristotle argues, has only a potential existence in the whole (δυνάμει ἐν τῷ ὅλῳ – Arist. *Ph*. 250a24–25).

[22] Such as the parts are not significant by themselves (καθ' αὑτὰ μὲν ἄσημά ἐστιν), but each part, in being in potentiality as matter in the whole, contributes to the meaning of the name, so too the person who hauls up the ship will move nothing by himself (*in Ph*. 881.12–15).

[23] In the paraphrase of this Themistius passage I am drawing on Todd's translation of this text; see Tood, (2008).

[24] For this approach, see Wardy (1990: 323).

there is no reason why any part (ὁτιοῦν μέρος) should be able to move in any amount of time any amount of the air which the whole bushel (ὁ ὅλος μέδιμνος) moved as it fell (*Ph*. 250a20–22). Clearly, the assumption is that the noise made is proportional to the amount of air moved; in fact, for Aristotle there must be a portion of air involved in the production of any noise, since the air is a continuous quantity and is able to set the sense organ in motion (*de An*. 419a13–15). The portion of the bushel does not move the quantity of air it would move if it were by itself because within the whole bushel no portion exists, except potentially. This matches quite well with Aristotle's account in the *Sens*. 6; in fact, he thinks that putting forward the infinite divisibility of magnitude (whether perceptible qualities are infinitely divisible or not) involves serious problems. Aristotle wonders if every body is infinitely divisible; if so, it would appear that its perceptible qualities (color, flavor, odor, sound, weight, cold or heat, heaviness or lightness, hardness or softness, and so forth) are infinitely divisible, as well. This, though, cannot be the case, since each of these produces perception (in the sense that each of these activates a sense power) and if their power (δύναμις) is divisible, our perception of them should likewise be divisible to infinity, and every part of a body should be a perceptible magnitude (*Sens*. 445b3–10). Any magnitude must be perceptible; if not, it would be possible to see a thing which is white but not of a certain quantity (which is absurd, since the bearer of qualities is a bodily substance). Thus, there cannot be a body without color, weight, or any other quality, since, if this were possible, perceptible objects should be taken to be composites of non-perceptible parts (*quod non* for Aristotle).

Now Aristotle's main interest is focused on the fact that a continuum is divisible into an infinite number of unequal parts. That which is not by itself continuous is divisible into species which are finite (πεπερασμένα) in number (*Sens*. 445b27–29). Since properties (i.e. the perceptible qualities of bodily things) must be taken to be species and given that continuity (συνέχεια) always exists in these, one must admit that what is in potentiality differs from what is in actuality. That is why, Aristotle concludes, when one *sees* a grain of millet, its ten-thousandth part turns out to be unnoticed by sight (*Sens*. 445b31–446a1). For the same reason, the sound contained in a quarter-tone escapes notice; what one can hear is the *whole* strain (ἀκούει τοῦ μέλους παντός), as it is a continuum (συνεχοῦς ὄντος). What escapes one's perception is the interval between the extreme sounds. This, Aristotle contends, is enough to prove that extremely small perceptive ingredients (τὰ μικρὰ πάμπαν; 446a5) are unnoticed, and this is so because they are potentially, not actually, perceptible (when they are not separated from the wholes). The way in which Aristotle deals with the millet seed paradox in *Sens*. 6 shows that he did think that a serious problem regarding perception was involved in it. Thus, when Zeno holds that a single millet seed makes no sound in falling but a thousand seeds make sound, he is at odds with perceptual phenomena.

This being so, if within the whole bushel no portion even exists, except potentially, and if Zeno is right (*quod non* in Aristotle's view), the proportion is not preserved; such a proportion is preserved if in an equal amount of time an equal motive power moves half a moved object double the distance traversed, and moves half a moved object over

the distance it has moved in half the amount of time it has taken (*Ph.* 250a3–4: οὕτω γὰρ ἀνάλογον ἔσται). The analogy with the argument of the stone being worn away by the drop of water and of the hauled ship now turns out to be clearer: the fact that the drop of water has worn a certain amount of the stone does not imply that half of the drop will remove half that amount of stone in half the time. The same goes for the haulers of the ship: the movement of the ship is due to a kind of simultaneous and 'cumulative' effort, as it were, of the many persons hauling the ship; thus, it should not be inferred that each hauler in particular moves the ship lightly. Similarly, and *mutatis mutandis*, it is not the case that, if a bushel of millet seed makes a sound, the single millet seed and the ten-thousandth part of a seed will make a sound, too.[25]

How 'contrary to nature' are Eleatic Tenets for Aristotle? Concluding Remarks

As observed above, while assessing the scope of Aristotle's 'quantitative laws of movement', one should consider the fact that they are valid both for locative and qualitative movement. Defining a 'greater power' (ἡ πλείων δύναμις), he asserts that it is always the one producing an equal effect in less time, such as heating or sweetening or throwing (*Ph.* 266a26–28). As is clear here, the power that acts upon something else is not a power that only provides locative movement. In fact, there is an agent of increase and an object increased; the former causes increase, and the latter is increased in a certain amount of time and to a certain extent. The same goes for the agent of alteration and what is altered (see *Ph.* 250a28–b7). But Aristotle's important point here (which can be read as a rejection of Eleaticism) is that in the case of increase and decrease the process cannot be continuous; rather there must be intermediate periods in which there is neither increase nor decrease. From the fact that decrease is infinitely divisible, it does not follow that some part must always be destroyed (a whole can be destroyed at a certain moment); the same will occur with alteration itself: in fact, it often occurs all at once, as in freezing (*Ph.* 186a14–16; 253b23–26). Aristotle's point is that water passes from one state to the other as a whole, and if this is so, there must be a first part that freezes and hence alteration is possible.[26]

This kind of argument, if it is read as an objection to Zeno's paradoxes on infinite divisibility, intends to show both that such paradoxes are contrary to Aristotle's conception of nature and (what is probably worst of all) that to argue that alteration is continu-

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[25] The argument is even clearer if it is recalled that this debate is included in the passage where Aristotle is examining alteration and arguing against the possibility that alteration is continuous; on this point see Bolotin, (1998: 67–68). I return to this issue in the next section.

[26] As observed by Bolotin (1998: 62), if everything that changes is divisible, one should assume infinite divisibility, since the changing being as a whole can also be applied separately to each of its changing parts, and to the parts of those parts, and so on. But Aristotle thinks that there are changes (e.g., alteration) in which a being is transformed simultaneously in all its parts.

ous is too much at odds with 'evident facts' (τοῖς φανεροῖς ἀμφισβητεῖν – *Ph.* 253b29–30; 254a8), for alteration goes from one contrary to another.[27] If the Eleatic rationalization of the natural world is endorsed, natural phenomena cannot be explained. This, though, does not mean that Aristotle dismisses the Eleatic view of the world at all (in fact, he acknowledges that what the Eleatics argue contains a certain philosophical interest – *Ph.* 185a20); such a view turns out to be important for Aristotle's purposes in the elaboration of his account of nature. Indeed, some important issues that he seriously considers when determining the basic principles of his 'science of nature' are closely related to his critique of the Eleatics. For example, Aristotle takes advantage of his discussion with Parmenides in a constructive manner in favor of his own theory of change and of the indispensable conditions for the constitution of a science of nature. One of the crucial Aristotelian disagreements with Parmenides (his theory of being) is at once one of the most fertile issues from the standpoint of Aristotle's use of such disagreements in order to establish and develop the foundations of his physics.[28] This explains why Aristotle takes pains to show why, even though the Eleatics are not really concerned with nature, given that they sometimes point out certain problems which are important to the study of nature, it might be good to debate their theories, as the investigation contains some philosophical interest. However, although the Eleatic views have a certain philosophical interest (insofar as they put forward physical issues, such as motion, change, the infinite, etc.; *Metaph.* 986b17–987a2), they ultimately miss the mark.

As indicated at the beginning of this paper, an important imputation that Aristotle makes against Parmenides is that he ignores the φαινόμενα.[29] It is a charge that he also makes against the Pythagoreans who, while constructing another earth in opposition to ours (the 'counter-earth' – ἀντίχθων), they are not seeking explanations and causes in order to account for the phenomena (οὐ πρὸς τὰ φαινόμενα τοὺς λόγους καὶ τὰς αἰτίας ζητοῦντες), but forcing the phenomena and accommodating them to certain explanations and opinions of their own (*Cael.* 293a23–27). Now, when referring to the counter-earth the Pythagoreans are not paying attention to what seems to be the case, both in the sense of common opinions and in the sense of what is manifestly observed at the most basic level of sense perception (cf. *Cael.* 297b23–24: διὰ τῶν φαινομένων κατὰ τὴν αἴσθησιν; see also 306a16–17).

Nevertheless, this is also the criticism Aristotle addresses against Parmenides in *Ph.* VIII.3: for a theoretical explanation to be defensible and truly explanatory, it must have

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[27] For Aristotle any change (including alteration, of course) involves opposites, so it does not continue as one and the same change forever; *Ph.* 252b28–30.

[28] For this kind of methodology in Aristotle (but focused on the domain of physics), see, for instance, *Cael.* 298b14–17, where he ascribes both to Melissus and Parmenides the view that there is no generation and destruction, but "it only seems to us" (ἀλλὰ μόνον δοκεῖν ἡμῖν). According to Aristotle, the Eleatics maintain that nothing that is (οὐθὲν (...) τῶν ὄντων) is subject to generation or destruction, but in Aristotle's view this stance is, once again, utterly refuted by the evident facts themselves.

[29] Although, in a certain sense, Aristotle thinks that Parmenides himself, being forced to follow the phenomena (*Metaph.* 986b31: ἀναγκαζόμενος δ' ἀκολουθεῖν τοῖς φαινομένοις), and assuming that what is is one (reading

a connection with the phenomena and with what perception indicates to us in the phenomenal domain. The Eleatic considerations of nature rely more on reasoning than on perception; Zeno's paradoxes can be taken to be refined reasonings that theoretically show that there is no motion, but in fact things move, i.e., they are subject to change. One can formulate a very sophisticated theory about nature (like the Eleatic one), but if one does not respect the Aristotelian prescription, according to which any philosophical theory must respect what phenomena indicate, such a theory cannot be part of the 'science of nature'.

Aristotle insists that, in fact, some things are subject to change, so to maintain that everything is in permanent rest is to go against our perceptual capacities that clearly point out the opposite, and implies a kind of 'softness of mind' (*Ph*. 253a33–34: ἀρρωστία τίς ἐστιν διανοίας). Aristotle cannot be more emphatic when asserting that the tenet that there is no motion at all is both contrary to perception and to the study of nature; further, it is a thesis contrary to the 'physicist' (πρὸς τὸν φυσικόν) in addition to all the other sciences, as they all make use of motion. The reference to mathematics (in *Ph*. 253b2–6) is the same as that which Aristotle made earlier in *Ph*. I.2 (184b25–185a3): neither the physicist nor the mathematician is interested in objecting to the principles of their respective sciences, because without indemonstrable principles the constitution of a science is inconceivable. So, there is no 'scientist' (no matter his field of expertise) who is interested in responding to the denial of the object of his science.

At this point it is much clearer why Aristotle holds that the 'basic assumption' of physics is that nature is the principle of motion (the subject had already been demonstrated and discussed at length in *Ph*. II.1, but his debate with Eleaticism contributes to showing how this is effectively the case). What Aristotle is surely stressing is that a true principle of physical science is to start from the fact that science of nature takes motion for granted, motion understood in all possible senses (substantial, qualitative, quantitative, or local). In Aristotle's view, I think, Eleaticism understood as a theory interested in explaining what nature is should be taken to be a 'successful failure':[30] it is a failure because it ignores the basic assumption of the science of nature (i.e. "there is motion") and thereby it is unable to account for natural processes. On the other hand, that failure is 'successful' (i.e., successful for Aristotle's project) because without an Eleatic philosopher stating that there is no motion, it would have been much more difficult to reach the intermediate (and 'more reasonable') position, according to which there are things that are in motion and others at rest.

τὸ ὂν ἕν with the Greek commentators) conceptually (κατὰ τὸν λόγον), but many according to perception (κατὰ τὴν αἴσθησιν), posits the hot and the cold (i.e., fire and earth) as causes and principles.

[30] Indeed, the Parmenidean philosopher always might argue that Parmenides' main purpose was not to explain what nature is and how natural process occur; but Aristotle certainly assumed that the Eleatic metaphysics (as his own metaphysics does) should be able to account for the natural world and its functioning.

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Aristotle, Eleaticism, and Zeno's Grains of Millet

This paper explores how Aristotle rejects some Eleatic tenets in general and some of Zeno's views in particular that apparently threaten the Aristotelian "science of nature." According to Zeno, it is impossible for a thing to traverse what is infinite or to come in contact with infinite things in a finite time. Aristotle takes the Zenonian view to be wrong by resorting to his distinction between potentiality and actuality and to his theory of mathematical proportions as applied to the motive power and the moved object (*Ph.* VII.5). He states that some minimal parts of certain magnitudes (i.e., continuous quantities) are perceived, but only in potentiality, not in actuality. This being so, Zeno's view that a single grain of millet makes no sound on falling, but a thousand grains make a sound must be rejected. If Zeno's paradoxes were true, there would be no motion, but if there is no motion, there is no nature, and hence, there cannot be a science of nature. What Aristotle noted in the millet seed paradox, I hold, is that it apparently casts doubt on his theory of mathematical proportions, i.e., the theory of proportions that holds between the moving power and the object moved, and the extent of the change and the time taken. This approach explains why Aristotle establishes an analogy between the millet seed paradox, on the one hand, and the argument of the stone being worn away by the drop of water (*Ph.* 253b15–16) and the hauled ship, on the other.

KEYWORDS

Aristotle, Eleaticism, Parmenides, Zeno, motion, mathematical proportions

An Ontology for the In-Between of Motion: Aristotle's Reaction to Zeno's Arguments*

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Aristotle says in his *Sophist* (...) that Zeno was the first person to have discovered dialectic.[1]

Dialectic puts opinions to the test on matters of which first philosophy gives real knowledge.[2]

1. Introduction

The present paper will perhaps appear misplaced in a collection of essays about Aristotle's reception of Eleatic ontology. In fact we do not know if, and to what extent, Zeno did

* An important part of what follows originates in contributions to the seminar on the *Physics* held by Pierre Pellegrin in Paris and Lille in the 1990s. I am pleased to remember the warm and stimulating atmosphere of those sessions, and I thank Pierre and all the other participants for so many fruitful discussions. I borrowed most of the translations of Greek texts to extant English translations, especially to Laks, Most (2016) for all the Zenonian material, and to the Revised Oxford Translation for Aristotle's treatises. In some cases, I had to make such changes as were required to fit in with my interpretations.

[1] D.L. VIII.57 (LM Zeno R 4 = DK 29 A 10)

[2] Arist. *Metaph.* IV.2, 1004b25–26.

care about ontology at all. Many historians of Greek philosophy even doubt that he ever expressed positive philosophical views of his own. If he did subscribe to an ontological creed, we have reason to believe that it was Parmenides' 'monist' ontology, which I do not intend to consider here (others contributors will).

My point is different. We know from Aristotle that Zeno devised some arguments about motion with paradoxical conclusions, "which cause so much trouble to those who try to answer them"[3] and are considered as rejecting the possibility of motion altogether.

Seen that way, these arguments would amount to a rejection of the whole of Aristotle's natural philosophy, since "nature is a principle of motion and change, and it is the subject of our inquiry. Therefore we must not ignore what motion is; for if it were unknown, nature too would be unknown"[4] – and, we may add, if it was shown to be impossible, nature too would be impossible. So the face-off with Zeno's paradoxes might remind us of the predicament created by Parmenides' claim that being must be one in the first book of the *Physics*.

However, Aristotle's reaction to these situations is not the same. In *Physics* I.2, he has described Parmenides' and Melissus' absolute monism as a major threat to natural philosophy; but he has immediately disposed of it by rejecting the burden of the proof and showing by means of appropriate *luseis* that the monists' arguments are not valid; nevertheless he also feels that he is bound to build an alternative picture of change. He does so in the second half of Book I, showing that in a sense change starts from not-being, although not from absolute not-being.[5] With Zeno, he does not take issue in such a dramatic manner. In fact, he does not say in so many words that his arguments lead to a rejection of motion altogether; but he takes them seriously. He obviously considers that it falls to the natural philosopher to solve such difficulties and that he has to address their structure and contents in detail, and not just their relevancy or irrelevancy.

The report and criticism of the four arguments is contained in one page of *Physics* Book VI (Chapter 9, 239b5–240a15). If you read just that chapter, you may feel that each argument is easily – perhaps too easily – rejected. But in fact Aristotle has prepared well ahead the arguments he uses for these refutations. He has done that explicitly a few pages before, in Chapter 2 (*Ph.* 233a21–b15), but in fact his objections implement a large part of the analyses of motion that he has carried out in Book VI and indeed from the beginning of Book V. These two books have a distinct character in that they develop technical and abstract analyses of the inner structure of motion and follow them up into their minutest details. Some of these analyses will be used later on in the demonstration of the existence of a First Mover of the heavens; but as they stand in the text of Books V and VI, they might be considered as a self-contained treatise about motion. The striking

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[3] Arist. *Ph.* VI.9, 239b10–11.

[4] Arist. *Ph.* III.1, 200b12–15.

[5] Arist. *Ph.* I.8, 191a33–b27.

fact is that the specific philosophical style of these two books is quite different from what we read about motion in other parts of the *Physics* (on this see below § 8), while it looks much like what seems to have been Zeno's own style. I do not write that without fear and hesitation, since we know so little of Zeno's philosophical production – the more so since a large part of what we know comes from the *Physics,* so that the alleged resemblance could be caused and biased by the fact that Aristotle had perhaps rephrased and interpreted Zeno's arguments. However, I may draw some confidence from the fact that the arguments that we know by Simplicius' direct citations[6] show much the same style.

Another important similarity between Zeno's arguments and the general contents of Books V and VI is that they bear on what I will call 'the In-Between' of motion and change (on this see below § 9).

Thus, the aim of the present paper is to show that some important results of Books V and VI constitute a specific ontological description of motion, that Aristotle has elaborated, among other reasons, in response to the challenge of Zeno's paradoxical arguments. I do not intend to bring in historical arguments, in the narrower sense of that phrase, to establish that point. I am not sure that it could be done – due to the scarcity of our knowledge about Zeno – and at least I will not undertake to do that. The only historical argument of that kind that I can see is the interesting fact that Zeno is the only one philosopher whom Aristotle cites in Books V and VI, but I would not put too much weight on it. As I have just recalled, there is no formal 'declaration of war' against Zeno as there is against Parmenides in Book I. So I may readily concede that I mean that not as history but just as a mere story, convenient to put into light an intellectual landscape, and continuity in the history of a given problem over several generations (in fact, I will even give an argument to that effect in § 7).

In the pages that follow, I will first offer a description of Zeno's undertaking as it may have appeared to Aristotle (§ 2) and review the different arguments and the specific answers that Aristotle gives to each of them (§§ 3–7). This part of the paper collects the data for the discussion that follows: in §§ 8–9 I will try to characterize the distinctive method of inquiry of the last books of the *Physics* in the light of Zeno's own method (at least as far as we know it). In the last two sections, I will try to assign a specific 'ontological location' to Aristotle's analyses of the in-between of change (§ 10) and to interpret his claim that the structure of total order that he calls *before and after* is central to its ontology (§ 11).

2. On the character and contents of Zeno's writing

I do not intend to propose a reconstruction of Zeno's work and of his philosophy by itself, but to address his picture of motion through its reflection in Aristotle's *Physics.* But it

[6] Especially the fragments LM Zeno D5–6 (= DK 29 B 1) and LM Zeno D11 (= DK 29 B 3).

turns out that our information about Zeno has come to us mainly through Aristotle and Plato, or was set off on the occasion of comments on the relevant passages of Plato and Aristotle,[7] so that any historical interpretation of Zeno's arguments presupposes a correct assessment of Plato's and Aristotle's attitude towards his philosophy.

Plato's testimony is not exactly a real testimony, since it is placed in the mouth of the young Socrates and of Zeno himself on the occasion of a fictitious encounter between Socrates, Zeno and Parmenides. It does not give much information about the contents of Zeno's arguments,[8] but on the character and purpose of his writing. I am not claiming that we should accept at face value the story told by a fictitious character in a fictitious situation. However, Plato was writing for readers who had some acquaintance with Zeno's *sungramma* and the story told by 'Zeno' appears to be meant to explain some features of that unusual piece of writing.

Zeno wrote one book; maybe that was not even a book, but some kind of personal notes[9] – containing forty (or so) arguments.[10] It seems to have been just a collection of difficulties without any indication of a positive philosophical claim. This is probably the reason why young 'Socrates', in the *Parmenides,* suggests an interpretation which is praised by his elder interlocutors – and why ancient commentators still disagreed on his intention, as is shown by Simplicius' commentary on *Physics* I.2.[11] That interpretation of his arguments as moves in an indirect proof probably lead Aristotle, and others after him, to celebrate Zeno as the inventor of dialectic.[12]

Aristotle cites five of these arguments and two propositions that must have belonged in other similar arguments:

– He paraphrases and discusses the four aguments about motion that I will consider here. They are well-known and I will call them hereafter by the names that have become more or less canonical: the Dichotomy (or: the Division), the Achilles (or: Achilles and the Tortoise), the Arrow and the Stadium.

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[7] The most serious candidate for being a source independent from Aristotle and Plato is Diogenes Laertius. However, a good deal of the stories he tells about Zeno's life and death (IX.26–27) might be just illustrations of his reputation as the founder of dialectic; the physical doctrines Diogenes reports under his name (IX 29 = LM Zeno R 39) look much like a wrong attribution, and the fragment that he reports (IX.72; LM Zeno D17 = DK 29 B 4) might result from a confusion with a similar opinion of Diodorus Cronos.

[8] Nevertheless, Laks and Most retain (LM Zeno D4) a testimony left aside by Diels and Kranz: the argument that Socrates' summarizes in the first part of the *Parmenides* (*Prm.* 127e): 'if the things that are are many, then they must be like and unlike (δεῖ αὐτὰ ὅμοιά τε εἶναι καὶ ἀνόμοια); but this is impossible, for neither can the unlike be like, nor the like be unlike'. – This argument may seem rather weak, since it seems to be self-evident that what is like must also be unlike (insofar as *like* does not mean *identical*); but, for the reasons I am giving above, it would be strange for Plato to introduce deliberately a fake citation of a real book that he mentions just at that point in the dialogue.

[9] According to what 'Zeno' himself declares in Plato's Parmenides (*Prm.* 128d–e).

[10] Procl. in *Prm.* 694.17–19 (LM Zeno D2 = DK 29 A 15).

[11] Cf. testimonies R10–13 in Laks, Most (2016).

[12] See D.L. VIII.57, quoted above in the epigraph. There is also a possible hint at this specific style of argumentation of Zeno in the *Phdr.* 261d.

– He mentions another one about place: "if something is real, it must exist somewhere", *i.e.* 'in some place'. One should probably go on: "but if place itself is real it must be in some place too; and if that place is real it must be somewhere", and so on indefinitely.[13]

The two isolated propositions are:

– any part (ever so small) of a millet seed must produce a sound when falling on the ground;[14]

– that which, when added to something, does not increase its magnitude, is nothing.[15]

Information linked with Aristotle but not transmitted directly by him comprises the argument alluded to in the beginning of the *Parmenides* and literal citations provided by Simplicius in his commentary to *Physics* I.[16] Simplicius cites literally[17] two or three other arguments:

– One of them (LM Zeno D7 = DK 29 B 2) establishes that what "when added to something, does not make it any larger", is nothing or does not exist[18]; this is probably the same premiss as cited in *Met.* III.4 and perhaps the same as εἰ μὴ ἔχοι μέγεθος τὸ ὂν οὐδ' ἂν εἴη (Simp. *in Phys.* 141.1–2, LM Zeno D5), which might belong to the same argument as LM Zeno D6, as Diels assumed.

– Another one (LM Zeno D6 = DK 29 B 1) is about the division of continuous magnitudes; the paradoxical conclusion is that "if there are many things, it is necessary that they be both small and large, so small that they do not have any size and so large that they are unlimited."[19] The argument appears to rest on a dilemma: if we suppose that the process of division has come to an end, then how shall we conceive the ultimate elements? They must have either some size or no magnitude at all. If they have no magnitude, then the sum of them all will equal zero; if they have some size, however small, then the sum of an infinite number of such parts will excede any given finite magnitude.

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[13] Arist. *Ph.* IV.1, 209a23–25; IV.3, 210b22–28 (LM Zeno D13 = DK 29 A 24); at 210b27, Aristotle objects that "it is not necessary to go on *ad infinitum*."

[14] Arist. *Ph.*, VII.5, 250a19–22 (LM Zeno D12 = DK 29 A 29). Although Aristotle calls it a λόγος, his answer does not attack it as being wrongly inferred or inferred from wrong premisses, but considers only the material falsity of that proposition in itself (on the ground that Zeno ignores threshold effects in causality).

[15] Arist. *Metaph.* III.4, 1001b7–13 (LM Zeno D8 = DK 29 A 21).

[16] These citations are brought about by an enigmatic mention, in Aristotle's text, of 'the argument from dichotomy', to which some thinkers deferred by assuming the existence of indivisible magnitudes (I.3, 187a1–3). In fact, there is nothing about the division of physical magnitudes in the immediately preceding context (the discussion of Parmenides' monism); at 186b35 we find the sentence: ἐξ ἀδιαιρέτων ἄρα τὸ πᾶν, but it seems to conclude a discussion about definition by division.

[17] Although he could cite literally these passages, it is clear from his commentary on chapter VI.9 (1012.21–29) that Simplicius did not have access to the full text of Zeno's writing, since he could not tell whether there were just four arguments about motion, or whether the mention of four arguments referred only to those which were hard to solve. Moreover, all along that section (1011.9–1020.6), he clearly appears to reconstruct the meaning and logical form of each argument as best he can from Aristotle's text.

[18] Simp. in *Phys.* 139.11-15. I am not sure that this is a distinct argument: its conclusion is not that paradoxical (it might be just a formulation of the so-called 'axiom of Archimedes') and at line 141.1 Simplicius says that it is a 'preliminary demonstration' (προδείξας).

[19] Simp. *in Phys.* 141.2–8.

– Another one (LM Zeno D11 = DK 29 B 3) is about the number of objects that must exist if there are many things; the paradoxical conclusion is that there are compelling reasons to say that their number is finite and that it is infinite.[20]

The four arguments reported in *Phys.* VI.9 are generally considered to be 'against motion', although each of them has (in Aristotle's report) a distinct specific conclusion. Only the Dichotomy is said to lead to the inexistence or the impossibility of motion (περὶ τοῦ μὴ κινεῖσθαι), and in fact even that could be qualified. A deflationary and perhaps more appropriate translation would be: "establishing that »a <given> motion *could not occur*« – because it just could not start, which is the point of the argument. The conclusion of the Achilles is that "the slowest will never be overtaken by the swiftest"; that of the Arrow is that "the flying arrow is at rest"; and that of the Stadium is that a certain lapse of time must be equal to the half of itself.

I will end this section by mentioning the question: if Zeno's writing contained forty arguments, of which only four especially addressed motion, what was the target of the other thirty-six? The *Parmenides* suggests that they were about multiplicity, but it also suggests that their connection with multiplicity was not immediately evident, otherwise there would be no reason to praise the young 'Socrates' for having seen it. On the basis of the limited sample that has come down to us, they seem to bear on different opinions, commonly held or perhaps also held by eminent philosophers – *endoxa*, in Aristotle's own idiom – about natural philosophy. This is another aspect of the affinity of Zeno's arguments with Aristotle's dialectic (more on that point in § 8).

3. The Dichotomy and the Achilles

> The first < argument > asserts that there is no motion (περὶ τοῦ μὴ κινεῖσθαι) on the ground that that which is in locomotion must arrive at the half-way stage before it arrives at the goal. This we have discussed above.
> The second is the so-called Achilles, and it amounts to this, that in a race the quickest runner can never overtake the slowest, since the pursuer must first reach the point whence the pursued started, so that the slower must always hold a lead.[21]

Aristotle joins those two arguments together, for he says they have the same structure and must be solved in the same way (*Ph.* 239b25–26). "We have discussed this before" refers back to VI.2, 233a21–b15. In that context (Chapters 1–2), Aristotle establishes that whatever is continuous cannot be composed of indivisible parts. He has given first an *a priori* demonstration by showing (through elimination) that none of the conceivable modes of

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[20] Simp. *in Phys.* 140.28–33.

[21] Arist. *Ph.* VI.9, 239b11–18.

composition could apply to indivisible parts (*Ph.* VI.1, 231a26–b18); then, leaning on an analogy between magnitude, motion and time,[22] he shows that either the three of them are composed of indivisibles, or none. In the course of that discussion, he remarks that Zeno's arguments appear to assume arbitrarily a different regime, if I may say so, or inner ontological structure, for spatial magnitudes and for time: while he allows to divide the finite course of a given motion in infinitely many parts, he claims that it would take an infinitely long time to pass successively through all these parts. But if one allows the infinite divisibility of a finite magnitude for time as well, then it will always be possible to have a one-to-one correspondence between the points of the course and the instants of time, without even having to decide the question whether both are composed of indivisibles or indefinitely divisibles. This objection applies equally to the first argument and to the Achilles.

In his comments about these arguments (*Ph.* 239b18–29), he calls the first one 'the argument by dichotomy' (τῷ διχοτομεῖν) and 'the dichotomy'. This way of referring to it may have led commentators to conflate it with Fragment D6 / B1, which, as we have seen (§4 above and fn. 24), is introduced by Simplicius in order to explain the sentence: "some thinkers gave way (...) to <the argument> from dichotomy by positing indivisible magnitudes" (*Ph.* I.3, 187a1–3). It is impossible to guess with certainty which 'argument from dichotomy' Aristotle may have meant at that place. Nevertheless, it is important to stress that the paradoxical conclusions of D6 / B1, on the one hand, and of the Achilles and the 'Dichotomy' of Book VI are quite different. D6 / B1 bears on the size or extension of things that 'are many' (εἰ πολλά ἐστιν, be they the whole of reality taken together or each extended object considered apart); that has nothing to do with motion.[23] On the contrary, the Dichotomy and the Achilles establish conclusions about motion, and in each of them the notion of succession in time (the notion of *before*) plays a crucial part. The mobile in the Dichotomy cannot reach the middle point *before* it has crossed the quarter of its course, and so on; Achilles will not come up to the Tortoise *before* he has run the small length the Tortoise has crossed while he was arriving at its previous position, and so on.

Although Aristotle suggests to treat them on a par, as two variants of the same model ("for in both a division of the space in a certain way leads to the result that the goal is not reached" – *Ph.* 239b22–24), it is interesting to notice that they lead to somehow symmetrical impossibilities: in the Dichotomy, it is impossible to start; in the Achilles it is impossible to reach a certain result. Still more precisely, the symmetry is not perfect, for in the Achilles the aimed-at result is not given from the beginning, but depends on the relation between two distinct motions. It is difficult to guess whether Zeno introduced

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[22] He has carefully expounded that analogy in Book IV (*Ph.* IV.11, 219a10–b33), and used it in order to define time; see below § 11.

[23] In fact, Simplicius expressly mentions dichotomy (140.33–34) about D11 / B3, *not* D6 / B1; but D11 / B 3 is an argument about the *number* of the multiple beings, not about their *magnitude*.

that difference on purpose[24] (and, if so, which purpose?), but I will return to that point later on (§ 10, under #4).

4. The Arrow

Unfortunately, and although it triggers Aristotle's excursus about Zeno's arguments in chapter VI.9, this one is particularly obscure and laconic in Aristotle's presentation, and the transmitted text has been questioned:

> Zeno's reasoning, however, is fallacious, when he says that if everything, whenever it is over against an equal <extent of space>, is at rest or in motion (εἰ γὰρ αἰεί, φησιν, ἠρεμεῖ πᾶν ἢ κινεῖται ὅταν ᾖ κατὰ τὸ ἴσον), and if that which is in locomotion is always in a *now*, the flying arrow is therefore motionless. This is false; for time is not composed of indivisible *nows* any more than any other magnitude <is composed of indivisibles>.
> (...) The third is that already given above, to the effect that the flying arrow is at rest, which result follows from the assumption that time is composed of *nows*: if this assumption is not granted, the conclusion will not follow.[25]

The difficulty of the first passage lies in the phrase ὅταν ᾖ κατὰ τὸ ἴσον, which raises two questions: (1) how are we to understand κατὰ + *Acc*.? (2) what is the unexpressed complement of τὸ ἴσον? Both questions will bear upon an important issue in the translation, namely, the choice of the noun or nominal phrase necessary to complete the meaning of τὸ ἴσον.

As to κατὰ + *Acc*., we may take some light from the immediately preceding context (*Ph*. VI.8, 239a23–b4), in which Aristotle states that a moving object can never be κατά τι, at least in a strict sense (κατά τι πρῶτον). The phrase refers clearly to the possibility of locating the moving object by reference to some external mark. Although I am not a native speaker of English, it seems to me that Hardie and Gaye's rendering 'over against' is a good solution. In Chapter 8, Aristotle seems to admit (but distinguish) two uses of that phrase, a stricter (as in κατά τι πρῶτον) and a looser one, in which the mobile need not coincide with the external marks.[26]

Now, in κατὰ τὸ ἴσον, does ἴσον refer implicitly (*a*) to the object itself ("(...) when it is in a space equal *to itself*" a body must be at rest") or (*b*) to different possible situations: if A is over against some space equal to those over against which B is and C is, etc., and A is at rest, then B and C must be at rest too; if A is in motion, then B and C must be in

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[24] Aristotle suggests that it was perhaps just a matter of giving the argument a narrative, more dramatic form.

[25] Arist. *Ph.* VI.9, 239b5–9, 30–33.

[26] This looser use is to be assumed in Zeno's argument if one opts for interpretation (*b*) below; for the same reason I chose to render τὸ ἴσον by 'an equal <extent of space>'.

motion; etc? If you opt for interpretation (*a*), then ἢ κινεῖται at 239b6 does not make sense any more and you have to suppress it. This is what Ross and the great majority of modern interpreters do; many of them complete that suppression with different heavier emendations in order to get closer to this meaning.[27]

But this is not necessary, and we can make sense of the text as it stands, if we assume that being 'over against' some definite extent of space defines something like the state of motion of a physical object at a given time. Thus, if two objects are over against equal extents of space, they are both moving (possibly: at the same speed) or both at rest; this is interpretation (*b*) above. Then Zeno's argument would rest on the fact that if you consider objects at one instant, it is impossible to discern those that are moving from those that are at rest. — However, the gist of the argument must be something like that, even in interpretation (*a*),[28] since Aristotle's defence is that time is not composed of indivisible *nows*.[29]

5. The Stadium: Textual and exegetical questions

Aristotle's report of this fragment[30] is longer and more detailed; I give it below in full. Zeno appears to have followed the geometer's method of writing in three steps: [I] a general statement of the proposition; [II] the *exposition*, in which the proposition is rephrased in an arbitrarily chosen particular case; [III] the conclusion – here the two conclusions (*a*) and (*b*), since Zeno's point is that two incompatible propositions can be inferred from the situation he has described. In the text below, this procedure is inter-

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[27] This line of interpretation dates back at least to Themistius; but there is no reason to suppose that he did not read ἢ κινεῖται, since he was writing a paraphrase. In the same vein, he completed κατὰ τὸ ἴσον with κατὰ τὸ ἴσον **αὑτοῦ διάστημα** to make his interpretation explicit. – Simplicius seems to have read the same text as we read in all the extant mss., but he comments on it by combining two different interpretations: (i) the arrow is not (cannot be) in motion in the *now* and (ii) everything must be either in motion or at rest. Thus the flying arrow must be at rest in the *now*, and therefore it must be at rest all along its flight, since its flight is made of a succession of *nows*. An orthodox Aristotelian answer would then be to grant (i) (Aristotle says that there is no motion in the *now*) but to deny (ii) (there cannot be any rest in the *now* either). This line of argument is relevant (this is more or less what Aristotle has just sketched in the last lines of Chaper VI 8), but it does not fit in well with the syntax of the text as it stands (notice also that Zeno's claim is that the arrow is 'motionless', not that it is 'at rest'). In ms. E the initial εἰ has been warped into an ἢ, probably in order to back up this interpretation.

[28] Any interpretation of lines 239b5–9 has to find a link between κατὰ τὸ ἴσον and ἐν τῷ νῦν. It seems to me that the supporters of interpretation (*a*) take that for granted too easily.

[29] Another puzzle with the same sort of conclusion (LM Zeno D17 / DK 29 B 4) is mentioned by Diogenes Laertius: "Zeno abolishes motion by saying that *what is moved does not move either in the place in which it is nor in the place in which it is not*." It may be authentic, but it cannot be easily connected with Aristotle's report of the Arrow. I will not consider it here, since my subject is Aristotle's reaction to Zeno's arguments, under the form that he knew.

[30] Arist. *Ph*. VI.9, 239b33–240^{a}18.

rupted twice, at [I'] and [III'], by Aristotle's own comments on the fallacy of the argument (in italics).[31]

The Greek text of section [III] is difficult and has given rise to various emendations, from ancient Greek commentators to modern editors and interpreters, and to some variance in the manuscripts. Modern scholars generally follow a text which, in my opinion, has been influenced by Simplicius' commentary (although some of Simplicius' most conspicuous misinterpretations have been rejected). In the interpretation that follows[32] I tried to keep as close as possible to the best transmitted text. I cannot discuss here all the interpretations that have been proposed, but I will indicate and explain the points on which I part from the received interpretation(s).

> [I] The fourth argument is the one about bodies of the same size that move at an equal speed in a stadium and pass alongside equal bodies in the opposite directions, the ones starting from the end of the stadium, the others from the middle,[33] in which case, he thinks, one half of a period of time time is equal to its double.
> [I'] *The fallacy consists in supposing that a body of equal size moving at an equal speed moves during the same time alongside a moving body as alongside a body at rest. But this is false.*
> [II] For example, let bodies of equal size at rest be AA; let BB be those that start from the middle <of the stadium>,[34] which are equal to the former in number and in magnitude; and let CC be those starting from the end <of the stadium>, which are equal to these in number and in magnitude, and equal in speed to the B's.
> [III] It follows that, (*a*) when they move alongside one another, the first B and the first C are at the end <of the A's> at the same time; and it also follows that the C has passed over (διεξεληλυθέναι) all the A's but, as to the B's, half of them; so that the time is one half, for each of them is in front of each <C> for an equal <time>. And at the same time it follows (*b*) that the <first> B has passed along (παρεληλυθέναι) all the C's (for the first C and the first B will be at opposite ends at the same time), being along <each of> the B's for exactly the same time as along <each of> the A's, as he says, because both pass an equal time along the A's.

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[31] Incidentally, I disagree with Laks and Most, who put all of sections [I'], [II], [III] and [III'] together under the title 'Against the Fourth Argument'. In my opinion, only [I'] and [III'] are Aristotle's own interventions; the rest belongs to Zeno.

[32] I proposed this interpretation at Pellegrin's seminar in 1995. Pellegrin, although he did not retain my suggestion for his French translation, published it nevertheless as an appendix (Pellegrin 2000: 449–450), with a short footnote by way of comment. By that time I did not know that a similar interpretation had been developed long ago by Lachelier, although the journal *Corpus* had reprinted his 1910 paper in 1994. Lachelier resorts to a different set of editorial options, implying more conjectures and corrections than mine, but the gist of his interpretation is the same.

[33] It is generally acknowledged that 'the middle' means the turning-point in an antique stadium, so that, for the Greek reader, 'end' and 'middle' referred to extreme opposite positions.

[34] Some mss. (F, K and J *post correctionem*) read 'from the middle of the A's'.

[240a9] συμβαίνει δὴ τὸ πρῶτον **β** ἅμα ἐπὶ τῷ ἐσχάτῳ εἶναι καὶ [10] το πρῶτον **γ**, παρ' ἄλληλα κινουμένων. συμβαίνει δὲ τὸ [11] **γ** παρὰ πάντα τὰ **α** διεξεληλυθέναι, τὰ δὲ **β** παρὰ τὰ [12] ἡμίση· ὥστε ἥμισυν εἶναι τὸν χρόνον· ἴσον γὰρ ἑκάτερόν ἐστιν [13] παρ' ἕκαστον. ἅμα δὲ συμβαίνει τὰ **β** παρὰ πάντα τὰ **γ** [14] παρεληλυθέναι· ἅμα γαρ ἔσται τὸ πρῶτον **γ** καὶ τὸ πρῶ[15]τον **β** ἐπὶ τοῖς ἐναντίοις ἐσχάτοις, ἴσον χρόνον παρ' ἕκαστον [16] γιγνόμενον τῶν **β** ὅσον περ τῶν **α**, ὥς φησιν, διὰ τὸ ἀμ[17]φότερα ἴσον χρόνον παρὰ τὰ **α** γιγνεσθαι.[35]

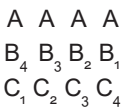
[III'] *This then is the argument, and it arises from the falsehood that I have indicated.*

The received version[36] implies two important corrections:

– at 240[a]11, to replace 'the A's' by 'the B's' – which can lean only on two late manuscripts (H and I) and possibly on the text of E *ante correctionem*;
– at [a]13, to replace 'the B's' by 'the <first> B'.[37]

In this version, the initial situation is:

and the final situation will be:



Thus "the <first> C has crossed all of the B's and the B's only half", by which we are supposed to understand that the B's have crossed only one half *of the A's* (as Simplicius supposes) or perhaps one half *of their own size*? If that is the meaning of Zeno's argument,

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[35] Here is a simplified apparatus for these lines, adapted to the text that I retain:
[10-11] **γ**] ἐπὶ τῶ ἐσχάτω **β** [παρ' add. H – [11] τὰ **α** E[2]FJK *Alex. Philop. Simpl.* : τα **β** HI **β** E[1] – [11] τὰ δὲ **β** FHIJK *Philop.* : τὸ δὲ **β** E *Alex. Simpl.* – [11-12] παρὰ τὰ ἡμίση EFHIJK *Alex. Ishâq* : παρὰ τὰ ἡμίση **α** *Simpl.* – [13] ἕκαστον FHIJK : ἕκαστον αὐτῶν E – [13] τὰ **β** FHIJK *Simpl.* : τὸ ᾱ **β** vel τὰ **β** E (τὸ πρῶτον **β** coniecit Cornford) – [14] ἔσται EJ* : ἐστι FHIK – [17] παρὰ codd. omnes : κατὰ *Alex.*

[36] Here is Laks and Most's translation of the text they edit, which seems to me to be a good representative of the line of interpretation most commonly followed nowadays: "It follows that, when they move alongside one another, the first B and the first C are at the end at the same time; and it also follows that the C has crossed all of the B's and the B's only half, so that the time is one half, since each one passes beside the other for an equal time. And at the same time it follows that the <first> B has crossed all the C's; for the first C and the first B will arrive at the last <bodies> located at opposite extremities at the same time, as <the first C> is alongside each of the B's and each of the A's for an equal time, as he says, because both of them are beside the A's for an equal time."

[37] Corrections at that place can lean only on ms. E (fol. 49r, l. 9), which has been corrected – probably by the original copyist, since the ink is the same. It shows this: . Cornford conjectured that it meant τὸ ᾱ [= πρῶτον] **β**; but that use of ᾱ might create a confusion with the use of letters for the data of the argument (and actually, at all other places in the context, E spells out πρῶτον in full). Otherwise, that might result from a correction of τὸ **α** or τὸ **β** into τὰ **β** (the copyist of E uses normally this form: of the beta, although he sometimes uses as well).

then the proposed text is at least a strange way of expressing it: why speak of 'the <first> C' in one case and of 'the B's' in the other? and how are we to explain that τὰ ἡμίση is left without further determination (in a context in which every other element seems to be accurately determined)? Apart from these matters of expression, this version does not explain how Zeno meant to obtain the conclusion that "the time is one half." And of course the fallacy would be too obvious. Admittedly, Aristotle suggests that the argument is weak when he accuses Zeno of passing (willingly or by ignorance) over the well-known empirical fact of relative speed. But we may credit Zeno with a more subtle, albeit fallacious, move.

The interpretation I am advocating supposes that in the sequence τὰ[38] δὲ β παρὰ τὰ ἡμίση, τὰ δὲ β is an expressive prolepsis, thus giving to τὰ ἡμίση the determination that it would lack otherwise. So the argument will rest on the following decomposition of the crossing, which takes four moments:

[1]	A A A A B_4 B_3 B_2 B_1 C_1 C_2 C_3 C_4
[2]	A A A A B_4 B_3 B_2 B_1 C_1 C_2 C_3 C_4
[3]	A A A A B_4 B_3 **B_2** B_1 **C_1** C_2 C_3 C_4
[4]	A A A A **B_4** B_3 B_2 B_1 **C_1** C_2 C_3 C_4

Thus, τὰ δὲ **β** παρὰ τὰ ἡμίση means that C_1 has been in front of only one half of the B's, those that are marked in bold letters at times [3] and [4]. Although the process as a whole extends over four moments, the crossing of the B's by C_1 takes only two of them, that is, 'half the time'.

[38] Retaining the plural τὰ δὲ **β**, given by the mss. FHIJK, rather than τὸ δὲ **β**, although the latter has the (considerable) support of a good ms. (E) and of Alexander and Simplicius.

6. Further reflections on the meaning of the Stadium

Far from ignoring the fact of relative speed, the first part of the argument offers a smart account of that fact – indeed the best possible account of relatve speed in a discontinuous physical universe, in which a motion must be composed of a series of atomic elementary motions – *kinemata*,[39] just like the elementary motions that our eye (or brain) re-creates on the basis of the discontinuous still images on the film. Each of these events consists in the fact that an indivisible elementary magnitude leaps from one elementary indivisible position to the next one, in an elementary indivisible lapse of time.

In that picture of the physical universe, such elementary motions provide the unit of time, on the basis of the assumption that the duration of one such event is equal to the duration of any other one. Thus, crossing an object that moves at the same speed and in the opposite direction takes twice as less time than passing over an object at rest. *E.g.,* in the above figure, passing-over takes four elementary events (C_1 being successively in front of each one of the four A's) while crossing takes just two of them: C_1 in front of B_2 and C_1 in front of B_4. It is just as if C_1 had not been in front of B_1 and B_3 (as if these events had just fallen on the empty intervals between two images on the film).

The Stadium, just as Fragment D6 / B1, has a dilemmatic structure. Branch (*a*) of the conclusion states that C_1 takes twice as less time to cross the B's than to pass over the A's, while Branch (*b*) states that the crossing is composed of as many events as the passing-over, since if B_1 has moved from an extremity of the C's to the other, then it must have been successively in front of each of them during its movement. It is important to notice the use of perfect tense (διεξεληλυθέναι, παρεληλυθέναι) and the difference in the preverbs: δι-εξ- in Branch (*a*), παρα- in Branch (*b*): παρα- conveys the notion of moving *along* (implying a continuous movement), whereas δια- means that an interval has been crossed, possibly by a leap; it might be the case that the addition of εξ-, indicating that the action is considered as completely performed, enhance that difference of meaning. So διεξεληλυθέναι fits well the idea that a motion is made of elementary movements.

The paradox of the conclusion lies in the fact that one can count the duration in two different ways. This is expressed by the two syntactically parallel[40] clauses that mention 'an equal time' at the outset of each branch of the argument:

(*a*) ἴσον γὰρ ἑκάτερόν ἐστιν παρ' ἕκαστον
for each ot them[41] *is in front of each <C> for an equal <time>* (*Ph.* 240a12–13)

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[39] The noun κίνημα occurs twice in *Ph.* VI, in both cases to deny that a motion could be composed of *kinemata.* Its meaning differs from that of κίνησις in that it refers to an achieved or finished movement (expressed by the perfect tense, see the typical occurrence in VI.2, 232a8–9).

[40] In my opinion this parallelism, which is not only syntactical and logical, but also semantical (since both clauses refer to equal times), forbids such conjectures as Alexander's, who suggested transposing 240a15–16 before 240a10–11, or Ross', who simply deletes it.

[41] I take ἑκάτερόν to refer to the B's and the A's respectively, so that ἕκαστον must mean 'each C'.

(*b*) ἴσον χρόνον παρ' ἕκαστον γιγνόμενον τῶν **β** ὅσον περ τῶν **α**
being along <each of> the B's for exactly the same time as along <each of> the A's (*Ph.* 240a15–16).

These sentences appear to be the premisses that explain each part of the paradox, and one can make sense of them only by assuming that time is measured by a number of elementary events.

Even so, the fallacy may seems gross and obvious; but, as Lachelier puts it:[42]

> You will probably say: – There is still some sophistry in that. It is not instantaneously and as a whole that B_1 arrives right in front of A_3, neither does C_2 take C_1's place right there in that same sudden and entire manner. B_1 moves gradually to the right and its anterior part coincides in succession with the different parts of A_3. Therefore, that same anterior part may coincide with all the parts of C_1 and C_2 which are moving towards it at the same speed. – Well, are you sure? Divide B_1 and A_3 on the one hand, C_1 and C_2 on the other, in slices as thin as you like, provided that they be all equal within each of these bodies: you will see the same facts happen with these fractions as before with the wholes. For the slices of C_1 and C_2, taken together, will be twice as many as the slices of A_3: so the anterior slice of B_1 will not be in a position to coincide during the same number of instants with all the slices of A_3 on the one hand, and of C_1 and C_2 on the other. Necessarily, thus, either it will have to skip one out of two of the latter, or it will take, to pass over C_1 and C_2, twice as much time as to pass before A_3 (...). This is what Zeno had undertaken to prove.[43]

Thus you would have to push the division further again and again, and in fact it would never be completed. As long as you try to analyze motions into constituent parts, be they ever so small, you are faced with that paradox. On the face of it, Aristotle's defence against the Stadium, as it stands in the text of *Physics* VI.9, appears to be crude and naive. The reason is that he could just oppose his firm belief in the empirical evidence of relative speeds, but he had not the necessary intellectual tools to account for it: relative speed is an effect of Galilean relativity that rests on the principle of inertia, which Aristotle notoriously ignored. Nevertheless, this is not his last word on that topic (see below § 10, #4).

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[42] Lachelier is commenting on the transition between stages [2] and [3] of the model above.

[43] Lachelier (1910: 19) reprint.

7. A note on the two anonymous additional arguments: motion vs. change in general

Before leaving the text of Chapter VI.9, it is worth noticing that after the discussion of the famous four arguments, this chapter ends[44] with the mention and resolution of two other difficulties about change. Aristotle does not give any indication about their origin. Since he emphasizes that Zeno had produced *four* arguments about motion, we may suppose that these ones do not come from him, even though the first one has a kind of Eleatic flavour in its style (it is a dilemma and it rests on alternatives of the type "to be or not to be"). Nevertheless, we will meet again with the first one in the last discussion of Zeno's paradoxes in VIII.8; and they raise interesting questions as to Aristotle's scheme in that discussion, so I wish to introduce them shortly here and make a few comments about them.

The first one[45] bears on 'contradictory change', which means other types of change, as distinct from locomotion. Of course, Zeno did not know the broader use of *kinesis* (including qualitative change, growth and diminution, and generation and corruption), which was introduced long after him by Aristotle. His four 'arguments about *kínesis*', as reported by Aristotle, bear on locomotion only. In his answers, Aristotle follows in his footsteps; more generally, the discussions in Books V and VI (from V.3 on, in fact) seem to fit better with locomotion, although Aristotle has carefully expounded and explained his doctrine of the four types of change in chapters 1–2. It appears here and there that what he is saying holds for the three other types of change as well, but he never expresses that in so many words.

Motion (i.e., locomotion) has a particular position with respect to the other three types. *Inter alia*, the standard model of change of Book I, based on matter and form, does not apply so easily to motion: it is difficult to see how the fact of being here rather than there may be, for some objects, assimilated to the full possession of a form.[46] On the other hand, it is easier to apprehend the development of change and its intermediary steps in the case of motion than in the case of the other types, so that the analysis of motion provides a most convenient prop for the analysis of the in-between in general.[47]

Aristotle's focus on motion has another motive, which appears in reference to the second anonymous argument. There the difficulty is about the case of a rotating sphere,

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[44] Admittedly, the division into 'chapters' is not by Aristotle himself; but in this case the transition between Chapters 9 and 10 clearly marks a step forward ("Having demonstrated these points..."), whereas the transition within Chapter 9 (at *Ph.* 240a18–19) is a smooth one.

[45] Arist. *Ph.* 240a19–29: "Nor in reference to contradictory change shall we find anything impossible – *e.g.* if it is argued that if a thing is changing from *not-white* to *white*, and is in neither condition, then it will be neither *white* nor *not-white*; for the fact that it is not wholly in either condition will not preclude us from calling it *white* or *not-white* (...). So, too, in the case of *being* and *not-being* and all other conditions which stand in a contradictory relation: while the changing thing must of necessity be in one of the two opposites, it is never wholly in either."

[46] This is not altogether impossible, however: for instance one might say that it is a better condition for a hungry animal to be in front of some substantial food; and so on.

[47] Aristotle expounds that point in Chapter IV.11 by means of a threefold analogy between magnitude, motion and time in the course of his inquiry about the definition of time (see § 9).

which moves although it does not change place (at least taken as a whole).[48] This model, as is well known, plays a crucial part in the last book of the *Physics*, since that kind of motion is the only one type of change compatible with the perpetual existence of motion and thus with the eternity of the physical world. And with this model, the notion of a change directed to the possession of a form does not make sense any more: in fact, the structure of the motion itself is the form. Therefore, strictly speaking the notion of 'in-between' will not make any sense either in that case; or rather, that kind of motion contains nothing else than what I propose to pick out as the in-between in the other cases (*i.e.* finite changes in the sublunar world).

These reflections result in an important restriction on my claim that the contents of Books V and VI consist in a reaction to Zeno's arguments. Aristotle has another goal, still remote at that moment but far more important for him: the demonstration of the existence and nature of the First Mover of the heavens.

8. Zeno's dialectic and Aristotle's ontology of motion

The premisses of Zeno's arguments combine reference to well-known experiences of motion with highly abstract requirements as to what it is to *move* and what must be the inner structure of motion; and Zeno assumes that every phenomenon of motion must be describable according to these requirements.

The basic situations of the arguments are simple and familiar: a movable object (a boat, a carriage) is set in motion. A runner tries to catch up with another one and overtake him. A launched arrow keeps going on. One cart passes another coming the other way. But the conclusions are counterintuitive: the boat or carriage will never be able to leave its place. Achilles will never overtake the Tortoise. The flying arrow is at rest as well. A certain lapse of time must be equal to the half of itself.

A distinctive feature of Zeno's way of arguing (in the context of 'Presocratic' philosophers of nature) is that he gives preference to *a priori* reasoning over empirical evidence. His paradoxes rest, first, on the use of formal properties that define the conditions of the possible existence of multiple or extended objects in space: *wholes and parts, continuity, differences, limits,* and the notion of a *total order* (the *between* and the *before-and-after*). This last notion, as we will see, is more specific to motion: a moving object cannot reach a given position if it has not first reached those that are *before* it. However, one must keep in mind that while Zeno *uses* these notions as tools, he does not define them or specify the rules for their use. It is *Aristotle* who undertakes (all through the major part of Books

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[48] Arist. *Ph.* 240a29–b7: "Again, in the case of circles and spheres and everything that moves within its own dimensions, it is argued that they will be at rest, on the ground that such things, themselves and their parts, will occupy the same position for a period of time, and that therefore they will be at once at rest and in motion." Notice that this argument provides a nice counterpart to that of the Arrow, but it is impossible to guess whether Aristotle deliberately intended that contrast.

V and VI) a systematical review and analysis of all these terms, with the view that a more precise and correct account of these concepts will solve Zeno's arguments, which he discusses at the end of Book VI.

Zeno's arguments imply, second, some important epistemological assumptions:

(1) He assumes that *to account for a physical reality is to analyze it into, and to reconstruct it on the basis of, its elementary parts*; he does not state this rule in so many words, but it plays an important role in his arguments (and Aristotle does not fail to mention it in the discussion). Perhaps he thought that this principle was a natural epistemological consequence of the thesis that physical beings are multiple.[49]

(2) There are some operations that can be iterated indefinitely on certain objects; he had a keen eye to detect them, and he found a striking formula to express that fact: "it is the same thing to say this one time and to repeat it every time" (ὁμοῖον δὴ τοῦτο ἅπαξ τε εἰπεῖν καὶ ἀεὶ λέγειν, Fragment LM Zeno D6 / DK 29 B 1);

(3) He also allows himself to consider what would be the case at the end of such processes, although they cannot in fact be carried on to an end.[50]

In the case of motion, propositions (2) and (3) can be specified as:

(2') Whatever has an extension can be indefinitely divided.

(3') Nonetheless, one may treat the products of such divisions as if they were definite objects.

For him, the problem of motion is to understand how an object can pass from the situation D to the situation F through a series of changes E_1, E_2, E_3, ..., E_n which are in a total order relation.

According to these premisses, proposition (1) may be specified as follows:

(1') 'Motion' may be recognized as a real (and intelligible) fact if and only if one can account in a clear and consistent manner for what happens as the moving object travels along an indefinitely divisible interval.

According to propositions (2') and (3'), he gives a special attention to what happens in the cases in which E_i differs from $E_{(i+1)}$ by the smallest possible difference and when one approaches the limits of a given fact or process. Zeno thinks that that happens (has to happen) in the smallest possible unit of time (an atomic moment or instant).

Thus his arguments assume that the existence of motion implies that of elementary motions, which correspond to the ultimate stage of steadily iterated division. And his arguments claim that although there *must* be such elementary components, one *cannot*

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[49] A variant of this conjecture (which I do not need to assume) is the widely held historical supposition that Zeno's arguments were levelled at some 'Atomist' natural philosophers, whoever these might have been.

[50] That this style of reasoning was known by Aristotle and that it had been used by some geometers before him to establish that the diagonal of the square is incommensurable, is attested by *Metaph.* IX.4, 1047b6–12 (cfr. also *APr.* I.23, 41a26–28, *GC* I.2 , 316a14–23).

account for them (*i.e.* describe them, define them and more generally think of them) in a consistent way.

The first two arguments work by showing that the assumption of infinitely many infinitely small motions leads to conclusions that would ruin basic commonsensical assumptions about motion; the Arrow focuses on one particular atomic moment and claims that one could not distinguish motion from rest; the Stadium seems to show that there cannot be such elementary atomic changes.

This is so – Zeno says – because these familiar facts conflict with some of the constraints without which motion would be altogether unintelligible. I will call the set of these constraints 'Zeno's ontological picture of motion'. It is ontological insofar as it rests on *a priori* determinations that define what it is, for a motion, to be a motion. But this is not really an ontology, *i.e.* a sufficiently complete and consistent system of claims about the essence and structure of a domain of reality. This is rather a picture, and a sketchy one; and it is a fiction. Zeno did not adhere to it: from the beginning, it was intended to be refuted. As such, it does not need to be complete and stable, provided that it squares sufficiently with the facts and notions that most people ordinarily associate with motion.

Books V and VI – and, in fact, a large part of the *Physics* from Book III to Book VIII – have the same *a priori* character as Zeno's arguments. Aristotle takes up the task of assessing and criticizing that fictitious ontology of motion, a task which amounts in the end to proposing another one that could avoid Zeno's paradoxical conclusions while satisfying any sound and necessary requirement that may be contained in his premisses.

These books ask such questions as: "is motion indefinitely divisible?", "are its parts continuous or contiguous?", "what makes a motion (or a change) *one*?", "is there a first moment in a change?" – which they answer by means of a small number of elementary notions, which he obviously considers as indispensable and sufficiently clear by themselves, such as *same* and *distinct*, *whole, part* and *limit, prior* and *posterior*, and so on. That list resembles that of the objects and questions that "dialecticians try to inquire, starting their investigation from reputable premisses only."[51] Thus the identification of Zeno as the discoverer of dialectic might reflect not only his effective use – highlighted by the story in the *Parmenides* – of refutation as a method of indirect proof, but also his manner of arguing *a priori* on physical questions.

The discussions in the *Physics* – especially in Books V and VI[52] – have that same 'dialectical' character, as if Aristotle had taken over Zeno's specific method for setting and discussing physical questions.

François De Gandt has proposed[53] to describe the specific philosophical style and contents of Books V to VII as 'une topique des mouvements'; by 'topique' he meant

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[51] Arist. *Metaph.* III.1, 995b19–25.

[52] In fact, that philosophical style is also present in Book IV (in the definition of time) and it is used in Books VII and VIII in the long demonstration of the existence of the First Mover.

[53] De Gandt (1991: 95–97).

'an exploratory mode of inquiry' in the style of the *Topics*. I subscribe to that diagnosis, although I would like to add that these books go further than mere exploration; they establish some important points about the nature of motion.

9. The In-Between

I have already mentioned another aspect of the kinship of these two books with Zeno's arguments: they focus on what happens, or may happen, *in the course* of a motion or of a process of change. One should look more closely at that specific interest, since this is not Aristotle's usual way of considering motion and change. He gives other, more famous and much different accounts of the ontology of *kinesis* in the *Physics*.

In Book I, as an answer to Parmenides' contention that nothing can come to be out of nothing, he expounds his famous model of change involving matter, form and an active mover. According to this model, change is the effective bestowal of a form on a material substratum which is in some way able or prepared to receive it.

That concept of change is central to Aristotle's metaphysics. On the one hand, it is an essential tool for his specialized inquiries in natural philosophy: to account for a natural process is to identify its substratum, the form that it aims at realizing and its first mover. On the other hand it is closely related to the metaphysical doctrines of the four causes and of substances as compounds of matter and form.

In this view, a change (*one* change) is a well-determined unity, from a given starting-point to a definite end[54] (or better the other way around: to a definite end from a given starting-point). The particular processes that are contained within this unity are only conditions for its possibility or 'material' causes. For instance: the specific reactions produced in the patient's organism by the tools or drugs used by the doctor.

Change, thus described, must be understood in one piece; what happens between the starting-point and the endpoint does not matter much.[55] However, these intermediary steps are something real and as such one must be able to account for the specific sort of reality that their existence represents. Aristotle's answer is the definition of *kinesis* given in the opening chapters of Book III: change, seen that way, is 'the actualization of a potentiality *qua* potentiality'. That definition gives an ontological status to the in-between, but it does so only in an abstract, general way; whereas the discussions of Books V and VI, as well as Zeno's arguments, go deeper into the inner structure of the in-be-

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[54] If – as it often happens in real life – the process is incomplete in some way or other, for instance when it is interrupted before reaching to its end, some intermediate state which should have remained only potential, will become effective and permanent; but this is only accidental.

[55] The doctrine of the two entelechies, sketched in the *De Anima* in order to account for sense-perception and intellection (*de An.* II.5) represents the most radical version of that point and might help understanding Aristotle's fundamental insight: once the substratum is ready, and provided that some specific agent exerts the appropriate action, the actualization of the form can be immediate – even though the preparation of the substratum is a complex process that requires some time.

tween, that is: of which sort of parts is it composed?, and what sort of relations are there between its parts?[56]

Now one may ask: why did Aristotle feel the need to inquire so extensively about these questions? With his general ontological account of change, he seems to have a quick and effective answer to Zeno's paradoxes: considered as a natural event, a motion is one fact, not a series of elementary facts; the divisions or subdivisions of the overall process are only virtual or potential. He has another strong answer to the Division and Achilles:

> Hence Zeno's argument makes a false assumption in asserting that it is impossible for a thing to pass over or severally to come in contact with infinite things in a finite time. For there are two ways in which length and time and generally anything continuous are called infinite: they are called so either in respect of divisibility or in respect of their extremities (Arist. *Ph.* VI.2, 233a21–26).

> The claim that that which holds a lead is never overtaken is false: it is not overtaken while it holds a lead; but it is overtaken nevertheless if it is granted that it traverses the finite distance' (Arist. *Ph.* VI.9, 239b26–29).

> (...) there is no absurdity (...), in supposing the traversing of infinite distances in infinite time, and the element of infinity is present in the time no less than in the distance' (Arist. *Ph.* VIII.8, 263a13–15).

That is: if we admit the analogy between magnitude, motion/change, and time, then the problem disappears. Zeno's fallacy consists in allowing himself to treat time in a different way from magnitude.

These are appropriate answers to Zeno's interrogations, *i.e.* to his premisses. But Aristotle thinks he has to account for the in-between not only in order to silence Zeno, but also in order to achieve substantial knowledge of change. A passage in Book VIII stresses emphatically this point:

> But, although this solution[57] is adequate as a reply to the questioner (πρὸς τὸν ἐρωτῶντα ἱκανῶς ἔχει) (...), nevertheless *as an account of the fact and the truth* it is inadequate (πρὸς δὲ τὸ πρᾶγμα καὶ τὴν ἀληθείαν οὐχ ἱκανῶς).[58]

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[56] Notice that this is not the end of the story of Aristotle's concern for the in-between. Since the actualization of the potential requires a certain amount of preparation of the subject or substratum, he has to account for the conditions of that preparation, which involves material conditions. He will do that in the first book of *Generation and Corruption* I, taking issue with the upholders of discontinuist theories of matter, mainly Empedocles, but also the Atomists and Plato

[57] The solution expounded in Chapter VI.2.

[58] Arist. *Ph.* VIII.8, 263a15–18.

10. Aristotle's answers: Preliminary moves

Aristotle's full answer to Zeno's arguments rests on some preliminary moves.

(1) As I have had occasion to mention (§ 8), he revisits the notions implemented in Zeno's paradoxes and submits them to a careful scrutiny. Thus, in Chapter V. 3, he defines *to be together* and *apart*, *in contact*, *between*, *in succession*, *contiguous*, and *continuous* by means of the notions of *part and whole, limit* (and also *same / other, contrary*). The crucial outcome of that inquiry, with regard to Zeno's arguments, is that what is continuous cannot be composed of indivisible elements.

(2) Although, according to his holistic model of change, the change as a whole is more real than, and prior to, its parts, he takes some pains (in Chapter V. 4) to define accurately what makes a change *one* change on the basis of local criteria. A given process is one change:

– if it affects the same object or substratum,

– if it occurs within one and the same *pragma* (the range of states or properties determined by one pair of contraries)

– and lasts during one uninterrupted homogeneous stretch of time.

(3) He draws on the analogy that he has developed in Book IV between magnitude, motion and time. Thus he shows that "either all of these are composed of indivisibles and are divisible into indivisibles, or none" (Arist. *Ph.* VI.1, 231b18–20).

(4) Like Zeno, he uses the differences in speed as an argument, but in an opposite manner. In the Stadium, the differences in speed create a paradox because Zeno assumes that there must be elementary components. The Stadium assumes as a premiss that the basic constituents of every motion are minimal events in which a mobile crosses the smallest possible length in the smallest possible interval of time. Then, Zeno shows that it is impossible to conceive the basic constituents of the motion of a given body once it is assumed that this motion has different relative speeds with regard to different external objects. He concludes, or at least he suggests, that our concept of motion must be inconsistent and empty.

Aristotle, on the contrary, assumes that motions really exist and that they have differences in speed. He concludes that no part of a motion, however small, can be said to be indivisible. For the quicker of two motions will cross the same magnitude in less time and the slower will cross less magnitude in the same time. Thus, if one motion takes time T_0 to cross magnitude M_0, a quicker one will take time T_1, shorter than T_0; and during T_1 the slower motion will cross magnitude M_1, lesser than M_0; and in turn the quicker will take a still shorter time T_2 to cross M_1, and so on :

> We can carry on this process for ever, taking the slower after the quicker and the quicker after the slower, and using what has been demonstrated; for the quicker will divide the time and the slower will divide the length. If, then, this alternation always holds good, and at every turn involves a division, it is evident that all time must be continuous. (Arist. *Ph.* VI.2, 233a5–9)

11. The before and after

Seen from an ontological point of view, the analogy between magnitude, motion and time is not merely a formal isomorphism. It has a genetic aspect, so to say; it develops from the most accessible to the most abstract, from magnitude to time, through the mediation of motion.

Notice that Aristotle does not introduce a direct correspondence between magnitude and space, as most modern philosophers would readily do;[59] for him, there is a crucial difference between time and magnitude: the latter can be as given all at once – which is impossible in the case of time. As he says in the *Categories*,[60] the parts of a magnitude have a position while the parts of time have only an order, because they do not 'remain' (οὐχ ὑπομένει, οὔκ ἐστιν ὑπομένον).

Magnitude, time and motion share the essential feature that Aristotle names 'the before-and after' (τὸ πρότερον καὶ ὕστερον), *i.e.* they have a structure of total order: of any two of their elements, one must be *before* and the other *after*, otherwise they would be one and the same. But in the case of magnitude, that relation exists only θέσει – a phrase that one might translate either as 'by position' or 'by convention'; both would be correct in a sense. If a magnitude is taken in itself, its parts are only 'just there'; it is only when you assume a position within or in relation to that magnitude, that one point might be said to be closer or farther than another, before or behind. This is not so with motion. In motion, the before and after is a necessary and strictly determined condition of its existence and of its being just that motion. As Aristotle puts it, "the before and after in motion is what, by being that, it is motion."[61] "What, by being that, it is <such and such>" is an attempt to imitate as closely as possible the Greek phrase ὅ ποτε ὂν κίνησίς ἐστι. This enigmatic phrase[62] occurs only ten times in the Aristotelian corpus, seven of which belong to the context of the definition of time in *Physics* IV. It is more or less parallel to the phrases ἕτερόν τι ὄν / οὐχ ἕτερόν τι ὄν ('by being something else' / 'without being something else'), by which Aristotle characterizes the ontological status of accidents and substances respectively, so that ancient commentators came to consider it as merely equivalent to τὸ ὑποκείμενον, 'the substratum'. But that does not explain why, in a few distinct contexts, Aristotle carefully uses this difficult expression instead of τὸ ὑποκείμενον. The difference is that ὅ ποτε ὂν conveys a notion of indeterminacy, the notion of a *je-ne-sais-quoi* expressed by the adverb ποτε. The idea is that the *hó pote on* (here, the *before and after*) is a condition for the existence of motion that can

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[59] For instance Kant (1787: 50).

[60] Arist. *Cat.* 6, 5a15–37

[61] Arist. *Ph.* IV.11, 219a19–21.

[62] I am following here the interpretation of this phrase by Brague (1982) and Hussey (1983).

be conceived of without the concrete determinations that make it this or that motion, although it cannot exist independently of motion.

The ontological status of time, defined as 'the number of a motion according to the before-and after', is a consequence of that specific ontological position. This is another story, but we have to keep in mind that the formal structure of the 'in-between' of motion has the same status or, if I may say so, the same ontological location. In Chapter IV.11, Aristotle develops in more detail the correspondance, within the analogy, between the point, the moving thing and the *now*:

> The *now* in one sense is the same, in another it is not the same. In so far as it is in succession, it is different (which is just what its being *now* was supposed to mean), but what, by being it, it is a *now* is the same; for motion, as was said, goes with magnitude, and time, as we maintain, with motion. Similarly, then, there corresponds to the point the body which is carried along, and by which we are aware of the motion and of the before and after involved in it. This – whatever it may be[63] – is the same (whether a point or a stone or something else of the kind), but it is different in its description – as the sophists assume that *Coriscus in the Lyceum* is a different thing from *Coriscus in the market-place*. This, then, is different in so far as it is at one time here and at another there (...). This is what is most knowable; for motion is known because of that which is moved, local motion because of that which is transported. For what is transported is a *this*, whereas the movement is not. Thus the *now* in one sense is always the same, in another it is not the same; for this is true also of what is transported.[64]

See how Aristotle assumes boldly, for the sake of his demonstration, what he considers generally as the matrix of sophisms, *i.e.* the identification of an object with one of its accidents. In his concrete deambulation, Coriscus goes from the Lyceum to the marketplace for his own business and all along he is the very same Coriscus; but try to lessen his substantial identity down to the point at which it is exactly balanced by the difference between his two different positions, and that ambiguous mode of existence is exactly the ontological position of the *now*. We are not concerned with the ontology of time here; but since time is defined as the number of motion, my claim is that Aristotle's propositions about the inner structure of motion refer to exactly the same ontological location, that is, they describe an *hó pote ón*: a layer of reality which is known just insofar as it expresses the conditions for the existence of real natural motions.[65]

That ontological location could and should perhaps be simply called potential, since it corresponds to an incompletely determined mode of being; and in fact it squares with

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[63] This is ὅ ποτε ὂν again; a fuller translation would be: "whatever it may be that makes it a moving object."

[64] Arist. *Ph.* IV.11, 219b12–22, 29–33.

[65] Apart from the study of time and motion in the *Physics*, the notion of *hó pote ón* is used by Aristotle in two other contexts, in order to analyze fundamental facts about basic structures of nature: the constitution of blood in the *Parts of Animals* (*PA* II.2, 647a15, b24) and the reciprocal transformations of the simple elementary bodies in *Generation and Corruption* (*GA* I.3, 319b3).

the canonical definition 'the entelechy of the potential *qua* potential'; however, it must be stressed that this is not the same sort of potentiality as the potentialities of natural beings.

The discussion of that point of general ontology would lead us too far; in the last lines of this paper I will limit myself to exploring the notion that the *before and after* is an essential ontological feature of motion (and change) *qua* motion or change.

In Chapter VI.5, Aristotle claims that there is no first moment of change, although there may be a last one:

> The primary time that has reference to the end of the change is something really existent; for a change may be completed, and there is such a thing as an end of change, which we have in fact shown to be indivisible because it is a limit. But in reference to the beginning there is simply no such thing; for there is no such thing as a beginning of change, nor any primary time at which it was changing.[66]

Many commentators have expressed perplexity about that claim, starting with Theophrastus: "How did <Aristotle> take the limit to be indivisible, but the beginning divisible to infinity?"[67] Theophrastus seems to have thought that since this analysis of the structure of change rests on mathematical arguments it must be reversible, and thus one might as well claim that the first moment is indivisible and the last one indefinitely divisible. Here is Aristotle's argument, which looks much like the Dichotomy:

> For suppose that AD is such a primary time. Then it cannot be indivisible; for, if it were, the nows would be consecutive. Again, if the changing thing is at rest in the whole time CA (for we may suppose that it is at rest), it is at rest in A also; so if AC is without parts, it will simultaneously be at rest and have changed; for it is at rest in A and has changed in D. Since then AD is not without parts, it must be divisible, and the changing thing must have changed in every part of it (for if it has changed in neither of the two parts into which AD is divided, it has not changed in the whole either; if, on the other hand, it is changing in both parts, it is likewise changing in the whole; and if, again, it has changed in one of the two parts, the whole is not the primary time in which it has changed: it must therefore have changed in every part). It is evident, then, that there is no primary time in which it has changed; for the divisions are infinite.[68]

How are we to understand that strange pronouncement? What distinguishes motion, as a physical fact, from the abstract, geometrical structure of magnitude, is its inscription in the *before and after.* That creates an asymmetry between the starting-point and the end. Change has a direction, and it is directed towards its end rather than set off by some

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[66] Arist. *Ph.* VI.5, 236a10–15.

[67] After Simp. *in Ph.* 986.7–10.

[68] Arist. *Ph.* VI.5, 236a15–27.

event at its beginning; this is an implication of Aristotle's teleology. In a sense, he agrees with Zeno on the fact that the motion does not 'start'; but that does not mean that motion cannot exist, but only that the beginning of the motion *qua* motion is inassignable and that the first instants of the process are not significant in themselves. Every moment of the process develops under the influence of the ultimate term; that goes along with the fact that a change is named after its endpoint or goal.

And why does Aristotle claim that there is a last instant of change? In fact, it is not so much a last instant of change as a first instant at which the object *has changed*. In the last book of the *Physics*, in the course of the demonstration of the existence of the First Mover, Aristotle refers back to the Dichotomy and the Achilles and to his own answers in Book VI:

> Now in our first discussions of motion we put forward a solution to this difficulty turning on the fact that the period of time contains within itself an infinite number of units: there is no absurdity, we said, in supposing the traversing of infinite distances in infinite time, and the element of infinity is present in the time no less than in the distance. But, although this solution is adequate as a reply to the questioner (the question asked being whether it is impossible in a finite time to traverse or count an infinite number of units), nevertheless as an account of the fact and the truth (πρὸς τὸ πρᾶγμα) it is inadequate. For suppose the distance to be left out of account and the question asked to be no longer whether it is possible in a finite time to traverse an infinite number of distances, and suppose that the inquiry is made to refer to the time itself (for the time contains an infinite number of divisions): then this solution will no longer be adequate, and we must apply the truth that we enunciated in our recent discussion. In the act of dividing the continuous distance into two halves one point is treated as two, since we make it a beginning and an end (...). In the case of counting the halves, it is clear that this result follows; for then one point must be reckoned as two: it will be the end of the one half and the beginning of the other, if he counts not the one continuous whole but the two halves.[69]

That former answer was only a *lusis*, Aristotle says, *i.e.* a defence by detecting the fallacy in the opponent's premisses. Now, he says, we need an answer with a positive content. The reader will perhaps be slightly disappointed by what Aristotle brings here as a positive counterpart, for that seems to be nothing more than the distinction between potentiality and actuality that he has established at the beginning of Book VI in the case of spatial magnitudes. But the refutation goes on:

> It is also plain that unless we hold that the point of time that divides earlier from later always belongs only to the later so far as the thing is concerned, we shall be involved in the consequence that the same thing at the same moment is and is not, and that a thing is not at the moment when it has become. It is true that the point is common to both times, the earlier as

[69] Arist. *Ph.* VIII.8, 263a11–25, 263a30–b3.

> well as the later, and that, while numerically one and the same, it is not so in definition, being the end of the one and the beginning of the other; but so far as the real thing is concerned it always belongs to the later affection.[70]

Let A, C, B, be successive instants in a change, and D the object that changes. Let D be *not-white* at A and *white* at B, and let C be the point at which it has changed from *not-white* to *white*. If we reckon C as two, then we would have to say that at C, the thing D is both *white* and *not-white*, which would violate the law of non-contradiction. This is the first anonymous argument of Chapter VI.9 (cf. § 7 and fn. 46). There, Aristotle had a rather hazy answer: although the thing that changes must be (at each moment) in one of the two opposites, "it is never wholly in either." Here, a decision is made: at C the object is definitely *white*. By this decision, Aristotle declares and defines the ontological reality of motion.[71]

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[70] *Ibidem*, 263b9–15.

[71] Kant too, facing a similar challenge (*i.e.* Hume's arguments against the idea of a necessary connection in what we consider as causal sequences), resorted to the existence of a real order between the stages of natural processes. See *Critique of Pure Reason*, Transcendantal Analytic III, proof of the second Analogy (p. 236–238 of the second edition).

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An Ontology for the In-Between of Motion: Aristotle's Reaction to Zeno's Arguments

This paper proposes an interpretation of Books V and VI of Aristotle's *Physics* as being (at least partly) a reaction to Zeno's four "arguments against motion" that Aristotle expounds and discusses in *Phys*. VI 9. On the basis of a detailed textual analysis of that chapter, I show that Zeno's arguments rest on a frame of *a priori* notions such as part and whole, in contact, between, limit, etc., which Aristotle takes over in order to account for the inner structure (here called "the In-Between") common to all facts of motion and change. That frame allows him to develop a specific ontology for that inner structure – although it exists only potentially according to the Aristotelian orthodoxy – because he needs such an ontology in order to vindicate the reality of motion and change.

KEYWORDS

Aristotle, Aristotle's *Physics*, change. continuous, dialectic, infinite, motion, ontology, time, Zeno of Elea

Aristotle's Mixture in its Medical and Philosophical Background: The Hippocratic *De victu* and the Aristotelian *De generatione et corruptione**

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1. Introduction

In the proem to *Meteorologica* (*Mete.* 338a20–39a10), Aristotle describes the programme of his study of nature by enumerating a series of works already written or yet to be written, beginning with a reference to his *Physics* and concluding with a mention of his zoological and botanical treatises.[1] This programmatic catalogue refers, remarkably, to

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a discussion on corporeal elements (their number, kinds, and mutual transformation), and on generation and corruption in general. Traditionally, these two latter topics have been understood as covered by *De caelo* III–IV and *De generatione et corruptione*, in the form in which we read them today.[2] If *De caelo* III arrives at the conclusion that the primary elements are reciprocally transmutable, and *De caelo* IV is wholly dedicated to expounding the theory of the natural places of the primary elements, neither of the two books delves deeper into the question of what really happens when the primary elements transform into one another or mix together – processes whose basic principles are laid down in *De generatione et corruptione.* As our goal is to make a contribution which can shed new light on the historical roots of Aristotle's theory of mixture as ruled by the mechanism of the reciprocal interaction of the elements, our focus here will be Aristotle's essay *De generatione et corruptione,* which provides us with the best insight into this topic.

2. Aristotle's elementary physics in De generatione et corruptione

Before proceeding to the enquiry, I shall present a brief review of Aristotle's elementary physics of *De generatione et corruptione*, which will then lead us to outlining the basic principle underlying the theory of mixture contained in this treatise.[3] Aristotle posits four sublunary primary elements: fire, air, water, earth, and, as it is clearly spelt out in *De generatione et coruptione* 330b3–5, every element is coupled with two primary qualities. Fire is hot and dry, air is moist and hot, water is cold and moist, earth is dry and cold.[4]

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[1] "We have already dealt with the first causes of nature and with all natural motion (*Phys.*); we have dealt also with the ordered movements of the stars in the heavens (*Cael.* I–II) and with the number, kinds, and mutual transformations of the four elements, and growth and decay in general (*Cael.* III–IV, *GC*). It remains to consider a subdivision of the present inquiry which all predecessors have called Meteorology (...). After we have dealt with all these subjects let us then see if we can give some account, on the lines we have laid down, of animals (the zoological *corpus*) and plants (reference to a lost work *On Plants*, cf. Bonitz *Index* 104b38), both in general and in particular (...)" (transl. and references by Lee).

[2] For the problematic relationship between *Cael.* III–IV and *GC*, cf. Migliori (2013: 20–30), on this cf. also Brunschwig (2004: 28–31). In contrast to the majority of ancient commentators and modern scholars, who are inclined to hypothesise that *Cael.* I–II (which is dedicated to the heavenly motions) should be kept apart from *Cael.* III–IV (which focus on the sublunary world and should be brought instead closer to *GC*, representing its logical continuation), according to Brunschwig, in the abovementioned passage from *Meteorologica*, once mentioned *Physics* (where Aristotle deals with more abstract and general topics), the philosopher would refer to a larger unit whose subject matter is the whole set of physical bodies and processes, both supralunar and sublunar. This larger unit, in Brunschwig's view, would be composed of three subunits "put exactly on the same level in an ordered but non-hierarchic sequence", i.e., *Cael.* I–II, III–IV, and *GC*, cf. Brunschwig (2004: 30) and also Giardina (2008a: 11–19).

[3] A brief terminological observation: Aristotle has two technical terms to define mixture: *μίξις* and *κρᾶσις*. The first term indicates a mixture of both solids and liquids (insofar as it is the genus), whereas *κρᾶσις*, as it is the species, designates a mere mixture of liquids (cf. *Top.* 122b30–31, οὔτε γὰρ ἡ *μίξις* ἅπασα κρᾶσις (ἡ γὰρ τῶν ξηρῶν *μίξις* οὔκ ἐστι κρᾶσις), for a discussion of Aristotle's and Peripatetic terminology with further bibliographical references, cf. Mirrione (2017: 255–257).

[4] It should be noted that in *GC*, however, the term στοιχεῖον, namely 'element', does not, in general, indicate the simple bodies (ἁπλᾶ σώματα, i.e., fire, air, water, and earth) of which all the mixed bodies are composed (cf.

Moreover, every element is principally associated with one primary quality: fire is hot, air moist, water cold, and earth dry (*GC* 331a4–6).[5]

The mutual transformations of the elements into one another and their mixture account for all ongoing processes in the sublunary region, but they are not the same thing. For it must be pointed out that according to Aristotle, there is an important difference between generation and mixture, as the second has to be more precisely ascribed to a peculiar type of alteration, or *alloiōsis*. As opposed to generation, there is 'alteration' when "the substratum is perceptible and persists, but changes in its own properties, the properties in question being opposed to one another either as contraries or as intermediates" (*GC* I.4, 319b11–12, transl. Joachim). This happens – as Aristotle declares – when a body, for example, is healthy and then sick again. In any case, it continues being in the same body. Mixture has to be thought of as a specific kind of alteration, where the constituents, which have been altered (cf. *GC* I.10, 328b1: ἡ δὲ μίξις τῶν μικτῶν ἀλλοιωθέντων ἕνωσις), become something else at the end of the process (so as to be interpreted from the word ἕνωσις), but are still recoverable. It is relevant to underline this difference, as Aristotle dedicates most of his speculation in *GC* to distinguishing generation from alteration (and therefore from mixture), in order to take a position against some of his Presocratic predecessors who called generation mixture, and identified the latter with a merely mechanical mixture.

Reciprocal elemental transmutation takes place when an exchange of one or two basic qualities occurs: for example, air (hot and moist) changes into water (cold and moist) when the hot is completely replaced by its opposite, the cold (as air and water have in common the moist), and so on. As is evident in this case, the hot *qua* patient has

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GC II.8, 334b31–335a9), but rather their basic qualities, as for example in *GC* II.3, 330a30 ff. Ἐπεὶ δὲ τέτταρα τὰ στοιχεῖα, τῶν δὲ τεττάρων ἓξ αἱ συζεύξεις, τὰ δ' ἐναντία οὐ πέφυκε συνδυάζεσθαι (θερμὸν γὰρ καὶ ψυχρὸν εἶναι τὸ αὐτὸ καὶ πάλιν ξηρὸν καὶ ὑγρὸν ἀδύνατον), φανερὸν ὅτι τέτταρες ἔσονται *αἱ τῶν στοιχείων συζεύξεις, θερμοῦ καὶ ξηροῦ, καὶ θερμοῦ καὶ ὑγροῦ, καὶ πάλιν ψυχροῦ καὶ ὑγροῦ, καὶ ψυχροῦ καὶ ξηροῦ*, cf. Joachim (1922: 213), Williams (1982:160), Frede (2004: 303), and Giardina (2008a: 63). Less convincingly, given the clarity of the passage from a philological point of view, Crowley has interpreted the text as if Aristotle had referred not to the pairings of hot, cold, dry, and moist as the στοιχεῖα, but to the pairings of hot/cold and dry/moist interpreted as the contrary properties distinguishing the στοιχεῖα (which – in the scholar's view – would coincide with fire, air, water, and earth), cf. Crowley (2013: 169). However, apart from the ongoing discussion concerning the qualitative or corporeal nature of the term στοιχεῖον in Aristotle's *GC*, what matters here is ascertaining the historical model which Aristotle may have looked to, in the elaboration of his theory of mixture, as ruled by the mechanism of qualitative interaction of hot/cold and dry/moist, namely primary/basic contrary qualities distinguishing fire, air, water, and earth, which are traditionally understood as the primary elements. It is this understanding of the term which we have used in this essay. Sometimes, in fact, the Stagirite refers to the simple bodies as the so-called 'elements' (cf. *GC* I.1 329a24–26) possibly referring to the previous medical and philosophical tradition (cf. the observations by Rashed 2005: 129, n. 4); on the expression 'so-called elements' used by Aristotle in several passages, cf. Crowley (2008), who explains it as a neutral report of contemporary understanding according to which the elements of bodies are fire, air, water, and earth).

[5] As Giardina highlights, this statement contradicts some other textual *loci*, e.g., *Mete.* IV.4, 382a3–4 where water is principally associated with the moist (in place of the cold). According to the scholar, Aristotle would privilege the association of water and cold in *GC* because, when in *GC* II.4 he deals with the mutual transmutation of the elements, in the passage from air (moist and hot) to water (cold and moist), it is the transformation from hot to cold which plays the major role, cf. Giardina (2008b: 201–202).

been completely assimilated by the cold *qua* agent.[6] The elementary transformation is essential to explain physical phenomena such as the formation of rain, when, for example, air turns into water (*GC* 338b6 ff.). The elemental mixture is, instead, brought about by a process of reciprocal qualitative assimilation, and accounts for the formation of the so-called homoeomerous part.[7] In the case of mixture, by acting and being acted upon by one another, hot and cold reach a common midpoint (μεταξύ), and – at the same time and by the same process – dry and moist also reach a common midpoint, because none of them succeeds in assimilating the other completely.[8] In Aristotle's own words:

> the actually-hot is potentially-cold and the actually-cold potentially-hot; so that hot and cold, unless they are equally balanced, are transformed into one another (and all the other contraries behave in a similar way). It is thus, then, that in the first place the 'elements' are transformed; and that (in the second place) out of the 'elements' there come-to-be flesh and bones and the like-the hot becoming cold and the cold becoming hot when they have been brought to the 'mean'. For at the 'mean' is neither hot nor cold. The 'mean', however, is of considerable extent and not indivisible. Similarly, it is qua reduced to a 'mean' condition that the dry and the moist, as well as the contraries we have used as examples, produce flesh and bone and the remaining compounds (*GC* II.7, 334b22–30 transl. by Joachim).[9]

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[6] This is the first option, and is the case of two elements that are consecutive according to the natural order (fire-air-water-earth) transforming into one another through one qualitative change. Aristotle describes two other possible solutions: (ii) the element changes into another that is not consecutive, for example from fire to water (this process entails two qualitative changes), and (iii) two non-consecutive elements can give rise to a third element when each of the two elements loses one of its properties, namely "when the hot of the fire and the moist of the water have passed-away, there will be earth, owing to the survival of the dry of the fire and the cold of the water" (transl. by Joachim). On this cf. *GC* II.4 (with parallels in *Cael.* III.6, 304b23 ff.) and cf. Joachim (1922: 219–223), Gill (1989: 67–77), Giardina (2008a: 71–73), Giardina (2008b: 202–223), Migliori (2013: 331–334), Krizan (2013).

[7] Aristotle's theory of mixture (whose general concept is presented in *GC* I.10) provides a rationale for the formation of the so-called homoeomerous parts (whose composition from the mixture of elements is analyzed in great detail in the complementary chapters, II.7 and II.8). The notion of the homoeomerous part is largely applied by Aristotle to his biological theories, as it is one of the levels of structure in living being. In *PA* II.1, 646a12–24, he describes the three *synthesis* of living beings' organisms; the first from elemental powers to simple compounds, the second from simple compounds to homoeomerous parts (that is, organic tissues like flesh, bone, etc.), and the third from homoeomerous to anhomoeomerous or organic parts (face, hand, etc.), cf. Lennox (2001: 180–181, comments *ad* 646a12–24). For, even though the main concern of *De generatione et corruptione* is that of providing an exhaustive account of the μεταβολαί of the substance (substantial generation, alteration, growth, and diminution), and to give a clear description of elemental theory and elements' reciprocal qualitative transformations, it can also be seen as a prelude to the Aristotelian biological works, cf. Rashed (2005: CXL–CLXXXVI).

[8] Arist. *GC* II.7, 334b22–30, the passage is quoted in full immediately after. Traditionally, Aristotle's mixture has been conceived of as the reciprocal qualitative assimilation of hot and cold, and of moist and dry, cf. various studies especially Joachim (1904), Joachim (1922: 194–297, 241–244), Frede (2004), Giardina (2008a: 64–65), Giardina (2008b: 182–183), Groisard (2016: 30–31), and Zarifian (2018). Cf. especially Frede (2004: 301): "In *mixis* there is a two-way rather than just a one-way change: both constituents in a mixture act as agent in one sense and as patient in another, for each actively modifies the opposite quality in the other without eradicating it. Otherwise the change in question will be generation and destruction instead of mixture."

[9] Arist. *GC* II.7, 334b22–30: ἔστι γὰρ τὸ ἐνεργείᾳ θερμὸν δυνάμει ψυχρὸν καὶ τὸ ἐνεργείᾳ ψυχρὸν δυνάμει θερμόν, ὥστε ἐὰν μὴ ἰσάζῃ, μεταβάλλει εἰς ἄλληλα· ὁμοίως δὲ καὶ ἐπὶ τῶν ἄλλων ἐναντίων. Καὶ πρῶτον οὕτω τὰ

As Bogen has underlined, hot and cold (contraries within the higher genus of 'temperature'), and dry and moist (contraries within the higher genus of 'density') have to be envisioned as extreme limits of continua of intermediates between one extreme and its contrary.[10] Also, how far the qualitative interaction or assimilation will progress, thus leading either to a complete elementary transformation or to a homoeomerous compound, "depends on the degree of activity of the agent and of susceptibility of the patient",[11] in other words the degree to which the patient "changes into the agent" (*GC* 324a11–13) or the agent "makes the patient similar to itself" (*GC* 324a10–11). The key aspect of such a formulation that we have so far summarised is that Aristotle's natural primary bodies, namely fire, air, water, and earth, are constituted by two pairs of contrary qualities (hot and cold, dry and moist). Thus, they are thought of as the extreme limits of a continuum which ranges from a maximum (for instance the maximum degree of hotness coinciding with the minimum degree of coldness) to a minimum (the minimum degree of hotness coinciding with the maximum degree of coldness), and vice-versa. In between there is a considerable μέσον of intermediary combinations, specifically the field of mixture (which brings about the homoeomerous compounds).

Now, is this formulation, which represents a milestone in Aristotle's theory of nature, totally ascribable to Aristotle, or should it be regarded more historically as a theoretical development built upon previous elemental theories?

3. Two Hippocratic models of mixture: De natura hominis and De victu

In the introductory essay preceding the last and most authoritative critical edition of *De generatione et corruptione* (2005), Rashed denounces the lack of attention devoted to the relations between Aristotle's elementary theory and the Hippocratic elemental (and qualitative) reductionism mainly displayed in *De natura hominis* and in *De victu*.[12] Rashed's historical underlining, however, does not seem to have been further developed by scholars who today investigate different aspects of Aristotle's theory of mixture as formulated in *De generatione et corruptione*.[13] Thus, it seems to us to be worth the effort to explore in depth these similarities in order to find out, *mutatis mutandis*, the model of the basic physical contrarieties (hot/cold and dry/moist) envisioned as the extreme

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στοιχεῖα μεταβάλλει, ἐκ δὲ τούτων σάρκες καὶ ὀστᾶ καὶ τὰ τοιαῦτα, τοῦ μὲν θερμοῦ γινομένου ψυχροῦ, τοῦ δὲ ψυχροῦ θερμοῦ, ὅταν πρὸς τὸ μέσον ἔλθῃ· ἐνταῦθα γὰρ οὐδέτερον, τὸ δὲ μέσον πολὺ καὶ οὐκ ἀδιαίρετον. Ὁμοίως δὲ καὶ τὸ ξηρὸν καὶ ὑγρὸν καὶ τὰ τοιαῦτα κατὰ μεσότητα ποιοῦσι σάρκα καὶ ὀστοῦν καὶ τἆλλα.

[10] Bogen (1992: 13 ff.)

[11] Mourelatos (1984: 6).

[12] Rashed (2005: XXV with n. 1 and XXVI). cf. also Vizgin (1980), Althoff (1992: 12–13 with n. 8 and 9), cf. Longrigg (1993: 220–226).

[13] Notably in the last few years: Groisard (2016: 1–73), Krizan (2018a and 2018b), Zarifian (2018).

limits of a continuum of intermediaries ranging from a maximum to a minimum. This is an essential precondition to understanding Aristotle's mixture in the way it has been formulated throughout *De generatione et corruptione*.

Within the varied and heterogeneous Hippocratic Corpus, *De victu* and *De natura hominis*, although contemporaneous (they both originate from the end of the fifth or to the beginning of the fourth century BCE),[14] belong to two different poles of writing. *De victu*, also called *De diaeta* or, in English, *On Regimen* (together with such treatises as *De carnibus*), is a medical treatise which displays a philosophical bent, the author being profoundly convinced that the knowledge of the ultimate constitutive elements of human nature (that according to the author of this treatise are fire and water) is necessary for the development of medical reflection. On the other hand, *De natura hominis* (together with *De vetere medicina*), although exhibiting remarkable philosophical influences (notably Empedocles'), intends to posit the basis for a science – medicine – that has to be regarded as autonomous from philosophical doctrines (especially the Ionic and the Eleatic monisms).[15] Both treatises, however, show great interest in, and investigate, the question relating to the basic building blocks of nature, while providing two different answers. Let us look at this more closely.

De natura hominis dedicates the first seven chapters to delineating a theory of human nature and, as Lloyd has remarked, preserves the first extant text where the hot and the cold, and the dry and the moist are envisioned as the ultimate components of other things.[16] However, when it comes more specifically to human bodies, the humoralistic perspective, which makes this Hippocratic writing notorious, becomes overtly dominant.[17] Thus, the four humours are conceived of as the peculiar constituents of human nature, and each of them is associated with a pair of basic contraries (each of them prevails during one of the four seasons – from spring to winter – and during one stage of human life, from childhood to old age). Hence, blood is hot and moist, yellow bile is

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[14] Hp. *Nat.Hom.* has to be dated back to the time between 420 and 400, cf. Jouanna (2002: 59–61), whereas according to Byl *Vict.* belongs to the end of the fifth or to the beginning of the fourth century, cf. Byl (2003: 44–47).

[15] For an overview on the Hippocratic Corpus and its set of writings, cf. Jouanna (1999: 56–71). On the various and intertwined interrelations between Presocratic philosophy and *De natura hominis* (especially on the criticism by the Hippocratic author against the Ionic and Eleatic monisms and Empedocles' influences on the writing), cf. Longrigg (1993: 85–92).

[16] Lloyd (1964: 92–93); cf. Hp. *Nat.Hom.* 3, CMG I.1.3, 170–172 Jouanna. The ultimate qualitative constituents, hot and cold, dry and moist, do not have to be ὁμόφυλα, and do not have to possess the same δύναμις (on the sense and significance of the term, cf. footnote n. 18). They are paired in couples, and either can be proportionally mixed with one another (in this case they contribute to generate something else; the expression used is συμβάλλειν ἐς τὴν γένεσιν), or can prevail over the other (in this case no generation is possible) (cf. Hp. *Nat. Hom.* 3, CMG I.1.3, 170.11–14 Jouanna: καὶ πάλιν, εἰ μὴ τὸ θερμὸν τῷ ψυχρῷ καὶ τὸ ξηρὸν τῷ ὑγρῷ μετρίως πρὸς ἄλληλα ἔξει καὶ ἴσως, ἀλλὰ τὸ ἕτερον τοῦ ἑτέρου πολλὸν προέξει καὶ τὸ ἰσχυρότερον τοῦ ἀσθενεστέρου, ἡ γένεσις οὐκ ἂν γένοιτο).

[17] The humoralistic nature of the human being is clearly spelt out in Hp. *Nat.Hom.* 4, CMG I.1.3, 172.13–174.10 Jouanna.

dry and hot, black bile is dry and cold, and phlegm is moist and cold.[18] As is clear from the rest of the tract, they are essential for understanding the physiopathology of human beings, as their health and pathological states depend respectively on a balanced and imbalanced mixture of these four bodily fluids. The human body is mainly considered from a hydromechanic point of view, which is understandably derived from accurate clinical observations of the Hippocratic doctor working on his patients: the aetiology of disease is principally explained on the grounds of excessive, or excessively scarce, quantities of humours that could be evacuated by the body, or that could be extracted from the organism by means of specific hydragogue drugs.[19]

According to Longrigg, who has written an important contribution on the role of the basic contrary qualities in pre-Aristotelian physics, more than in *De victu*, it is in *De natura hominis* that closer parallels to Aristotle's ascription of hot, cold, dry, and moist to the elements can be found, as this Hippocratic writing employs the same binary combinations (hot and moist, hot and dry, cold and moist, and cold and dry).[20] However, such a statement, of course, cannot be exempt from objections. Firstly and most obviously, Aristotle's contrary qualities are not associated with the four humours of the Hippocratic tradition, which Aristotle knows but does not assign such a pivotal role to in his account of living beings.[21] More importantly, although in *De natura hominis*, hot and cold, and dry and moist are conceived of as reciprocally interacting and balancing contraries (but this is not – of course – an innovation introduced into Greek thought, since the idea of various couples of reciprocally interacting contraries can be traced back to Anaximander, as Lloyd has highlighted),[22] they are not integrated into a coherent model of elementary mixture where hot/cold and dry/moist are thought of as the extreme limits encompassing a μέσον, in which an interaction takes place (as it occurs in Aristotle's *De generatione et corruptione*). No explanation is given regarding *how* the two pairs of contraries act in order bring about the four humours within the organism (such a detail remains indeed

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[18] The correspondence between qualities and humours is explicitly observed at Hp. *Nat.Hom.* 7, CMG I.1.3, 182.4–187.12 Jouanna. In order to guarantee a healthy state, the mixture of blood, phlegm, and yellow and black bile have to be proportionate according to quantity and δύναμις (*Nat.Hom.* 4, CMG I.1.3, 172.15–174.1 Jouanna), and, as it is stated in Ch. 5, the four corporeal fluids differ considerably with regard to external aspect and δύναμις (τοσοῦτον διήλλακται ἀλλήλων τὴν ἰδέην τε καὶ τὴν δύναμιν, *Nat.Hom.* 5, CMG I.1.3, 176.8–9 Jouanna), whereby δύναμις, the Hippocratic author would define the qualitative composition of the fluid and its power, which can be grasped by sense perception, cf. Plamböck (1964: 4–15 with footnote n. 7).

[19] On Hippocratic humoralism, cf. also Moreno Rodríguez (1991: 92–95) and Jouanna (2002: 39–55, 2012) on the relationship between *Nat.Hom.* and the different humoral systems of the Hippocratic Corpus.

[20] Longrigg (1993: 224–225).

[21] Aristotle is certainly familiar with the Hippocratic four humours (in *HA* 550b9–10, he lists phlegm and yellow and black bile as residues together with faeces), but he considers phlegm and the two biles as useless residues – *perittōmata* – which do not exert an influence on health and the pathological states of living beings (the notion of *perittōma* was not even known in the Hippocratic Corpus, and was introduced into Greek medicine only after the second half of the fourth century BCE, possibly by Aristotle himself). On this, cf. van der Eijk (2005:152–155, esp. 153).

[22] Lloyd (1964: 98 and ff.).

obscure). Let us examine, instead, the model of mixture which the author of *De victu* puts forward.

De victu consists of four books (it is one of the longest writings of the Hippocratic Corpus) and is presented as a medical treatise principally containing dietary prescriptions based on an equilibrium between food and physical exercise, and above all, for our purposes, on a philosophically grounded understanding of human nature. For in the second of the two introductory chapters, the Hippocratic author declares that whoever desires to work out a theory on human regimen "must first acquire knowledge and discernment of the nature of man in general", that is, "knowledge of its primary constituents and discernment of the components by which it is controlled" (γνῶναι μὲν ἀπὸ τίνων συνέστηκεν ἐξ ἀρχῆς, διαγνῶναι δὲ ὑπὸ τίνων μερῶν κεκράτηται).[23] These primary constituents are, as we have observed, fire and water; these two elements are always mixed with each other. Let us see how this happens by considering the model of mixture reported in Chapter 3:

> Now all animals, including man, are composed of two things, different in power but working together in their use, namely, fire and water. Both together these are sufficient for one another and for everything else, but each by itself suffices neither for itself nor for anything else. Now the power that each of them possesses is this. Fire can move all things always, while water can nourish all things always; but in turn each masters or is mastered to the greatest maximum or the least minimum possible. Neither of them can gain complete mastery for the following reason. The fire, as it advances to the limit of the water, lacks nourishment, and so turns to where it is likely to be nourished; the water, as it advances to the limit of the fire, finds its motion fail, and so stops at this point. When it stops its force ceases, and hereafter is consumed to nourish the fire which assails it (Hp. *Vict.* I.3, CMG I.2.4, 176.5–15 Joly-Byl, transl. Jones).[24]

First of all, we note that the Hippocratic author narrows the scope of his investigation to animals and, more specifically, to man. As he declares, they are composed of two elements, these being fire and water (afterwards he further clarifies, however, that the mixture of fire and water "suffice for all things throughout the universe" – πῦρ καὶ τὸ ὕδωρ, ὥσπερ εἴρηταί μοι, αὐτάρκεά ἐστι *πᾶσι διὰ παντὸς*, cf. Hp. *Vict.* 3, CMG I.2.4, 126.18 Joly-Byl).

Secondly, fire and water are described as "different in power, but working together in their use" (διαφόροιν μὲν τὴν δύναμιν, συμφόροιν δὲ τὴν χρῆσιν): the dichotomy

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[23] Hp. *Vict.* I.2, CMG I.2.4, 122.22–23 Joly-Byl (transl. Jones).

[24] Συνίσταται μὲν οὖν τὰ ζῶα τά τε ἄλλα πάντα καὶ ὁ ἄνθρωπος ἀπὸ δυοῖν, διαφόροιν μὲν τὴν δύναμιν, συμφόροιν δὲ τὴν χρῆσιν, πυρὸς καὶ ὕδατος. Ταῦτα δὲ συναμφότερα αὐτάρκεά ἐστι τοῖσί τε ἄλλοισι πᾶσι καὶ ἀλλήλοισιν, ἑκάτερον δὲ χωρὶς οὔτε αὐτὸ ἑωυτῷ οὔτε ἄλλῳ οὐδενί. Τὴν μὲν οὖν δύναμιν αὐτῶν ἑκάτερον ἔχει τοιήνδε· τὸ μὲν γὰρ πῦρ δύναται πάντα διὰ παντὸς κινῆσαι, τὸ δὲ ὕδωρ πάντα διὰ παντὸς θρέψαι· ἐν μέρει δὲ ἑκάτερον κρατεῖ καὶ κρατεῖται ἐς τὸ μήκιστον καὶ τὸ ἐλάχιστον ὡς ἀνυστόν. Οὐδέτερον γὰρ κρατῆσαι παντελῶς δύναται διὰ τόδε· τὸ μὲν πῦρ ἐπεξιὸν ἐπὶ τὸ ἔσχατον τοῦ ὕδατος, ἐπιλείπει ἡ τροφὴ, ἀποτρέπεται οὖν, ὅθεν μέλλει

διαφόροιν-συμφόροιν helps to express a concept which underpins the whole treatise, namely the mutual interdependence of two different elements. By employing the essentially Heraclitean idea of the unity of opposites, but in accordance with the medical principle of the plurality of physiopathological causes, the Hippocratic author breaks free of the monistic ties, and develops a binary elemental theory.[25] Therefore, fire and water work together to guarantee the functioning (τὴν χρῆσιν) of the human constitution (which, as we have seen, constitutes the privileged focus of *De victu*), but they can do this insofar as they possess complementary δυνάμεις. The meaning and significance of the concept of δύναμις in *De victu* appears more complex than what we have found in *De natura hominis*. On the one hand, it refers to the qualitative composition of each single element. As explicitly stated in Chapter 4 (and here we can see the correspondence between elements and qualities), fire is hot and dry, whereas water is cold and moist, the active properties in turn being those of heating, drying, cooling, and moistening (in this aspect, not so dissimilar from the meaning of the term we have encountered in *Nat.Hom.*). On the other hand, the primary and essential δυνάμεις, as we see from the textual passage we quoted, is the one of moving all things always, which is attributed to fire, and the one of nourishing all things always, which is attributed to water (Τὴν μὲν οὖν δύναμιν αὐτῶν ἑκάτερον ἔχει τοιήνδε· τὸ μὲν γὰρ πῦρ δύναται *πάντα διὰ παντὸς κινῆσαι*, τὸ δὲ ὕδωρ *πάντα διὰ παντὸς θρέψαι*). As we can glean from the text, one active property (such as the one of moving which pertains to fire, for instance) allows the element to master the other, while the other is mastered (ἐν μέρει δὲ ἑκάτερον κρατεῖ καὶ κρατεῖται): while one advances, the other recedes. In other words, and with full respect to the most probable original meaning of δύναμις in early Greek medical and philosophical thought, while one element is active, the other is passive, and vice-versa.[26]

Finally, as stated explicitly in the text quoted, this active-passive interplay takes place between two extreme limits: "in turn each masters or is mastered to the greatest maximum or the least minimum possible (ἐς τὸ μήκιστον καὶ τὸ ἐλάχιστον). Neither of them

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τρέφεσθαι· τὸ δὲ ὕδωρ ἐπεξιὸν ἐπὶ τὸ ἔσχατον τοῦ πυρὸς, ἐπιλείπει ἡ κίνησις, ἵσταται οὖν ἐν τούτῳ, ὅταν δὲ στῇ, οὐκ ἔτι ἐγκρατές ἐστιν, ἀλλ' ἤδη τῷ ἐμπίπτοντι πυρὶ ἐς τὴν τροφὴν καταναλίσκεται.

[25] In chapter two of his monograph dedicated to *De victu*, Bartoš reconstructs the philosophical background of Hippocratic writing (he principally discusses the presence in the treatise of the teachings of the Pythagoreans, Heraclitus, Empedocles, and Anaxagoras), and clarifies how the Hippocratic author of *De victu* upholds the Heraclitean principle of the unity of the opposites (which is illustrated in Heraclitus' fragments DK 22 B 8, B 10, B 48, B 50, B 51, B 57, B 67, and B 88). However, by recognizing the unsuitability of monistic conceptions within the medical field (cf. the attack by the Hippocratic author of *De natura hominis* on Ionic and Eleatic monisms) and by drawing on this assumption, the Hippocratic author develops, from the Heraclitean monistic theory based on fire as an all-embracing cosmic principle, a dualistic elementary theory which provides a more appropriate explanation for natural, and more precisely, biological and micro-cosmic processes (Bartoš, 2015: 117–127).

[26] On the concept of δύναμις in *De victu,* cf. Miller (1959: 147–164) together with some observations in Plamböck (1964: 32–41). Miller quotes a passage from Plato's *Phaedrus*, which, according to him, conveys the essential meaning of the term within the early Greek medical and philosophical field, and where, with reference to the Hippocratic medicine and its enquiry into nature, δύναμις is properly designated as "power of acting (...), or of being acted upon" (σκοπεῖν τὴν δύναμιν αὐτοῦ, τίνα πρὸς τί πέφυκεν εἰς τὸ δρᾶν ἔχον ἢ τίνα εἰς τὸ παθεῖν ὑπὸ τοῦ, cf. Pl. *Phdr*. 270d), cf. Miller (1959: 148 with footnote n. 6).

can gain complete mastery for the following reason. The fire, as it advances to the limit of the water, lacks nourishment, and so turns to where it is likely to be nourished; the water, as it advances to the limit of the fire, finds its motion fail, and so stops at this point." The maximum of fire (and of its constitutive qualities, i.e., hot and dry) coincides with the minimum of water (as is clarified in Chapter 4, fire retains the moist from water, ἔχει δὲ ἀπ› ἀλλήλων τὸ μὲν πῦρ ἀπὸ τοῦ ὕδατος τὸ ὑγρόν· ἔνι γὰρ ἐν πυρὶ ὑγρότης, cf. Hp. *De victu* I.4, CMG I.2.4, 126.21–22 Joly-Byl), and, vice-versa, the maximum of water coincides with the minimum of fire (as, conversely, the water retains the dry from fire, τὸ δὲ ὕδωρ ἀπὸ τοῦ πυρὸς τὸ ξηρόν· ἔνι γὰρ ἐν ὕδατι ξηρόν, cf. Hp. *De victu* I.4, CMG I.2.4, 176.22–23 Joly-Byl). As we see, by feeding on it, fire advances to the limit of water (τὸ μὲν πῦρ ἐπεξιὸν ἐπὶ τὸ ἔσχατον τοῦ ὕδατος), and then comes back when it lacks nourishment (ἐπιλείπει ἡ τροφὴ, ἀποτρέπεται οὖν, ὅθεν μέλλει τρέφεσθαι),[27] whereas, by moving because of fire, water advances to the limit of fire (τὸ δὲ ὕδωρ ἐπεξιὸν ἐπὶ τὸ ἔσχατον τοῦ πυρὸς) and then it comes back when it lacks motion.[28] the Hippocratic author uses two key terms, which are the verb ἐπέξειμι and the adjective ἔσχατος. The verb ἐπέξειμι is a verb of motion and indicates the action of 'attacking', 'going out against', or 'proceeding against' (when used in military or legal contexts, cf. *LSJ ad loc.*). In this case it designates the action of one element (fire or water) which advances against the other element so as to tend to reach its opposite limit. The extremities of such a middle area, where this active-passive interplay between fire and water takes place, are described by employing the adjective ἔσχατος ('farthest', 'uttermost', 'extreme', cf. *LSJ ad loc.*), which turns out to be quite suitable for indicating such limits.

This discourse on the physical basics of every being which exists in nature, however, including man, principally, functions to prepare the reader to face the main portion of the dietetic treatise which concerns the study of the unchangeable variables of a regimen (such as seasons, individual constitution, sex differences, age, winds, districts, state, or constitution of the year), and of its changeable variables (food, physical exercises, and inferences from dreams) which, at the most fundamental level, ultimately depend on the balance found by the interaction of fire and water and their distinctive qualities (hot and cold, dry and moist). In this article, however, we cannot exhaustively discuss *De victu*'s dietetical ramblings which, although representing the main theme of the writing, go far beyond our present aim. Now, it is time to turn again to the Aristotelian model of mixture from *De generatione et corruptione*, in which we discover both similarities and difference with *De victu*'s model of mixture (Section 4). This will then allow us to draw some conclusions (Section 5).

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[27] As Bartoš observes, the idea that fire is fed by water is shared both by the Hippocratic author of *De victu* and by Aristotle (cf. *de An.* 416a25–27, *Mete.* 355a5, *Long.* 465a13–16). However, although there are no such parallels in the pre-Aristotelian evidence, the scholar concludes that it is plausible that the concept was relatively common before Aristotle, cf. Bartoš (2015: 255–257 with footnotes).

[28] Jones explains the interaction between fire and water in this way: "fire advances, sets water in motion and turns it to steam; then it retires and the steam condenses to water", cf. Jones (1959: XLIV).

4. The models of mixture in De generatione et corruptione and De victu

Before proceeding to the comparison between the two models of mixture sketched so far, it is necessary to widen the perspective a little in order to comprehend the extent to which Aristotle was familiar with ancient medical treatises of his time, and remained influenced by them in the elaboration of his own theories.

Aristotle, the son of an elite Macedonian doctor who was himself a reader of contemporary medical treatises, seems to show a certain degree of acquaintance with both the Hippocratic *De natura hominis* and also *De victu*. As for *De natura hominis*, in his *De partibus animalium* (*PA* III.3, 512b–513a) Aristotle quotes an account of blood vessels and ascribes it to Polybus, a pupil of Hippocrates. Almost verbatim quotations of this account can be found in *De natura hominis* (11)[29] and this physician is also credited with the work[30] (whose consistent unity has been persuasively demonstrated by Jouanna).[31] It is therefore plausible to assume that Aristotle knew the treatise authored by Polybus. As far as *De victu* is concerned, some scholars in the past have suggested that in his work Aristotle could be referring to the account of *De victu*,[32] but recently the question has been taken up again by Bartoš. When examining a series of Aristotelian textual *loci* in *Parva naturalia*, *De anima*, and *De partibus animalium*, the scholar has gathered much greater evidence confirming Aristotle's acquaintance with *De victu*.[33] Now, if we assume

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[29] Jouanna (2002: 59), Bartoš (2015: 241 with footnote n. 65).

[30] Jouanna (2002: 55–59).

[31] Jouanna (2002: 22–38).

[32] Bartoš refers, more precisely, to a famous passage in Aristotle's *De divinatione per somnum* (*Div.Somn.* 463a3–7: "At any rate even accomplished physicians – τῶν ἰατρῶν οἱ χαρίεντες – say that close attention should be paid to dreams; and it is natural for those to suppose so, who are not skilled, but who are inquirers and lovers of truth", transl. by Hett), where Aristotle reports that his own theories relating to the diagnostic value of dreams can be strengthened by the views of some previous distinguished doctors. As Bartoš affirms, "it is obvious that Aristotle has in mind specific authors and their doctrines, which actually provide a rare example of opinions which met with Aristotle's sympathy. Focusing on the Hippocratic authors, a number of them recognized the prognostic value of dreams but the only extant theoretical account of dream diagnosis is to be found in the fourth book of *On Regimen*, which is wholly devoted to the topic and which opens with the claim that »he who has gained a correct understanding about the signs that come in sleep, will find that they have an important influence upon all things«. So it is not surprising that a number of scholars have (...) considered the possibility that Aristotle refers here directly to *On Regimen*", cf. Bartoš (2015: 243 with references at footnotes 73–76), cf. also, more specifically, van der Eijk's analysis of the Aristotelian passage mentioned above; according to the scholar, the author of *De victu* "certainly meets Aristotle's requirements for being a *charieis iatros*", cf. van der Eijk (2005: 198).

[33] We will try to summarise here the main elements of Bartoš' more detailed analysis. In *de An.* 416a9–18, when Aristotle discusses his concept of vegetative life (which coincides with the nutritive and reproductive faculties of the soul shared by both animals and plants), he declares: "To some the nature of fire seems by itself to be the cause of nutrition and growth; for it alone of all bodies and elements seems to be nourished and grow of itself. Hence one might suppose that it is the operating principle in both plants and animals. It is in a sense a contributory cause, but not absolutely the cause, which is much more properly the soul; for the growth of fire is without limit, so long as there is something to be burned, but of all things naturally composed there is a limit or proportion of size and growth; this is due to the soul, not to fire, and to the essential formula rather than to matter." According to Bartoš' reasoning, one of these unnamed thinkers to whom Aristotle refers here might be the Hippocratic author of *De victu*. For in Ch. 9 of *De victu*, the Hippocratic author assigns 'the hottest and strongest fire' a leading role in physiological processes, and indeed holds that in fire there are "soul, reason, thought,

that Aristotle knew the content of this treatise, and that it represented a tacit but all-important point of reference for the formulation of key concepts of his natural philosophy, then it is also reasonable to think that he could have drawn on it to work out some features that mark out his introductory, but fundamental, theory of mixture, which – as we have previously said – lies at the very foundation of his understanding of natural and biological facts and processes. And indeed, we find some striking parallels between the two models of mixture.

First of all, they have in common the basic structure of the model of mixture. With the due differences (which we will analyse below), *De victu* exhibits a real elemental contrariety, which resembles Aristotle's way of envisioning the basic physical contrarieties of hot/cold and of dry/moist, as being composed of two extremities between which we find a middle area where the interaction occurs. As we have seen, an oscillation takes place between one dominant element (the hot/dry one) and the other (the cold/moist one) but, and this is what differentiates it from the previous philosophical tradition, within certain limits which cannot be exceeded (let us recall that the Hippocratic author uses the neuter of the adjective ἔσχατος to label such limits). This is quite remarkable, because, when in *Physics* I (especially in *Ph.* I.5), and in other contexts, Aristotle strives to demonstrate that all his predecessors held the contraries as principles, it has been noted by scholars that ultimately none of them thought of hot/cold and dry/moist as limits (with intermediates) between which an interaction takes place; this has traditionally been considered Aristotle's original contribution to the debate.[34] However, here we have, as we have shown in detail, an emergent elemental contrariety from a text which Aristotle seems to have known.

Secondly, what occurs in the μέσον, namely the central area between τὰ ἔσχατα? As we have noticed, Aristotle's hot/cold or moist/dry can be both active and passive (for example, the hot acts on cold which is then itself acted upon or vice-versa), or, in the case of mixture, they can be both active and passive to some extent (by reciprocal assimilation, i.e., by reciprocally acting and being acted upon, hot and cold – or moist and dry – reach an equilibrium point). In *De victu* a similar elemental interplay takes place. When one element (the moving hot and dry fire) advances or dominates, that is, when it

growth, motion, decrease, mutation, sleep, walking." However, as we saw, this vital fire has to be counterbalanced by a second principle, this being the water on which it is fed. Also, it is clear, in the context of *De anima* mentioned above, that Aristotle speaks of fire and of its counterbalancing and limiting principle, but he provides instead a different answer from the previous thinkers, for according to him, the counterbalancing principle is the soul itself which provides this fire with a limit and proportion of size and growth. Second, Bartoš proposes that several passages from Aristotle's biological treatises exhibit a close resemblance to some doctrines of *De victu* (i.e., the role of fire in the digestion process, and the related concept of innate heat, which in *De victu*, as well as in Aristotle, is implied in the vegetative functions of the organism), and even with its terminology, as Aristotle, in analogous contexts (*PA* 670a22–26, *Iuv.* 469b6–20, *Resp.* 474b10–13) makes use of the same verb ζωπυρέω ('kindle into flame'), used also by the Hippocratic author of *De victu* to describe a kind of kindling of the soul during its embryonic evolution. This is metaphorically illustrated by the image of heated coals, cf. Bartoš (2015: 245–266 for the complete analysis and further references).

[34] Lloyd (1964: 94 and ff. for further references).

is active, the other (the nourishing moist and cold water) recedes or is dominated; thus it is passive (this is also clarified by the alternating use of active and passive verbal forms). Now, this action can be total when one element is present to its extreme degree (while the other is passive and present to the least degree), or partial when the two opposite forces encounter each other and each exerts its action over the other to some extent (and to some extent each is subject to the other element's action). In other words, the μέσον between the extremes is the field where two opposite forces, fire and water, advance, meet, collide, and, finally, find a balance or equilibrium point (we saw that this is what happens in Aristotle's mixture when, by reciprocal assimilation, the hot and the cold reach an equilibrium point between extreme hotness and extreme coldness, and the same thing happens in the case of the moist and the dry). Furthermore, in Aristotle's mixture this interaction between hot and cold, and between moist and dry brings about intermediate elemental degrees accounting for the extreme varieties of homeomerous parts present in the sublunary organic and inorganic realms. In the very same fashion, in *De victu* also, this elemental interaction of fire and water – within fixed limits – yielding different equilibrium points (or we may also call them 'attunements') seems to be responsible for the variety of existing forms of beings in nature. Here is how Jones poses the question with reference to *De victu*:

> In general terms, what is it that causes specific differences, separating forever blood from marrow, horse from man, and rose from daisy? (...) Water and fire, if they attain one attunement, become one thing, if another attunement, another thing. As a modern chemist might say, one attunement of oxygen and hydrogen produces water, another attunement hydrogen peroxide. Exact proportions in favorable conditions produce, not mechanical mixture, but chemical change.[35]

Now, having singled out the similarities between the two models of mixture, we will pass on to review the points of disentanglement and detachment which make Aristotle's own formulation unique.

First and foremost, we cannot overlook two essential points: (a) while the author of *De victu* describes an interaction between two *elemental* forces (though endowed with

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[35] Jones (1959: XLV). As Jones observes, by quoting Peck's view (a scholar who devoted an unpublished essay to *De victu*), a crucial passage is the first part of Ch. 6 where it is affirmed that 'parts of parts' and 'wholes of wholes' contain a mixture of fire and water (μέρεα μερέων, ὅλα ὅλων, ἔχοντα σύγκρησιν πυρὸς καὶ ὕδατος, cf. Hp. *Vict.* 6, CMG I.2.4, 128.25–130.1 Joly-Byl), where ὅλα ὅλων may refer to the 'chemical attunements' bringing about the difference from species to species, while μέρεα μερέων refers to those attunements differentiating a part of the body from another, cf. Jones (1959: XLV with n. 2). That the elemental interaction between fire and water gives rise to very different results is implied in a recent study on *De victu* by Popa, who has recognised in the text various forms of dry water (i.e., water contaminated by fire) and forms of moist fire (i.e., fire contaminated by water) yielding different outcomes in terms of human constitution. As Popa confirms, while summarising his views, "References to varieties of water and fire begin to crop up in Chaps 7, 9 and 10. Chapter 10, for example, mentions fine (or light) water (*hudatos leptou*), air-like ('ethereal' in Jones, 1931, 'aérien' in Joly, 1984) fire, and the hottest and strongest fire (*thermotaton kai ischurotaton pur*). Such elemental varieties become instrumental

a different qualitative composition, fire is hot and dry, water is cold and moist), Aristotle speaks of an interaction (action and passion) between *qualities*: hot and cold, and moist and dry; (b) Aristotle's system of the elemental presents, in addition to fire and water, also air and earth – his elemental system is clearly *quadripartite* and not *bipartite*. This probably has to be considered as another historical development, namely his attempt to consider, yet at the same time go beyond, both the Empedoclean quadripartite elemental theory (which creates a compact system by referring to the elements coming from the earlier Ionian monistic traditions, but which was amply criticised by Aristotle for not having explained elemental transformation and mixture in terms of qualitative interaction), and the theories of the neo-Empedocleans. Among these, Philistion of Locris was the first who drew an apparently problematic connection, between the four non-inter-transmutable Empedoclean primary elements and the four qualitative δυνάμεις of hot, cold, dry, and moist. We only have fragmentary evidence of Philistion's theories, but Aristotle gives the impression of being acquainted with them.[36] Aristotle's doctrines of primary elements and mixture have to be considered not as an unparalleled and unprecedented formulation arising *ex nihilo*, but more historically – and more accurately – as a clearly original formulation which incorporates different influences from the past. Our point is that it seems plausible that in the development of Aristotelian thinking about elemental and qualitative dynamics, the Hippocratic *De victu* may have contributed to suggesting to Aristotle a way of envisioning the structure of his basic physical contrarieties. In fact, if we replace *De victu*'s (hot and dry) fire, and (cold and moist) water with Aristotle's hot/cold and dry/moist contrarieties, we arrive at a very telling similarity: two (be they either elemental or qualitative) extremes, and between them a central area with an ample range of attunements or equilibrium points. Aristotle's system is certainly more complex because it bases itself on a double pair of contrarieties and on binary qualitative combinations (hot and dry, hot and moist, cold and moist, cold and dry) each corresponding to one of the four elements (fire, air, water, earth), and accounting for mixture

in the division of types of human natures or constitutions in Chap. 32 and in our writer's discussion of *phronēsis* in Chap. 35. Joly believes that the *Regimen*'s reliance on the notion of elemental varieties (dry water and so on) betrays Anaxagoras' influence. It is in principle possible that we have a simplified version of the 'everything in everything' principle. If so, however, we might expect to read in *Regimen I* about watery fire or fiery water or to find some other nomenclature which indicates that every amount of water contains some fire and the other way around. It is not clear, however, that *Regimen I*, in invoking such stuffs as moist fire, refers to mixtures. It is more likely, I think, that these are still elementary stuffs – *forms of water and fire – each displaying different degrees of contamination, so to speak, by a quality normally belonging to the other element (moist or dry)*", cf. Popa (2014: 892–893 with n. 16, emphasis mine). I would add just two points, here: (a) the reference to Anaxagoras seems to me to be misleading, since in Anaxagoras' seeds we find, as noted, everything in everything. This principle asserts the omnipresence of *all* possible ingredients in a mixture where just one predominates, and does not presuppose a *dualistic* elemental theory where only one or the other one prevails over the other; (b) I am not sure that, as Popa maintains, these degrees of contamination between fire and water cannot be called mixtures: in Ch. 4 of *De victu* I, when the Hippocratic author indicates the technical terminology by which to refer to the fire–water dynamic, he calls it more appropriately 'mixture' and 'separation' (of the elemental mixt) cf. Ch. 4, CMG I.2.4, 128.7 Joly-Byl, and to this process he indeed attributes the variety of forms of seeds and animals (πολλὰς καὶ *παντοδαπὰς ἰδέας* (...) σπερμάτων καὶ ζώων), cf. Hp. *Vict.* 4, CMG I.2.4, 126.23–24 Joly-Byl, emphasis mine).

[36] cf. fr. 4 Wellmann with Rashed (2005: XXXV–XLVIII).

and elemental transmutations. But upon more attentive reflection, we find the very same logic in the mind of the Hippocratic author.

Secondly, as we have clarified several times in this paper, in Aristotle the qualitative interaction between hot and cold, and dry and moist is a mechanism which answers for both mixture and elemental transformation (we have mixture when the extremes find an intermediate equilibrium point, and we have elemental generation when in each contrariety, hot/cold and dry/moist, one contrary quality dominates over the other and then is present in the contrariety at the extreme degree). Contrary to Aristotle, for whom this is fundamental in explaining sublunary phenomena such as the formation of rain, for instance (i.e., air that turns into water), the author of *De victu* does not specifically deal with these topics. However, this is no surprise, because *De victu* bases its doctrine on the knowledge of human nature, and remains a treatise relating to dietetics which does not have the ambition, as Aristotle clearly does, to provide an all-encompassing explanation of the world and of its physical processes: *De victu*'s privileged and principal focus being man *qua* living being, a category which includes also animals and plants.[37] But if the Hippocratic author of *De victu* develops a nascent structure of a contrariety (though it applies especially to man among the living beings), and if the very same structure, although more complex and articulate (because endowed with a double couple of qualitative contrarieties), is afterwards used by Aristotle to explain mixture, then this structure also anticipates Aristotle's way of thinking about elemental transformation because, as we have seen, elemental transformation and mixture are ruled by the same mechanism. Whereas in *De victu* we have a maximum degree of fire (which is hot and dry), which coincides with the minimum degree of the contrary element, water (which is cold and moist), and whereas the Hippocratic author of *De victu* states that the elements dominate one another to the greatest maximum or the least minimum possible (*ἐς τὸ μήκιστον καὶ τὸ ἐλάχιστον*), in Aristotle we have a maximum degree of a quality, let us say hot, which coincides with the least degree possible of the contrary quality, cold. Aristotle, however, does not use this vague and loose terminology but, as he usually does in order to bring the ontological structure of nature to light, he refers to his own ontological distinction: while the hot is in actuality, the cold remains in the contrariety only in potentiality.

4. Conclusions

It is known that Aristotle's notion of qualitative interaction ruling both the process of mixture and the process of reciprocal elemental transmutation is based upon the idea of a physical contrariety. This is endowed with two extremes and a wide central area where

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[37] This seems to be confirmed by the abovementioned passage where the Hippocratic author speaks of the variety of living beings generated by the fire-water interplay. Here he expressly refers to "many forms of many kinds, both of seeds and of living creatures" (πολλὰς καὶ παντοδαπὰς ἰδέας (...) *σπερμάτων καὶ ζώων*), cf. Hp. *Vict.* 4, CMG I.2.4, 126.23–24 Joly-Byl (emphasis mine).

the opposite forces reach different equilibrium points (in this case we have a mixture), or can be present to the fullest degree (in this case we do not have a mixture, but an element).

However, in contrast to previous scholarship which attributes this notion specifically to Aristotle, we have found in a text which Aristotle seems to have been acquainted with – the Hippocratic *De victu* – an incipient structure of a contrariety endowed with extremes, and a central area where opposite forces meet and yield respective equilibrium points (i.e., a mixture). Moreover, the aim and justification of this Hippocratic model of mixture seems to be the same as Aristotle's, namely an explanation of the variety of beings which exist in the world.

De victu does not tackle the issue of elemental transformation, but we did not expect it to do so, because it is a treatise devoted to human nature and dietetics, and it does not deal with physical processes which require the application of an elemental theory on a higher scale (that which Aristotle did indeed feel was necessary). In any case, in *De victu*'s emergent contrariety, which we have singled out in detail, the opposite forces can be present to their extreme or least degree, and this would have allowed Aristotle to make use of this notion to explain reciprocal elemental transmutation in the terms we have described: a process where one quality, or two qualities of the contrarieties, acts on the other, prevails over it, and reaches its maximum degree.

This, however, does not mean that the two models of mixture can be simply superimposed over one another. There are differences insofar as Aristotle's theory of mixture involves qualitative contrarieties (more precisely two qualitative contrarieties, hot/cold and dry/moist), and not an elemental contrariety (fire/water endowed, however, with contrary qualities, hot and dry/cold and moist), as does the Hippocratic *De victu*, and insofar as Aristotle's elemental system is quadripartite and not bipartite. We have explained these differences by observing that Aristotle's doctrines have to be understood more historically as taking into consideration certain philosophical quadripartite elemental theories (i.e., Empedocles' quadripartite elemental system and Philistion's first correspondence between the four elements and the four basic contraries hot, cold, dry, moist), and then surpassing them.

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Aristotle's Mixture in its Medical and Philosophical Background: The Hippocratic *De victu* and the Aristotelian *De generatione et corruptione*

Aristotle's notion of qualitative interaction ruling both the process of mixture and the process of reciprocal elemental transmutation is based upon the idea of a physical contrariety endowed with two extremes and a wide central area where the opposite forces reach different equilibrium points (i.e., the so-called mixtures) or can be present to the fullest degree (in this case we do not have a mixture, but an element). Differently from previous scholarship which attributes this notion specifically to Aristotle, we have found, in a text which Aristotle seems to have been acquainted with, the Hippocratic *De victu*, an incipient structure of a contrariety endowed with extremes and a central area where opposite forces meet and yield respective equilibrium points, mixtures, which, as in Aristotle, give an account of the variety of beings existing in the world. In this article, we suggest the possibility that in the development of the Aristotelian thinking about elemental and qualitative dynamics, the Hippocratic *De victu* may have contributed to suggesting to Aristotle a way of envisioning the structure of his basic physical contrarieties.

KEYWORDS

Aristotle, mixture, elemental theory, Hippocratic Corpus, *De victu*, *De generatione et corruptione*

Bycie – nie bycie, prawda – fałsz w koncepcji Arystotelesa

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Toteż jak ma się wszystko
do bycia, tak i do prawdy.
Metaph. 993b30

Jeżeli nie do filozofa, to do kogóż
innego należy dociekanie prawdy i fałszu?
Metaph. 997a14

Nie dlatego sądzimy prawdziwie, że ty jesteś
blady, jeśli jesteś blady, lecz dlatego, że ty jesteś
blady, my stwierdzając to wypowiadamy prawdę.
Metaph. 1051b7

W wielu rozprawach na temat filozoficznego pojęcia prawdy nawiązuje się zwykle do Arystotelesa, uznając go za twórcę klasycznej, semantycznej czy korespondencyjnej koncepcji prawdy. Prawie cztery dekady temu, gdy nie było jeszcze szerszych opracowań na ten temat, podjąłem w kilku publikacjach całokształt złożonych wywodów Stagiryty o prawdziwości zdań i przesłanek nauk. Z dzisiejszej perspektywy moje dawniejsze ujęcia wymagałyby znacznej rewizji i doprecyzowania, a także przekładów greckich

tekstów[1]. Dopiero w nowym stuleciu powstały szersze monografie o pojęciu prawdy u Arystotelesa. Przykładowo Crivelli (2004) oprócz aspektu historycznego ujmuje rzecz podług dzisiejszej filozofii analitycznej, w trudnym i rozwlekłym stylu, obciążonym formalizacjami niezbyt przystającymi do greckiego filozofa. Natomiast Long (2011) w perspektywie heideggerowskiej fenomenologii i amerykańskiego pragmatyzmu naturalistycznego rozważa za Arystotelesem prawdę jako kwestię poprawnego przedstawiania przedmiotów, współdziałania człowieka ze światem natury w trosce o wyartykułowanie prawdy o rzeczach i sprawiedliwość ekologiczną. Z kolei Wheeler (2020) podejmuje nową interpretację historyczną Arystotelesowskiej teorii prawdy w terminach miary (*metron*). Autor na podstawie tekstowej egzegezy i filozoficznej analizy *Metafizyki* Arystotelesa pokazuje, że badania prawdy i fałszu w tym traktacie są ściśle metodyczne i stanowią główne linie myślowe.

Niezależnie od tych opracowań, a właściwie całkiem inaczej, proponujemy odtworzenie osnowy wywodów Arystotelesa na temat bytu – niebytu, prawdy – fałszu. Ważne jest dla nas przede wszystkim podanie wywodów Arystotelesa w wiernym polskim przekładzie. Ograniczymy się do sedna kwestii podanych w tytule, co stanowi podstawę, choć jeszcze nie wyczerpuje innych wątków prawdy i fałszu u Arystotelesa, zwłaszcza w jego analityce i apodejktyce[2].

1. Syntaksa i semantyka bycia – nie bycia, prawdy – fałszu

Arystoteles tematyce prawdy i fałszu nie poświęcił oddzielnego traktatu, lecz kwestie te przewijają się w jego pismach logicznych – w *Kategoriach* (4–5; 10; 12), w rozprawie *O wyrażeniu* (1–9), w *Analitykach pierwszych* i *wtórych* (*passim*), w *Topikach* (*passim*), w *Sofistycznych odparciach* (25), a szczególnie w *Metafizyce* (IV.7, V.7 i 29; VI.4 i IX.10) oraz w innym kontekście w traktacie *O duszy* (III.6). Ponadto w księgach etycznych rozważa Arystoteles prawdomówność jako wypośrodkowanie pomiędzy skromnością i samochwalstwem.

Ogólnie są to wnikliwie przemyślane i możliwie spójne wywody, stanowiące pochodną kilku innych zintegrowanych założeń, które należy odpowiednio rozpoznać. Wyrażenia, którymi Arystoteles stale operuje w wywodach o prawdzie i fałszu, są określeniami stanowiącymi przeciwstawne pary: bycie – niebycie, twierdzenie – przeczenie (czyli człony sprzeczności), złożenie – rozdzielenie, jedno – wielość, rzeczy złożone – niezło-

[1] Zob. Wesoły – tytuły w Bibliografii. Z nowszych opracowań warto uwzględnić następujące: Razzino (1990); Tugendhat (1992); Vigo (1998); Pritzlt (1998); Wolff (1999); Fiorentino (2001); Sonderegger (2004); Pearson, (2005); Szaif (2006; 2018); Duma (2013); Charles, Peramatzis (2016).

[2] Zob. nasz przekład Arystotelesa *Analityk pierwszych i wtórych* (Wesoły 2020).

żone (proste). Traktując o tym w różnych kontekstach podaje on te same przykłady (niewspółmierność przekątnej, blady człowiek, ty siedzisz).

Trzeba wiedzieć, że Arystoteles posługiwał się pojęciem prawdy (ἀλήθεια) w sensie ogólnym, na przykład mówiąc, że filozofia jest dociekaniem prawdy, albo że prawdę cenić trzeba bardziej od przyjaciół (zob. poniżej 6.). Natomiast traktując ją specjalnie, używał form odprzymiotnikowych z rodzajnikiem *neutrum* – τὸ ἀληθές, w znaczeniu „to, co prawdziwe", analogicznie używał τὸ ψεῦδος – w znaczeniu „to, co fałszywe"[3]. Podobnie rzecz ma się z użyciem form czasownikowych τὸ ἀληθεύειν – τὸ ψεύδεσθαι („wyrażanie prawdy" – „wyrażanie fałszu"). Nadawało to wywodom bardziej konkretny i ścisły wymiar. Brak w języku polskim rodzajnika uniemożliwia nam wierne oddanie tych wyrażeń, jako też związanych z nimi pojęć: „być" – „nie być" (τὸ εἶναι – τὸ μὴ εἶναι) oraz ich form pochodnych „byt" – „niebyt" (τὸ ὄν – τὸ μὴ ὄν), „jest" – „nie jest" (τὸ ἔστιν – τὸ οὐκ ἔστιν).

Pojęcia „byt" i „prawda" (z ich negacjami), wywodzące się z argumentacji Parmenidesa obciążone były aporiami i sofizmatami, z którymi się zmierzył wybornie Gość z Elei w platońskim *Sofiście* (*Sph.* 246a–264b). Rozstrzygające było uznanie niebytu jako „odrębności" (ἕτερον) względem bytu i tym samym możliwości orzekania fałszu. Na tej podstawie jak zasadny jest byt jako prawda, tak zasadny jest niebyt jako fałsz. Inspirowany zapewne tym platońskim rozstrzygnięciem Arystoteles stwierdził, że dawną aporię Parmenidesa należało już wcześniej odeprzeć i uznać na równi zasadność niebytu według negatywnej predykacji (cf. *Metaph.* 1089a5).

W rozprawie *O wyrażeniu* Stagiryta stwierdza, że umownie stanowione nazwy (ὀνόματά) i słowa (ῥήματα – czasowniki) są znakami wrażeń doznawanych w duszy, pojęciami czy dźwiękami. Bez wzajemnego powiązania nie tworzą one wypowiedzi zdaniowej (λόγος), która tylko w swej formie oznajmującej (ἀπόφανσις) wyrażać może prawdę lub fałsz. Trzeba w tym rozpoznać nader istotne stwierdzenie:

> Same przez się orzekane czasowniki są nazwami i coś oznaczają (σημαίνει τι) (...), ale czy [coś] jest, czy nie (εἰ ἔστιν ἢ μή), jeszcze tego nie oznaczają; bycie bowiem lub nie bycie (τὸ εἶναι ἢ μὴ εἶναι) nie jest znakiem [żadnego] przedmiotu, nawet jeśli byt wypowiesz czysty (τὸ ὂν εἴπῃς ψιλόν). Samo przecie jest niczym, a współoznacza pewne połączenie (σύνθεσίν τινα), którego bez złożeń (ἄνευ τῶν συγκειμένων) nie można pomyśleć (*Int.* 16b19–25; cf. *APo.* 92b14; *Top.* 127a27).

Tak więc greckie słowo *einai* w swych różnych formach, samo w sobie nie oznacza niczego, nie jest predykatem ani podmiotem, a tylko współoznacza *synthesis* predykatu

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[3] Por. S.E. *M.* I 38: „Prawda zaś, sądzą niektórzy, zwłaszcza ci ze Stoi, różni się od tego, co prawdziwe, na trzy sposoby: istotnością, strukturą i możnością. Istotnością o tyle, że prawda jest ciałem, a to, co prawdziwe, jest bezcielesne".

z podmiotem w formule prostego zdania (*logos*). Εἶναι / ἔστιν jako syntaktyczny łącznik (*copula*) nie jest określeniem istnienia ani istoty rzeczy[4].

Natomiast w aspekcie semantycznym „byt (i nie-byt) orzeka się wielorako" (τὸ ὂν λέγεται πολλαχῶς)[5], mianowicie w czterech modułach podanych w księdze V.7: (1) według przypadłości (κατὰ συμβεβηκὸς), (2) według samego siebie (καθ' αὑτό), czyli figur kategorii; (3) w sensie prawdy lub fałszu; (4) według możności i aktu. Podstawowe w tym jest bycie *per se* orzekane według figur kategorii w swej funkcji predykatywnej.

> Podług samych przez się (καθ' αὑτὰ εἶναι) byciem orzekane są te wyrażenia, które oznaczają figury predykacji (τὰ σχήματα τῆς κατηγορίας): na ile bowiem sposobów się orzeka (λέγεται), na tyle oznacza się bycie (τὸ εἶναι σημαίνει). Skoro zaś jedne z predykatów oznaczają, czym coś jest, drugie jakość, inne ilość, inne relację, inne działanie lub doznawanie, inne miejsce, a jeszcze inne czas, to w każdym z nich bycie oznacza to samo (τὸ εἶναι ταὐτὸ σημαίνει). Niczym się bowiem nie różni orzekanie: „człowiek jest zdrowiejący" i „człowiek zdrowieje", ani „człowiek jest idący" lub „tnący" i „człowiek idzie" lub „tnie". Podobnie i w innych [predykacjach]." (*Metaph*. V.7, 1017a22–30; cf. *Cat*. 4; *Top*. I.9).

Arystoteles syntaktyczne „bycie"/„jest" (τὸ εἶναι/τὸ ἔστιν), nagiął pod taką formułę predykacji, czyli „orzekania czegoś o czymś" (λέγεται τὶ κατά τινος), na tyle sposobów, na ile oznaczają (denotują) figury kategorii według substancji, ilości, jakości, relacji itd. Owe schematy czy figury kategorii stanowią pewne semantyczne modele predykacji w zdaniach kategorycznych (orzecznikowo-podmiotowych)[6]. Kwestie te tutaj pomijamy, podając jedynie na schemacie, jak wygląda konstrukcja i układ wzajemny substancji z kategoriami ilości, jakości, relacji oraz ich pochodnych: miejsca i czasu, działania i doznawania, położenia i posiadania.

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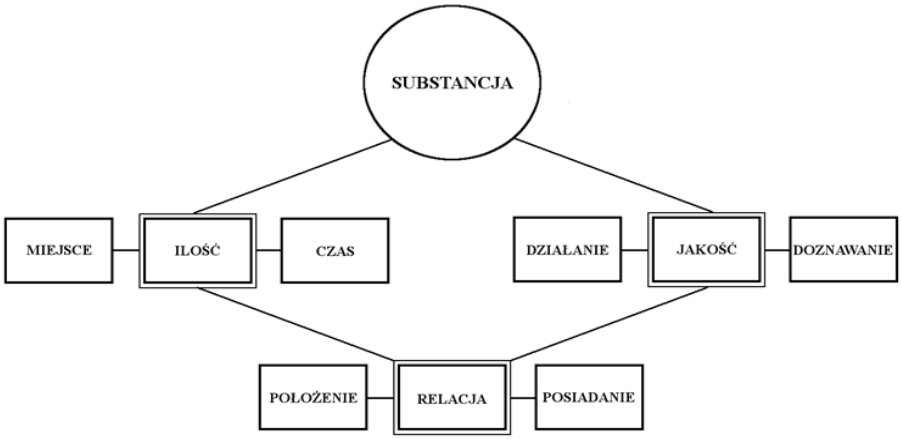
[4] Podzielamy tutaj interpretację Apelta (2020: 101-126. Oryginał niemiecki *Die Kategorienlehre des Aristoteles* z 1891 roku). Zob. nowatorskie studia na temat greckiego słowa „być": Kahn (2008). Arystotelesowe znaczenia bytu nie pokrywają z nowożytną trychotomią słowa „jest" jako predykacji, egzystencji i identyczności. Przyznaje w tym względzie rację Arystotelesowi Hintikka (1983: 443–468; 1986: 81–114; 2004).

[5] Księga V *Metafizyki* stanowi wykładnię wieloznaczności 30 ważnych pojęć. Zob. nowy przekład: Wesoły (2016).

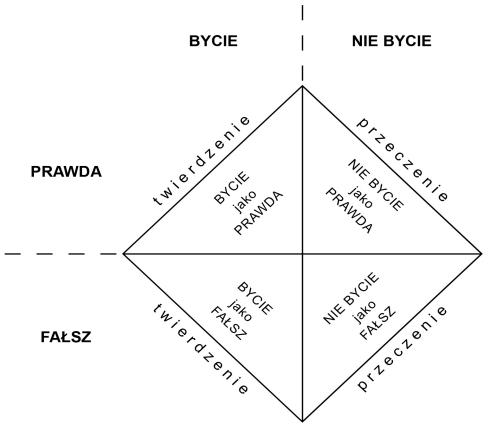
[6] Na ten temat dokładniej zob. Wesoły (1984; 2003).



W księdze V.7 *Metafizyki* zaraz po określeniu „bycia" podług figur predykacji następuje takie określenie bycia – niebycia jako prawdy – fałszu.

> Ponadto „być" i „jest" oznacza, że to prawda (τὸ εἶναι σημαίνει καὶ τὸ ἔστιν ὅτι ἀληθές), a „nie być", że to nie prawda, lecz fałsz, podobnie przy twierdzeniu i przeczeniu. Na przykład [twierdzenie] „Sokrates jest wykształcony", że to prawda, albo [przeczenie] „Sokrates nie jest blady", że to prawda. Natomiast „nie jest" [na przykład twierdzenie] „przekątna jest współmierna" oznacza, że to fałsz (*Metaph*.1017a31–35).

Sens tego lapidarnego tekstu i innych z nim związanych ukazać można na diagramie podług kombinatorycznych zależności między byciem – nie byciem jako twierdzeniem lub przeczeniem a prawdą – fałszem.



Otóż bycie jako prawdę wyraża zdanie twierdzące, a nie bycie jako prawdę wyraża zdanie przeczące. Analogicznie bycie jako fałsz wyraża zdanie twierdzące, a nie bycie jako fałsz zdanie przeczące. Zwykle w podanych przez Stagirytę przykładach w grę wchodzą bycie jako prawda, a nie bycie jako fałsz.

Jak bycie i niebycie wyraża syntaktycznie twierdzenie i przeczenie, tak łączenie (*synthesis*) i rozdzielenie (*diairesis*) wyraża semantycznie prawdę i fałsz. Arystoteles tak to krótko ujmuje: „W łączeniu i rozdzieleniu są [orzekane] fałsz i prawda" (*Int.* 16a12). „W czym zachodzi fałsz i prawda, tam już jest jakieś łączenie pojęć, jakby były czymś jednym" (*de An.* 430a27). „Łączeniem bowiem pojęć jest prawda i fałsz" (*de An.* 432a11).

Takie łączenie (twierdzenie) i rozdzielenie (przeczenie) jest aktem predykacji; dopiero w ramach zdania (*logos*) nazwa (*onoma*) staje się podmiotem, a słowo (*rhema*) predykatem. Oddzielne wyrażenia języka mają charakter umowny bez cechy prawdy czy fałszu, bo dopiero twierdzenia lub przeczenia mogą być prawdziwe lub fałszywe (cf. *Cat.* 2; *Int.* 1–6).

Nie wnikając w szczegóły, trzeba tu odnotować, jak Arystoteles w swych *Analitykach* przeformułował predykację, nie stosując zwykłej formy zdania „B ἐστὶ A" („B jest A"), a tylko dla wyrażenia tego, że „coś jest o czymś orzekane" używa w stronie biernej λέγεται – κατηγορεῖται (łac. *dicitur*, *praedicatur*). Częściej jednak stosuje formułę predykacji „coś przysługuje (ὑπάρχει) czemuś", co pozwala odróżnić predykaty od podmiotów w ich przypadkach gramatycznych. Stosuje więc dwie równoważne formuły predykacji:

(1) „A orzekane jest o B" (τὸ A κατὰ τοῦ B λέγεται = τὸ A κατὰ τοῦ B κατηγορεῖται);
(2) „A przysługuje B" (τὸ A ὑπάρχει τῷ B).

Są to notacje zdań orzecznikowo-podmiotowych, czyli predykatywnych, które w późniejszej tradycji zwane są zdaniami kategorycznymi i zapisywane w odwróconej

formule z użyciem słowa „jest". Stagiryta stawiał na pierwszym miejscu predykat nie podlegający kwantyfikacji, a podmiot jej podlegający na drugim. Dodajmy przy tym, że negacje, kwantyfikacje i modalności ujmował on jako modyfikacje samych predykatów, co różni znacząco jego logikę od wykładni tradycyjnej i nowoczesnej[7].

Syntaktyczne w swej podstawie „bycie" Arystoteles doprecyzowuje semantycznie w schematach predykacji kategorialnej, podług których wyraża się owo „przysługiwanie" i „orzekanie prawdy". Oto znamienne, acz mało rozpoznane i zapomniane, stwierdzenia autora *Analityk*:

> Otóż na ile sposobów orzeka się bycie (τὸ εἶναι λέγεται) i mówienie prawdy tego o tym (τὸ ἀληθὲς εἰπεῖν αὐτὸ τοῦτο), na tyle samo sądzić należy, iż oznacza to przysługiwanie (σημαίνειν καὶ τὸ ὑπάρχειν) (*APr.* 48b2–4).
>
> Przysługiwanie tego [terminu] temu (τὸ δ' ὑπάρχειν τόδε τῷδε) i orzekanie prawdy tego o tym (τὸ ἀληθεύεσθαι τόδε κατὰ τοῦδε), winno być ujmowane na tyle sposobów, na ile rozdzielają się kategorie (αἱ κατηγορίαι) (...) Podobnie i nie przysługiwanie (τὸ μὴ ὑπάρχειν). Trzeba to przebadać i określić lepiej (*APr.* 49a6–10; cf. *APo*. I 22).

Powyższe zadanie nie zostało bliżej podjęte w znanych nam pismach Arystotelesa, a chodziło o ważne dookreślenie semantyki w teorii predykacji. Tak pojęta predykacja zależnie od wartości przesłanek tworzy odpowiednio sylogizm epistemiczny (naukowy) albo dialektyczny. Arystoteles wniknął gruntownie w osnowę zdania kategorycznego i wnioskowania, a w swym analitycznym ujęciu doprecyzował elementy predykacji, czyli trzy terminy (*horoi*) zdaniotwórcze w trzech figurach sylogizmów ujętych odpowiednio w diagramach[8]. Oto zalążek jego postulowanej metody badawczej z dociekaniem prawdy:

> Należy bowiem wyśledzić przysługujące własności i to czemu przysługują w obu terminach skrajnych, a jak największej ich ująć, i dostrzec poprzez trzy terminy, odpierając w ten sposób, potwierdzając zaś w tamten. Podług prawdy z terminów prawdziwie wyrażonych jest przysługiwanie (κατὰ μὲν ἀλήθειαν ἐκ τῶν κατ' ἀλήθειαν διαγεγραμμένων ὑπάρχειν), a w sylogizmach dialektycznych z przesłanek według mniemania (ἐκ τῶν κατὰ δόξαν προτάσεων)" (*APr.* 46a3–10; cf. *APo*. 81b22; 88a19).

Orzekaniu prawdy podług figur kategorii nie poświęcił Arystoteles systematycznych wywodów. Teoria kategorii była dlań podstawą także w zakresie wiedzy o „bycie jako bycie", która bada też zasady dowodzenia (zob. księgę czwartą *Metafizyki*).

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[7] Na temat formuł predykacji dokładniej zob. Wesoły (2020: 31–34).

[8] Odsyłam do mojej rekonstrukcji diagramów trzech figur sylogizmów: Wesoły (2020: 24–50). Rzecz uznał za trafną i podjął w swej diagramatycznej wykładni logiki Englebretsen (2019: 21-26).

Wszelako byt – niebyt jako prawda – fałsz w sensie predykacji kategorialnej nie stanowi przedmiotu dociekanej teorii „bytu jako bytu", o czym dalej wspomnimy.

2. Sprzeczność – niesprzeczność wyznaczniki definicyjne fałszu – prawdy

Jak wynika z powyższego, prawda i fałsz odnoszą się syntaktycznie do twierdzeń i przeczeń, a te stanowią wykluczające się człony sprzeczności. W związku z tym w grę wchodzi taka współzależność tych określeń, że fałsz zasadza się na sprzeczności, a prawda na niesprzeczności.

To proste stwierdzenie stanowiło rozstrzygnięcie eleackiej i sofistycznej aporii co do niemożliwości orzekania niebytu i fałszu. W *Sofiście* (*Sph.* 240e) Platona Gość z Elei określa pomysłowo zdanie fałszywe (*logos pseudes*), które „byty orzeka, że nie są, a niebyty, że są (τά τε ὄντα λέγων μὴ εἶναι καὶ τὰ μὴ ὄντα εἶναι)"[9]. Arystoteles podejmie takież sformułowanie fałszu, które jest wyrazem sprzeczności (byt nie jest, niebyt jest), określając z kolei prawdę jako niesprzeczność (byt jest, niebyt nie jest). Inaczej mówiąc, konieczna jest niesprzeczność wypowiedzi twierdzącej lub przeczącej, by była ona sensowna, czyli prawdziwa lub fałszywa.

W czwartej księdze *Metafizyki*, traktując o 'bycie jako bycie', uzasadniał Arystoteles tę najpewniejszą ze wszystkich zasad, która wyklucza sprzeczność w wywodach, a zatem stanowi niesprzeczność. Zasadę tę ujmuje Stagiryta w swej formule predykacji jako 'przysługiwanie tego temu', które równoważne jest z 'byciem czymś' i 'orzekaniem czegoś o czymś'. Stąd równoważne są merytorycznie trzy na pozór różne wersje tej zasady[10].

> By to samo zarazem przysługiwało i nie przysługiwało temu samemu i podług tego samego, to niemożliwe (τὸ γὰρ αὐτὸ ἅμα ὑπάρχειν τε καὶ μὴ ὑπάρχειν τῷ αὐτῷ κατὰ τὸ αὐτὸ ἀδύνατον) (*Metaph.*1005b19).
>
> Niemożliwe jest dla kogoś przyjąć, że to samo jest i nie jest [czymś] (ἀδύνατον γὰρ όντινοῦν ταὐτὸν ὑπολαμβάνειν εἶναι καὶ μὴ εἶναι) (*Metaph.*1005b23–24).
>
> Takie więc jest mniemanie najpewniejsze ze wszystkich, że nie są prawdziwe zarazem przeciwstawne wypowiedzi (τὸ μὴ εἶναι ἀληθεῖς ἅμα τὰς ἀντικειμένας φάσεις) (*Metaph.* 1011b14–15).

Arystoteles bronił zasady niesprzeczności i polemizował z jej przeciwnikami – Heraklitem i Protagorasem. Niemożliwe jest zarazem twierdzenie i przeczenie tego samego

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[9] W tłumaczeniu zachowujemy liczbę mnogą wyrażeń *ta onta, ta me onta*, a nie jako „to, co istnieje", „to, czego nie ma"; tak samo *einai, me einai* oddajemy w formie „być", a nie „istnieć". W tym względzie mylny jest przekład W. Witwickiego: „Więc i to twierdzenie, mam wrażenie, będziemy uważali za fałszywe, które mówi, że nie istnieje to, co istnieje, i to, które mówi, że istnieje to, czego nie ma" (*Sph.* 240e).

[10] Arystotelesowi chodziło o niesprzeczność, lecz Łukasiewicz (1910) niejako na przekór nazywa to zasadą sprzeczności, wyróżniając trzy jej różne wersje: ontologiczną, psychologiczną i logiczną. W nowszej literaturze przedmiotu rzecz jest inaczej stawiana, por. Pasquale (2005).

o tym samym, bycie i niebycie tego samego, orzekanie zarazem prawdy i fałszu, które są sobie przeciwstawne. Tym samym nie może być czegoś pomiędzy członami sprzeczności. Sugeruje to nam zasadę wyłączonego środka, nazwaną w nowożytności *tertium non datur*, której jednak Stagiryta nie odróżniał od zasady niesprzeczności. Wykluczał możliwość sprzecznych zarazem wypowiedzi, co jest równoważne z tym, że jedna z nich musi być prawdziwa, a druga fałszywa. Twierdzenie i przeczenie jako człony sprzeczności zakładają przecież rozróżnienie fałszu i prawdy. W tym kontekście obrony zasady wyłączonego środka Arystoteles zwięźle określił, czym jest fałsz i prawda.

> Wszak nie może być niczego pomiędzy [członami] sprzeczności, lecz z konieczności twierdzi się lub przeczy jedno o czymś drugim. Jasne to wpierw dla tych, którzy określają, czym jest prawda i fałsz (τί τὸ ἀληθὲς καὶ ψεῦδος). Mówić bowiem, że byt nie jest, albo że niebyt jest – to fałsz; że zaś byt jest, a niebyt nie jest – to prawda (τὸ μὲν γὰρ λέγειν τὸ ὂν μὴ εἶναι ἢ τὸ μὴ ὂν εἶναι ψεῦδος, τὸ δὲ τὸ ὂν εἶναι καὶ τὸ μὴ ὂν μὴ εἶναι ἀληθές)[11]. Toteż mówiący, że [coś] jest lub nie jest [czymś] – wypowie prawdę lub wypowie fałsz. Bo ani bytu nie orzeka się nie byciem, ani niebytu byciem (*Metaph*. 1011b25–29).

W dalszej polemice z nośnymi podówczas sofizmatami, że wszystko jest prawdą lub fałszem, Arystoteles obstaje przy podaniu definicji jako określeniu znaczenia danej nazwy.

> Ponadto wszystko, co pomyślane i pojęte, myślenie [ujmuje] w twierdzeniu lub przeczeniu – to zaś z definicji wiadomo – gdy orzeka prawdę lub fałsz. Gdy w ten sposób się łączy, twierdząc lub przecząc, orzeka prawdę, gdy zaś inaczej, orzeka fałsz (*Metaph*.1012a2–5).

> Przeciw tym wszystkim argumentom należy wysunąć postulat, jak powiedziano w powyższych wywodach, nie że coś jest lub nie jest, ale co to oznacza; toteż wychodząc z definicji, trzeba określić, co oznacza fałsz lub prawda. Jeśli stwierdzenie prawdy nie jest niczym innym, jak zaprzeczeniem fałszu, to niemożliwe, by wszystko było fałszywe. Musi bowiem jeden z członów sprzeczności być prawdziwy. Ponadto, jeśli wszystko z konieczności stwierdza się lub przeczy, to niemożliwe, by jedno i drugie było fałszem. Jeden bowiem z członów sprzeczności jest fałszem (*Metaph*. 1012b5–13).

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[11] Zdanie to przywołuje Alfred Tarski (1933: 18) jako historyczne zaplecze dla swej semantycznej definicji prawdy. Podany przezeń przekład różni się od naszego w sposobie oddania wyrażeń τὸ ὂν („byt"; „to co jest") – τὸ μὴ ὂν („niebyt"; „to, co nie jest"): „Jest fałszem powiedzieć o tym, co jest, że nie jest, lub o tym, co nie jest, że jest; jest prawdą powiedzieć o tym, co jest, że jest, lub o tym, co nie jest, że nie jest". Dokładniej o tej kwestii zob. Woleński (2017: 261–268). Jest to raczej definicja nominalna fałszu i prawdy, jak wykazuje Wheeler (2018: 97–116). Inne zaś teksty Arystotelesa podają nam definicję realną w szerszym kontekście problemowym – zob. poniżej (3)–(5).

W tym miejscu należy stwierdzić, że Stagiryta zawieszał zasadę wyłączonego środka co do przypadkowych zdarzeń przyszłych (*contingentia futura*). Przytoczmy jedynie samo zakończenie jego złożonego wywodu w *De interpretatione* (9)[12].

> Toteż, skoro podobnie zdania prawdziwe mają się tak, jak rzeczy (ὁμοίως οἱ λόγοι ἀληθεῖς ὥσπερ τὰ πράγματα), to jasne, że jeśli tak mają się, jak przypadło i dopuszczają przeciwieństwa, to musi podobnie mieć się i sprzeczność. Zachodzi to w przypadku tych zdarzeń nie zawsze będących lub nie zawsze nie będących. Z nich bowiem musi jeden człon sprzeczności być prawdziwy lub fałszywy, jednak nie konkretnie ten czy tamten, lecz jak przypadło, i bardziej prawdziwy jeden od drugiego, jednak jeszcze nie prawdziwy czy fałszywy" (*Int*. 19a32–39).

Stagiryta na gruncie syntaktycznym i predykatywnym ustalił nie tylko semantykę bycia i nie bycia (*Metaph*. V.7), lecz także wnikliwie określił ich typy przeciwstawień (ἀντικείμενα, *opposita*. *Cat*. 10–11; *Int*. 6–9; *Metaph*. IV.10, I.4–7), którymi są:

(1) sprzeczność (ἀντίφασις) między bytem – twierdzeniem i niebytem – przeczeniem;
(2) posiadanie (ἕξις) lub brak (στέρησις), czyli bycie lub niebycie stałych własności w danym podmiocie;
(3) Przeciwieństwa (τὰ ἐναντία), czyli bycie lub niebycie skrajnych własności w obrębie danego rodzaju;
(4) Korelaty (τὰ πρός τι), czyli bycie lub niebycie współzależnych własności.

W przypadku dwuczłonowej sprzeczności (twierdzenie – przeczenie) z konieczności jedno z nich jest prawdziwe, a drugie fałszywe, niezależnie od realności przedmiotu, o którym się coś twierdzi lub przeczy (*Cat*. 11; *Top*. II.7–8; *Metaph*. I.3–7).

Co tyczy się zaś przeciwieństw, posiadania – braku, i korelatów, nie jest konieczne, aby jedno było prawdziwe, a drugie fałszywe. Weźmy przykład przeciwnych zdań: „Sokrates jest chory" – „Sokrates jest zdrów".

> Jeśli Sokrates jest [żyje], jedno będzie prawdziwe, a drugie fałszywe; a jeśli Sokrates nie jest, to obydwa będą fałszywe; bo ani twierdzenie „Sokrates jest chory", ani twierdzenie „Sokrates jest zdrów" nie jest prawdziwe, jeśli samego Sokratesa w ogóle już nie ma (*Cat*. 13b16–19).

Rzecz dotyczy szeregu współzależności logicznych dociekanych wnikliwie przez Arystotelesa (*Int*. 17b16–26; 19b5–20b12), które później przedstawiano w tak zwanym

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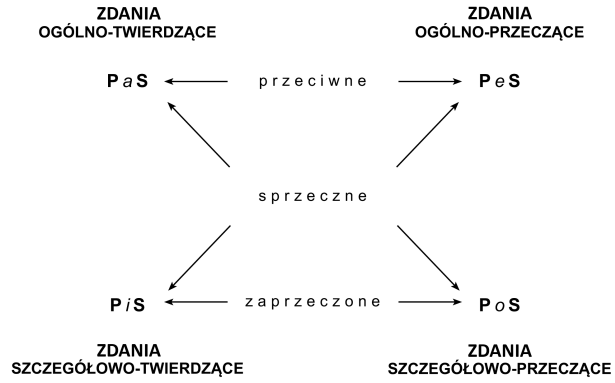
[12] Zob. komentarz do tego nadal dyskutowanego rozdziału *De interpretatione*, Tiuryn (2018: 304-415).

kwadracie opozycji[13]. Bliski Arystotelesowi tego prototyp w notacji czterech form zdań kategorycznych z predykatem na pierwszym miejscu i formułami twierdzeń, przeczeń i kwantyfikacji (według znanych spójek: *a, e, i, o*) można ująć następująco.



Przykładowo formułę „P *a* S" czytamy: „P przysługuje każdemu S", albo: „P jest orzekane o każdym S". W obrębie tych czterech modułów predykacji Stagiryta wyróżnił cztery pary zdań przeciwstawnych, czyli przysługiwanie: (1) każdemu – żadnemu; (2) każdemu – nie każdemu; (3) pewnemu – żadnemu; (4) pewnemu – nie pewnemu (*APr.* II.15). Pierwsze z nich stanowią zdania przeciwne, które nie mogą być zarazem prawdziwe, choć mogą być fałszywe. Natomiast kolejne trzy pary wyrażają zdania sprzeczne, z których jedno musi być prawdziwe, a drugie fałszywe. Kwestie te jednak pomijamy, gdyż wymagają oddzielnego i wnikliwego opracowania.

3. Fałsz orzekany w zdaniach, rzeczach i ludziach

W piątej księdze *Metafizyki* nader zwięzłe ujęcie bytu – niebytu jako prawdy – fałszu zostało zrekompensowane nieco szerszym przedstawieniem wieloznaczności fałszu. W ogóle to Arystoteles zwykł rozważać przeciwstawne pojęcia wychodząc od strony negatywnej. Oto w przekładzie cały ten tekst:

> Fałsz (τὸ ψεῦδος) orzeka się w inny sposób niż rzecz fałszywą; przy czym nie łączy się [podmiot z predykatem] lub niemożliwe jest łączenie; tak orzeka się, że „przekątna jest współ-

[13] Zob. Bocheński (1951: 37–38). O kwadracie logicznym sylogistyki klasycznej zob. Suchoń (1996: 35-36; 152).

mierna", albo że „ty siedzisz". Z tych [zdań] jedno fałszywe jest zawsze, drugie zaś niekiedy; tak bowiem stanowią one niebyty.

Te zaś [rzeczy fałszywe] są, lecz zwykły jawić się nie takimi, jakimi są, albo takimi, jakimi nie są, na przykład malowidło czy zjawy senne. One są czymś, lecz nie tym, czego sprawiają wyobrażenie. Rzeczy więc tak orzeka się fałszywymi: albo same nie są, albo od nich wyobrażenie jest czymś nie będącym.

Natomiast zdanie fałszywe jako takie dotyczy niebytów, dlatego każde zdanie fałszywe jest czymś innym od prawdziwego, na przykład prawdziwe [twierdzenie] o kole jest fałszywe o trójkącie. O wszystkim jest zdanie raz jako jedność tego, czym coś bywszy jest (τὸ τί ἦν εἶναι), raz zaś jako wielość, skoro tym samym jest jakoś dany [przedmiot] i jego własność, na przykład Sokrates i Sokrates wykształcony. Fałszywe zaś zdanie jest po prostu zdaniem o niczym. Dlatego Antystenes naiwnie sądził, że niczego nie można orzekać inaczej, jak tylko jego własnym określeniem, jedno o jednym. Z tego wynika, że nie można wypowiadać sprzeczności, ani nawet orzekać fałszu. Można zaś wszystko orzekać nie tylko właściwym, ale i określeniem czegoś innego, fałszywie zupełnie, można też i prawdziwie, jak na przykład ósemkę [określa się] mnożeniem dwójki. Tak więc orzeka się fałsz.

Człowiek zaś fałszywy [kłamliwy] to ten, kto lekkomyślnie i umyślnie skłonny jest do takich wypowiedzi, nie z innej racji, tylko przez to, i który innym podaje takie wypowiedzi, jak rzeczy, o których mówimy, że sprawiają fałszywe wyobrażenie. Dlatego zwodniczy jest wywód w *Hippiaszu* [*mniejszym*], że ten sam [człowiek] jest kłamcą i prawdomównym. Zdolnego bowiem kłamać bierze się za kłamcę (on zaś jest świadomy i rozumny), a nadto ten, kto rozmyślnie będąc podły, jest lepszy. To zakłada się fałszywie z indukcji; kto bowiem umyślnie kuleje, jest lepszy od nieumyślnego, mówiąc, że chromanie się naśladuje, skoro kulejący dobrowolnie jest może gorszy, tak jak w etyce, tak i tutaj (*Metaph.* V.29, 1024b17–1025a13).

Według Arystotelesa o fałszu zdaniowym mówi się inaczej niż o rzeczy fałszywej, na co podaje dwa przykłady. Pierwszy – „współmierność przekątnej z bokiem kwadratu", stanowi wyraz fałszu zdaniowego, gdzie błędnie łączy się podmiot z predykatem, gdyż zachodzi tu ich stałe rozdzielenie, czyli prawdziwe przeczenie: „przekątna kwadratu nie jest współmierna z jego bokiem". W przykładzie drugim – „ty siedzisz", fałsz może występować nie zawsze, ale tylko w danym czasie. Przykłady tych fałszów dotyczą zdań twierdzących wyrażających niebyty.

Aczkolwiek w *Metafizyce* (VI.4) czytamy, że prawda i fałsz nie występują w rzeczach, a tylko w myśleniu (διάνοια), lecz tutaj chodzi o rzeczy fałszywe jako iluzje, jak na przykład malowidło czy widzenie senne, które są wprawdzie czymś, ale jawią się nie tym, czym są faktycznie, albo tym, czym nie są. Przypadki te dotyczą fałszu na poziomie

postrzegania wyobrażeniowego, czyli fałszywych przedstawień, o czym mowa w traktacie *O duszy* (III.3).

Zdanie fałszywe dotyczy niebytów, różniąc się swą dziedziną od zdania prawdziwego, jak na przykład prawdziwe twierdzenie o kole jest fałszywe w odniesieniu do trójkątów. Zdanie prawdziwe wyraża daną jedność w orzekaniu istotnościowym podług tego „czym coś bywszy jest", na przykład w definicji człowieka „istota żywa, dwunożna i rozumna" (cf. *Int.* 17a13). W określeniu definicyjnym tego, „czym coś jest", Arystoteles zakładał – jak zobaczymy – prawdziwość czy nieomylność, jeśli tylko się ją w badaniu trafnie uchwyci.

Zdanie prawdziwe może też wyrażać wielość, jak w orzekaniu akcydentalnym, na przykład „Sokrates" i „Sokrates muzykalny". Natomiast zdanie fałszywe jest po prostu zdaniem o niczym. Podważa tu Arystoteles naiwny i paradoksalny pogląd Antystenesa, że jedynie uzasadnione jest orzekanie tożsamościowe, z czego ma wynikać niemożliwość sprzeczności, a tym samym wyrażania fałszu (cf. *Top.* 104b20–21; *Metaph.* 1043b23–32). Jednak o każdej rzeczy można orzekać właściwe dla niej określenia, jak i określenia jej obce, stąd też może występować zarówno prawda jak i fałsz.

Trzecie znaczenie fałszu odnosi się do człowieka jako kłamcy. Sokrates platoński w *Hippiaszu mniejszym* (*Hp.Mi.* 365c–369c; 373c–375c) mylił się, przyjmując, że tylko znawca jest w stanie kłamać, i lepszy jest ten, kto umyślnie fałszuje. Ten, kto dobrowolnie kuleje, jest lepszy od tego, który kuleje wbrew swej woli. Tak jednak nie jest, gdyż umyślne naśladowanie kalectwa nie uchodzi za godziwe. Podobnie w wypadku umyślnego kłamstwa.

4. Złączenia – rozdzielenia – niezłożoności/nierozdzielności

W świetle powyższych rozważań możemy właściwie zinterpretować dwa rozdziały w *Metafizyce* (VI.4, IX.10), które najszerzej traktują o prawdzie i fałszu. Wychodząc z rozróżnień pojęciowych bytu i substancji (księga V.7–8), rozwinął Arystoteles rozległe i wysoce sproblematyzowane wywody w zespole kolejnych ksiąg *Metafizyki*. Dociekał tam zasad i przyczyn bytu substancjalnego oraz możności i aktu, natomiast o bycie – niebycie jako prawdzie – fałszu wypowiedział się zwięźle tylko w dwóch miejscach, uznając te kwestie za odrębne. Oto pierwszy z tych tekstów w dosłownym przekładzie:

> Byt zaś jako prawda, a nie-byt jako fałsz (τὸ δὲ ὡς ἀληθὲς ὄν, καὶ μὴ ὂν ὡς ψεῦδος), skoro są podług złączenia i rozdzielenia (παρὰ σύνθεσίν ἐστι καὶ διαίρεσιν), to razem wzięte stanowią człon sprzeczności (περὶ μερισμὸν ἀντιφάσεως); prawdę bowiem wyraża twierdzenie o tym, co złączone, a przeczenie o tym, co rozdzielone, natomiast fałsz to sprzeczność takiego członu. Jak zaś to łącznie lub rozdzielnie przypada rozumieć, to już inny wywód; nazywam to łączenie i rozdzielenie tak, że nie następują po sobie, lecz tworzą coś jednego.

> Nie ma wszak fałszu ani prawdy w rzeczach (ἐν τοῖς πράγμασιν), jakoby dobro było prawdą, zło zaś fałszem, lecz w myśleniu (ἐν διανοίᾳ); co zaś tyczy się [elementów] prostych i tego, czym

coś jest (περὶ δὲ τὰ ἁπλᾶ καὶ τὰ τί ἐστιν), to nie w myśleniu. Co więc trzeba rozważyć o takim bycie i nie-bycie, należy przebadać później.

Skoro zaś złączenie i rozdzielenie jest w myśleniu, a nie w rzeczach, to taki byt jest różny od tych naczelnych (ἕτερον ὂν τῶν κυρίως); to bowiem, czym coś jest, czy to jakością, czy ilością, czy jeszcze czymś innym, to wiąże lub rozdziela myślenie (συνάπτει ἢ ἀφαιρεῖ ἡ διάνοια).

Byt zaś jako przypadłość i byt jako prawdę trzeba tutaj pominąć; przyczyna pierwszego jest nieokreślona, a drugiego jest pewną cechą myślenia (τῆς διανοίας τι πάθος); obydwa dotyczą pozostałego rodzaju bytu, a nie ukazują jakiejś zewnętrznej natury bytu (οὐκ ἔξω δηλοῦσιν οὖσάν τινα φύσιν τοῦ ὄντος). Dlatego trzeba je pominąć, a rozważyć samego bytu przyczyny i zasady (*Metaph*. VI.4, 1027b18–1028a4).

To już wiemy, że byt – prawdę jako złączenie wyraża twierdzenie (κατάφασις), a niebyt – fałsz jako rozdzielenie wyraża przeczenie (ἀπόφασις), gdzie twierdzenie i przeczenie to dwa człony sprzeczności (ἀντίφασις). Nowym stwierdzeniem jest tutaj to, że prawda i fałsz nie są w rzeczach, a tylko w myśleniu (διάνοια), które wiąże lub rozdziela, czyli predykatywnie twierdzi lub przeczy według kategorii istoty, jakości, ilości itd. Takie myślenie nie dotyczy jednak elementów prostych (bez łączenia czy rozdzielenia) oraz tego, czym coś jest, czyli definicyjnej istoty; rozważenie tego odkłada Arystoteles na później. Nadto z dociekanej obecnie teorii bytu pomija on byt przypadłości oraz byt prawdy i fałszu, jako że nie ukazują zewnętrznej natury bytu. Powrócił zaś do tej kwestii nieco szerzej w ostatnim rozdziale księgi IX. Oto w dosłownym przekładzie ten ważny, acz trudny w interpretacji tekst:

Skoro byt i niebyt orzeka się według figur kategorii (τὰ σχήματα τῶν κατηγοριῶν), tudzież według możności lub aktu tychże, bądź na odwrót, i byt ten jest naczelny (κυριώτατα ὄν), to prawda lub fałsz względem rzeczy jest w ich złączeniu lub rozdzieleniu, toteż prawdę orzeka ten, kto jako rozdzielone uznaje to, co jest rozdzielone, a jako złączone to, co jest złączone; orzeka zaś fałsz ten, kto uznaje, iż rzeczy mają się przeciwnie. Kiedy zaś [występuje] owo ‘jest’ lub ‘nie jest’ (ἔστιν ἢ οὐκ ἔστι) – jako tak orzekana prawda lub fałsz (τὸ ἀληθὲς λεγόμενον ἢ ψεῦδος)? To bowiem trzeba rozważyć, co tak orzekamy. Otóż nie dlatego my sądzimy prawdziwie, że ty jesteś blady, jeśli jesteś blady, lecz dlatego, że ty jesteś blady, my, stwierdzając to, mówimy prawdę.

Jeśli zaś jedne [rzeczy] zawsze są złączone i nie mogą być rozdzielone, inne są zawsze rozdzielone i nie mogą się łączyć, a jeszcze inne mogą mieć się przeciwnie, to byciem jest złączenie i bycie jednym, a nie bycie nie złączeniem, lecz wielością. Co tyczy się więc tych [rzeczy] mogących [mieć się inaczej], takie powstaje fałszywe i prawdziwe mniemanie (δόξα), i takież zdanie (λόγος), i można raz orzekać prawdę, innym zaś razem fałsz. Co się zaś tyczy tych [rzeczy] nie mogących mieć się inaczej, nie zachodzi raz prawda, a raz fałsz, lecz zawsze są one prawdziwe lub fałszywe.

Co się zaś tyczy [rzeczy] niezłożonych (τὰ ἀσύνθετα), to czymże jest ich bycie i nie bycie oraz prawda i fałsz? Nie to bowiem stanowi złączenie, że jest, gdy się łączy, a nie jest, jeśli się rozdziela, jak na przykład białe drzewo czy niewspółmierność przekątnej; prawda ani fałsz nie

będzie już im podobnie przypadać. Bo jak prawda dla nich nie jest tym samym, tak też i bycie, lecz jedno jest prawdą lub fałszem, uchwycenie i wysłowienie (τὸ μὲν θιγεῖν καὶ φάναι) jest prawdziwe (nie jest bowiem tym samym stwierdzenie i wysłowienie (κατάφασις καὶ φάσις), a niewiedza to nie uchwycenie. Mylenie się bowiem co do tego, czym coś jest (τὸ τί ἐστιν), nie zachodzi, chyba że podług przypadłości.

Podobnie co tyczy się niezłożonych substancji (περὶ τὰς μὴ συνθετὰς οὐσίας) nie można się mylić, bo wszystkie są w akcie, nie w możności, [bo inaczej] powstawałyby i zanikały, atoli byt sam ani nie powstaje, ani nie ginie, gdyż z czegoś by powstawał. Co do tego, co tak jest jako bycie czymś i w akcie, nie można się mylić, lecz pojmować to lub nie. Lecz tego, czym coś jest, docieka się, czy jest takie czy nie (τὸ τί ἐστι ζητεῖται περὶ αὐτῶν, εἰ τοιαῦτά ἐστιν ἢ μή)[14].

Bycie zaś jako prawda, i nie bycie jako fałsz, w jednym przypadku, jeśli się łączy, jest to prawda, jeśli zaś się nie łączy, wtedy jest to fałsz; w innym zaś, jeśli byt, to tak jest, a jeśli nie tak, to nie jest. Prawdą jest tego pojmowanie, fałszu zaś nie ma ani błędu, lecz jest niewiedza, ale nie jak ślepota, gdyż ślepota jest wtedy, gdyby ktoś w ogóle nie miał zdolności pojmowania.

Jest też jasne, że co do rzeczy nieruchomych (περὶ τῶν ἀκινήτων) nie ma mylenia się według czasu, jeśli uznaje się je za nieruchome. Na przykład trójkąt, jeśli zakłada się, że nie ulega zmianie, to nie założy się, że raz suma jego kątów równa się dwom kątom prostym, a innym razem nie, bo musiałby ulec przemianie, lecz czymś jest, czymś nie; na przykład żadna liczba parzysta nie jest pierwsza, albo że jedne są takimi, inne nie. Nie odnosi się to do liczby numerycznie pierwszej; nie założy się już, że coś ma się tak, a coś inaczej, lecz że wypowie się prawdę lub fałsz, jak zawsze coś się ma w ten sposób (*Metaph.* IX.10, 1051a34–1052a11).

Najpierw powtarza Arystoteless swoje stałe założenia (byt – prawda; niebyt fałsz) w terminach złączenia i rozdzielenia. W orzekaniu prawdy stawia nadrzędność strony przedmiotowej, co ilustruje przykładem „jesteś blady", gdzie prawdziwe tego stwierdzenie zależy od faktycznej twojej bladości, a nie odwrotnie. Wprawdzie to przykład orzekania akcydentalnego, gdzie możliwa jest czy to prawda, czy fałsz, lecz jego wymowa jest jasna: zaistnienie czegoś poprzedza i warunkuje nasze o tym prawdziwe stwierdzenie. Świadczy też o tym następujący wywód w *Kategoriach*:

To bowiem, że jest [żyje] człowiek, odwraca się wedle następstwa jego bycia z prawdziwym o nim zdaniem. Bo jeśli jest człowiek, to prawdziwe jest zdanie, w którym mówimy, że jest człowiek. I na odwrót, jeśli prawdziwe jest zdanie, w którym mówimy, że jest człowiek, to człowiek jest. Prawdziwe zdanie nie jest jednak przyczyną bycia danej rzeczy, ale rzecz ta okazuje się właśnie przyczyną prawdziwego zdania; przez to, czy dana rzecz jest czy nie, prawdziwe lub fałszywe nazywa się zdanie (*Cat.*14b4–23; cf. 4b8; *Int.* 19a33).

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[14] Heidegger dodając negację *ouk (nie)* całkowicie odwraca sens tego zdania, sugerując jakiś fenomenologiczny wgląd w istotę, czyli intuicję. Zob. Berti (2015: 112).

Następnie w aspekcie przedmiotowym wyszczególnia Arystoteles trzy przypadki możliwych połączeń lub rozdzieleń: (1) stałe złączenie jako jedno – na przykład twierdzenie: „w trójkącie suma kątów równa się dwom kątom prostym"; (2) stałe rozdzielenie jako wielość – na przykład przeczenie: „przekątna kwadratu nie jest współmierna z jego bokiem"; (3) raz złączenie, raz rozdzielenie – na przykład wypowiedź „ty siedzisz", czyli mniemanie, które może być raz prawdziwe, a innym razem fałszywe. Stagiryta tych przykładów tu nie podaje, a posługuje się w wywodach pokrewnych. Rozróżnienia te przypominają teorię predykabiliów, czyli działów orzeczeń o podmiocie (cf. *Top*. I.5–9).

Następnie pyta Arystoteles o same „niezłożoności" (τὰ ἀσύνθετα), czym jest w ich wypadku byt i nie-byt oraz prawda i fałsz. Gdzie bowiem brak łączenia i rozdzielenia, gdy coś jest niezłączone, nierozdzielne i proste, inaczej się przedstawia byt i prawda, czym jest bezpośrednie uchwycenie (θιγεῖν, *simplex apprehensio*) i wysłowienie (φάσις), z wykluczeniem fałszu i niebytu, którym odpowiada brak uchwycenia jako niewiedza. Prawda lub fałsz dotyczą twierdzeń lub przeczeń, natomiast owo uchwycenie stanowi nieomylne pojęcie i wyrażenie. Do owych nieomylnie pojętych „niezłożoności" zalicza Stagiryta definicyjną istotę, czym coś jest (τὸ τί ἐστιν), a także niezłożone substancji (μὴ συνθεται οὐσίαι), którymi nie są odwieczne istoty boskie, a tylko w akcie poznawczym treści myślne (noetycze) jako formy bez materii. Wszelako w ich wypadku zbadać trzeba, czym one są, takie czy inne, co wyklucza jakieś podejście poza-empiryczne czy intuicjonistyczne[15].

Pojawia się tu trudność, skoro formuła definicyjna jest wyrażeniem złożonym z wielu określeń, orzekaniem „czegoś o czymś". Problem ten w nieco innym kontekście podnosił Stagiryta w księdze *Metaph*. VII.12 i 17, że ostatecznie czymś jednym jest to, czego określenie (λόγος) stanowi definicję (ὁρισμός). Za pomocą właściwego podziału ustala się najbliższy rodzaj, a następnie różnicę gatunkową; pojęcie rodzaju dla danego definiowanego obiektu jest zawsze jedno, spośród różnic należy zaś wybierać jedynie takie, które ostatecznie określają istotę substancjalną.

W zakończeniu księgi VII *Metafizyki* dla wyjaśnienia, czym jest oddzielona od rzeczy zmysłowych forma substancjalna, stawia Arystoteles problem następująco. Wszelkie pytania poznawcze mają postać: „dlaczego coś przysługuje czemuś", lecz w pytaniu o istotę, na przykład „czym jest człowiek", chodzi o orzeczenie tego, co proste (τὸ ἁπλῶς λέγεσθαι), a co stanowi noetyczną formę bez materii. Jednak ten problem poznawania „rzeczy prostych" należy do innej dziedziny badań. „Jasne wiec, że o rzeczach prostych nie ma badania i nauczania, lecz inny jest sposób ich dociekania" (*Metaph.* 1041b9). Stanowi to zapewne odniesienie do kwestii podjętych w traktacie *O duszy*, o czym wspomnimy poniżej.

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[15] Na ten temat dokładniej zob. Wesoły (1981)

5. Intelekcja (pojmowanie) nierozdzielności

W księgach *Metafizyki* traktował Arystoteles o prawdzie – fałszu w pojęciach bytu – niebytu, twierdzenia – łączenia, przeczenia – rozdzielenia, co jest funkcją myślenia zdaniowego, natomiast wspomniane „niezłożoności" należą już do innego przedmiotu dociekań. W księdze III *O duszy* traktuje Stagiryta gruntownie o poznaniu zmysłowym i rozumowym. Wszelkie bowiem poznanie wywodzi się z percepcji zmysłowej jako postrzeżenie (αἴσθησις) i wyobrażenie (φαντασία), a dalej sięga percepcji rozumowej (νοῦς) i intelekcji (νόησις). Prosty i niepodzielny przedmiot percepcji zmysłowej i rozumowej (intelekcji) jest nieomylny. Arystoteles mówi w aspekcie epistemologicznym o prawdzie i fałszu jako łączeniu lub rozdzieleniu pojęć (νοήματα), przy zachowaniu tych samych przykładów (niewspółmierność przekątnej, blady człowiek).

Byt jako prawda w odniesieniu do „niezłożoności" nie stanowił przedmiotu teorii bytu jako bytu, gdyż kwestia ta należy do poznania zmysłowego i rozumowego. Prawdziwość dianoetyczna odnosi się do zdań, natomiast prawdziwość noetyczna dotyczy poznawczego uchwycenia formy-istoty oraz owych „nierozdzielności". W aspekcie rozróżnień możności i aktu Stagiryta rozważa pojmowanie nierodzielności w sensie ilościowym (na przykład długość), ze względu na formę (na przykład powszechnik) oraz przypadek przeciwieństw (na przykład kolor czarny). Nie wnikając w szczegóły podajemy w dosłownym przekładzie wywody Arystotelesa na ten temat[16].

> Pojmowanie nierodzielności (τῶν ἀδιαιρέτων νόησις) dotyczy tego, o czym nie ma fałszu. W czym zaś jest fałsz i prawda – to już pewne łączenie pojęć jako będących czymś jednym (σύνθεσίς τις ἤδη νοημάτων ὥσπερ ἓν ὄντων). Jak rzecze Empedokles: „tak oto [z ziemi] głów wiele bez karków zakiełkowało", a potem spojone zostały w miłości, tak i tutaj te rozdzielone spajają się, na przykład „niewspółmierność" i „przekątna" [kwadratu].
>
> Gdy zaś chodzi o zdarzenia przeszłe lub przyszłe, łączenie uwzględnia także czas. Fałsz bowiem jest zawsze w łączeniu, bo gdy się powie, że to, co białe, nie jest białe, łączy się nie-białe z białym. Można też wszystko to zwać też rozdzieleniem. Jest więc nie tylko fałsz lub prawda, jak na przykład „Kleon jest blady", lecz także „Kleon był" lub „będzie blady". A to, co czyni wszystko jednym, to intelekt.
>
> To zaś, co nierozdzielne, orzeka się dwojako: w możności albo w akcie, a nic nie przeszkadza pojmować niepodzielność, gdy pojmuje się długość (jest bowiem niepodzielna w akcie) i w czasie niepodzielnym. Podobnie bowiem czas jest podzielny i niepodzielny w swej długości. Nie można tedy orzec, co pojmuje się w każdej połówce czasu, bo nie można, jak tylko potencjalnie, zanim nie rozdzieli się całości, Oddzielnie każdą z połówek pojmując, dzieli się zarazem czas, jak i długości; jeśli zaś jakby z obydwu połówek, to i w czasie z ich obydwu.

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[16] Zob. na ten temat szczegółowy komentarz: Berti (2004: 77–87).

> To zaś, co niepodzielne nie podług ilości, ale w swej formie, pojmuje się w niepodzielnym czasie i niepodzielnym aktem duszy. Przypadłościowo zaś, a nie jako takie, podzielne jest to, co się pojmuje i w czasie, lecz pojmuje się jako niepodzielne; jest bowiem w nich coś niepodzielnego, lecz chyba nie oddzielonego, co czyni jednym czas i długość. Podobnie we wszystkim co ciągłe, i w czasie i długości.
>
> Natomiast punkt i wszelki podział, i to, co tak nierodzielne, jawi się jako brak. Podobne określenie jest i w innych przypadkach, na przykład jak poznaje się zło lub czerń; poznaje się bowiem poprzez przeciwieństwo. Trzeba, by w możności było to, co się poznaje, i było w nim samym. Jeśli zaś czemuś brak przeciwieństwa, samo to poznaje się i jest w akcie i oddzielone.
>
> Otóż twierdzenie (φάσις), jak i przeczenie (ἀπόφασις), jest orzekaniem czegoś o czymś (τι κατά τινος), i każde jest prawdziwe lub fałszywe. Intelekt (νοῦς) jednak nie wszystko [tak orzeka], lecz prawdziwie to, czym coś jest, podług tego, czym coś bywszy jest (ὁ τοῦ τί ἐστι κατὰ τὸ τί ἦν εἶναι), a nie, gdy orzeka coś o czymś. Bo jak widzenie danej właściwości [np. bieli] jest prawdziwe, lecz czy „człowiek jest blady", czy „nie", to nie zawsze jest prawdziwe. Tak też rzecz się z tym, co jest bez materii (*de An.* 430a26–430b31).

W związku z kwestią prawdy i fałszu warto jeszcze odnotować znamienny pogląd Arystotelesa w traktacie *O duszy* (III.8), gdzie streszcza om swe wywody, z czego cytujemy tu samo zakończenie:

> Dlatego też nie postrzegając zmysłowo niczego nie można się nauczyć ani pojąć, a kiedy się coś rozważa, to musi się jednocześnie rozważać jakieś wyobrażenie (φάντασμα). Wyobrażenia bowiem są jakby przedmiotami postrzeganymi, tylko że bez materii. Lecz wyobraźnia (φαντασία) jest czymś różnym od twierdzenia i przeczenia; łączeniem bowiem pojęć jest prawda i fałsz (συμπλοκὴ γὰρ νοημάτων ἐστὶ τὸ ἀληθὲς ἢ ψεῦδος). Pierwsze zaś pojęcia (τὰ δὲ πρῶτα νοήματα) czym będą się różnić, nie będąc wyobrażeniami? Czyż i one nie są wyobrażeniami, ale nie bez wyobrażeń (*de An.* III 8).

Na podstawie postrzeżeń zmysłowych, wyobrażeń i doświadczenia kształtują się treści myślne, czyli pojęcia, będące przedmiotem różnych form poznania. Prawda i fałsz na poziomie myślenia uwarunkowana jest treścią wyobrażeń i pojęć. Takie stanowisko realizmu poznawczego jest wyrazem wszechstronnej teorii i praktyki badawczej greckiego filozofa[17].

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[17] Na temat Arystotelesowej koncepcji wiedzy naukowej oraz dowodzenia i wyjaśniania zob. Wesoły (1998; 2018).

6. Dociekanie prawdy i prawdopodobieństwa

Wymownym wyrazem realizmu Arystotelesa jest też jego stosunek do idei Platona, które w *Analitykach wtórych* (83a35) nazwał „pustosłowiem" (τερετίσματα). W kwestii zaś orzekania Dobra, wobec faktu, że „nasi przyjaciele wprowadzili Idee", stwierdził on, że dla ocalenia prawdy filozofom lepiej naruszyć osobiste względy. „Jedno i drugie nam bowiem drogie, choć jest rzeczą świętą przedkładać prawdę" (*EN* 1096a16). Stwierdzenie to stało się przysłowiowe w tradycji łacińskiej: *Amicus Plato, sed magis amica Veritas*!

Warto przytoczyć tu kilka wybornych wypowiedzi Arystotelesa na temat dociekania prawdy w różnych uprawianych przezeń dziedzinach. Badanie prawdy ogólne dotyczy filozofii jako dociekań nad naturą wszechrzeczy (*peri physeos*). Arystoteles jako badacz i realista żywił przekonanie, że możliwe jest poznawanie prawdy, a postęp w danej dziedzinie zależy od dorobku wspólnych dociekań. W księdze drugiej *Metafizyki* czytamy o tym znamienny wywód:

> Badanie prawdy (ἡ περὶ τῆς ἀληθείας θεωρία) pod jednym względem jest trudne, pod innym zaś łatwe. Oznaką tego jest fakt, że nikt nie może jej należycie uchwycić, ani też wszyscy nie błądzą, lecz każdy głosi coś o naturze i choć oddzielnie nie wnosi niczego bądź niewiele, ze wszystkich zaś razem zebranych udziałów powstaje pewien wkład. Toteż jeśli sprawa zdaje się mieć podobnie jak w powiedzeniu: „któż pomyliłby drzwi?", to pod tym względem badanie byłoby łatwe. Objęcie jakiejś całości, a nie zdołanie części, ujawnia samą trudność. Zapewne trudność ta jest dwojakiego rodzaju; nie w rzeczach, lecz nas samych jest tego przyczyna. Bo jak oczy nietoperzy mają się do światła dziennego, tak i rozum naszej duszy ma się do rzeczy w naturze najbardziej jasnych ze wszystkich. Nie tylko należy się słusznie wdzięczność tym, których poglądy mógłby ktoś podzielać, lecz i tym, którzy wypowiadali się w sposób raczej powierzchowny; wszak i oni cokolwiek dorzucili; pobudzili bowiem naszą zdolność myślenia. (...) W ten sposób rzecz się ma w odniesieniu do tych, którzy wypowiadali się na temat prawdy; od niektórych przejęliśmy pewne poglądy, inni zaś sprawili pojawienie się tamtych.
>
> Słusznie tak nazywa się filozofię wiedzą o prawdzie. Bo celem filozofii teoretycznej jest prawda, a praktycznej działanie. Badacze działań praktycznych, jeśli nawet baczą, jak rzeczy się mają, nie dążą do poznania samej przyczyny, lecz tylko, że coś do czegoś się odnosi i to w czasie obecnym. Nie poznajemy jednak prawdy bez wykrycia przyczyny. (...)
>
> Toteż jest i najprawdziwsze to, co jest przyczyną rzeczy następnych w ich byciu prawdą. Dlatego zasady bytów z konieczności są zawsze najprawdziwsze, gdyż nie są raz prawdziwe, i nie dla nich coś jest przyczyną bycia, lecz one dla innych. Toteż jak ma się wszystko do bycia, tak i do prawdy (ὥσθ' ἕκαστον ὡς ἔχει τοῦ εἶναι, οὕτω καὶ τῆς ἀληθείας) (*Metaph.* 993a30–993b31).

Dla Arystotelesa dociekanie przyczyn (materialnej, formalnej, sprawczej i celowej) stanowi istotny przedmiot w poznaniu naukowym. Rozróżnienie filozofii teoretycznej i praktycznej dotyczy tego, że pierwsza poznaje prawdy teoretyczne stałe i ogólne,

natomiast druga wyjaśnia ludzkie działania praktyczne, gdzie mowa też o prawdzie praktycznej.

> Tak jak w myśleniu jest twierdzenie i przeczenie, tak w pragnieniu dążność i unikanie. Toteż skoro cnota etyczna jest dyspozycją wybierania, wybór zaś obmyślanym pragnieniem, to dzięki temu namysł winien być prawdziwy, a pragnienie słuszne, jeśli wybór jest dobry, bo to samo się stwierdza i podejmuje. Takie jest tedy myślenie i prawda praktyczna, natomiast w myśleniu teoretycznym, które nie jest praktyczne ani wytwórcze, dobrem lub złem jest prawda lub fałsz (takie zresztą jest dzieło wszelkiego myślenia); prawda zaś myślenia praktycznego i teoretycznego ma się podobnie do trafnego pragnienia (*EN* VI.2, 1139a21–31).

W szóstej księdze *Etyki nikomachejskiej* Arystoteles przedstawił dyspozycje dianoetyczne (intelektualne), poprzez które dusza orzeka prawdę w twierdzeniu lub przeczeniu[18]. Wiedza naukowa (ἐπιστήμη) stanowi dyspozycję do dowodzenia i wyjaśniania na podstawie przesłanek ogólnych, koniecznych i prawdziwych. Natomiast roztropność (φρόνησις) jest dyspozycją wraz z namysłem do praktycznego działania (πρᾶξις), tak jak sztuka (τέχνη) jest dyspozycją wraz namysłem do tworzenia (ποίησις) w zakresie tego, co może być tak czy inaczej. Rozróżnieniu temu odpowiada podział na dziedziny teoretyczne, praktyczne i wytwórcze.

Stagiryta przywiązywał szczególne znaczenie do trafnego wykrycia podstawy – zasady (ἀρχή) w podjętych badanych. Jest to właściwie najtrudniejsze, ale daje podstawę do spójnego rozwinięcia wynikłych następstw. Oto wymowne wymogi greckiego filozofa:

> Najważniejsza chyba ze wszystkiego jest podstawa (ἀρχή), jak to się mówi. Stąd i najtrudniejsza; na ile bowiem najsilniejsza w swej możności, na tyle, będąc najmniejszej wielkości, najtrudniejsza jest w dostrzeżeniu. Po jej wykryciu łatwiej już rozwinąć i dopełnić resztę (*SE* 183b22–26).
>
> Podstawa bowiem wydaje się być czymś więcej niż połową całości, i wiele rzeczy badanych dzięki temu stanie się jasne. (...) Z prawdą bowiem współgrają wszelkie realności (τὰ ὑπάρχοντα), z fałszem zaś szybko rozmija się prawdziwość (*EN* 1098b7–12).

> Musi bowiem wszystko to, co prawdziwe, być zgodne z sobą wszędzie (*APr.* 47a9).

Założenie zaś czegoś mylnie na początku prowadzi w następstwie do bezkrytycznego powielania błędów. Stwierdza to Stagiryta w związku ze sporną kwestią nieskończoności, a także w kwestii mylnych poglądów na temat ustrojów politycznych (demokracji i oligarchii):

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[18] Zob. nowy polski przekład tej księgi: Wesoły (2019).

> Małe odchylenie od prawdy staje się dalej w badaniu nader zwielokrotnione (*Cael.* 271b8)[19].

> Przyczyna tego taka, że niemożliwe, by wychodząc od pierwotnego i na wstępie popełnionego błędu nie natknąć się w końcu na jakieś złe następstwo (*Pol.* 1302a6).

Takie diagnozujące błędy podejście wiąże się z jego strategią stawiania i rozstrzygania aporii, czyli spornych kwestii, na podobieństwo wysłuchania racji obydwu stron w procesie sądowym. Wiedzy filozoficznej służy metoda dialektyczna, „gdyż zdołając rozstrzygnąć aporie jednych i drugich (πρὸς ἀμφότερα διαπορῆσαι), łatwiej dostrzeżemy we wszystkim prawdę i fałsz" (*Top.* 101a35; cf. 145b17).

Arystoteles stawiał wymóg kompetencji metodologicznej (παιδεία) w zakresie analityki, czyli metod dowodzenia i wyjaśniania naukowego. Chodzi o ścisłość i spójność sformułowań w danym zakresie oraz należną konsekwencję wywodów. Jednak nie we wszystkich dziedzinach wiedzy w równej mierze osiągalna jest ścisłość i powszechność twierdzeń. I tak w odniesieniu do kwestii etycznych stwierdza następująco:

> Mówiąc o tych sprawach i wychodząc z takich danych, należy zadowolić się tym, że z grubsza tylko i w zarysie ukazuje się prawdę, bo traktując o tym, co zachodzi w większości przypadków i wychodząc od takich danych, również takie osiąga się wnioski. W ten też sposób trzeba przyjmować każde twierdzenie; komuś bowiem kompetentnemu przypada na tyle dociekać ścisłości w danej dziedzinie, na ile dopuszcza tego natura danego przedmiotu. Bo okazałoby się czymś podobnym matematykowi przyjmować racje wiarogodne, a od retora wymagać ścisłych dowodzeń. Każdy rozstrzyga dobrze to, na czym się zna i w czym jest dobrym sędzią (*EN* 1094b19–31).

Arystoteles okazywał i zalecał niebywałą skłonność co ciągłego zgłębiania i modyfikowania (μεταβιβάζειν) badanych kwestii.

> Każdy wszak głosi coś własnego o prawdzie, z czego musi jakoś dowodzić swych racji. Bo z prawdziwych stwierdzeń, choć jeszcze niezbyt jasnych, dojdzie się do jasności, przedkładając zawsze twierdzenia bardziej pewne od tych głoszonych zwykle na sposób luźny (*EE* 1216b30–35).

W księdze czwartej *Metafizyki* wobec argumentów sceptycznych uznaje też to, co jest „bardziej prawdziwe" (μᾶλλον ἀληθεύει).

> Jeśli więc jest coś bliższego, to byłoby i coś prawdziwego, czemu bliższe jest to, co bardziej prawdziwe. A choćby i tego nie było, to jest już coś bardziej pewnego i prawdziwego, i tak byli-

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[19] W myśl tego stwierdzenia Arystotelesa poddał krytycznej analizie wyjściowe błędy filozofii nowożytnej Mortimer J. Adler (1985).

byśmy wyzwoleni od tego nieposkromionego argumentu i powstrzymującego, by cokolwiek w myśleniu określać (*Metaph.* 1009a1–5).

Pomimo tych trudności i różnic Arystoteles zakładał jednaką wartość argumentacyjną w poznawaniu prawdy i podobieństwa do prawdy. W jego *Retoryce* czytamy, co następuje:

Albowiem prawdziwość i to, co prawdzie podobne, można dostrzec tą samą zdolnością, a ludzie łącznie mają wystarczająco naturalną skłonność do prawdy i w większości osiągają prawdę. Stąd osiąganie poglądów na sposób domniemany ma się podobnie do posiadania wiedzy prawdziwej (*Rh.* 1355a14–18).

7. Prawdomówność i kłamstwo

O prawdomówności (ἀλήθεια) i fałszu/kłamstwie (ψεῦδος) jako cechach charakteru ludzkiego traktuje Arystoteles w *Etyce Nikomachejskiej* (IV.13, 1127a13–b32), czego skrótowym ujęciem są też wywody w *Etyce Wielkiej* (I.32, 1192a28–35) i w *Etyce Eudemejskiej* (III.7, 1233b38–1234a3). Jest to szczególnie interesujące w aspekcie kompleksowego pojęcia cnót (ἀρεταί) jako umiarów (zob. ich instruktywne zestawienie tabelaryczne w *EE* 1220b37–1221a12). Zauważmy, że prawdomówność nie stanowi tu bezwzględnej wartości, ale jest wypośrodkowaniem przeciwstawnych wad: z jednej strony – chełpliwości (ἀλαζονεία), a z drugiej udawanej skromności (εἰρωνεία).

A człowiek prawdomówny i szczery, którego nazywają rzetelnym, jest pośrodku między udającym skromność i samochwałem. Kto bowiem nieświadomie zmyśla o sobie rzeczy gorsze, ten udaje skromnego, a kto rzeczy lepsze, ten jest samochwałem, kto zaś mówi, jak rzeczy się mają, ten jest prawdomówny i podług Homera wiarygodny, i w ogóle miłośnikiem prawdy, a tamten fałszu (*EE* 1233b38–1234a3).

Prawdomównego i kłamcę rozpoznaje się bowiem w słowach, działaniu i zachowaniu ze względu na postawiony cel, którym bywa popisywanie się, przydawanie sobie więcej zalet niż się ma faktycznie, albo też odmawianie ich sobie i udawanie skromnego, co po grecku nazywano ironią. Prawdomówność jest wyrazem szczerości, stanowi wartość etyczną samą dla siebie, a świadome kłamstwo dla sławy czy zysku zasługuje najbardziej na naganę. Sam w sobie fałsz – kłamstwo jest czymś szpetnym i nagannym, prawda zaś czymś pięknym i chwalebnym (cf. *EN* 1127a28–30).

8. Adaptacje koncepcji prawdy według Arystotelesa

Na podstawie cytowanych powyżej ważniejszych tekstów Arystotelesa na temat prawdy i fałszu możemy wniknąć w osnowę pojęciową jego złożonych rozważań, które w znacznej mierze odbiegają od naszych wyobrażeń i konwencji terminologicznych. Podstawa jego wywodów o prawdzie i fałszu sformułowana jest syntaktycznie według rozróżnień bytu jako predykatywnego twierdzenia – łączenia i odpowiednio niebytu jako przecenia – rozdzielenia. Jak wyróżnikiem definicyjnym fałszu jest sprzeczność, tak prawdy – niesprzeczność. Wyrażanie prawdy lub fałszu w formie oznajmującej twierdzeń lub przeceń jest funkcją myślenia jako dyspozycji poznawczej człowieka podług figur semantycznych predykacji kategorialnej. Arystoteles sformułował teorię predykacji w odniesieniu wyłącznie do zdań kategorycznych, nie zaś do zdań złożonych (spójnikowych), i to w konwencji różnej od późniejszej logiki tradycyjnej.

Niezależnie od tego Arystoteles uchodzi za twórcę klasycznej koncepcji prawdy, zwanej też teorią adekwatności czy korespondencji jako zgodności myśli z rzeczywistością, podług łacińskiej formuły Tomasza z Akwinu: *Veritas est adaequatio rei et intellectus*. Jednak Stagiryta nie traktuje o takiej zgodności, a tylko o tym raz wzmiankuje, że „prawdziwe zdania (λόγοι) mają się podobnie, jak rzeczy (πράγματα)" (*Int*. 19a33). Można to rozumieć nie jako adekwatność czy korespondencję, ale raczej jako pewien izomorfizm strukturalny między zdaniami – nośnikami prawdy a ich odniesieniem przedmiotowym[20].

Bliższa w tym względzie Arystotelesowi wydaje się jednak wersja adaptacyjna podjęta nowocześnie przez naszego wybitnego logika, Alfreda Tarskiego, w jego semantycznej definicji prawdy[21]. Jednakże filozof grecki nie tyle dociekał definicji prawdy jako takiej, lecz szerzej rzecz ujmował wychodząc właściwie od fałszu jako sprzeczności. W naszej interpretacji uznaliśmy Arystotelesa figury predykacji za pewne modele semantyczne, a orzekanie prawdy jest funkcją tychże figur, stąd zasadne byłoby nazwanie tej teorii prawdy właściwie predykatywną i semantyczną[22].

Na koniec tylko wspomnijmy, że w przeciwieństwie do wszystkich koncepcji prawdy, Martin Heidegger nie uznawał jej za własność myślenia czy zdania, ale za bezpośrednie przejawianie się bycia w nieskrytości (*Unverborgenheit*). Wywodził więc od Arystotelesa swe własne pojmowanie bycia i prawdy, zniekształcając go całkowicie[23].

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[20] Zob. Szaif (2018: 45–46).

[21] Zob. Woleński (2017).

[22] Zob. Wesoły (1984; 2003).

[23] Zob. Berti (2015: 113): „Trudno sobie wyobrazić bardziej bezpardonowe przywłaszczenie sobie Arystotelesa".

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Being – Not-Being, Truth – Falsehood in Aristotle's View

The basis of Aristotle's arguments about truth and falsity is formulated syntactically according to the distinctions of 'to be' as the predicative affirmation - composition and, correspondingly, 'not to be' as negation – separation. As the nominal defining characteristic of falsity is contradiction, so of truth is non-contradiction. The expression of truth or falsity in the declarative sentence of affirmation or negation is a function of thinking as a human cognitive disposition under the semantic figures of categorical predication. In addition, we cite Aristotle's more important texts on the true intellection of non-composites (indivisibles), the investigation of truth and probability, the diagnosis of falsehood, the truthfulness and lying. Finally, a mention of modern adaptations of Aristotle's concept of truth.

KEYWORDS

Aristotle, Being – Not-Being, Categorical predication, Falsity as Contradiction, Truth as non-contradiction, Philosophy as investigation of truth, Truthfulness and Lying.

Truth in Practical Reason: Practical and Assertoric Truth in Aristotle's *Nicomachean Ethics**

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The concept of truth, though crucial in many Aristotelian texts, does not serve a single distinct purpose throughout the corpus. In some epistemically oriented passages, 'truth' is called upon to separate science from dialectic (*APr.* 65a36–37) and knowledge from opinion (*APo.* 89a1–10), while in more general contexts Aristotle refers to his predecessors in theoretical philosophy as "those who philosophized about the truth" (*Metaph.* I, 983b2–3). The predicate 'true' or the verbs ἀληθεύειν and ψεύδεσθαι follow the same pattern: they normally refer to propositional sentences (*Int.* 4, Met. IV, 1011b26–27), but in various other instances they are attributed to things, capacities and virtues, some of them not of linguistic nature at all.[1] Thus, it is no surprise that the most recent scholarship is far from reaching a consensus on the central meaning or function of truth in Aristotle's

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[1] See e.g. Arist. *Metaph.* 1024b17–26, 1139b15–16.

philosophy. To complicate matters even further, in one of the most enigmatic passages in his Ethics, Aristotle speaks of 'practical truth', a term that has justifiably generated much controversy especially after a revival of interest in his moral philosophy in recent decades. In the following study we will try to capitalize on various approaches to the notion of 'practical truth', in order to delineate a comprehensive idea of truth that connects both with practical and theoretical reason.

1. Truth varieties

For a philosopher with such sensitive 'antennas' for homonymy and ambiguity, Aristotle seems rather uninterested in clarifying a central or 'focal' meaning for truth. In his influential study on the subject, Paolo Crivelli (2004: 45) admits that Aristotle never explicitly addressed the problem of the multiple 'bearers' of truth and falsehood in his philosophy, to which we may add that there is not much talk about different 'kinds' of truth either – although one could say that there are some distinct manifestations thereof.

Some examples might be instructive here. In *Nicomachean Ethics* VI Aristotle says:

> [T1] ἔστω δὴ οἷς ἀληθεύει ἡ ψυχὴ τῷ καταφάναι ἢ ἀποφάναι, πέντε τὸν ἀριθμόν· ταῦτα δ' ἐστὶ τέχνη ἐπιστήμη φρόνησις σοφία νοῦς.
>
> Let the states, by which the soul has truth in positive or negative predications, be five in number: *techne, episteme, phronesis, sophia* and *nous*. (Arist. *EN* 1139b15–17)

Here the predicate 'has truth' (ἀληθεύει) is coupled with positive and negative predications, but the most important feature of the passage is that, whereas the first clause still adheres to a linguistically oriented definition of truth (καταφάναι and ἀποφάναι), the second clause includes states (ἕξεις), i.e. intellectual virtues that have little to do with linguistic properties as such. One of them, *nous* (understanding), is elsewhere emphatically described as an immediate perception of singular forms of which there is no combined *logos* (*EN* 1142a27). Moreover, in *De Anima* (*de An.* 427b11–12) the αἴσθησις τῶν ἰδίων, i.e. sensory perception of data exclusive to each of the senses, which does not rely on *logos*, is described as 'always or mostly true', since in this case perception perceives exactly that for which it is designed. These faculties appear to be infallible and true, *because* they do not need or allow for the connection or composition of terms that necessarily occurs in propositions. And at the same time, it seems to be this very property of composition that allows propositional speech to partake in truth and falsehood, as opposed to a single meaning expressed by a single word. Furthermore, not all combinations of meaningful words entail truth or falsehood. Aristotle puts it this way:

[**T2**] ἔστι δὲ λόγος ἅπας μὲν σημαντικός, οὐχ ὡς ὄργανον δέ, ἀλλ' ὥσπερ εἴρηται κατὰ συνθήκην· ἀποφαντικὸς δὲ οὐ πᾶς, ἀλλ' ἐν ᾧ τὸ ἀληθεύειν ἢ ψεύδεσθαι ὑπάρχει· οὐκ ἐν ἅπασι δὲ ὑπάρχει, οἷον ἡ εὐχὴ λόγος μέν, ἀλλ' οὔτ' ἀληθὴς οὔτε ψευδής.

Every *logos* has meaning, not as a tool, but, as we have said, by convention. Yet not every *logos* is a proposition; only those in which there is truth or falsity. There is not truth and falsity in all: a prayer is a *logos* but is neither true nor false. (*Int.* 16b33–17a4)

Notably, in this example the concept of truth is not presented as the product or result of propositional structure. What happens is the exact opposite. Truth is the *definiens* of assertoric *logos*. In *Metaphysics*, however, it seems to be the other way around: Aristotle defines truth as saying what is and falsehood as saying what is not (*Metaph.* 1011b25–28). As it is always the case when truth is concerned, the context is important. While Aristotle's intention in *Int.* is to *define* assertoric *logos* setting it apart from other kinds of *logos*, in *Metaphysics* IV his aim is to defend the principle of non-contradiction, which can only be done within the confines of logic and predicative speech. With regard to the exact relationship and definitional priority between assertoric *logos* and truth, the evidence in both texts seems inconclusive. This is not to say that assertions or combinations of meanings in thought do not enjoy a prominent place when truth comes into play. To name one example, Aristotle associates truth with *dianoia* in *Metaphysics* IV.4 (*Metaph.* 1027b27), where dianoia is clearly meant as discursive thought that combines or divides things, which is a prerequisite for the capacity to form beliefs and express them in *logos*. Correct combinations of things and their predicates is a recurring theme in other texts as well.[2] With these examples in mind, most of the apparent inconsistencies in the terms *aletheia* or *aletheuein* throughout the corpus could be resolved by clarifying the relationship between truth-bearing objects (to which Aristotle ascribes priority) on the one side and true or false propositions and beliefs in *dianoia* or *logos* on the other. Such efforts have already been made by scholars in the last two decades, with some significant results.[3] There still remains an outlier, though: Aristotle's notion of *practical truth* resists both the aforementioned pattern of object-related explanation and the most common understanding of truth throughout the history of philosophy.

Let us now cite the passage most central to our inquiry, a passage that at the same time marks the one and only occurrence of the term 'practical truth' in Aristotle's work:

[**T3**] ἔστι δ' ὅπερ ἐν διανοίᾳ κατάφασις καὶ ἀπόφασις, τοῦτ' ἐν ὀρέξει δίωξις καὶ φυγή· ὥστ' ἐπειδὴ ἡ ἠθικὴ ἀρετὴ ἕξις προαιρετική, ἡ δὲ προαίρεσις ὄρεξις βουλευτική, δεῖ διὰ ταῦτα μὲν τόν τε λόγον ἀληθῆ εἶναι καὶ τὴν ὄρεξιν ὀρθήν, εἴπερ ἡ προαίρεσις σπουδαία, καὶ τὰ αὐτὰ τὸν

[2] See especially *Met.* V.7 and *Met.* IX.10.

[3] Of central importance here Crivelli (2004); his approach is followed by Reeve (2012) and is obviously the background for Rangos (2009).

μὲν φάναι τὴν δὲ διώκειν. αὕτη μὲν οὖν ἡ διάνοια καὶ ἡ ἀλήθεια πρακτική· τῆς δὲ θεωρητικῆς διανοίας καὶ μὴ πρακτικῆς μηδὲ ποιητικῆς τὸ εὖ καὶ κακῶς τἀληθές ἐστι καὶ ψεῦδος (τοῦτο γάρ ἐστι παντὸς διανοητικοῦ ἔργον)· τοῦ δὲ πρακτικοῦ καὶ διανοητικοῦ ἀλήθεια ὁμολόγως ἔχουσα τῇ ὀρέξει τῇ ὀρθῇ.

What assertion and denial are in the case of thought – that, in the case of desire, is precisely what pursuit and avoidance are. So, since virtue of character is a deliberately choosing state and deliberate choice is deliberative desire, it follows, because of this, that both the *logos* must be true and the desire must be correct, if indeed the deliberate choice is to be an excellent one, and the very things the one says, the other must pursue. So this is the practical intellect and truth. The good or bad in theoretical intellect – when neither practical nor productive – is the true and the false [respectively], since this is the case in all intellectual work. As for the practical and intellectual good, though, [it is the] truth corresponding to the correct desire. (*EN* 1139a21–31)

The information provided by Aristotle in this passage is not enough to build a seamless connection between practical truth and the common versions of the concept summarized above. More importantly, the central role of desire and the way Aristotle unhesitatingly combines it with truth demand certain interpretative steps to reconcile it with other passages about truth *simpliciter*, and especially with the most prominent, assertoric type.

Given the complicated nature of the issue, it is no surprise that practical truth is singled out – and ultimately left out – by Crivelli (2004: 40) as an isolated case within the spectrum of Aristotle's truth-related arguments. His deliberate omission has been recently challenged by Olfert (2014 and 2017), on the grounds of an elaborate theory about practical truth's importance and its conformity to the standard theory of truth in Aristotle (more on this later, section 2). Be that as it may – and regardless of our effort for a unified theory – there are several reasons why we should focus on practical truth: as an essential part of practical reason, practical truth (and falsehood) is connected to decision making, which in turn is of paramount importance for moral and political matters. Moreover, it seems to have a privileged, if not exclusive relationship with particular cases, where things "can be otherwise" and demand deliberation. And it is also the only kind of truth directed to particulars with respect to the predicate *agathon* (good), which, along with *dikaion* (just) and *sympheron* (contributive to goals), marks a property exclusively accessible to humans through their capacity of reason (*Pol.* 1253a9–10), setting their practical lives apart from other animals. For all these reasons, it is important to address both practical truth as such and in its connection with truth in general.

2. Focusing on practical truth

To give a sense of the controversy around this notion: the views of scholars range between the thesis that "there is no such thing as practical truth" (Kenny 2011: 2) to a most recent praise of Aristotle's innovative notion of practical truth as the cornerstone

upon which the distinctness of practical reason relies (Olfert 2017). Other scholars who have stressed the significance of practical truth include Broadie, who already in her commentary (Broadie 2002: 362) notes that without a plausible notion of practical truth Aristotle "should either abandon the principle that truth is the proper work of rational thought or the doctrine that practical wisdom is an excellence of reason". For Richardson Lear (2004), this notion is central to her project of reconciling the (first-rate) happiness assigned to the theoretical way of life in *EN* X with the (second-rate) happiness assigned to the practical way of life in accord with the virtues of character and practical wisdom in the rest of the *EN*. In her conception, the bridge that unites both is that practical activity is 'for the sake of *theoria*', as an approximation of the latter. In other words, practical activity resembles theoretical activity by being a mode of grasping truth.

What lies at the heart of the controversy is a question both about the distinctiveness of practical reason itself and about the unity of practical and theoretical reason in Aristotle's thought. From this point of view, it would be worthwhile to focus on Olfert's (2014/2017) account, not only because her recent book *Aristotle on Practical Truth* is the most extensive account on the topic but also because it takes [T3] as a basis to argue for specific conditions (Olfert 2017: 86–92) that, according to her, every account of practical truth should satisfy.[4] Out of these conditions – or *desiderata* in her own terminology – the most relevant to our inquiry is the one that directly addresses the integration of practical truth into the standard interpretation of the term, that is, propositional truth.[5] Olfert's effort, if successful, would be a first step towards a unified concept of truth, as it would show that there is indeed a way to integrate even the most distant versions of truth into a single, 'standard' model – assuming that the standard for Aristotle is indeed "assertoric thoughts and statements standing in a truth-evaluable correspondence relation to the world" (Olfert 2017: 119).

Olfert's interpretation of Aristotle's theory of truth could be summarized as a rigorous focus on the specific features of a particular situation that come into question in practical syllogism. Her reconstruction of practical truth relies mainly on two distinct points:

> First, practical truth is the truth about what is good for someone without qualification, that is, what is good and an end for her in the highest and strictest sense. Second, practical truth

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[4] In a nutshell the *desiderata* are the following: (1) Priority: we should not derive the distinctness of practical truth from the distinctness of practical reason, but the other way around. (2) Function-specifying: the notion of practical truth must contribute to establishing practical reason as a distinct form of reason (namely, how its concern with practical truth is different from other kinds of reasoning). (3) Truth: the notion of 'truth' in 'practical truth' must be understood as 'truth' of the same general kind presented in Aristotle's theoretical works. (4) Practicality: we should explain how this truth is practical. (5) Unity: we should integrate the rationality and the practicality of practical reason into a single function responsible for 'action and truth'.

[5] Olfert calls it 'the Truth Desideratum' (Olfert 2017: 88).

> is the truth about what is unqualifiedly good relative to a particular person in a particular situation (Olfert 2017: 105).

The first seems to refer to ἁπλῶς ἀγαθόν (happiness) as a concrete plan a person chooses for her life. The second seems to denote the particular instantiation of this plan in particular circumstances. A strength of this twofold account is that it allows for general truths about human happiness to be context-sensitive and in a sense personalized (Olfert 2017: 114–116), emphasising the element of specification or application as integral in the function of practical thought.[6] It seems that, in Olfert's terms, this specification is precisely what does the heavy lifting of practical truth's practicality. Practical truths are normatively connected with our specific desires and with particulars that can change from situation to situation, whereas, by contrast, theoretical truths are normatively disconnected from our specific desires. Universal (καθόλου) claims about human happiness cannot be applied directly to specific desires nor be action guiding, except (as Olfert rightly notes), via some specification of human happiness. It seems, then, that practical truth ultimately consists in a *true specification*. In other words, a "mediation by a translation of some kind – a translation from theory to concrete particulars, provided by practical reason" (Olfert 2017: 117).

This interpretation is largely supported by Aristotle's account of practical syllogism, but the problem is that in Olfert's view, if practical truth deserves its name, it should be understood in terms of the standard version of the concept of truth, which means that it has to fall under some version of correspondence between an assertion and reality. Thus, practical truth finds its expression in an actual proposition or thought of the type "the particular X is good", which must be both true for a particular agent and practical in that it directly motivates her rational desire. Now, given the process of specification of this particular good and Aristotle's typical portrayal of such process, an assertion of this type should find its way in the actual practical syllogism itself. For it would be rather peculiar if Aristotle, while talking about practical reason, relied on the truth of an assertion that does not ever appear in a practical syllogism at all. Assuming now that practical truth is a predicative truth appearing in or as a result of a practical syllogism, let us go through what this might entail. Consider the following formalization of a practical syllogism, which summarizes most of Aristotle's own examples:

[example A][7]
(i) Happiness is X for a person of the type T
....

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[6] This is an important insight and (to be fair) it is reminiscent of Gadamer's emphasis on the element of specification or application as inseparable from practical thought properly conceived. See, e.g., Gadamer (2004: 316) for the significance of application/particularization in practical thought.

[7] Modelled after Arist. *MA* 701a7 ff.

(1) G (universal) is good (where G follows from the definition of happiness as X)
(2) This particular and possible (for me) thing to do[8] is G (a member of the G-class)
(3) → doing M

In this example it is worth noting that the premise (i) is implicit in every practical syllogism made by a prudent agent.[9] The qualification 'for a person of the type T' is necessary, since Aristotle does not believe that every person capable of action can achieve the highest order of *eudaimonia* in every political environment. Nonetheless every person must be able to define the good for their whole lives when they reach maturity.[10] Between (i) and (1) in the example above, many intermediate steps may be taken before the appearance of the universal G. It is crucial, though, that the very last step before the conclusion be the recognition of some possibility of concretely realizing G in the specific situation the agent finds herself in. Furthermore, in order for our abstract model of the syllogism to account for most of Aristotle's examples, we should think of G in the broadest terms, as potentially representing not only a class of good things, but also a class of good situations: G could thus stand for "man has a house", which in the second premise would appear within a realization of the fact that I am also a man and I can also recognize what it means for me to have a particular house. Provided this reconstruction is correct, the successful course of the practical syllogism depends on the middle term G that is both known, as a universal, to be contributory to happiness and recognized, as a particular, in the particular circumstances of the agent making that syllogism. Aristotle is clear that not every step of this reasoning needs to be consciously uttered in the mind of an agent. Even implicit, though, it still exists as a *logos* that contributes to the action.[11] What Aristotle is also unambiguous about is the immediacy in the practical enactment of the conclusion implied by the practical syllogism:

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[8] In *De Motu Animalium* Aristotle refers to the components of a practical syllogism as ἀγαθόν and δυνατόν (*MA* 701a23–24). It seems that he distributes those two qualities to the major and minor premises respectively: αἱ δὲ προτάσεις αἱ ποιητικαὶ διὰ δύο εἰδῶν γίνονται, διά τε τοῦ ἀγαθοῦ καὶ διὰ τοῦ δυνατοῦ. It could also be that both refer to the second premise. The only option that seems rather far-fetched is that the δυνατόν just refers to the first and major premise, since what makes the terms of the major premise (the καθόλου part) actually possible is the minor premise. And that could also be what Aristotle means to say here.

[9] This particular premise represents the 'grand end', or the ultimate goal of one's life. For a differentiated view of this notion see Reeve (2012: 186–187). In the case of a prudent agent we can speak of a virtuous life or a life in accordance with *theoria*, although it should be noted that Aristotle doesn't think that every person is capable of the latter. For the presence of a universal, highest good as part of practical syllogism, see also Nielsen (2015: 32–33).

[10] See Arist. *EE* 1214b5–9 and *NE* 1140a26–28: πρὸς τὸ εὖ ζῆν ὅλως. Aristotle emphasizes at the beginning of *NE* the importance of experience and maturity. In *Pol.* 1335b32–35 and *Rh.* 1390b9–11 it is indicated that the age of intellectual maturity is around 50; see also Reeve (2012: 252).

[11] Arist. *MA* 701a25–30. See Reeve (2012: 176).

[**T4**] ἡ μὲν γὰρ καθόλου δόξα, ἡ δ' ἑτέρα περὶ τῶν καθ' ἕκαστά ἐστιν, ὧν αἴσθησις ἤδη κυρία· ὅταν δὲ μία γένηται ἐξ αὐτῶν, ἀνάγκη τὸ συμπερανθὲν ἔνθα μὲν φάναι τὴν ψυχήν, ἐν δὲ ταῖς ποιητικαῖς πράττειν εὐθύς·

For one is a universal belief, whereas the other is concerned with particulars, which perception already controls. But when a single belief comes about from these, the soul, in one sort of case, necessarily says what has been concluded, whereas in productive cases it acts straightaway. (*EN* 1147a25–28)

The ἔνθα of the first infinitive clause probably refers to theoretical syllogisms – but in any case, it is there to draw a contrast with the last clause where πράττειν εὐθύς is introduced as the result of a practical syllogism (see also *MA* 701a10–14). Hence the conclusion (3) from example [A] is not an assertion but an actual activity.[12] Olfert's view that the standard concept of truth consists in a proposition or thought that is isomorphic to reality, combined with the thesis that this must also be the case for *practical* truth, implies that the latter is realised in an assertion of the type "this X (or doing X) is good" – since 'good' for Aristotle is a predicate that could very well be used in an assertion. But this presents us with a problem: Aristotle specifically states in the passage introducing the practical truth that the two components in practical intellect and truth, i.e. *logos* and *desire*, point to the same thing but in different capacities:

[**T5**] τὰ αὐτὰ τὸν μὲν [λόγον] φάναι τὴν δὲ [ὄρεξιν] διώκειν

the very things the one [*logos*] says the other [desire] pursues. (*EN* 1139a25–26)

Assuming Aristotle uses the standard assertoric concept of truth, we should now be able to refer to the syllogism, in order to find what the *logos*-related component of practical truth is. If practical truth is of the assertoric type, we should be able to locate it in the *logos* of the practical syllogism.

The first and major premise ("G is good") is obviously excluded from being the *practical* truth, because it is not really about a particular, hence not really practical in the strict meaning needed for Olfert's argument (and Aristotle's, for that matter). However, the second premise also does not state that something is good – hence it cannot be what we need either. The assertion we need, to verify Olfert's desideratum, i.e. "this *particular* G is good," would therefore necessarily be the *conclusion* of the syllogism, but as we see, the latter does not appear as a *logos* to be uttered, but as an action to be done and in a fairly different form. Obviously, this does not sit well with Aristotle's explicit definition: "the

[12] See Reeve (2013: 8): "The conclusion of the argument (…) is not a further proposition but an action"; see also Reeve (2012: 169–170).

very things the one says, the other pursues. So this is the practical intellect and truth" (*EN* 1139a25–27, included in [T3]).

One could argue that we take this φάναι too literally. After all, Aristotle never says that every part of the syllogism should be explicitly present in it – in fact, he alludes to the opposite. But in the case of the *conclusion* of the practical syllogism, which is now at issue, things are different. The conclusion of a practical syllogism is not a self-evident, trivial fact or a piece of always active knowledge in the agent's mind, like the statement "I am a man", which may be omitted from the explicit steps of a syllogism. Moreover, the verb φάναι, as used in our passage, is employed in its eminently literal sense when Aristotle emphasizes the difference between practical and theoretical syllogism both in [T3] and in [T4].[13] Hence the absence of an explicit conclusion in a practical syllogism and its replacement by the action is not just optional, but a matter of principle. If by *logos* in [T5] Aristotle meant the conclusion of practical syllogism, why would he use φάναι for something that is not supposed to be said, but only enacted?

In conclusion, if the assertion "this particular G is good" – the only fitting to Olfert's desideratum – is supposed to retain the standard/assertoric sense of truth in the practical realm *and* at the same time explicitly assign the predicate 'good' in practical syllogisms, then it is definitely a curious candidate for the task, for Aristotle converts it directly to an action without the need of an actual φάναι. Even assuming that the φάναι here refers only to an implied assertion which, paradoxically is never to be said but done, another argument against insisting on this particular predication ("this particular G is good") is that, in our text, Aristotle states that the *logos* says or names the exact same things, which desire pursues (καὶ τὰ αὐτὰ τὸν μὲν φάναι τὴν δὲ διώκειν). If the pertinent *logos* were a conclusion of the type "this particular X is good", it is hard to imagine how this sentence has the same intentional content as the desire: if my correct desire is towards me having a house, what the desire pursues is me having a house. Conversely, if the conclusion tilts towards the avoidance of X, it should tell me to "avoid this" (*EN* 1147a34: λέγει φεύγειν τοῦτο). Both are not assertions of the type "This particular G is good/bad".[14]

This is not to say, of course, that Aristotle has no room for assertions such as "this particular M is good for me" like the ones Olfert's argument seems to rely on. We simply claim that the attempt to equate a proposition within the practical syllogism with what

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[13] Synonyms and circumlocutory equivalents are used in other similar cases when referring to practical reasoning (e.g. *MA* 701a10–14, 31–32 and 1147a34, where the same argument is made using the verb λέγειν). In the syllogism of the ἀκρατής in 1147a34 ff. the conclusion of a correct syllogism says that something should be avoided but the ἀκρατής does the opposite, which draws a contrast between what is said and what is done. This cannot be the case in practical truth, where the syllogism is completed by the action.

[14] One could perhaps think that the conclusion of a practical syllogism is not a standard predicative sentence but an imperative in the form of "do this". However, taking Aristotle's description in *Int.* 4 into account, it is hard to imagine how an imperative clause would take a truth value. If εὐχή, a form of plead, is excluded from being true or false, the same should be the case for an order/encouragement. And even if such clauses were considered as translatable into assertions of the type "X is good", this wouldn't change the fact that the most intuitive reading of the τὰ αὐτά in [T6] is as a reference to the actual *things* desired and evaluated as good, not to *evaluations* in the case of *logos* and to things in the case of desire.

desire pursues is destined to fail. There are, however, alternatives to consider: the word λόγος might be representative of the content of the whole syllogism – a meaning the word λόγος frequently has. This would result in a much more natural reading of this extremely dense passage, but it does not sit well with the assumption that practical truth is of the standard semantic/assertoric type.[15] For, if true *logos* in [T5] refers to the truth of the practical syllogism as a whole, then the practical truth cannot be of the standard version of assertoric truth, not only because of the broader scope of a syllogism compared to an assertion but also because the practical syllogism is not a standard type of syllogism.[16] In any case, Olfert would be wrong in her third desideratum, which carries a lot of her whole argument.

Perhaps more importantly, we should reserve judgement as to what the φάναι of *logos* in [T5] refers to and what really makes up the truth of practical syllogism, until we know more about its relation to desire. For all we know, this φάναι could be used for singular terms or for combinations of terms that do not necessarily reach the level of an assertion: those terms could name perceptible things and situations, perceived either by νοῦς or αἴσθησις – things necessarily *included* and *named* in our practical reasoning, whose main difference from theoretical reasoning is its orientation towards the last particular (*EN* 1143b3: τοῦ ἐσχάτου καὶ ἐνδεχομένου καὶ τῆς ἑτέρας προτάσεως). Terms signifying such particulars may be crucial in the truth of a *logos qua* syllogism or in a part thereof, so much so, that they can very well summarize its content, without having to be true in the same sense as the *logos* (syllogism) itself is. Hence the *logos* in our passage could stand for a whole syllogism, *within which* a particular thing/situation is truthfully recognized (and 'said' in the soul of an agent) as something belonging to the class G, which is designated in the major premise as good, and therefore, once found in a particular situation, desired. Moreover, in light of Aristotle's assurance that in practical truth the same is said and desired, desire might prove essential in illuminating the *logos*-component as well. After all, since the agent is personally involved in interpreting the present situation, and since the situation falls already into the spectrum of practicable things for her, desire

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[15] Interestingly, this conclusion fits other aspects of Olfert's theory of truth as explained in her book (2017): "Truth is, roughly, a way of getting things right in which the contents of our thoughts and statements reflect or correspond to the way the world is. For Aristotle, as for Plato before him, this way of getting things right is something we aim for whenever we engage in *reasoning* (...) However, Aristotle and Plato also hold that when we reason about what to do and how to live – that is, when we engage in 'practical' reasoning – we are also attempting to "get things right" in the sense of acting correctly and living a good life." Notice how a shift in the meaning of "getting things right" takes place. The first "getting things right" can be more or less strictly applied to assertions and predications. The second one is different, since living a good life is obviously not an assertoric act. If truth in Plato and Aristotle means "getting things right" in a broad sense – an opinion towards which we are very sympathetic – it is fair to say that this is not the standard used by Olfert in her 3rd desideratum.

[16] We would also have to define truth *from* the type of syllogism involved in practical reasoning which Olfert also rejects. However, as already demonstrated by Broadie (2019: 262), the reasoning behind Olfert's desideratum 1 – where truth has to be what we derive practical reason's distinctness from and not the other way around – is flawed.

is from the outset implicated in interpreting the situation in question.[17] Practical truth necessarily involves both the φάναι of the correctly desirable thing *and* the truth of all the components of practical *logos* in the broad sense. How and why this is possible and plausible – this we will show in the next chapter.

Let us now concisely summarize the analysis up to this point. In our view, if an interpretation – as the one, we think, Olfert offers – presupposes all of the following:

1) practical truth is a truth of the assertoric/semantic type, assigning the predicate 'good' to a particular thing or state of affairs;

2) the truth of practical *logos* is connected to desire in the following sense: what is said in that *logos*, the same (τὰ αὐτὰ) must be what is desired;

3) the aforementioned *logos* belongs in the practical syllogism;

then it contradicts at least one of the features of practical syllogism and practical truth described by Aristotle. It seems to us that (2) and (3) are well founded in Aristotle's passages on practical truth and practical syllogism. Hence what needs to be altered is (1), so that the concept of truth proposed by an interpretation of passage [T3] must be modified accordingly. Inevitably, the first step towards a broader understanding of practical truth with regard to its logical component cannot be other than applying it to the whole syllogism. At a later stage, we might have to adopt what Broadie calls a 'richer' sense of truth, like the one Aristotle alludes to when speaking of 'philosophizing about the truth'.[18]

Even in this case, though, there are still problems to be addressed: first, we now assume two senses of truth which are – or should be – connected, and their connection

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[17] As Rapp (2019: 204–206) notes, this is a first-person perspective or from the point of view of the desiderative attitude towards our being wherein our investigation of "is it good to do X for the sake of X?" is entangled from the outset with pleasures and pains. In other words, the good wears from the outset a certain (pleasant or painful, attractive or repellent) guise. An ὄρεξις that is already "trained" or educated to be attracted by good things, is motivated as soon as the ἔσχατον and πρακτόν in the minor premise is recognized.

[18] The term 'rich-sense of truth' is taken from Sarah Broadie's latest article about practical truth. Regarding the nature of practical truth, Broadie (2019) rejects the priority of an assertoric sense. According to her interpretation, *aletheia* in Aristotle "connotes the full measure of cognitive success", and practical *aletheia* is the "culminating intellectual achievement of *practical* inquiry", adding that "truth, on this proposal, is not claimed to be assertoric truth" (Broadie 2019: 263). Given our analysis above – and also the various instances in the corpus, where truth is obviously not meant as assertoric – we cannot but accept a broader understanding of the term 'truth' in the phrase 'practical truth'. However, Broadie's rich-sense of truth, defined as a cognitive achievement (Broadie 2019: 259), is so broad that it is difficult to explain why Aristotle speaks specifically about practical truth. Broadie admits that there's little added value in speaking of truth in such a broad sense regarding good deliberation and good *prohairesis* (Broadie 2019: 267), so the reason she gives is Aristotle's effort to fend off scepticism about the intellectual dignity of practical reason (Broadie 2019: 268–269). This is a plausible account, but it raises the question: if so much is at stake, why does Aristotle refer to practical truth only once? We believe that an alternative explanation for practical truth's presence in [T3] is the realisation on behalf of Aristotle that practical truth is the result of a specific type of syllogism that needs to be dealt differently than theoretical syllogism. It will be shown that practical truth marks the specific target of deliberation in a way that cannot be identified otherwise, especially since the result of practical syllogism is not an assertion but an action.

must be made clear and specific. Secondly, the relationship between practical truth and desire is yet to be explained.

3. Practical *logos* and *akrasia*

Regarding the first of our problems, Broadie's solution is that, within the whole of practical truth, there still remains an assertorically true *logos*. But since an assertorically true *logos* cannot account on its own for truth being specifically practical, it needs to have "correct desire at its side" (Broadie 2019: 264). Thus, "given an assertoric truth as to what it is good to do, the concordant correct desire is the source of its practical implementation and thereby of its elevation from being a mere assertoric truth to being an instance of *aletheia*". Broadie uses the word *aletheia* as representing a richer sense of truth, of which *practical* truth is an action-related version. The richer sense of *aletheia* circumvents the pitfalls created by equating practical truth with a kind of assertoric truth, one of which is the phenomenon of *akrasia*, where a true *logos* is present but a correct desire is not: "the acratic's *logos* is assertorically true", but the necessary desire to do what it says is missing. At the same time, the necessity of a combined presence of truth and desire indicates a solution to our second problem: *logos* and desire do not necessarily co-exist, but when they do, practical truth emerges. As to how and why they coexist, Broadie leaves it to the reader to fill the blanks – and the so-called Guise of the Good is perhaps the best candidate for that job. Olfert explicitly invokes this principle, according to which, for Aristotle, whatever seems good is also motivating desire. It is fair to assume that on this issue Broadie's approach is no different from Olfert's.

We now have a peculiar situation where two opposite positions result from the exact same premises: Olfert seems to believe that in a prudent agent's soul the coinciding, due to the Guise of the Good, of a desire and an assertion about good is exactly what justifies her view that practical truth is assertoric (standard) and practical at the same time,[19] and it is this very coincidence that gives an otherwise standard, assertoric kind of truth its

[19] See Olfert (2014: 229). Olfert's interpretation of 'the Guise of the Good' is not as self-evident as it may at first seem. For many scholars the Guise of the Good is something akin to a perceptual characteristic in things in case they appear good (see Richardson Lear 2004: 137). For a thing to be perceived as good means that desire is attracted to it. This can be interpreted in different ways, which are succinctly described by Charles (2015) as 'intellectualist and desired-based', along with his own interpretation, which he coins 'the third way interpretation'. From his point of view, *phronesis* unites truth and practicality into a single state that is neither belief nor desire, not even their combination, insofar as this unified phenomenon cannot be decomposed into successful thinking, on the one hand, and correct desiring, on the other. In any case, the Guise of the Good in Olfert's view seems to be attached to an assertion that something is good, in order for the latter to be prescriptive (Olfert 2014: 230). One could ask, however, if for X to appear good an assertion or a practical conclusion of the type "X is good" is necessary. And if the Guise of the Good is enough to explain the practicality of assertoric practical truth as Olfert assumes, Broadie's objection with regard to the acratic is entirely valid; we would need to explain why someone who reaches an assertion "X is good" doesn't act accordingly. In our interpretation, which will become clear in the next section, such an explanation is not needed, since the aforementioned assertion does not represent the actual process resulting in practical truth.

special, *practical* character. Broadie, however, believes that if practical truth were assertoric in the standard sense, then there should be no case of non-coinciding of desire and assertion about good. The acratic's failure to desire and act on what she knows is good would prove that an assertion about what is good is not enough and desire is also needed in a way that is not directly implied in the assertion itself (Broadie 2019: 258–259).

Our view is obviously more sympathetic to Broadie's, although not for reasons related to *akrasia*. For one thing, even in Broadie there still remains a question as to which assertion in a practical syllogism is supposed to agree or disagree with desire – which brings us back to the problem of the previous section. Second, in discussing the case of *akrasia*, Aristotle doesn't seem to support the idea that the acratic's *logos* is assertorically true in any *practically* meaningful way. More specifically, in dealing with Socrates' thesis on *akrasia*, which is, roughly speaking, that knowledge of the good automatically entails a desire for it, Aristotle seeks to qualify it rather than *tout court* reject it: it is because of the volatility of the minor premise, he proposes, not of the universal one, that "the result Socrates was looking for would seem to come about" (*EN* 1147b14–15). Indeed, in his practical syllogism the acratic does something quite peculiar:

> [**T6**] ὅταν οὖν ἡ μὲν καθόλου ἐνῇ κωλύουσα γεύεσθαι, ἡ δέ, ὅτι πᾶν γλυκὺ ἡδύ, τουτὶ δὲ γλυκύ (αὕτη δὲ ἐνεργεῖ), τύχῃ δ' ἐπιθυμία ἐνοῦσα, ἡ μὲν οὖν λέγει φεύγειν τοῦτο, ἡ δ' ἐπιθυμία ἄγει· κινεῖν γὰρ ἕκαστον δύναται τῶν μορίων· ὥστε συμβαίνει ὑπὸ λόγου πως καὶ δόξης ἀκρατεύεσθαι.
>
> When one universal premise is in the agent preventing tasting, as well as another (that everything sweet is pleasant) and this is sweet (and this one is active) and there happens to be an appetite in him [the acratic], the one premise says, "Avoid this!" but the appetite leads him on (since it can move each of the parts), the result is that, in a way, from reason and from belief he acts without self-control. (*EN* 1147a31–b1)

According to this example, two conflicting major premises co-exist in the acratic's mind. Driven by appetite, the acratic chooses the one saying "everything sweet is pleasant" and forgets the first one – or avoids deliberating altogether.[20] Formally speaking,

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[20] This is a matter of interpretation. Since Aristotle says that appetite moves the body and that the major premise of a true practical syllogism is swapped for a premise that *happens* to conform to appetite, the end result is hardly a practical syllogism. Elsewhere, Aristotle asserts that pleasure and pain already co-exist with perception (see *de An.* 413b21–24) in animals, so that we shouldn't need a syllogism to tell us that something sweet is pleasurable. But the acratic seems to be already engaged in a syllogism, because he also has knowledge of the correct universal (sweets are harmful). Therefore, in order to ignore the correct major premise, he shifts focus to a universal (pleasurable) that may be a correct predicate for the thing at hand, but it is irrelevant to the practical syllogism, insofar as a practical syllogism should strive for good. Aristotle adds that this (irrelevant) universal is just accidentally connected to *akrasia* (συμβαίνει (...) οὐκ ἐναντίας δὲ καθ' αὑτήν, ἀλλὰ κατὰ συμβεβηκός), since the knowledge that sweets give pleasure is not acratic *per se* (the wise have it too). Nevertheless, the exact process of the akratic's thinking is difficult to recreate on the basis of that text. To add more confusion, Aristotle seems to shift his focus from the major to the minor premise rather abruptly – though it may be the case that in Aristotle's

the assertions in his *actual* syllogistic process – provided he still engages in reasoning – are true (everything sweet is indeed pleasant) *and* the desire that motivates his action is compliant to a syllogism containing the premise "everything sweet is pleasant". The only explanation for the acratic's behaviour is therefore *not* that he has assertoric truth in his disposal, but that he chooses the wrong assertion as a starting point for his action. Generally speaking, the acratic has access to the true assertion but not when it matters, i.e. during the action or the deliberation leading to that action. That is why Aristotle speaks of an ἄγνοια ('ignorance') in the case of the acratic: during the process of decision-making, the acratic's knowledge becomes 'ignorance' (in the sense that it becomes inactive and gets temporarily annulled). Furthermore, this temporary ignorance of the first and major premise of the true practical syllogism seems to be connected with or caused by the actual volatility of the minor and last premise that pertains to the particular thing: whatever I know about sweets is absent or forgotten (*EN* 1147b10–12) when I see *this* sweet in front of me. Appetite makes it so that either I can't even correctly categorize what I see (I can only think of pleasure), or I forget whichever quality of the sweets is against the one I care about: pleasure. *In either case, assertoric truth about good is either absent or replaced by one* (e.g. all sweets are pleasant) *whose truth is incapable of leading to correct desire*.

Now, if this analysis is correct, the connection between true *logos* and correct desire cannot be explained in terms of simple co-existence of a correct assertion and a desire (in the case of practical truth), or their divergence (in its absence). For better or worse, Aristotle's conception of possessing true knowledge of something is not monolithic. A crucial part of it is the way it is achieved and the way it is put to work in the relevant context – in which case the formal assertoric standard for truth might prove to be secondary. An interpretation of true *logos* and its relation to practical truth should be able to account for this fact, which can be very hard to do if we strictly adhere to the assertoric model of truth. However, a true *logos* doesn't have to be a statement asserting that "X is good", and an assertion of this kind doesn't have to be why Aristotle speaks of practical *truth*. According to Aristotle's exact wording in [T3], what we need is a true *logos* that at some point makes obvious – by saying/naming it – that which the desire pursues. Neither does this *logos* have to be just one particular assertion nor does it need to name the desirable thing in the form of a conclusion stating "X is good". But in order to account for every aspect of practical truth named so far, a rethinking of the entire process of practical syllogism and its connection to truth is necessary.

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mind the acratic uses the minor premise ("this is sweet") as an anchor, in order to produce an antagonistic major premise (all sweets are pleasurable). When that happens, though, the acratic does not necessarily return to the process of practical reasoning with a new premise. He could just forgo the process altogether, otherwise Aristotle would have no reason to say that the acratic either doesn't have the minor premise or ignores it, as though he were asleep. The minor premise is vulnerable to feelings and it is easily moved around because of them, meaning that every general, prudent piece of universal knowledge we have about the thing it presents becomes inactive, because pleasure (or pain) replaces all other predicates we might assign to it.

4. *Logos*, desire and practical truth

In order for our proposal to work, we first need to make sure that *logos* in general can indeed be interpreted as syllogism, and that a syllogism, just like a proposition, accepts the predicates 'true' or 'false' in Aristotle. The answer is affirmative in both cases.[21] The word *logos* is notorious for having multiple meanings not only in philosophy but in colloquial Greek as well. When trying to pinpoint its specific meaning, context must always be taken into account, as well as the idiolect of a writer. In the case of Aristotle, on the one hand, it cannot be denied that in most cases he uses the phrase λόγος ἀληθής to designate true predicative assertions and not syllogisms. But on the other hand, when he does this, it's usually clear *which* assertion or what type of assertion he refers to. In the context of *EN* VI, the word λόγος appears mainly in the complex ὀρθός λόγος, which in turn seems to represent more often a reasoning about the median than just an assertion. Furthermore, in the context of *prohairesis*, within which the discussion of practical truth takes place, λόγος designates a βούλευσις, i.e. a reasoning about what to choose, and not a single predication.

The truth of a syllogism depends on the truth of its premises and the correctness of the syllogistic process, not on the truth-value of its conclusion alone (see *Top*. 162b3–22, 176b29–33). Another prerequisite, however, is for the argumentation to be appropriate for the subject matter (κατὰ τὴν οἰκείαν μέθοδον): If the syllogism is done within a therapeutic process, it has to be medicinal, and not just seem like one. The same goes for geometry or dialectics, Aristotle notes.

It might sound curious to our modern ears that Aristotle differentiates methods of syllogism in accordance with kinds of knowledge, but in this case, it can also be extremely helpful: practical syllogism is indeed a specific type of syllogism. Taking Aristotle's approach in the *Topics* to its full extent, differences in syllogistic objectives translate into different syllogistic methods. For instance, medicine, unlike geometry and dialectics, cannot rely on exclusively universal terms, for medicinal knowledge must be applied in real cases of sickness. Thus, a doctor might know that poultry is healthy in general, but this doesn't mean that she should advise poultry to every patient. A specific patient has to be identified as having a specific illness; and poultry should be administered if and only if in this particular case it is beneficial *and* available. Otherwise, a medicinal syllogism would only have theoretical value, and theorizing is not what we expect from a medical doctor.

Such problems do not arise in mathematical and dialectical syllogisms, which are of a strictly theoretical nature. Hence it is tempting to say that the shared qualities of the

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[21] The word *logos* can represent a syllogism in numerous occasions in the *Analytics* (see Bonitz 1870: 435). See also *Top*. 162a35–39. The predicate 'true' or 'false' with regard to syllogisms can also be found in many passages, some of them enumerated by Broadie (2019: 261–262): *Top*. 162b3–5, *APo*. 88a20–22 and *EN* 1142b21–26; she correctly remarks that, in several instances, the truth of a syllogism does not directly refer to the truth of an assertion.

above medicinal syllogism with the practical ones make it so that practical syllogism – or, for that matter, practical truth – is about finding the *means to an end* in particular situations. The πρακτόν, i.e. the last thing that needs to be considered in the minor premise of a practical syllogism in order to be executed in the action (an action, which is also the conclusion of said syllogism) must be particular and possible to do (δυνατόν: cf. *MA* 701a24–25). But there are some important differences between the practical and the technical syllogism. Finding the means to an end and recognizing it as such is not enough for the practical reasoning. A *techne* like medicine is oriented towards a result, and its final goal is to produce such a result (the ποιητόν). The doctor has to know how and why this result can be produced, but his technical syllogisms are true even if:

a) the doctor doesn't care or does not actually want to help the patient;
b) is generally a bad doctor, but happened to know what to do in this situation;
c) uses his medicinal capabilities to poison people instead of curing them.

No practical syllogism should be considered valid and no practical truth obtained in any of these three cases, and this illustrates once more the crucial Aristotelian distinction between practical and technical knowledge.[22] Finding a thing that contributes to good life is not enough, if the *prohairesis* is not good, since good life and happiness can only be achieved if the agent is striving for good in general. Doing the right thing for the wrong reason or accidentally runs against the specifics governing action and virtue and, therefore, against the οἰκεία μέθοδος of practical syllogism.[23] This is why we now have to consider the other important component of practical truth: the correct desire.

At an elementary level and in all animals, desire is connected with perception, which, in turn, is always accompanied with pleasure or pain, giving rise to appetite (ἐπιθυμία). Appetite, as defined by Aristotle, is the desire of such pleasure (τοῦ ἡδέος ὄρεξις; *de An.* 413b21–24, 414b4–5). For animals in possession of understanding, this model of explaining desire via attraction is expanded to ἀγαθόν and κακόν as conceived through understanding and reason, a fact which also accounts for conflicts in our desires:

[**T7**] ἐπεὶ δ' ὀρέξεις γίνονται ἐναντίαι ἀλλήλαις, τοῦτο δὲ συμβαίνει ὅταν ὁ λόγος καὶ αἱ ἐπιθυμίαι ἐναντίαι ὦσι, γίνεται δ' ἐν τοῖς χρόνου αἴσθησιν ἔχουσιν (ὁ μὲν γὰρ νοῦς διὰ τὸ μέλλον ἀνθέλκειν κελεύει, ἡ δ' ἐπιθυμία διὰ τὸ ἤδη· φαίνεται γὰρ τὸ ἥδη ἡδὺ καὶ ἁπλῶς ἡδὺ καὶ ἀγαθὸν ἁπλῶς, διὰ τὸ μὴ ὁρᾶν τὸ μέλλον).

This occurs whenever *logos* and the appetites are opposed, and this comes about in those with a perception of time (since understanding encourages a pulling back because of the future, whereas appetite operates because of what is already present – since a present pleasure appears

[22] For a similar analysis of the differences between practical and technical syllogism, see Reeve (2012: 189).

[23] See Arist. *EN* 1105a27–33.

to be an unqualified pleasure, and an unqualified good, because of its not seeing the future). (*de An.* 433b5–8)

It seems that pleasure appears as the only ἀγαθόν when there is no consideration for life in the future. However, the proper good for human beings can only be defined as the best activity in life as a whole (ἐν βίῳ τελείῳ), not just for a day or some brief period of time (*EN* 1098a18–20). Without reasoning (λόγος) and understanding (νοῦς), we have no access to concerns about the future or to life in its entirety, since that access presupposes an ability to grasp universals and to apply the conclusions from these universals in particular situations.

How can the universal character of 'good' or, more specifically, the end of *eudaimonia*, be grasped by understanding? The process for the discovery of every universal, as described in *Posterior Analytics* II.19, is induction and it involves accumulating experience of the sort of things we make the universal of. This is what Aristotle believes to be the case in practical universals too;[24] for we need experience (*EN* 1143b13–4) and maturity (*EN* 1143b8) to reach the universals of good action. This experience is not just an observation of raw perceptual data; it is experience in actions. If this is true, then in our inductive formation of our idea of happiness – which we will then use as a starting point in practical reasoning – desire has a significant role to play, since it is the only part of the soul that can move us to action. Its role in understanding's grasping of the universal 'good', is what we now need to clarify.

Aristotle remarks that reasoning and understanding, in contrast to desire and perception, are not fully formed in children; he rather regards them to be progressively developing capacities. The apparent mismatch in developmental stages between desire and understanding has the interesting consequence that, with regard to education, Aristotle finds it advisable to first take care (ἐπιμέλεια) of desire *for the sake of understanding* (*Pol.* 1334b27–28). Conversely, in *EN* I he notes that the desiring part of the soul takes at least some part in *logos* by listening to it as someone listens to their friend or father (*EN* 1102b30–33). We already saw in [T7] that desire's orientation towards good is dependent on understanding, so the only way these features of desire and understanding can work together is a mutual, quasi *synergetic approach* in realizing what is good for human life. If that is true, it will have some interesting consequences for the universal ἀγαθόν and for its relationship with both capacities.

According to Aristotle, no movement (and therefore no action) can be produced without desire (*MA* 701a30–35, *de An.* 433a18–32, 433b27). What desire moves us towards is a good (ἀγαθόν), or something that appears good (φαινόμενον ἀγαθόν), insofar as they both are within our power to act (πρακτόν ἀγαθόν – *de An.* 433a28–29). This means that

[24] For a similar approach in grasping the universal of *eudaimonia* see Reeve (2012: 161): "Happiness is the unconditional end (*EN* 1139b2–4) at which practically wise people aim (*EN* 1142b29-33), it is something we reach, as we do for all universals, not by deliberation but by induction". See also Charles (2015: 88).

the *universal* ἀγαθόν to be reached by our understanding will be inextricably connected with desire, for every particular ἀγαθόν exists as desire's intentional correlate.[25] In other words: true understanding of the ἀγαθόν *is understanding it qua* desirable. We have already seen how desire pursues pleasure and avoids pain in the case of animals. Our desires, though, are not just desires of animals, but of beings with understanding and reason. It follows that the ἀγαθόν for such beings is different than the one of animals. It is a difference that can be more accurately explained when we consider two things: First, for Aristotle, the intentional objects of desire for all animals – including humans – are necessarily captured by imagination (*de An.* 433b29);[26] second, the ability of imagination differs substantially between beings with and without reason: in beings with understanding and reason, imagination can go beyond perceptual pictures, because it is capable of calculation and deliberation (*de An.* 434a7). We already saw (example [A] in ch. 2) that deliberation involves universals. Without universals, our actions are no different than those of animals.[27] Thus, in an ideal scenario of practical reason (as in practical wisdom), understanding provides desire with a universal ἀγαθόν worthy of human life (and with universals that specify it further), while the most noble feature of this life is understanding itself. We could describe this as a perfect alignment between understanding and desire: understanding shapes the universal ἀγαθόν as something to be *desired* in practical life – for without desire (to begin with), there is no such thing as practical life – while this universal is only such as it is *because* the animal in question has the capacity of understanding. Conversely, the raw material for the understanding in order to develop this idea of ἀγαθόν is the instances where desire has taken its direction from reason.[28]

Because of its practical origin and purpose, the universal ἀγαθόν standing at the top of practical syllogism is already oriented towards implementation in particular situ-

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[25] This idea as well as some of the following thoughts in this section presuppose a certain view on Aristotle's understanding of universals. In Reeve's words: "Aristotle is not an *ante rem* theorist of universals, like Plato, but he is an *in re* theorist of them, not a nominalist or some other sort of antirealist or someone who thinks that universals exist only in the mind" (Reeve 2013: 32).

[26] Aristotle presents some questions concerning animals with very limited perceptual capabilities and the ability of imagination. This aspect of his analysis of animal imagination is not important for the present discussion.

[27] See Arist. *EN* 1147b4–5. In another passage we also learn from Aristotle that while animals desire and move according to pleasure, only humans have a sense of the good, because of their ability to reason (λόγος) (*Pol.* 1253a10–17). This sense (αἴσθησις) cannot be a perception of exclusively particular beings if indeed λόγος is necessary to acquire it. In order to perceive ἀγαθόν, a perception of universal forms is necessary, which is probably also why νοῦς (understanding) has to be involved in the discovery of the ἔσχατον and πρακτόν as explained in *EN* 1143a35–b11. Practical perception, i.e. perception of doable things, cannot be entirely sensual, for it involves access to possibilities (see the already mentioned *MA* 701a24–25 and [T7]).

[28] This does not presuppose a fully developed idea of good. Acting according to understanding and reason can be achieved gradually and that is probably why in the already quoted passage of *Politics*, 1334b27–28, Aristotle suggests that we start the ἐπιμέλεια (taking care of) of desire for the sake of understanding (meaning obviously: *practical* understanding) and not the other way around. Natural virtue is also important in the development of full virtue, but it needs the 'eye of the soul', which is understanding (*EN* 1144a29–b14). Habituation in virtues will produce the kind of pleasures worthy of a human life (see Charles 2015: 78, 88) led according to our most noble feature (understanding), which, as we saw in T7, has the advantage of accounting, among other things, for time and durability. Having this kind of experience is necessary for understanding in its task to form

ations in real life. Without any participation in practical life, we wouldn't be able to form the universal idea of 'good'. Application belongs to the universal ἀγαθόν in an essential way. Hence the idea of such ἀγαθόν already points to the last (ἔσχατον) and practicable thing (πρακτόν). Similarly, the understanding that grasps it remains, in one way or another, involved in practical life, which is why Aristotle speaks of *practical* understanding (πρακτική διάνοια)[29], since any real grasp of ἀγαθόν must be concerned with its actual specific implementation. Having a general idea of *eudaimonia*, without desiring it, means not really having it – it is similar to the inactive knowledge of someone who is asleep, drunk or just parroting words of others (*EN* 1147a17–20, b11–12).[30] This peculiarity of understanding the good and desiring good is what allows Aristotle to speak interchangeably of 'desiderative understanding' or 'thought involving desire' in cases of an ideal deliberate choice (προαίρεσις σπουδαία): practical understanding, if it really is understanding of the good, can only be as desiderative understanding. And desire for an ἀγαθόν that fits human life as a whole – and as it is most proper to this life – is necessarily engaged in thinking.[31]

Going back to practical syllogism, we can now see how this conceptual framework reflects on practical truth: As already mentioned, desire moves us immediately after the identification of a concrete possibility that represents an instantiation of the ultimate goal, the ἀγαθόν. But that doesn't mean that desire is otherwise in a dormant condition, as if it had to sit and wait for an explicit conclusion of practical syllogism. Desire is already implicated in the first and major premise containing the universal ἀγαθόν. As the cause of movement, desire can only move us in specific, material situations, that is why we are compelled to search, through deliberation (*EN* 1142b), for a specific implementation of ἀγαθόν that is possible (δυνατόν) in our particular circumstances. That is also why practical understanding, which is driven by ἀγαθόν, is directed both to the universal starting point as well as to the last particular.[32] Desire can only initiate movement when

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the universal idea of good. Another indication of desire's ability to be attracted by higher kinds of goals is the fact that Aristotle feels the need to re-evaluate the notion of pleasure in order to accommodate pleasures pertinent to noble acts. Pleasure is what drives desire in general, so there has to be a form of pleasure that accompanies the οἰκεῖον ἀγαθόν of human life – otherwise we would hardly be motivated to pursue it. As animals with reason we should have the ability to experience pleasure in activities led in accord with that reason (ἡδονή οἰκεία – *EN* 1176a3). The ability does not necessarily entail its transition to actuality, since we first have to experience this kind of pleasures before we pursue them. And that is why ethical virtues are a prerequisite for the correct desire.

[29] For the purposes of this analysis, we will not focus on potential differences or overlaps between uses of the concepts νοῦς and διάνοια in Aristotle's practical philosophy.

[30] This observation is similar to Pakaluk's arguments concerning the "robustness" of practical reasoning (2010: 155). His approach is focused on singular assertions about what is good which, in our view, can only partially account for the meaning of practical truth.

[31] As far as we know, this interpretation was first introduced by Charles (2015).

[32] Aristotle makes clear that understanding can work in both directions (καὶ ὁ νοῦς τῶν ἐσχάτων ἐπ' ἀμφότερα), i.e. universals and particulars, where there can be no *logos*, since we must grasp the final terms, of which any combination through *logos* is made. It follows that for practical syllogism understanding has a double role: 1) grasping the universal – which must have been done already before one deliberates, 2) grasping the particular to be acted upon, which must happen in deliberation (*EN* 1143a35–b11).

actual and material conditions allow the universal of the major premise to be realised in actual, particular conditions taking over as soon as the understanding identifies the last thing, the *eschaton*. However, the last thing can only be desired *as* a representative of what desire has been striving for all along: the good – whether this good is a fully formed idea of one's good, or a still developing one. And that is why desire can immediately move the parts of the body as soon as this good is understood to be possible in a concrete situation. Importantly, Aristotle repeats more than once that desire moves us *immediately* into action, once the identification of the ἔσχατον has been performed. This is an essential part of practical deliberation, otherwise Aristotle would need to explain why someone waits before acting and in which way another moment to act is chosen – which means that another deliberation will be required *ad infinitum*. Desire, on its part, seems to have no need of a conclusion in order to motivate the body to action. It does not wait for such a conclusion, because it is supposed to produce the conclusion of practical reason, which, as Aristotle asserts, is not a theory (*MA* 701a10–12). Desire is already expecting an instance of the good and when deliberation provides it, desire moves us immediately. The implication for practical syllogism is that its conclusion is not a *logos* but an action – and necessarily so.[33]

All those things happening in the background of what Aristotle names 'practical truth' and all those steps that have to be completed in the right way and in a specific practical sense before practical truth comes to be do not fit in the standard model of assertoric truth. What can be said of practical truth is that it is the truth of a syllogism of a non-standard type, since it is inextricably intertwined with desire. There is no question, of course, that assertions are and must be included in the process. For instance, a significant part of practical truth is the correct identification of a possibility that instantiates the correctly defined universal good, as in the minor premise of practical syllogism. What makes the desire correct, though, is not this minor premise alone. For if desire is not already on the look for the instantiation of the universal good regarding a person, it will simply not be there when the time to act on the specifics of this last premise has come. Desire is correct insofar as it is driven by the understanding of good (and universals that derive from it) prescribed by the first and major premise. And it is this very premise that gets ignored by the acratic. However, the minor premise is the one producing the necessary last term, the πρακτόν, for the sake of which desire activates motion. Both are needed, not only for epistemic, but also for practical reasons.

The specific practical character of the minor premise might seem obvious. And while one might think that the major premise is purely scientific – as a result of induction's culmination in a form to be grasped by the understanding – we should bear in mind

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[33] See again Reeve (2012: 173-175). Notice, however, that practical truth does not mean that the action will definitely be successful or completed, since a lot of unpredictable things might go wrong during the action itself. The action itself is not the source or the validation of practical truth and practical truth is not a correspondence between the reality of an action and a statement describing it either. In that sense, our interpretation differs from Anscombe's (1965) and stands in agreement with Broadie's (2019: 266) and Olfert's (2014: 215) reservations.

that it is not enough to *know* the universal good or the *eudaimonia*, but we also have to desire it when engaging in practical syllogism. The counterexample is given by Aristotle himself: the concept of good in the understanding of an acratic person might have been formed through various theoretical processes, but, as Aristotle maintains, it isn't really more active knowledge than the knowledge of someone asleep or drunk. The crucial universal of practical reasoning, the ἀγαθόν for human beings and indeed for ourselves as agents, *is* actually formed by the accumulating effect of virtuous deeds (and pleasures), so that it can be truly grasped when our desiring capability is already in a good shape, i.e. developed and educated in agreement with our most noble abilities of understanding and reason. Practical reasoning does not take place in a desire-less vacuum, where desire emerges from obscurity only after the correct πρακτόν is found. In the same vein, the 'agreement' between desire and understanding, expressed by the ὁμολόγως in 1139a30, means something more than just a reiteration of the already stated; the phrase τὰ αὐτὰ τὸν μὲν φάναι τὴν δὲ διώκειν in 1139a25–26, denotes something more than a momentary alignment of judgement and wish. It refers to the entire framework of the practical syllogism that proved to be true.

In our interpretation, correct desire will not appear as a result of a good practical syllogism that starts without it. If it were so, Aristotle wouldn't have to explain in the very next sentence that the *prohairesis* cannot be without moral habituation (ἠθική ἕξις), for it is the latter that must have shaped desire *already* in agreement with understanding. The εὐπραξία, that is the well-doing in action, which is what desire is striving for (ἡ δ' ὄρεξις τούτου), is not meant just for a single action produced by a particular practical syllogism but is a general goal for human beings – that is why Aristotle emphasizes the universality of this principle by saying that the intellectual desire defined this way is a starting point founded in the essence of human beings (καὶ ἡ τοιαύτη ἀρχὴ ἄνθρωπος). And if that is true, then *all* steps in practical reasoning have to be true, not just in a logical sense, but in a way that involves action-related elements from the very beginning.

5. Practical truth and truth in general

In the previous section we saw how every step in practical reasoning is irreducibly *practical* and, if the syllogism is to be successful, true as well. But, given our initial discussion, in what sense is practical truth indeed *truth*?

If, generally speaking, truth signifies an agreement to reality, then there are a lot of things in a practical syllogism reflecting this. First, happiness and good life are real conditions, not abstractions for the mind of the agent, so failure to conceive them as what they are is a real possibility – indicating that truth and falsehood in the sense described in *Metaphysics* III (*Metaph.* 1011b21–28) is still right in place. Second, even if we get the definition of happiness right, there are intermediate steps needed in our practical reasoning, before the final premise names the πρακτόν: the universal ἀγαθόν has, as every other universal with its definition, specifications and properties that derive from it, named

by further universals.[34] And since deducing such universals is the work of Aristotelian science, we can assume that discovering them is what makes scientific knowledge in ethics useful. For it would be indeed unreasonable to expect that every particular act be directly inferred from the universal good. Dealing with more 'localised' universals though, is also not enough, even when we are equipped with many of them and their respective rules to achieve them. 'Reading' the situation *and* its potential for the realisation of what ultimately can lead to happiness is a necessary and perhaps the most important step in practical reasoning.[35]

An intellectual ability to know what is and what is not in every step of the process is of great importance, but 'what is' involves our desiring part as an essential component of the state of practical affairs. Correct desire is not a necessary condition for the universal human good to be recognized as such, but for this universal to exist in the first place. This does not necessarily mean that practical truth is a distinctive practical truth only because of its different object.[36] It is a different kind of truth because, unless the agent is already capable of true practical reason, its object is not even there. Does this mean that correct practical syllogisms are impossible from the standpoint of an impartial spectator? A third-person perspective cannot possibly be denied in practical matters, and indeed the capacity to make correct evaluations in such cases has its own name (*sunesis*) in Aristotle's moral philosophy. However, even in this case, the spectator has to rely, in one way or another, on her own practical and political experience and on her own sense of good. Based on her already developed practical perception, which she already has as an agent in her own life, she can make correct judgements about practical matters, in which she is not involved.[37] Practical truth, though, in its definitive form introduced in *EN* VI.2, can only be achieved from a person with the correct desire – which means: a person involved in the particular situation.

In conclusion, our interpretation seems to agree with those who believe that truth must be understood as an intellectual accomplishment, whose function is to connect the goals of understanding and reason with reality. There are many scholars accepting that Aristotle's primary sense of truth is a combination of objects in reality, which is then reflected in assertions. Those 'objects' can be both universals (forms) and material

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[34] This is one of the possible interpretations of the term καθαυτά συμβεβηκότα, in *APo*. 75b1 ff.

[35] In a statement applying to political as well as individual conduct, Aristotle says that "not everything is regulated by [universal] law, for there are some things about which a law cannot be established, so that decrees are needed instead. For the standard applying to what is indefinite is itself indefinite" (*EN* 1137b27–30).

[36] We agree with Olfert at this point; see Olfert (2017: 105).

[37] Arist. *EN* 1143b11–14: "experienced and older people or practically-wise ones (...) because they have an eye formed from experience, they see correctly". On the subject of moral judgements by spectators, also see Kontos (2021: 1.3): "To see the noble one must have a certain acquaintance with the interconnection between goodness, choiceworthiness, and pleasure (*Rh*. I.9, 1366a33–34). And one cannot have such an acquaintance unless one already has some experience of the noble from within the sphere of one's own deliberate choice. That is why a base person or an intemperate one is never a good judge of nobility and, likewise, never displays comprehension. Spectators' capacity to see the noble is partially dependent on their experience as agents."

things (which are themselves combinations of form and matter), so that in the same vein we could say that practical truth is not just a recognition of such a combination made in a statement, but a real combination of things and on multiple levels, be it desire and the good, or both of these with a *prakton*. This truth could then be recognized as such on an assertoric or intellectual level, so that a perfectly standard/assertoric type of truth would apply to practical truth. But if that were the whole story, we would miss why Aristotle chooses to speak of *practical* truth and *practical* thought. Practical truth is a distinctive kind of truth, not only because the conclusion of a practical syllogism must be performed in praxis and not spoken, but also because this is the direct consequence of an alignment of desire and understanding such that our own enactment of the universal good is itself part of the underlying state of affairs we recognize as true. In that sense, practical truth represents the correctness of our grasp of states of affairs as stated in every part of a practical syllogism, where the distinctly practical part consists in that the realities of these *logoi* depend on the actual state of the agent who makes them.

The involvement of the 'subject', as we would say in modern terms, is perhaps characteristic of practical truth in a very distinctive way, but it is not entirely absent in other cases of truth. As already stated before, knowledge (for Aristotle) has to be an active state for those who have it. Knowing the reasons why something is the case is also an essential part of knowing the truth – having stumbled upon a correct assertion about the state of affairs is not enough. There are different stages and different ways to be actively involved with truth and knowledge – as it is obviously shown in *EN* VI – but it must be clear that an interpretation of truth in Aristotle depending heavily on the assertoric model as the 'standard' can prove quite misleading. There is no doubt that truth can be achieved by our soul by using λόγος. However, predicative λόγος is one – perhaps the most important even – but not the only way to grasp truth.

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Truth in Practical Reason: Practical and Assertoric Truth in Aristotle's *Nicomachean Ethics*

Truth has always been a controversial subject in Aristotelian scholarship. In most cases, including some well-known passages in the *Categories*, *De Interpretatione* and *Metaphysics*, Aristotle uses the predicate 'true' for assertions, although exceptions are many and impossible to ignore. One of the most complicated cases is the concept of *practical truth* in the sixth book of *Nicomachean Ethics*: its entanglement with action and desire raises doubts about the possibility of its inclusion to the propositional model of truth. Nevertheless, in one of the most extensive studies on the subject, C. Olfert has tried to show that this is not only possible but also necessary. In this paper, we explain why trying to fit practical truth into the propositional model comes with insurmountable problems. In order to overcome these problems, we focus on multiple aspects of practical syllogism and correlate them with Aristotle's account of desire, happiness and the good. Identifying the role of such concepts in the specific steps of practical reasoning, we reach the conclusion that practical truth is best explained as the culmination of a well-executed practical syllogism taken as a whole, which ultimately explains why this type of syllogism demands a different approach and a different kind of truth than the theoretical one.

KEYWORDS

Aristotle, practical truth, practical syllogism, practical wisdom, assertoric truth

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