The Role, Structure and Status of Aristotle's *Physics* I

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I. *Physics* I: A Beginning

Physics I is the beginning of Aristotle's scientific inquiry into natural things. Its declared aim is to 'try to determine the things concerning the principles' (184a14–16). Aristotle stresses in various ways that the book is a beginning. In chapter 1 he describes its aim as the first thing that the natural scientist must try to accomplish (ibid.). Moreover, he presents the inquiry that he is going to conduct as the start of an epistemic journey (184a16–26). Further, at the end of the book he describes the investigation he has just carried out as a beginning to be followed by another beginning (192b4): *Physics* I is the first of two beginnings.

But 'beginning' is said in several senses. So, to understand what *Physics* I is about, we should clarify what kind of beginning it is and what its role is within Aristotle's physical project. I shall start by considering *Physics* I's epistemic status and specific approach to the issues it deals with.

First of all, *Physics* I is a beginning that displays clear signs of continuity both with what follows it in the *Physics* and, more generally, with the corpus of Aristotle's physical writings. It is to a large extent a scientific physical investigation. Indeed, as already mentioned, its aim is described as the first thing that the natural scientist must try to accomplish. Of course, it is not a piece of *episteme* in the sense of *APo* (i.e. demonstrative science), since it is not aimed at constructing demonstrations from principles, but rather at finding the principles needed to construct demonstrations. However, it is clearly presented as an instance of physical science. The only exception is the inquiry into Eleatic monism and immobilism that

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occupies part of chapter 2, chapter 3 and chapter 8. This inquiry is described as something that lies outside the natural scientist's expertise (184b25–185a20). But this exclusion, by contrast, implies that the rest of the investigation carried out in the book does belong to the natural scientist's expertise. The continuity of *Physics* I with the rest of the *Physics* and especially with books II–IV is also shown by the content and method of these investigations. *Physics* I starts an inquiry into the principles of natural things, which is carried forward in the subsequent books: it introduces and focuses on two of the four causes of natural substances (matter and form),[1] whereas book II, besides inquiring further into matter and form, and besides defining 'nature', tackles the other two causes (mover and goal),[2] and the subsequent books deal with issues whose treatment is required to understand more clearly what nature is (e.g. change and the infinite in book III; place, void and time in book IV). From the methodological point of view these inquiries do not differ significantly: they all employ a combined method, which comprises an inductive procedure and a doxographical inquiry, and use evidence and *phainomena* of various kinds.[3]

The continuity of *Physics* I with the other physical investigations is also suggested by the way in which Aristotle refers to *Physics* I elsewhere, for instance in *Meteor.* I.1 and in several passages of the *Metaphysics*. The first entry of the *curriculum* of the physical investigation presented in *Meteor.* I.1 seems to include the inquiry into principles conducted in *Physics* I: 'We have already discussed the first causes of nature, and all natural motion' (338a20–1). Further, some passages from the *Metaphysics* are even more telling because their reference to *Physics* I is more precise. Here Aristotle refers to *Physics* I without showing any sign of discontinuity between it and the other physical *logoi*. This suggests that he considers it either an instance of the *logoi peri physeos* or an integral part of them (*Metaph.* A 3.983a33–b1, A 5.986b30–1, A 7.988a21–2, A 10.993a11–13, K 6.1062b31–3, M 9.1086a21–4).[4]

[1] *Phys.* I only hints at the role of form as mover and as goal (191a3–7, 192a16–25). Nevertheless, it thereby prepares the ground for *Phys.* II's inquiry into these principles (on this connection, see Lennox in this volume).

[2] In section II, I come back to the issue about the relation between *Phys.* I and II, and the order in which the principles are introduced in these two books.

[3] It should be added, however, that *Phys.* I stands out for a particular use of dialectical principles and distinctions. I come back to this issue in section III.

[4] *Metaph.* M 1.1076a8–9 may be added to this list, with the caveat that it might refer to *Phys.* II.

These are some of the most obvious signs of continuity between *Physics* I and the other physical investigations. But *Physics* I also presents some other features that, without denying its general physical character, offer a different perspective as well as further clues to its specific role. The features I shall focus on make *Physics* I look like a relatively free-standing treatise, aimed at introducing the science of nature by, as it were, setting its scene, by working out, at some preliminary level, the principles of natural substances. I shall progressively clarify the sense in which *Physics* I plays an introductory role.

Physics I's inquiry begins and carries on to its conclusion without providing a definition of the subject matter of natural science (i.e. nature and natural things). Aristotle gives a first description of this subject matter from the point of view of how it appears at the beginning of the inquiry ('what is more knowable to us'): a 'confounded whole', a 'universal' and something perceptible (184a16–26). Then he describes it generically as a multitude of entities, some or all of which undergo change (185a12–14). These descriptions do not refer exclusively to natural entities. Moreover, the inquiry uses evidence that either does not concern natural entities alone or concerns aspects of natural entities that are not peculiar to them. Therefore, the principles arrived at as a result of the investigation, although presented as principles of natural substances, are also applicable to other kinds of things: they are applicable to everything that changes, comes to be and passes away, regardless of whether these processes are natural or not, and whether what undertakes them is a natural thing or not. Indeed, the distinction between natural and non-natural things is not drawn until *Phys.* II.1, where Aristotle defines nature as an internal principle of change and rest. Moreover, in *Phys.* II.2 a further refinement of the concepts of form and matter will also be used to distinguish the specific subject matter of physics from those of mathematics, first philosophy and the scientific enterprises set up by Aristotle's predecessors. From this point of view, the principles tackled in *Physics* I (form and matter), in so far as they do not hold exclusively of natural entities and are not sufficient to distinguish the subject matter of physics from that of other sciences or from things that are not among the objects of natural science (i.e. artefacts), are not yet distinctively physical principles.[5] This is one of the senses in which *Physics*

[5] This does not mean that *Phys.* I does not have a distinctively physical goal: indeed, the book is explicitly aimed at finding the principles of natural science. By 'non distinctively physical principles' I mean principles that, by themselves, are not sufficient to distinguish natural from non-natural substances, and that are introduced by means of evidence that is not only physical.

I may be considered introductory: it prepares the ground for the investigations carried out from *Physics* II on, and it does so by outlining and focusing on the notions of matter and form, which, together with those of mover, goal and means, will be used in *Physics* II both to define the central object of natural science (II.1), and to delimit the domain of physics (II.2). The kind of introduction provided in *Physics* I may have heuristic and/or didactic purposes. Indeed, nature is difficult and the principles of natural things are especially tricky to disentangle. So, Aristotle may have thought it necessary, or at least highly advisable, to start the search for principles by inquiring about a broad sample of things and at a level in which the distinction between form and matter is easier to draw. Having done that, in *Physics* II he goes on to show that, in the case of natural substances, form and matter play also the role of internal principles of change, and that they stand in a teleological relation in which form is the goal and matter is the means to it.

Besides starting from a description of its subject matter that is not exclusive to natural things and introducing principles that are not distinctively physical (in the sense just mentioned), *Physics* I starts from a description of its subject matter (i.e. of how the subject matter appears at the beginning of the inquiry) that is generic from the ontological point of view. It starts from the very broad idea that this subject is a perceptible whole comprising many things as its parts (184a24–6) or some sort of combination of things that are confused together (184a21–2). In this respect, the starting point of the investigation initiated in *Physics* I differs significantly from that of, for instance, *DC* I.1 or III.1.[6] Here, Aristotle introduces the inquiry by providing a description of the ontological status of its central object that is much more precise and employs a distinction between substance and affections that belong to the substance: physics, claims Aristotle, deals with bodies, or sensible substances, magnitudes, and with their affections and changes (268a1–6, 298a27–b5). What in *De caelo* is a starting point of the inquiry, in *Physics* I is instead part of its final achievement.[7] One of the main aims of *Physics* I is to characterise the central object of natural science from the ontological point of view as a substance, conceived of as a compound of form and matter (190b17–23) receptive of accidental affections, and to present this characterisation as an

[6] On a connected point concerning Theophrastus' approach to this issue, see Falcon in this volume.
[7] This of course is not to say that the description of the central objects of physics as bodies or bodily substances affected by *pathe*, provided in *DC* I.1 and III.1, is exactly the same as *Phys.* I's description of them as compounds of form and matter.

alternative to those provided by Aristotle's predecessors (both the Eleatics, who conceive of what is as an absolute and indivisible unity, and maintain that natural things are only appearances or false appearances,[8] and the physicists, who conceive of the ontological composition of natural substances in ways that are different from Aristotle's). Further, in *Phys*ics I, Aristotle's project of characterising the ontological structure of the central object of physics amounts to determining its principles and, first of all, to determining that there are principles of natural things, i.e. that natural things can be divided into principles (184a22–3).[9] *Physics* I plays an introductory role not only because it introduces principles that are not distinctively physical, but also because it outlines the ontological status of the object of natural science in terms that are not distinctively physical.

Another sign of the introductory character of *Physics* I is found in the fact that the book tackles at length two basic starting points of natural science: the existence of both change and plurality (185a12–14). The treatment of this issue is a non-physical or a pre-physical inquiry since, in Aristotle's view, the natural scientist derives these starting points from sense-perception and takes them as obvious truths, without having to account for them or to argue against those who deny them (185a14–17). Aristotle tackles this issue by addressing and criticising the Eleatics' denial of change and plurality, a denial that caused them to deviate from what in Aristotle's view is the natural path of the inquiry into principles (191b31–3) and thus bringing them outside the domain of natural science (184b25–185a1) and, even more radically, of any science (185a1–5).[10]

[8] *Phys*. VIII.3.254a27.

[9] For a description of the aim of *Phys.* I (and of some of the inquiries of Aristotle's predecessors) in ontological terms, which is presented as equivalent to the aim of searching for the principles of natural things, cf. 184b22–5 and below, section II.

[10] In *Phys*. I Aristotle considers the Eleatic theory from two different points of view: the point of view of the epistemological structure of natural science and that of its historical development. From the first point of view, the Eleatic theory is not about nature (184b25–185a1, 185a17–18), since it denies the basic starting points of natural science (i.e. the existence of change and plurality). Moreover, the Eleatic claim that what is is absolutely one denies one of the fundamental presuppositions of any science: the existence of principles, conceived of as distinct (in some way) from what they are principles of (185a1–5). However, when natural science is considered from the perspective of its historical development, Aristotle describes the Eleatics as philosophers who inquired into nature (191a24–5) and who deviated from the natural path of this inquiry (191a26–7, 191b31–3) because of physical difficulties (185a18) they were unable to solve. In other words, the Eleatics' inquiry is seen as an argument, or a series of connected arguments, that is about nature or that raises physical puzzles, but whose final conclusion that what is is one and changeless is not about nature. This latter view on the Eleatics is employed also in *Metaph*. A 3.984a16–b1.

Physics I is not the only text in the *Physics* where Aristotle addresses the pre-physical issues connected with the starting points of natural science and with the Eleatic denial of nature. Other relevant texts are, for instance, *Phys.* II.1 (193a3–9) and especially *Phys.* VIII.3. However, *Physics* I stands out for the breadth and complexity of its investigation of these issues.[11] Some aspects of the particular strategy used in *Physics* I to tackle the starting points of physics and the Eleatic denial of nature repay closer examination in order to get a clearer idea of *Physics* I's specific role, i.e. of the kind of relevance for natural science that Aristotle discerns in his treatment of these pre-physical issues in *Physics* I.

Aristotle's treatment of the Eleatic theory in *Physics* I is aimed specifically at resolving the Eleatic arguments, rather than refuting their claims (185a8–10, 186a5–11, 22ff.).[12] In doing this, Aristotle is not demonstrating the starting points of physics, i.e. that nature or multiplicity or change exist, but detecting and removing the mistakes that brought the Eleatics and their heirs to deny these obvious facts. This is relevant for at least three reasons.

First, Aristotle maintains that it would be ridiculous to try to demonstrate obvious facts, attested by sense-perception, like the existence of nature, of plurality and of change. For it would imply proving what is obvious by what is obscure (193a3–9). Hence, the only acceptable or

[11] *Phys.* II.1's and VIII.3's treatments of this issue are much shorter and simpler than *Phys.* I's. *Phys.* II.1 labels as ridiculous the attempt to prove that nature exists and provides reasons for this judgement. *Phys.* VIII.3 tackles only the Eleatic denial of change, and describes this task with words that are very similar to those used in *Phys.* I.2, but its overall strategy is very different from the one adopted in *Phys*. I. The main difference is that *Phys.* VIII.3 provides a refutation of the Eleatic thesis and not, like *Phys.* I, also a resolution of the Eleatic arguments. It is noteworthy that neither in *Phys.* II.1 nor in *Phys.* VIII.3 does Aristotle make any reference to *Phys.* I. One may try to speculate over the reasons why in *Phys.* II.1 and VIII.3 (unlike for instance in *Metaph.* A 5.986b10–31, which is an interesting parallel passage) Aristotle does not mention *Phys.* I. The connections between *Phys.* I and both of these passages is sufficiently strong to justify such a speculation. One possible reason is that *Phys.* II.1 and/or *Phys.* VIII.3 were originally written before *Phys.* I and so ignore the inquiry conducted there. A clue in this direction may be provided by *Phys.* II.1.193b20–1. There Aristotle says that it still has to be determined whether there is privation and the opposite within absolute generation, which is an issue that he clearly addresses in *Phys*. I and, at least to a certain extent, considers there as established. In so far as *Phys.* II.1 is concerned, another possibility, not necessarily incompatible with the first, is that, unlike some parts of *Phys.* I, *Phys.* II.1 is considered by Aristotle as a distinctively physical investigation, which therefore does not deal with the starting points of natural science, since it would amount to transcending its boundaries, and for the same reason does not mention pre-physical inquiries of the kind conducted in *Phys.* I. Lastly, *Phys.* II.1's and VIII.3's lack of any reference to *Phys.* I may have a variety of reasons of little philosophical or chronological significance.

[12] The refutation of the Eleatic thesis that what is is absolutely one occupies part of ch. 2, whereas the resolution of the Eleatic arguments occupies chs. 3 and 8.

reasonable way to tackle issues of this kind is to criticise those who deny them.

Second, those who deny these obvious facts, i.e. the Eleatics, were *forced* to do so by their arguments (*GC* I.8.325a17–18; *Metaph.* A 5.986b27–30) and because they were unable to solve certain difficulties (191b30–1): their claim that change, plurality and nature do not exist (or are not true beings but appearances or false appearances)[13] was not an assumption and a starting point of their reasoning, but rather a conclusion of it.[14] So, the most appropriate strategy to deal with their denial of the starting points of physics is to provide a resolution (*lysis*)[15] of the arguments and the difficulties that brought them to their paradoxical conclusions.

Third, Aristotle presents his solution of the argument that led the Eleatics to deny first coming to be (i.e. the argument that Aristotle calls the '*aporia* of the earliest thinkers') and then plurality altogether as the only effective and correct one (191a23–4). In this he shows himself aware of the fact that he was not the first to tackle the Eleatic theory and try to resist the Eleatics' conclusions by affirming the possibility of natural science.[16] However, Aristotle maintains that only his solution is the correct one. More precisely, he emphasises that only his solution is able to get natural science back on the right path after the Eleatic diversion (191b30–4).

Aristotle's resolution of the *aporia* about coming to be is accomplished in chapter 8 by means of the theory of principles that he constructs progressively in the previous chapters and that he completes in chapter 7. In this discussion, Aristotle does not prove what is more evident by means of what is obscure (193a3–9). Rather, his strategy and goal in chapter 8 may be described as the grounding of what is evident to us (i.e. the *hoti*: the existence of natural, changing things) by means of what is evident in itself (i.e. the *dioti*: the principles of natural, changing things): the first use of Aristotle's theory of principles is to ground the starting points of natural science so as to get natural science back on the right path after the Eleatic diversion.

All this discussion adds further information about the relevance that *Physics* I's treatment of pre-physical issues has for natural science, and so

[13] *Phys.* VIII 3.254a27. [14] Cf. n. 10.

[15] The criticism of the Eleatics' arguments provided in ch. 3 is called *lysis* (I.2.185a8; I.3.186a5, 23). Other passages from *Phys.* I where the terms *lyein* and *lysis* occur are: *Phys.* I.8.191a23-4, 191b30, 34. On the importance of the distinction between *lysis* (resolution) and *elenchos* (refutation), see Rossi 2006, 2014.

[16] On this issue, see e.g. *Phys.* I.9; *Metaph.* N 2.1088b35ff. See also Castelli, Cerami and Lennox in this volume.

about the introductory role of *Physics* I. This book is introductory in a further way because it is aimed at introducing people to Aristotle's own view on natural science by showing how it tackles the ongoing Eleatic challenge to natural science, which influenced the post-Eleatic tradition, how it solves problems that none of Aristotle's post-Eleatic predecessors was able to solve properly,[17] and so by connecting this new enterprise to the tradition of natural philosophy.[18] Moreover, doing this amounts to providing what, in Aristotle's view, seems to be the most reasonable arguments for the starting points of natural science.[19]

To conclude this section: we have collected and analysed some general and macroscopic features of *Physics* I with the aim of clarifying progressively its role and status. This initial survey suggests that *Physics* I has a complex and multi-faceted role. On one hand, it is a scientific physical investigation (indeed, the beginning of Aristotle's science of nature), which shows clear signs of continuity with the other physical inquiries and which introduces principles that would have a foundational role in Aristotle's science of nature and, more generally, in his philosophy as a whole. On the other hand, it also contains some other features that make it look like a relatively free-standing treatise aimed at introducing the science of nature, by setting, as it were, its scene: the book introduces and argues for principles that are not distinctively physical (although they are described as principles of natural things: 190b17–20, and although the aim of the book is to introduce the principle of natural science: 184a14–16); it does so by means of evidence that is not, or at least not always, distinctively physical; it is aimed at tackling in an unprecedented way two basic starting points of natural science, and, by so doing, at putting natural science back on the right path after the Eleatic diversion.[20] To these signs we may add a

[17] For a different view on this issue, see Bodnár in this volume.

[18] In section II, I tackle further the issue about *Phys.* I's target and audience by analysing its various schemes of construction and by emphasising Aristotle's reuse of traditional frameworks.

[19] Aristotle's treatment of the Eleatic theory in *Phys.* I is divided into two distinct parts, which bracket most of the rest of the book: a criticism of Eleatic monism in chs. 2–3 and a criticism of Eleatic immobilism in ch. 8. One aspect of this complex structure is that the treatment of the Eleatic theory is intertwined with the inquiry into the principles. This raises several questions, which clearly complicate the issue of the specific function that the treatment of the Eleatic theory (and of the pre-physical issues concerning the starting point of physics) has for natural science. Why is the treatment of the Eleatic theory divided into two parts? What is the relation between these two parts? What is the relation of each of them with the rest of the inquiry carried out in *Phys.* I? I tackle this issue in Quarantotto (forthcoming), where I suggest that the way in which, in *Phys.* I, Aristotle breaks down the criticism of Eleatic monism and immobilism is functional to the construction of his theory of principles and fits the particular approach of *Phys.* I to this topic.

[20] In section II, I suggest that *Phys.* I is introductory also from a heuristic point of view: it deals with principles that must be tackled first in order to construct a correct theory of principles.

further one that concerns *Physics* I's literary construction. The book is constructed as a relatively completed and autonomous entity: it ends with the claim that its aim has been accomplished and presents what follows it not as a continuation of the inquiry just carried out but as a restart, i.e. a new beginning (192b2–4). Of course, the idea of a beginning followed by another beginning may have a variety of meanings. However, in the light of my initial remarks, a plausible way to understand its occurrence at the end of *Physics* I (on the assumption that these concluding lines are Aristotle's) is that this book has the introductory role of a relatively free-standing treatise. That said, on the other hand, a continuation of *Physics* I's inquiry is needed to accomplish the very aim of *Physics* I: the identification of *distinctively physical* principles of natural things. Moreover, this continuation is already prepared in *Physics* I, especially in chapter 9, where Aristotle distinguishes between the study of form by first philosophy and that by natural science (192a34–b2), and introduces the teleological relation between form and matter (192a16–25), which is a key ingredient in his subsequent inquiry into nature.[21]

In what follows I shall address the issue of the role and significance of *Physics* I by focusing on its overall argumentative strategy, assumptions and relations with other Aristotelian texts.

II. The Argument, its Frameworks and the Status of Aristotle's Principles

The book provides a complex, articulated but unitary argument, whose main conclusion states that there are principles of natural things, what they are and how many they are (192b2–3). This amounts to the well-known Aristotelian theory of matter, form and privation, and to the idea that the principles of natural things are two in one sense (matter – conceived of as that which underlies – and form: 190b17–20, or the two opposites: 190b29–32),[22] and three in another (matter, privation and form: 190b35–191a3).

[21] On this issue, see Lennox in this volume.

[22] These two different ways of counting (form and matter, on one hand, and the two opposites, on the other) do not seem to be on the same level. The first looks like Aristotle's positive achievement, whereas the second seems to be the validation, by means of Aristotle's positive achievement, of the general opinion shared by Aristotle's predecessors that principles are opposites (188a19). Moreover, these two different ways of counting seem to be relative to two different points of view. To count form and matter amounts to focusing both on the principles that are constituents of natural substances conceived of as the result of change (190b20–3) and on the principles from which a substance comes to be (191a4–7). To count the two opposites, on the other hand, amounts either

Physics I is not the only text of Aristotle's corpus where the principles of natural things are dealt with. However, it is the one that provides the longest and most complex argument for the existence, nature and number of the principles that are constituents of natural things:[23] form and matter. If we exclude *Physics* II.3, there are no texts comparable to *Physics* I, from the point of view of its main topic, in the corpus of Aristotle's physical writings,[24] although there are some in his metaphysical writings: *Metaph.* A 3–10 and Λ 2–5 (besides, of course, *Metaph.* Δ 1–2). *Metaph.* Λ 2–5 provides arguments for the principles. However, in so far as the introduction of form and matter is concerned, it is largely a compendium of *Physics* I: *Metaph.* Λ 2 picks up and summarises some central passages of *Physics* I's argumentation, by skipping its doxographical discussion and by connecting the inquiry to issues that it does not tackle. On the other hand, *Metaph.* A 3–10 does not argue for Aristotle's theory of principles but presupposes it and tries to make it more plausible (983b5–6) by arguing that none of Aristotle's predecessors had introduced principles that are of a different kind from his own. To do so, it presents and discusses principles that are only imperfect and approximate versions of Aristotle's principles (*Metaph.* A 7, 10). Further, it is not aimed principally at stressing the differences between these principles and Aristotle's. By contrast, the main purpose of *Physics* I is to argue for a *correct* theory of principles of natural things, i.e. one that, in so far as it is correct, turns out to be different in various respects from the theories of Aristotle's predecessors.[25] For this reason, as we shall see shortly, a long stretch of *Physics* I takes the form of a *diairesis*, or division, whereby the theories of some of Aristotle's predecessors are progressively ruled out.

Further, both *Metaph.* Λ 2 and *Metaph.* A 3–10 provide clues that, with regard to the distinction between form and matter, *Physics* I's argument has epistemic priority over other Aristotelian texts on this topic. That *Physics* I's argument (i.e. a compendium of it) is used as a means or as an

to focusing on the principles as termini of change or to characterising matter in terms of what it, by itself or before acquiring the form, lacks, i.e. as a composite of matter and privation.

[23] I am here relying on the distinction between internal and external principles drawn in *Metaph.* Λ 4.1070b22–4 and Δ 1.1013a19–20.

[24] *Phys.* II, as a whole, does not focus on the distinction between form and matter as such. Rather, it focuses on the roles of form as mover and as goal, and consequently on the roles of matter as moved-mover and as means. Further, even if *Phys.* II deals with the distinction between matter and form, it does not provide an argument for it. Lastly, *Phys.* II does not tackle privation, and mentions it only once (193b19–21).

[25] For a different view on the relation between *Phys.* I and *Metaph.* A 3–10, see Mansion 1961: 40; Barney 2012: 73. Both maintain that the inquiry of *Metaph.* A 3–10 can be seen as in lieu of the argument for the four-cause system that is missing from the *Physics*.