Simple Bodies and Aristotle’s Explanation of Change:

*De Caelo* and *De Generatione et Corruptione*.

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SUMMARY

Why does Aristotle commit to the existence of simple bodies? Why does Aristotle conduct an investigation into simple bodies as part of his natural philosophy? These are the two questions I want to focus on in this dissertation. The answer to these questions, in my view, can be found in Aristotle’s investigations into simple bodies in *De Caelo* and *De Generatione et Corruptione*. On the basis of my interpretation of these two treatises, I argue in this dissertation that Aristotle’s investigation into simple bodies contributes significantly to his explanation of change, and amounts to a single, coherent, systematic account, based in first principles, of all change.

**Chapter 1** argues that Aristotle’s investigation of simple bodies in *De Caelo* is conducted through a cosmic method. This method, as I argue, is for the sake of the completeness and systematicity of his investigation of simple bodies. More specifically, I argue that, only if Aristotle’s investigation of simple bodies is conducted in a cosmological background, can he put forward a systematic investigation of an exhaustive list of the fundamental components of all possible physical things in the universe.

**Chapter 2** argues that, in *De Caelo* I.2, the introduction and differentiation of simple bodies is achieved entirely by differentiating simple motions, and that Aristotle’s aim in *De Caelo* I.2 is to provide an explanatory account of all possible locomotion. This contradicts the traditional interpretation of *De Caelo* I.2, which considers how, and how completely, Aristotle uses the differentiation of simple magnitudes to differentiate simple bodies, and which assumes that he introduces the notion of a simple body independently of the notion of a simple motion. This is why Aristotle identifies simple bodies with the fundamental components of the universe.

**Chapter 3** argues that the simple body that is neither heavy nor light (ether) is excluded from the field of generation and corruption, so that it does not contribute to Aristotle’s explanation of the changes other than locomotion by forming the physical things that are subject to these changes. I argue that the exclusion of ether from the field of generation and corruption is necessary for his overall explanation of the changes other than locomotion, because it leads to the conclusion that only the sublunary simple bodies constitute the corruptible physical things and, in this way, contribute to Aristotle’s explanation of the changes other than locomotion.
Chapter 4 argues that Aristotle’s investigation of simple bodies in *De Caelo* contains a rigorous deduction according to which the number of the sublunary simple bodies is ultimately settled. My reconstruction of this deduction is a refutation of the traditional view, according to which Aristotle has not provided sufficient reasons for the existence of four sublunary simple bodies in *De Caelo*. On the basis of my reconstruction of Aristotle’s deduction of simple bodies in *De Caelo*, it can be answered what are the simple bodies that are going to contribute to Aristotle’s explanation of change.

Chapter 5 argues that the reason why Aristotle moves from his characterization of simple bodies in *De Caelo* to that in *GC* is that his characterization of simple bodies in *De Caelo* is insufficient to support his view that the changes other than locomotion, especially generation and corruption, are everlasting. I argue against the traditional view, which says that Aristotle introduces a new characterization of simple bodies in *GC* because his characterization of simple bodies in *De Caelo* cannot differentiate simple bodies into four groups sufficiently. I argue that it is for the sake of providing us with an explanation of the changes other than locomotion that Aristotle moves on to his characterization of simple bodies in *GC* from that in *De Caelo*.

Chapter 6 investigates why simple bodies have to be investigated in *GC*, and argues that this is because the matter of physical things comes to be from the mixture of simple bodies. While something like this view has been recognized in regard to *Metaphysics* Θ, I argue that this distinction is defended in Aristotle’s theory of mixture in *GC*. This account of the way in which matter comes to be from simple bodies will significantly contribute to our interpretation of Aristotle’s explanation of change.

Chapter 7 explains, on the basis of *Physics* I and *GC* I, how simple bodies contribute to Aristotle’s explanation of changes by forming the matter of physical things. I argue that, only if there is such matter, can the possibility of the substantial changes and the distinction between the substantial changes and other changes be explained. I conclude that, for Aristotle, change cannot be sufficiently explained without his commitment to the existence of simple bodies.
Acknowledgements

Working on a PhD dissertation is like marching on a field of pebbles. One has to concentrate on the difficulties underfoot, otherwise one probably will sprain one’s ankle; it is also important to walk in the right direction, otherwise one may eventually find oneself in a dead end and miss the way. The difficulty of the task is to take care of all of these aspects at the same time. My supervisor, Vasilis Politis, is the guide of this expedition. He did not only contribute significantly to my discovery of the path toward this dissertation, but also reminded me frequently and enthusiastically to have a larger view whenever I was distracted by trivial obstacles from the correct route. I appreciate his guidance, and all his support in the last four years!

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INTRODUCTION

Why does Aristotle commit to the existence of simple bodies? Why does Aristotle conduct an investigation into simple bodies as part of his natural philosophy? These are the two questions I want to focus on in this dissertation. The answer to these questions, in my view, can be found in Aristotle’s investigations into simple bodies in *De Caelo* and *De Generatione et Corruptione*. On the basis of my interpretation of these two treatises, I argue in this dissertation that Aristotle’s investigation into simple bodies contributes significantly to his explanation of change, and amounts to a single, coherent, systematic account, based in first principles, of all change. Following Aristotle’s *De Caelo* and *De Generatione et Corruptione*, this dissertation is divided into two parts. Part I is mainly concerned with Aristotle’s discussion of simple bodies in *De Caelo*. In regard to *De Caelo*, I shall address two principal questions: (1) *Why does Aristotle feel the need to conduct an investigation into simple bodies as part of his natural philosophy?* (2) *What are the simple bodies that are going to contribute to Aristotle’s explanation of change, not only locomotion, but also generation and corruption?*

The first question is, to my knowledge, often neglected in the scholarship. My answer to this question is built on my interpretation of *DC* I.2. I argue that the introduction and characterization of simple bodies in *De Caelo* is achieved entirely through Aristotle’s differentiation of simple motions in *DC* I.2, which serves as an explanatory account of all possible locomotion. This interpretation is significantly different from the traditional interpretation of *DC* I.2. The question that critics tend to ask is: How, and how completely, does Aristotle use the differentiation of simple magnitudes to differentiate simple bodies? (Some critics think he does so in a complete way, others deny this.) Moreover, critics assume that Aristotle introduces the notion of a simple body independently of the notion of a simple motion. This, however, is to miss the point of Aristotle’s argument in *DC* I.2, which, so I argue, is to introduce the notion of simple motions, and to use this notion to introduce the notion of simple bodies, and in this way to provide an explanatory account of all possible locomotion. It is from here, according to my interpretation, that Aristotle sets out to investigate the role that simple bodies play in his explanation of the changes other than locomotion, namely, generation and corruption and the other non-substantial changes (i.e. alternation and growth).
My answer to the second question, namely, what are the simple bodies that contribute to Aristotle’s explanation of change, is built on my interpretation of DC III and IV. According to an influential traditional view, even if it is supposed that a complete list of simple bodies has been put forward in De Caelo, the investigation of simple bodies in De Caelo cannot explain the number of simple bodies within its own context. On the traditional view, a sufficient deduction of the number of simple bodies is not provided until the second book of De Generatione et Corruptione. In opposition to this reading, I propose that, in De Caelo, Aristotle does provide us with a strict deduction of the number of simple bodies that contribute to an explanation of the changes other than locomotion, especially generation and corruption. Accordingly, I provide a reconstruction of this deduction, based on a close reading of DC III and IV.

According to my interpretation, Aristotle’s deduction of the number of simple bodies proceeds on the basis of his differentiation and characterization of simple bodies in DC I.2. By the end of Chapter 2, I arrive at the conclusion that simple bodies are differentiated in accordance with Aristotle’s differentiation of three types of simple motions; and differentiated into three types, that is, the heavy simple body, the light simple body, and the simple body that is neither heavy nor light. Then, I argue that Aristotle arrives at his final list in two steps. First, in Chapter 3, I explain why the simple body that is neither heavy nor light (i.e. what Aristotle calls ether) is excluded from the field of generation and corruption, so that it cannot contribute to Aristotle’s explanation of the changes other than locomotion by forming the physical things that are subject to these changes. Then, in Chapter 4, I explain why, according to Aristotle’s theory of contraries, each of the heavy simple bodies and the light simple bodies, which are the simple bodies that contribute to Aristotle’s explanation of the changes other than locomotion, has to be distinguished further into two kinds of simple bodies, so that we have four corruptible simple bodies in total. My reconstruction of Aristotle’s deduction of the four simple bodies is a direct refutation of the traditional view. It shows explicitly that in De Caelo Aristotle has undertaken a sufficient deduction of an exhaustive list of simple bodies. On the basis of my reconstruction of Aristotle’s deduction of simple bodies in De Caelo, I can answer my second question in regard to De Caelo: What are the simple bodies that are going to contribute to Aristotle’s explanation of change?
Following the tradition of interpretation against which I am going to argue, I call Aristotle’s inquiry into the number of simple bodies in *De Caelo* a deduction. With ‘deduction’, I refer to a series of arguments on account of which Aristotle’s view is sufficiently spelled out and defended. This notion, however, is sometimes misleading, since it may be confused with ‘demonstration’ (ἀπόδειξις). ‘Demonstration’ is a technical term for Aristotle. It refers to the arguments whose premises are first principles of the science (or derived from them) and whose conclusions are therefore theorems of the science. This is, of course, not the case in the context of my discussion in Chapter 3 and Chapter 4. In these two chapters, what I intend to do is to reconstruct Aristotle’s investigation of the number of simple bodies that are going to contribute to his explanation of change. Simple bodies will emerge as the first principles in Aristotle’s overall natural philosophy, but in this investigation of the number of simple bodies, they are the end of the deductions, rather than the start point. For this reason, the deductions through which the number of simple bodies are determined are just deductive justifications of the first principles, rather than demonstrations that are built on the basis of the first principles. This distinction between deduction and demonstration is also applicable to some other similar cases in this dissertation.

In Part II, I turn to *De Generatione et Corruptione*, and ask: *In exactly what way do the four simple bodies contribute to Aristotle’s explanation of change?* I answer this question in Chapters 6 and 7. In Chapter 6, I propose that the way in which simple bodies contribute to Aristotle’s explanation of change is that they form the matter of physical things. Then, in Chapter 7, I argue that only on the supposition that there is such matter, can the possibility of the substantial change, and the distinction between the substantial change and the non-substantial change, be explained. In this way, I show that, for Aristotle, change cannot be sufficiently explained without simple bodies.

My account of the explanatory role that simple bodies play in Aristotle’s theory of change relies crucially on my proposal that, in *De Generatione et Corruptione*, Aristotle distinguishes between the mixture of simple bodies and the homogenous parts of substances. I propose that, for Aristotle, physical things are generated from a mixture of simple bodies, and physical things are directly composed of the homogenous parts of physical things.
According to my interpretation, the homogenous parts of physical things are generated from the mixture of simple bodies. At the same time, I argue that Aristotle does not identify or equate homogenous parts and the mixture of simple bodies; on the contrary, he distinguishes between them, and does so on the grounds that they have different forms. This is because simple bodies are wholly destroyed in the homogenous parts of physical things, whereas they still exist in virtue of themselves in the mixtures from which the homogenous parts of physical things come to be.

This interpretation of the role that simple bodies play in Aristotle’s explanation of change is not entirely new, since there are some critics who have already made a similar point with regard to *Metaphysics* Θ. For example, Makin has identified the homogenous parts of a physical thing as the concurrent matter of a substance, and simple bodies as the pre-existing matter of the substance.\(^1\) However, in Chapter 6, I show that this distinction, or something very similar to it, is present and operative in Aristotle’s theory of mixture in *De Generatione et Corruptione*; and, in Chapter 7, I use this point in regard to the *Physics* and, in particular, the question why *De Generatione et Corruptione* has to supplement the *Physics* (more on this question, later in this Introduction). This, as far as I know, is new. The critics have made a similar point with regard to *Metaphysics* Θ, but nobody, to my knowledge, has made this point with regard to *De Generatione et Corruptione* or with regard to the relation between *De Generatione et Corruptione* and *Physics*.

So far I have outlined my answers to the three questions discussed in this dissertation:

1. *Why does Aristotle feel the need to conduct an investigation into simple bodies in his natural philosophy?*  
2. *What are the simple bodies that are going to contribute to Aristotle’s explanation of change, not only locomotion, but also generation and corruption?*  
3. *In exactly what way do the four simple bodies contribute to Aristotle’s explanation of change?* Of all these three questions, the first two relate to *De Caelo*, while the third one relates to *De Generatione et Corruptione*. In responding to the first question, I show that Aristotle’s investigation into simple bodies is associated with his explanation of change. It is in terms of simple bodies that the variety and the complexity of locomotion is explained. Then, in responding to the second and the third questions, I argue that Aristotle’s investigation also contributes to his explanation of changes other than locomotion. I explain

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\(^1\) Makin 2006, 139-140; 167.
what simple bodies contribute to Aristotle’s explanation of these changes, and how they perform this function. In this way, as we shall see, Aristotle’s investigation of simple bodies in *De Generatione et Corruptione* supplements his investigation of simple bodies in *De Caelo*. We may conclude that the two treatises constitute a systematic investigation into the role of simple bodies in Aristotle’s explanation of change as a whole.

This reading of *De Caelo* and *De Generatione et Corruptione* differs from the traditional view of the relationship between Aristotle’s investigations into simple bodies in these two treatises. According to the traditional view, either Aristotle’s investigation in *De Generatione et Corruptione* means that he has given up on the investigation of *De Caelo*, or, at any rate, that Aristotle deals with different matters in the two treatises and does so in such a way that we cannot suppose a proper continuity or unity between them. Both views deny that the two treatises make up a single, coherent investigation into change; which is, precisely, what I argue that they do. In opposition to this traditional view, I argue that Aristotle’s characterizations of simple bodies in *De Generatione et Corruptione* is a necessary supplement to his investigation into simple bodies in *De Caelo*, upon which it directly builds. This interpretation allows us to develop an alternative understanding of the relationship between *De Caelo* and *De Generatione et Corruptione* than that presumed by the traditional view. According to our interpretation, the two treatises belong together, in this order, and provide a single, coherent, systematic account of all change, based in first principles.

*On the relation to the Physics*

As I shall spell out in the main body of this dissertation, Aristotle initially puts forward, as the conclusions of his investigation of change in the *Physics*, a series of principles with which he will operate in his investigations of simple bodies in *De Caelo* and *De Generatione et Corruptione*. This dissertation does not (except in three particular places) investigate the *Physics*. However, before I begin my formal discussion, it is necessary to situate Aristotle’s investigations in *De Caelo* and *De Generatione et Corruptione* in relation to the *Physics*. 

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In the modern editions of the *Corpus Aristotelicum*, the *Physics* comes before *De Caelo* and *De Generatione et Corruptione*. This arrangement is not without good reason. As Ross points out, in *DC* 275b22 and *GC* 318a2, Aristotle explicitly refers back to *Physics* VIII; in *DC* 303a23, he refers back to his previous discussion of time and motion in *Physics* VI, etc.¹ All these backward references in *De Caelo* and *De Generatione et Corruptione* indicate that, when Aristotle refers back to his discussions in the *Physics*, he must expect his readers to have been familiar with his theories and principles which have already been put forward in the *Physics*.

The reason why Aristotle frequently revisits the principles in the *Physics* is that the issues with which he has dealt in the *Physics* are prior, in the order of the philosophical inquiry into nature, to those in *De Caelo* and *De Generatione et Corruptione*. In the *Physics*, Aristotle offers a careful examination of the central notions of his physical inquiry, such as matter and form, causation, motion, time and space. All these notions are related, in one way or another, to the other particular studies of natural philosophy. The priority of the *Physics* in Aristotle’s natural philosophy is explicitly pointed out in Philoponus’ commentary on this treatise.² According to Philoponus, Aristotle is occupied with the issues that belong to all natural things in common in the *Physics*, but with particular issues of his natural philosophy in the subsequent treatises, such as *De Caelo* and *De Generatione et Corruptione*. Therefore, we may take it as a fact that Aristotle’s investigation into natural things takes its starting point in the *Physics*, and that, in his succeeding investigations in *De Caelo* and *De Generatione et Corruptione*, he follows the principles that he has introduced, and established at any rate up to a point, in the *Physics*.

Change is one of the central notions that is carefully discussed in the *Physics*. Aristotle introduces series of principles in *Physics*, based on his investigation into change. It is, therefore, reasonable to ask: If Aristotle has already carefully investigated change in the *Physics*, why does he still feel the need to develop a systematic account of all change in terms of an investigation of simple bodies in *De Caelo* and *De Generatione et Corruptione*? My answer to this question is that Aristotle’s investigations of change in the *Physics* are much too introductory and general. For this reason, some of their conclusions have to be worked out and sufficiently explained through further investigations; and some have to be

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¹ Ross 1936, 2.
² Philoponus 2006, 23.
complemented by further investigations to become properly adequate. I will spell out these two points with two examples.

According to my interpretation of *De Caelo* and *De Generatione et Corruptione*, Aristotle puts forward a series of explanations for different types of change as the basis of his investigation into simple bodies. It is in terms of these explanations that the role that simple bodies play in Aristotle’s explanation of various types of change will be established in this dissertation.

It is remarkable, as I will show in Chapter 2, that Aristotle’s explanation of the complexity and variety of locomotion comes before his explanations of generation and corruption and any other change. It seems to me that the priority of his explanation of locomotion in the explanations of different types of change has already been introduced in the *Physics*. In *Physics* VIII, Aristotle makes it clear that locomotion occupies a prior position to the other changes, e.g., generation and corruption, alteration, and growth. I note here that it is in *Physics* VIII that Aristotle properly introduces the notion of a simple body, and does so in association with the idea of simple motions, having mentioned simple bodies in passing in book II. This explains why locomotion is explained *first* in Aristotle’s investigations. I cannot discuss this priority, or what is behind it, here, but I would like to mention Odzuck’s *The Priority of Locomotion in Aristotle’s Physics* in which Aristotle’s arguments for the priority of locomotion have been sufficiently defended. According to Odzuck’s interpretation of *Physics* VIII, locomotion has ontological, temporal and essential priority over any other change. First, all changes depend on the first locomotion (i.e. the locomotion of ether and in general the everlasting locomotion), but this locomotion does not depend on them. Secondly, locomotion takes place before the occurrence of any other change. Finally, locomotion is prior to any other change in essence. The priority of locomotion in these aspects, as Odzuck points out, leads to the conclusion that the change which is directly caused by the unmoved mover can only be locomotion.\(^1\) At the same time, this indicates a necessary sequence in Aristotle’s further, more detailed and more adequate explanations of each of these two types of changes (i.e. locomotion and other changes), and in particular the investigations in *De Caelo* and *De Generatione et Corruptione*.

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\(^1\) Odzuck 2014, 11.
In his subsequent investigation into nature, and his accounts of different changes, Aristotle follows this sequence in his detailed explanations. As I will show in the main body of this dissertation, Aristotle first explains the complexity and variety of locomotion, which (as I argue) serves as the basis for his whole differentiation of simple bodies, and then moves on to his explanation of the changes in addition to locomotion, now on the basis of his investigation into simple bodies. This application of the principle that locomotion is prior to any other changes in Aristotle’s detailed explanations of change reveals the limitation of his investigation in the *Physics*. It is true that the principles that will be followed in the subsequent investigations are put forward in this treatise (i.e., *Physics* VIII), but how these principles are to be worked out remains open. Only once those further investigations, such as, in particular, Aristotle’s investigation into simple bodies, that are in conformity with the principles in the *Physics* but go beyond those principles as introduced there, have been conducted can the corresponding principles be sufficiently developed and elaborated. This is my first answer to the question of why Aristotle feels the need to embark on additional investigations beyond his *Physics*.

It seems that Aristotle has already said a lot on the material cause in the *Physics*. For example, in *Physics* I, in his response to the Eleatic challenge to the existence of change, Aristotle identifies the matter as the underlying thing of a change,¹ and argues that it is necessary to commit to the existence of matter in any change, otherwise the possibility of change will be radically challenged in the way the Eleatics argue. In *Physics* II, the notion of matter is characterized as the material cause of a natural thing. Since matter has been frequently discussed in the *Physics*, one may wonder, why Aristotle still feels the need to embark on an investigation of this notion in *De Caelo* and *De Generatione et Corruptione*. In other words, one may wonder why matter is still a question after the *Physics*.

The answer to this question (so I argue on the basis of the overall argument of this dissertation) is that Aristotle’s account of matter in the *Physics* is not adequate as it stands and is in need of supplementation by certain further investigations. This problem is most clear in Aristotle’s theory of matter in *Physics* I. It is in this book that the notion of matter is introduced into Aristotle’s natural philosophy and characterized, at this stage, as an entity

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¹ As we shall see in Chapter 7, the underlying thing, or substratum, of a change, strictly speaking, is a complex of privation and matter. But since privation is a non-being in virtue of itself, the underlying thing, in virtue of being the complex of privation and matter, can be identified as matter in a loose sense.
that is a being in one way but a non-being in another way. This characterization of matter, as we shall see in Chapter 7, serves as Aristotle’s response to the Eleatic challenge to the possibility of change in the Physics. At the same time, Aristotle is well aware that this characterization of matter is incomplete, since it remains unclear what the relationship between the matter and the form of a hylomorphic compound is. For this reason, immediately after his characterization in Physics I.8, Aristotle anticipates an alternative characterization of matter in terms of actuality and potentiality.\(^1\) This is just what is picked up in GC I.3, where the matter in a generation simpliciter is defined as the potential substance, which is going to be generated but is not this substance yet in actuality. In my view, the reason why Aristotle is compelled to reconsider the notion of matter in the treatises after the Physics is that what he has achieved in the Physics is not sufficient or adequate. As I will show in § 7.3.1 in my formal discussion, his new definition in GC I.3 opens a way in which matter can be directly related to a form. As a potential entity, matter can be actualized by receiving a form. In this way, in terms of the notions of actuality and potentiality, the gap between matter and form, which is left hanging in Physics, can be ultimately bridged in De Generatione et Corruptione.

This example indicates that Aristotle’s investigations in the Physics may not be sufficient or adequate by themselves, even though they do provide the starting point. It is for this reason that Aristotle feels the need to supplement the principles that have been established in Physics with further accounts. If we associate this example with the first one, then, from both of these examples, we can begin to understand why Aristotle feels the need, after the Physics, to move on to De Caelo and De Generatione et Corruptione (and to other treatises on natural philosophy), in order to take substantially further the project of the Physics.

**Summaries of each chapter**

**Chapter 1**

In this chapter, I argue that Aristotle’s investigation of simple bodies in De Caelo is conducted through a cosmic method. This method, as I argue in this chapter, is for the sake of the completeness and systematicity of his investigation of simple bodies. More

\(^1\) Cf. Physics I.8, 191b27-29.
specifically, I argue that, only if Aristotle’s investigation of simple bodies is conducted in a cosmological background, can he put forward a systematic investigation of an exhaustive list of the fundamental components of all possible physical things in the universe. Since the completeness and the systematicity are vital to Aristotle’s overall inquiry into the simple bodies, my investigation of the cosmological background in this chapter will serve as a proper start point of an interpretation of his systematic investigations of simple bodies in both De Caelo and in De Generacione et Corruptione.

Chapter 2

The thesis of this chapter is that, in De Caelo I.2, the introduction and differentiation of simple bodies is achieved entirely by differentiating simple motions, and that Aristotle’s aim in De Caelo I.2 is to provide an explanatory account of all possible locomotion. This contradicts the traditional interpretation of De Caelo I.2, which considers how, and how completely, Aristotle uses the differentiation of simple motions to differentiate simple bodies, and which assumes that he introduces the notion of a simple body independently of the notion of a simple motion. This is to miss the point of Aristotle’s argument in De Caelo I.2, which—so I argue—is to introduce the notion of simple motions, to use this to introduce the notion of simple bodies, and in this way to provide an explanatory account of all possible locomotion. This is why Aristotle identifies simple bodies in this chapter with the fundamental components of the universe.

Chapter 3

In this chapter, I argue that the simple body that is neither heavy nor light (i.e. what Aristotle calls ether) is excluded from the field of generation and corruption, so that it does not contribute to Aristotle’s explanation of the changes other than locomotion by forming the physical things that are subject to these changes. I argue in this chapter that this exclusion of ether from the field of generation and corruption is necessary for Aristotle’s overall explanation of the changes other than locomotion, because it leads to the conclusion that only the sublunary simple bodies, no matter what they are, constitute the corruptible physical things and, in this way, contribute to Aristotle’s explanation of the changes other than locomotion.

Chapter 4
In this chapter, I argue that Aristotle’s investigation of simple bodies in *De Caelo* contains a rigorous deduction according to which the number of the sublunary simple bodies is ultimately settled. My reconstruction of this deduction is a direct refutation of the traditional view, according to which Aristotle has not provided sufficient reasons for the existence of four sublunary simple bodies in *De Caelo*. My reconstruction, on the contrary, shows explicitly that in *De Caelo* Aristotle has undertaken a sufficient deduction of an exhaustive list of simple bodies. On the basis of my reconstruction of Aristotle’s deduction of simple bodies in *De Caelo*, it can be answered what are the simple bodies that are going to contribute to Aristotle’s explanation of change.

Chapter 5
In this chapter, I argue that the reason why Aristotle moves from his characterization of simple bodies in *De Caelo* to that in *De Generatione et Corruptione* is that his characterization of simple bodies in *De Caelo* is insufficient to support his view that the changes other than locomotion, especially generation and corruption, are everlasting. My interpretation of the relation between Aristotle’s two characterizations of simple bodies (i.e. in *De Caelo* and in *De Generatione et Corruptione*) significantly differs from existing views. On the traditional view, Aristotle introduces a new characterization of simple bodies in *De Generatione et Corruptione* because his characterization of simple bodies in *De Caelo* cannot differentiate simple bodies into four groups sufficiently. The traditional view, I argue, fails to recognize that both of Aristotle’s two characterizations of simple bodies contribute to a single, coherent and systematic account, based in first principles, of all change. According to my interpretation, it is for the sake of providing us with an explanation of the changes other than locomotion that Aristotle move on to his characterization of simple bodies in *De Generatione et Corruptione* from his first characterization of simple bodies in *De Caelo*.

Chapter 6
In this chapter, I consider why simple bodies have to be investigated in *De Generatione et Corruptione*. According to my interpretation, this is because the matter of physical things comes to be from the mixture of simple bodies. This interpretation of the role that simple bodies play in Aristotle’s explanation of natural substances and their changes is not entirely new, since there are some critics who have already made a similar point with regard to
Metaphysics Θ. For example, Makin has identified the homogenous parts of a physical thing as the concurrent matter of a substance, and simple bodies as the pre-existing matter of the substance. In this chapter, however, I argue that this distinction, or something very similar, is present and operative in Aristotle’s theory of mixture in De Generatione et Corruptione. This clarification of the way in which matter comes to be from simple bodies will significantly contribute to our interpretation of Aristotle’s explanation of change. As it will be finally shown in Chapter 7, it is by forming the matter of physical things that simple bodies contribute to Aristotle’s explanation of change.

Chapter 7
In this chapter, I explain how simple bodies contribute to Aristotle’s explanation of changes by forming the matter of physical things. This view is established on the basis of my interpretation of Aristotle’s explanation of change in Physics I and GC I. I argue that, only if there is such matter, can the possibility of the substantial changes and the distinction between the substantial changes and the non-substantial changes be explained. Since, as has been shown in Chapter 6, the matter of physical things comes to be from the mixture of simple bodies, I show in this chapter that, for Aristotle, change cannot be sufficiently explained without his commitment to the existence of simple bodies.
Part I

The investigation into the simple bodies, or the corporeal elements of the universe, constitutes the lion’s share of *De Caelo*, which shows that it occupies a significant place in Aristotle’s inquiry into the universe, or the heavens, as the title of this treatise indicates. However, scholars do not usually recognize that the investigation into simple bodies carried out in *De Caelo* is an overture to the investigation in *De Generatione et Corruptione*. In the view of these critics, the investigation into simple bodies in this treatise lacks completeness and strictness.¹ This is the view against which I shall argue in this part. In my view, even if the treatise itself is not strictly independent, it does not follow that the investigation into simple bodies that it contains, especially the deduction of the number of the simple bodies, is incomplete. In fact, the investigation into simple bodies in *De Caelo* is not only complete and strict, but even more ambitious than that undertaken in *De Generatione et Corruptione*. It is in *De Caelo* that Aristotle indicates, for the first time, why the notion of simple body has to be committed to, and derives an exhaustive list of the corporeal elements of the whole universe from this explanation.

In order to demonstrate the completeness and strictness of Aristotle’s ambitious investigation, I shall reconstruct his arguments according to the following sequence. (1) I shall first introduce the cosmological character of the characterization of simple bodies in *De Caelo*. (2) Then I will proceed to consider the reasons for Aristotle’s commitment to the existence of corporeal elements of the universe in view of the way in which simple bodies are characterized in *De Caelo*. (3) Finally, I will determine the number of corporeal elements to which Aristotle must be committed. In this way, I will show that *De Caelo* contains a systematic and complete investigation into the simple bodies, which starts from an argument for Aristotle’s commitment to the existence of simple bodies, and ends with an exhaustive list of the simple bodies of which the whole universe consists. If this is correct, then it provides us with the prospect of reconsidering the relationship between the two investigations into simple bodies carried out in *De Caelo* and *De Generatione et Corruptione*.

¹ See Solmsen 1960, 295; Berman 2018, 3, n. 6; Gill 2009, 145.
1. The Cosmological Background of the Investigation in De Caelo

*De Caelo* is the main treatise upon which I will focus in this part of the dissertation. It marks a fresh start for Aristotle’s investigation into the science of nature. Compared to the *Physics*, in which only the fundamental aspects of natural science are considered, *De Caelo* develops and employs a totally new strategy.¹ It is in *De Caelo* that the corporeal elements are designated as the simple bodies in the natural world. Though the aim of *De Caelo* is controversial, all inquiries conducted in the treatise, including the investigation into the simple bodies of the universe, serve as an explanation of the whole universe, and, therefore, are equipped with a cosmological character.

It is remarkable that Aristotle’s investigation of simple bodies in *De Caelo* is conducted according to a cosmological method. This method, as I shall argue in this chapter, is for the sake of the completeness and systematicity of his investigation into simple bodies. More specifically, I argue that, only if Aristotle’s investigation into simple bodies is conducted with a cosmological background, can he put forward a systematic investigation of an exhaustive list of the fundamental components of all possible physical things in the universe. Otherwise, if just a number of physical things were analysed, we would not be able to suppose that these samples contain all elements to be discerned. In this way, by sketching the cosmological background of Aristotle’s investigation into simple bodies, this chapter lays a firm foundation for a complete and systematic inquiry into simple bodies.

In this chapter, I shall first introduce the cosmological character of the investigation into simple bodies in *De Caelo* by pointing out the aim of this investigation. It is correct that this cosmological character is essential to the investigation into the simple bodies in *De Caelo*. Before examining this investigation *per se*, however, it is necessary to clarify what exactly the notion of universe which is to be analyzed means, and how this cosmic view is introduced. Thus, in the second section of this chapter, I shall elaborate the notion of the universe, and the way in which this notion is put forward. Insofar as the investigation contributes to a more ambitious inquiry into the whole universe, as I shall ultimately argue, it is possible to obtain an exhaustive list of the elements of which the whole universe is composed. This is the way in which the cosmological background contributes to the investigation into simple bodies in *De Caelo*. We shall see why this is necessary; for as I

shall argue in this dissertation, owing to the fact that the completeness and the systematicity
are vital to Aristotle’s overall inquiry into the simple bodies, my clarification of the
cosmological background in Chapter 1 will serve as a proper starting point of his systematic
investigations into simple bodies in both *De Caelo* and *De Generatione et Corruptione*.

1.1 The subject matter of *De Caelo*

Before stepping into my formal discussion of Aristotle’s investigation into simple
bodies in *De Caelo*, I would like to highlight the significance of this investigation in this
treatise. As I shall argue, mainly on the basis of Simplicius’ commentary on this treatise,
Aristotle’s investigation into simple bodies, which represent the constituents of the whole
universe, is given pride of place in a treatise called *On the Heavens* [sc. *De Caelo*]. The
fact that this investigation is conducted in a work on cosmology suggests that it is against
a cosmological background and according to a cosmological method that such an
investigation is conducted.

The debate surrounding the subject matter of *De Caelo* can be traced back to ancient
times. According to Simplicius’ report and commentary, commentators before him can be
split into three camps.\(^1\) Alexander of Aphrodisias allocates the subject matter of *De Caelo*
to both the whole universe and its simple bodies. Thus, the investigation into the heavenly
elements and the sublunar elements are of equal or comparable significance. Iamblichus
also agrees that Aristotle, in this treatise, concerns himself with the terrestrial elements and
their powers, but in his opinion, the reason why terrestrial simple bodies are investigated is
that they are governed by the superlunar world. It is not due to their intrinsic interest that
the terrestrial simple bodies are investigated under the title *On the Heavens* [sc. *De Caelo*].
The status of the study of the terrestrial world is even further denigrated by Syrianus and
his followers, according to whom it is for the sake of contributing to the study of the
heavenly bodies that the sublunar bodies are investigated.

Simplicius elaborates his own understanding on the basis of his critique of these views.
Against Alexander, he points out that, since each of Aristotle’s treatises concerns a single
subject, Aristotle will not address the whole universe and its fundamental components,

\(^1\) The ancient readings of the subject matter of *De Caelo* can be found in Simplicius 2002, 19-24.
which are two distinct, but related, subjects, in a single treatise. Moreover, according to Simplicius, even if the whole universe were the subject matter of *De Caelo*, Aristotle would not deal with everything about the universe in a single treatise, as Plato does in *Timaeus*. As Simplicius points out, in Plato’s *Timaeus*, “he treated both of the principles of natural objects, matter and form, motion and time, and of the general composition of the world, and gave a particular account both of the heavenly bodies and of those below the moon […]”¹ But it is obvious that the principles of natural objects are not investigated in *De Caelo*. This indicates that Aristotle has not considered different aspects of the universe in *De Caelo* alone. In this way, Simplicius makes his point loud and clear that we cannot agree with Alexander that *De Caelo* concerns both the whole universe and its fundamental components.

With regard to the discussion of sublunary simple bodies, Simplicius gives three reasons for thinking that they are studied in their own right, rather than for the sake of the study of the heavenly bodies. Firstly, the exposition of sublunary simple bodies is substantially longer than the exposition of the heavenly simple bodies in this treatise. Secondly, having discussed the heavenly simple bodies in the first two books, Aristotle restates the prologue of *De Caelo* at the beginning of the third book and proceeds with his investigation into sublunary simple bodies, which indicates that the inquiries share the same subject. Moreover, at both 298b6-8 and in the prologue to the *Meteorologia* (338a20-25), where the structure of *De Caelo* is outlined, the investigation into the heavenly simple bodies and the investigation into the terrestrial simple bodies are treated as being on a par, rather than the one being subordinate to the other. Therefore, according to Simplicius, the subject of *De Caelo* is neither the whole universe nor solely the superluniary world, but all kinds of simple bodies, which represent the constituents of the whole universe.²

The aim of this section is not to give a detailed account of the subject matter of *De Caelo*, as a whole. Though I agree with Simplicius’ view on this matter, my aim in quoting his report and commentary is to show that, in *De Caelo*, even if it is not the sole thesis of the treatise, it has been generally accepted by the scholarship that the investigation into simple bodies is given pride of place, and contributes to an inquiry into the whole universe. This is a crucial reminder that the investigation into simple bodies in *De Caelo* is conducted

¹ Simplicius 2002, 21
² ibid, 21-22.
against a cosmological background from the outset. As we shall see, this investigation
benefits greatly from its purpose of inquiring into the whole universe. Before stepping into
a detailed discussion of the investigation itself, it is necessary to clarify what exactly the
employed notion, viz., the universe, is, and in what way, according to Aristotle, we can
make sense of this notion. In the next section, I shall exhibit how the notion of the universe,
as the subject out of which the elements are analyzed, is introduced.

1.2 The way in which the cosmological background is introduced

The cosmological character of the investigation into the elements in De Caelo is salient.
Even before the term ‘element’, or ‘simple body’, appears, a chapter length clarification of
the notion of totality (tò πᾶν), or the universe,\(^1\) has already been presented to the reader. It
seems to be a proper starting point from which the elements of the universe are to be
analyzed and achieved. Nevertheless, if we, even in a rough way, read DC I.1, in which the
notion of totality is introduced, it may be curious that a large part of this chapter concerns
bodies, and, in particular, explaining why bodies are complete magnitudes. This may be
surprising, but as I shall argue, because the notion of the universe is quite difficult for us
human beings to grasp, it is necessary to provide us with a procedure through which the
meaning of this notion can be comprehended. Through his discussion of the completeness
of bodies, Aristotle gradually arrives at the notion of completeness and proceeds further to
reveal what the real complete thing, i.e. the universe, is. No less important is that this
procedure confirms the method outlined at the beginning of Physics I.1. It is through this
procedure that the meaning of the notion of the totality is initially exposited.

Before I enter into my formal discussion in this section, I would like to point out that
it is for the sake of a forthcoming investigation of simple bodies that the notions of body
and totality are considered in § 1.2. This motivation makes my discussion in this section
clearly different from a series of works on Aristotle’s concept of body. For example, in
Pfeiffer’s new book Aristotle’s Theory of Bodies, he has made a great contribution to our
understanding of the notion of body in Aristotle’s natural philosophy. But as the author
himself admits, “it is not a study of the elements, living beings, or generally physical

\(^1\) Since the universe is the most complete thing and contains everything, it is also called the totality
(tò πᾶν) in the Corpus Aristotelicum, e.g. 268a11.
substances. It is [...] a study of what belongs to them insofar as they are all bodies.¹ In this way, the role that simple bodies play in Aristotle’s natural philosophy is untouched in Pfeiffer’s treatment. In contrast with Pfeiffer’s account, however, what I am going to do (in this section) is set out the cosmological background against which the fundamental constituents of the totality are investigated. This is an important part of my interpretation of Aristotle’s investigation into simple bodies. Now I shall turn to the explanation of how the notions of body and totality are introduced in DC I.1.

1.2.1 From the complete magnitude to the totality

Having introduced the subject matter of the science of nature, namely “bodies and magnitudes, and their properties and changes, and all the principles of this kind of substance”,² Aristotle proceeds to explain what a body is. He says:

Now a continuum is that which is divisible into parts always capable of subdivision, and a body is that which is every way divisible. A magnitude if divisible one way is a line, if two ways a surface, and if three a body. (268a6-8)³

In this passage, Aristotle maintains that every magnitude is a continuum. Due to being infinitely divisible, things are continuous. Magnitudes can be divided in various dimensions. On account of the ways in which they are divisible, they fall into three kinds: line, surface and body. Body is the kind of continuous magnitude that is divisible in all three dimensions. In other words, what makes bodies different from other kinds of magnitudes is that they are continuous in three dimensions, or determined by the number ‘three’.⁴

Threeeness not only differentiates bodies from lines and surfaces, but also renders them the most complete magnitudes.⁵ According to the customs of the day, i.e. Pythagorean

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² DC I.1, 268a1-4: Ἡ περί φύσεως ἐπιστήμη σχεδὸν ἡ πλείστη φαίνεται περί τε σώματα καὶ μεγέθη καὶ τὰ τοίτων ὀσσα πάθη καὶ τάς κινήσιςς, ἐπὶ δὲ περί τὰς ἀρχάς, ὅσα τίς τοιαύτης ὀσσίς εἰσίν.
³ This passage may be involved in the ‘body problem’ as Studtmann claimed. More specifically, according to his reading, body is argued to be both a quantity and a substance in Aristotle’s philosophy. See Studtmann 2002, 211-234. If this is the case, then in this passage above, τοιαύτης should refer to σώματα, as Pfeiffer claims. See Pfeiffer 2018, 78. Therefore, Aristotle here attributes bodies to substance while later in the following passage they are described as quantities. However, as I shall argue later, the bodies and magnitudes here refer to natural bodies or bodies and magnitudes that have a principle of movement.
⁴ Συνεχὲς μὲν οὖν ἔστι τὸ διαμετέρον εἰς ἄει διαμετέρα, σῶμα δὲ τὸ πάνη διαμετέρον. Μεγέθους δὲ τὸ μὲν ἔρι ἐν γραμμή, τὸ δ’, ἐπὶ δύο ἐπίπεδον, τὸ δ’ ἐπὶ τρία σώμα·
⁵ DC I.1, 268a11: τοῖς τρεῖν ὄρισται.
⁶ DC I.1, 268a22-23: τὸ σῶμα μόνον ἄν εἰη τῶν μεγεθὸν τέλειον.
rituals and daily linguistic usage, Aristotle proposes that ‘three’ is equivalent to all.\(^1\) Since a magnitude can, at most, extend in three dimensions, and no further dimensions are thinkable, according to his knowledge of geometry,\(^2\) bodies possess the completeness which other types of magnitudes lack. Since there are no more than three dimensions for magnitude, even if the aggregation of lines generates a surface, and the aggregation of surfaces generates a body, it still cannot be the case that the totality, or the universe, which consists of all individual bodies has more than three dimensions.\(^3\) In this way, Aristotle identifies three dimensions with completeness, and further relates bodies to the universe, for both the universe and bodies are, to some extent, complete, though the universe is complete in an absolute way while bodies are complete only with respect to dimensionality. Furthermore, by comparing the whole universe with particular bodies in the universe, Aristotle explicates the sense in which particular bodies are incomplete, and, thus, highlights the absolute completeness of the universe. He says:

But each is determined relatively to that part which is next to it by contact, for which reason each of them is in a sense many. (268b7-8)

According to Simplicius, in this passage Aristotle distinguishes body as the complete magnitude from the totality by “saying that of bodies on the one hand some are parts and have retained the form of a part, while on the other hand there is also the whole of which these are parts”.\(^4\) In other words, even though bodies possess the character of completeness in dimensionality, each of them is still in the universe and one of many parts of the universe. Insofar as these bodies are parts, they are not a whole which consists of these parts. Therefore, the whole, or the totality of everything, possesses the maximum extent of completeness. It is by appealing to the notion of completeness that the most complete thing, viz. the whole universe, which is complete both in dimensionality and in

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\(^1\) \textit{DC} I.1, 268a9-10: τὸ τῶν τρία πάντα εἶναι καὶ τὸ τρίς πάντη; \(a23-24\), μόνον γὰρ ὄριστι τοῖς τρισίν, τοῦτο δ’ ἐστι πᾶν.

\(^2\) On the development of our knowledge concerning multidimensionality, see Cajori 1926, 397-406.

\(^3\) See \textit{DC} I.1, 268a28-b5. It is still controversial whether in this passage Aristotle commits himself to a transition from a lower-dimensional magnitude to a higher-dimensional magnitude. See Leggatt 1995, 174.

\(^4\) Simplicius 2002, 29. This is correct, but neglects the question of the sense in which limitation by contact can make a body many and incomplete. In his interpretation of this passage, Leggatt refers to \textit{Physics} VI.1, 231b2 and claims that in the present lines, what is in contact are parts of the things that are in contact. Hence, a body has as many parts as its neighbouring bodies that are in contact with it. See Leggatt 1995, 175. However, if it is because of having parts that a body is incomplete and is many, then for the same reason, the totality would be incomplete and would be many as well, for all things in the universe are parts of the totality.
integrity, is introduced and becomes an object of consideration.

The introduction of the totality lays a stable foundation for the further investigation into the corporeal elements. It is on the basis of an analysis of the universe that the elements are differentiated and the exhaustive list of the cosmic elements is provided. However, instead of proceeding to a formal investigation into Aristotle’s doctrine of the elements, I propose to attend to a consideration of why this introduction of the totality has to start from a clarification of the definition of body and magnitude. As we shall see, the reasons for this arrangement are rooted in his general method for natural inquiries. By explicating these reasons, I will establish how Aristotle advances from his general method to the first move in his investigation into elements.

1.2.2 An application of the general method of natural philosophy

Aristotle’s procedure here of introducing the concept of the totality is deliberate. It corresponds to the general method of inquiry for physical investigations. In *Physics* I.1, having introduced the objects of his natural philosophy, Aristotle spells out the appropriate method of inquiry:

The natural way of doing this [sc. to determine what relates to the principles of natural science] is to start from the things which are more knowable and clear to us and proceed towards those which are clearer and more knowable by nature. (184a16-17)\(^1\)

The passage above mirrors another passage in *Posterior Analytics* I.2, where Aristotle also emphasizes that an investigation into nature should start from what is more knowable and clearer to us, and proceed to what is clearer by nature. He says:

Things are prior and more familiar in two ways; for it is not the same to be prior by nature and prior in relation to us, nor to be more familiar and more familiar to us. I call prior and more familiar in relation to us what is nearer to perception, prior and more familiar simpliciter what is further away. (71b34-a4) \(^2\)

Aristotle is more expansive in the passage just quoted. Here he explicitly identifies what is more knowable and clear to us with “what is closer to sense perception”, and what is clearer and more knowable by nature with “what is further away” from our sense perception. If we realize that bodies are that which is closer to our sense perception, while the totality is that which is further away, as we shall see immediately, both of these identifications will

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\(^2\) Cf. *Topica* VI.4, 141b5-14.
contribute to our understanding of the necessity of starting from a formulation of ‘body and magnitude’ in the introduction of the totality in DC I.1.

According to the method recommended, even though DC I.1 aims to render the totality as the thing that possesses absolute completeness, it is still necessary for Aristotle to spend the majority of this chapter talking about bodies, and, in particular, clarifying why bodies are the most complete magnitudes. This is because natural investigations should start from investigating that which is knowable to us and closer to our sense perception. In terms of being the most conspicuous thing to our sense perception, bodies are such things, or properly speaking, are aspects of such things. It is through our contact with bodies that our sense organs are stimulated and generate sense perceptions.¹ If a thing does not have a body, it cannot be an object of our sense perception at all. Therefore, to the extent that a thing is perceptible, we realize that that thing must have a body. It is in this sense that possessing bodies is the most conspicuous character of a physical thing to our sense perception.

On the contrary, the totality, understood as the ultimate completeness, which is introduced in DC I.1, is far beyond our sense perception. None of our sense organs has the ability to perceive the universe as a whole. Therefore, since only what is near to our sense perception is that which is more knowable and clearer to us, the totality must conversely belong to that which is much too difficult for men’s understanding to start with. In order to introduce the notion of totality into the system, we must begin by considering something nearer to our sense perception. Not all aspects of the totality are far from our sensation. Insofar as being that which is more knowable and clearer to us, the aspect of having a body is the sort of thing we should start with. It may be objected that having a body is not what defines the universe, because, even if the universe, which consists of all bodies, has a body, it is not because it has a body that the universe is a universe; it is, rather, because it is the totality of things. However, as we have seen in the previous section, by analysing bodies, one of the most defining characteristics of the totality is revealed, namely its completeness. In this way, the delineation of the notion of body, though lengthy in DC I.1, provides us with a chance to approach an understanding of the totality. It is by means of considering a

¹ A general discussion can be found in Byrne 2018, 11. He argues: “all perception, he [sc. Aristotle] argues, requires contact between the object perceived and a sense organ, whether directly or through intermediate bodies”.

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particular aspect of the totality, namely having a body, which is more knowable and clearer to us, that we gradually focus on the totality itself, and get an impression of its absolute completeness; and it is in virtue of this that the notion of the totality is fundamentally defined.

The notion of the totality, or the universe, is introduced in accordance with the general method set out in the preamble of the *Physics*. Up to now, even though we hardly know anything more about the notion of the universe than that it is complete, the introduction of this notion, as we shall see, still underpins the further investigation into simple bodies with a cosmological background. In the next section, I shall explain the way in which this cosmic view contributes to the investigation into simple bodies.

1.3 The significance of the cosmic view

Having pointed out that the investigation into simple bodies in *De Caelo* is part of an inquiry into the universe, and how the cosmological background of this investigation is underpinned, I am now in a position to consider why Aristotle feels obliged to investigate simple bodies from a cosmic point of view.

First, Aristotle’s predecessors were notoriously at loggerheads over the question of what exactly the most fundamental components of the universe are, especially those which are subjects to generation and corruption, if indeed we suppose that there are such changes; or as Aristotle himself puts it, “earlier seekers after truth have differed from one another.”

Since Aristotle is a philosopher with a strong sense of the history and tradition of philosophy, it is natural for him to conduct his own inquiry into the basic constituents of the universe as a response to the “earlier seekers”.

Furthermore, it is necessary for Aristotle to conduct his investigation into the number of simple bodies from a cosmic point of view. More specifically, for the sake of having in view all possible elements to be investigated, the objects that the elements compose need to be analysed. The objects of this analysis, however, should not be merely a number of physical things, since we cannot simply suppose that these samples, as it were by a stroke

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1 *DC* III.1, 298b14.
of good fortune, contain all the elements. In order to avoid the situation in which some of the elements remain undiscovered because of a limited sample, the only solution is to consider all possible physical things. Since all possible physical things, or the totality of physical things, is precisely the universe, when the elements are investigated, it is the whole universe, rather than some part, or parts, of it, that must be analyzed. In other words, only if the whole universe, or the totality, is investigated, can we be confident that an exhaustive list of the elements of all possible natural bodies has been achieved. Therefore, it is necessary for an investigation into the elements to take a cosmic view. This is precisely what Aristotle does in the *De Caelo*.

It is reasonable to worry that a cosmological approach would lead to a denigration of the investigation into simple bodies in *De Caelo*; for, given the cosmological perspective, the investigation would be for the sake of the universe, rather than for the sake of the simple bodies themselves. Nevertheless, as I have been at pains to show, the cosmological scheme, instead of being a limitation, rather makes it possible for Aristotle to produce an exhaustive list of the simple bodies that compose all possible natural things. Owing to the cosmological background against which the investigation is conducted, Aristotle eventually obtains an exhaustive list of the most fundamental components of the whole universe. This is what this investigation owes to the cosmological background. It is for this reason that the notion of the totality is set down as a firm foundation on which the investigation into simple bodies can be conducted.

Beginning in the next section, I will turn to Aristotle’s characterisation of simple bodies itself. First, in Chapter 2, I shall examine the way in which the differentiation of simple bodies contributes to the explanation of locomotion. Then, in Chapters 3 and 4, I shall determine the complete list of the simple bodies on the basis of Aristotle’s characterization of simple bodies in *De Caelo*. 
2. Simple Bodies as Corporeal Elements

According to what has been revealed in §1.2.1, the universe, up to now, is a three-dimensional totality of all possible things, its components, and the nature of those components, however, remain unknown. Because of this, an investigation into the primary components, or the simple bodies, of the universe is immediately undertaken. It begins in DC I.2, which follows closely on from the introduction of the totality in DC I.1, with the aim of inquiring into the universe. In this chapter, I shall mainly consider the question of why Aristotle thinks it is necessary to regard some of the natural bodies, viz., simple bodies, as the components of other natural bodies.

The thesis of this chapter is that, in DC I.2, not only the differentiation but also the introduction of simple bodies is achieved entirely by distinguishing simple motions. This contradicts two traditional views in the literature. First, some critics hold that Aristotle uses the differentiation of simple magnitudes to differentiate simple motions and, thereby, simple bodies. Secondly, some critics take the view that the existence of simple bodies has already been committed to by Aristotle independently of the notion of simple motions. In opposition to the first view, I argue that, in DC I.2, simple bodies are differentiated in terms of the differentiation of simple motions, rather than the differentiation of simple magnitudes; simple magnitudes only provide the materials for describing the simple motions of simple bodies. In opposition to the second view, I argue that Aristotle’s commitment to the existence of simple bodies is based entirely on the role that simple motions play in his explanation of the complexity and variety of all possible locomotion. As I shall spell out in this chapter, since simple motions are those which would successfully account for all the variety of locomotions, and each of the simple bodies is identified as a proper subject of a simple motion, the existence of simple bodies contributes significantly to an understanding of the complexity and variety of all possible locomotion in the world. On the basis of these new observations of Aristotle’s arguments in DC I.2, I am in the position to argue that Aristotle’s aim in the chapter is to provide an explanatory account of all possible locomotion.

This thesis that simple bodies contribute to Aristotle’s explanation of all possible locomotion is, I believe, new. Indeed, to my knowledge, none of the existing interpretations of this passage come close to recognizing what Aristotle is doing here. According to my
interpretation, the point of Aristotle’s arguments in DC I.2 is (1) to introduce the notion of simple motions in terms of an analysis of all possible locomotion, rather than the distinction of simple magnitudes; (2) to use the notion of simple motion to introduce the notion of simple bodies; and (3) to provide an explanatory account of all possible locomotion. It is this explanatory project that explains why Aristotle identifies simple bodies in this important chapter with the fundamental components of the universe. This is what matters in Aristotle, and it is what ought to matter, principally and primarily, to us for our understanding of Aristotle and his argument here. Only if we recognize the gist of Aristotle’s argument in DC I.2 can we properly consider the question of how, and how completely, Aristotle uses the differentiation of simple motions to differentiate simple bodies, and thereby assess the different accounts in the literature in response to this question.

In order to spell out the way in which simple bodies contribute to an explanation of the complexity and variety of all possible locomotion, in the first section of this chapter, I shall begin by spelling out the way in which simple motions contribute to explaining the complexity and variety of locomotion. Then, in §2.2, by explaining why it is the case that each of the types of simple motions, as the fundamental factors to which all possible natural motions are reduced, must be assigned to one and just one type of simple body, I shall come to the specification of the way in which the notion of a simple body contributes to an explanatory account of the locomotion of all possible physical things. Finally, in §2.3, I shall consider and argue against traditional interpretations of DC I.2.

2.1 Simple bodies and the differentiation of simple motions

In this section, I shall examine the role that simple bodies play in explaining the complexity and variety of the locomotion of all possible physical things by examining the way in which the notion of a simple body is developed in DC I.2. This notion, which is identified with the fundamental components of the universe, is introduced in the first section of this chapter. It is in this section that Aristotle, for the first time in De Caelo, asserts that the universe is composed of simple bodies, and reveals the way in which they are recognised on the basis of the differentiation of simple motions. For convenience of discussion, I quote the entire passage below:
[1] We will now speak of those parts of the whole which are specifically distinct. Let us take this as our starting-point. For (γὰρ) all natural bodies and magnitudes we hold to be, as such, capable of locomotion; for nature, we say, is their principle of movement. [2] But all movement that is in place, all locomotion, as we term it, is either straight or circular or a combination of these two which are the only simple movements. [3] And the reason (αἰτία) is that these two, the straight and the circular line, are the only simple magnitudes. [4] Now revolution about the centre is circular motion, while the upward and downward movements are in a straight line, ‘upward’ meaning motion away from the centre, and ‘downward’ motion towards it. [5] All simple motion, then, must be motion either away from or towards or about the centre. [6] This seems to be in exact accord with what we said above: as body found its completion in three dimensions, so its movement completes itself in three forms.

[7] Bodies are either simple or compounded of such; and by simple bodies I mean those which possess a principle of movement in their own nature, such as fire and earth with their kinds, and whatever is akin to them. [8] Necessarily, then, movements also will be either simple or in some sort compound—simple in the case of the simple bodies, compound in that of the composite—and the motion is according to the prevailing element. (268b13-b29)

At the beginning of [1], Aristotle specifies that the task of DC I.2 is to speak of the specific parts of the universe. The preposition ‘for’ (γὰρ) in [1] suggests that the topic being discussed, i.e. the locomotion of things which have a nature, will somehow contribute to the overall thesis of this chapter. In other words, it is through an examination of the locomotion of ‘all natural bodies and magnitudes’ that the differentiation and the characterization of the basic constituents of the universe, namely, the simple bodies, will

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1 Πάντα γὰρ τὰ φυσικὰ σώματα καὶ μεγέθη καθ’ αὐτὰ κινητὰ λέγομεν εἶναι κατὰ τόπον· τὴν γὰρ φύσιν κινήσεως ἄρχην εἶναι φαμεν αὐτοῖς. Πάσα δὲ κίνησις δὴ κατὰ τόπον, ἡν καλοῦμεν φορᾶν, ἢ εὐθεία ἢ κύκλω ἢ ἐκ τούτων μικτῆ· ἄπλα γὰρ αὐτὰ δύο μόναι. Λίττων δ’ ὁτι καὶ τὰ μεγέθη ταῦτα ἄπλα μόνον, ἢ τ’ εὐθεία καὶ ἢ περιφερής. Κύκλω μὲν οὖν ἔστιν ἢ περὶ τὸ μέσον, εὐθεία δ’ ἢ ἄνω καὶ κάτω. Λέγω δ’ ἄνω μὲν τὴν ἀπὸ τοῦ μέσου, κάτω δὲ τὴν ἐπὶ τὸ μέσον. Ἔστ’ ἀνάγηκ πάσαν εἶναι τὴν ἀπλὴν φορᾶν τὴν μὲν ἀπὸ τοῦ μέσου, τὴν δ’ ἐπὶ τὸ μέσον, τὴν δὲ περὶ τὸ μέσον. Καὶ ἑοικεν ἡκολουθηκέναι κατὰ λόγον τοῦτο τοῖς ἔξ ἄρχης· τὸ τε γὰρ σῶμα ἀπετελέσθη ἐν τρισὶ καὶ ἡ κίνησις αὐτοῦ.

Ἐπεὶ δὲ τῶν σωμάτων τὰ μὲν ἐστὶν ἄπλα τὰ δὲ σύνθετα ἐκ τούτων (λέγω δ’ ἄπλα μὲν ὁσα κινήσεως ἄρχην ἔχει κατὰ φύσιν, οὖν πῦρ καὶ γῆν καὶ τὰ τούτων εἰδή καὶ τὰ συγγενή τούτως), ἀνάγκη καὶ τὰς κίνησις εἶναι τὰς μὲν ἄπλας τὰς δὲ μικτὰς ποις, καὶ τῶν μὲν ἄπλαν ἄπλας, μικτὰς δὲ τῶν συνθέτων, κινεῖσθαι δὲ κατὰ τὸ ἑπικρατοῦν.
be finally introduced in [7] and [8]. In [7], Aristotle sets out that simple bodies ‘possess a principle of movement in their own nature’. In [8], he immediately assigns simple motions to simple bodies. Now what we need to consider is the question of how exactly Aristotle arrives at the provisional conclusion in [7] and [8] from his examination of locomotion in [1] through [6].

It seems clear that, according to the passage from [2] to [8], the notion of simple a body is introduced on the basis of a differentiation among simple motions. More specifically, it is by attributing each type of simple motion to the nature of one and only one type of simple body that the notion of a simple body is characterized. Since the differentiation and the characterization of simple bodies are conducted on the basis of an investigation into simple motions, it is of great significance to clarify why the simple motions are simple, and how they are differentiated from one another. This is the task of the first part of this chapter. In this part I shall argue that it is in terms of an analysis of all possible locomotion, in all its complexity and variety, that the simplicity of simple motions and the reason why all possible movements can be reduced to simple motions are explained. From this analysis, the way in which simple motions serve as the contributing factors in explaining the complexity and variety of all possible locomotion is recognised.

2.1.1 The simplicity of simple motions cannot be explained geometrically

In their explanations of simple motions, commentators tend to appeal to the geometrical figures that simple motions trace as they move. According to this interpretation, it is because of tracing certain geometrical figures that some motions are simple. It seems that this interpretation is not without textual evidence. In [3], ‘the reason (αἴτιον)’ provided is apparently connected with the clause of [2], i.e., ‘which [sc. straight and circular locomotion] are the only simple movements’. This connection, according to these commentators, suggests that the simple magnitudes explain the fact that simple motions are either rectilinear or circular.\(^1\) For this reason, in his commentary on the passage quoted

\(^1\) I agree that simple magnitudes have some explanatory power in explaining the simplicity of simple motions, but, as I shall argue in the following section, it is not because of the existence of simple magnitudes that there are correspondingly some types of simple motions. I argue that the explanatory power of simple magnitudes, as the differentiation of simple motions, is derived from an analysis of the complexity and variety of all possible locomotion.
above, Leggatt claims that it is because the characters of some motions are straight lines or circles, which are the only two sorts of simple magnitudes in geometry, that these motions are simple motions.¹ This geometrical explanation of the simplicity of simple motion can be traced back as far as Xenarchus of Seleucia, who similarly holds that the simplicity of simple motions can be explained in terms of the simplicity of the characters of the simple motions in geometry. In his view, however, there is, in addition to the circle and the straight line, a third type of simple magnitude, viz. the helix, which is drawn on a cylinder. On the basis of this understanding of the simplicity of simple motions, Xenarchus complains that, contrary to Aristotle’s view, more than three types of simple bodies should be recognized.²

The problem with this geometrical explanation is that, even though it is correct according to [3] that the simple motions to which all locomotion can be reduced are either straight or circular, it does not follow that any motion that is straight or circular is a simple motion. Moreover, the next sentence [4] clearly shows that, should there be a motion that moves in a circle or a straight line, as long as it does not either move straight away from the centre of the universe, or straight towards the centre of the universe, or just around the centre of the universe, it is not a simple motion.³ Thus, it is clear that the geometrical simplicity of the characters of simple motions cannot explain why there are only three types of simple motions.⁴ Rather, simple motions are differentiated on account of their specific

¹ Leggatt 1995, 176 and 185. As I will show in this section, it is true that the character of a circular motion at issue is a circle, but not all locomotion the character of which is a circle is a circular motion. Strictly speaking, according to Aristotle, it is only when the centre of the figure over which a body moves is exactly the centre of the universe that the locomotion with which the body moves is a circular motion. Leggatt attempts to interpret this passage by attributing the simplicity of the simple motions to the simplicity of the corresponding geometrical magnitudes along which simple motions move, and he soon encounters difficulties in understanding Aristotle’s argument in the opening of DC I.4 where he explicitly denies this interpretation. In his commentary on DC I.4, 270b33-27, Leggatt says: “Since Aristotle does not reject the claim that straight and curved lines are contrary, then his basic strategy – runs counter to that of chapter 2, where the simplicity of rectilinear and circular locomotion was due to the respective magnitudes.”

² Simplicius 2002, 32; see also in Leggatt 1995, 177.

³ As Alexander correctly points put, the motion of a wheel is not a simple circular motion, for any part of the wheel which revolves around the centre of the wheel moves up and down relative to the centre of the universe. See Alexander, ap. Simplicius 15.2-13. Cf. Hankinson 2009, 87-88. Besides, if the geometrical explanation were correct, the rectilinear motion from north celestial pole to the south celestial pole would be a simple motion, but in fact, according to Aristotle’s description in [4], it is a complex of the upward simple motion and the downward simple motion.

It is true indeed that, in [4], Aristotle does not explicitly call the motion straight towards the center, straight away from the center, and around the center, “simple motions”. But in [5], Aristotle immediately adopts the notion of simple motion in describing these three types of motions.

⁴ The reader may notice that, in [2] from the quoted sentence, Aristotle mentions the number of simple motions as being just two, rather than three. According to my reading, this is just a provisional assertion. I prefer to hold that there are in fact three types of simple motions, as Aristotle finally confirms in [6].
relationships among the natural bodies in motion and the centre of the universe.

In responding to Xenarchus’ criticism of Aristotle’s differentiation of simple motions, Alexander points out that ‘Aristotle did not consider the simple magnitudes to be productive causes of the motions.’ More specifically, even though the simple magnitudes contribute to a demarcation of the characters of simple bodies, according to Alexander, it is not because of the existence of simple magnitudes that simple bodies move in their specific ways. In this, I agree with Alexander. But, then, Alexander immediately declares that it is not the case that every one of the simple magnitudes necessarily has its corresponding simple motion. This means that simple magnitudes cannot explain why simple motions are either rectilinear or circular or any other magnitude (if there is one). This is far removed from what Aristotle suggests in [3]. On Alexander’s interpretation, it remains unexplained in what sense Aristotle connects the distinction of the two types of simple magnitudes with ‘the reason’ for the differentiation of simple motions in [3].

It seems to me that the reason why Leggatt, Xenarchus, and Alexander fail to provide a satisfactory explanation of the simplicity of simple motions is that they all have neglected the fact that, before simple motions are related to the notion of simple magnitude in [3], they have already been characterized as the constituents of complex motions in [2].

If we take that there are primarily two types of simple motions, then we have to admit that the differentiation of these two types of simple motions, namely the rectilinear simple motions and the circular simple motions, are substantially distinct from the subdivision of the two sorts of rectilinear simple motions. The distinction between rectilinear simple motion and circular simple motion is conducted on the basis of a geometrical belief that there are only two types of simple magnitudes. But the criterion cannot apply to the further distinction between the straight upward simple motion and the straight downward simple motion, since the geometrical view cannot explain why it is the case that only these two sorts of rectilinear simple motions are simple, while other rectilinear motions, say a rectilinear motion beside the centre of the universe, are not. Even if this asymmetry problem is put aside, it is still difficult to explain the subdivision of rectilinear simple motions into these two groups. According to my interpretation, however, the differentiation and the simplicity of simple motions can be explained by the same criterion. As we shall see, it is through an analysis of all possible locomotion, in all its complexity and variety, that the simplicity of simple motions and the reason why all possible movements can be reduced to these three types of simple motions are explained.

1 Simplicius 2002, 32.
2 Ibid. “For it is not the case, if a simple body moves with a simple motion along a simple line, that it immediately follows that a simple natural body will move with a simple motion along every simple line, which is what Xenarchus assumes. For Aristotle did not suppose this.”
3 See DC I.2, 268b17-19, πᾶσα δὲ κίνησις ὥση κατὰ τόπον, ἣν καλοῖς φοραῖς, ἢ ἐσθία ἢ κύκλῳ ἢ ἐκ τούτων μικτῇ ἀπλαί γὰρ αὕτη δύο μόνην. As I shall show at the end of this section, this marks a significant distinction between the characterization of the simple motions and the characterization of simple bodies. At the very beginning, simple bodies are characterized as groups of natural bodies which move with simple motions, while simple motions are characterized in relation to the motions which they compose.
other words, before the simple motions are related to the simple magnitudes, they have already been identified with the fundamental components to which all possible motions are reduced. This means that simple motions are defined as the constituents of complex motions, and this in turn shows that the simplicity of simple motions is precisely their capacity to compose more complex motions. Therefore, if we want to understand Aristotle’s argument here, we must understand how he intends to derive the commitment to the existence of simple motions, as they are defined, from an analysis of simple motions as the fundamental factors to which all possible motions can be reduced. Since Aristotle does not spell this out, the analysis through which complex motions are reduced by Aristotle to certain simple motions has to be reconstructed. Now I am in a position to reconstruct the analysis of locomotion from which the three types of simple motions in [4] are recognized as the basic components of all possible locomotion, so as to explain the simplicity of simple motions.

2.1.2 Simple motions as the explanatory factors of the complexity of locomotion

It is true that, in the quoted passage, the way in which simple motions are distinguished is less than clear, but the distinction between three types of simple motions in terms of their relations to the centre of the universe in [5] provides us with a clue. In light of the conclusive description in [4], where simple motions are differentiated on the basis of their relations to the centre of the universe, we are encouraged to assign all possible locomotion to different groups in a similar way.

With respect to the relation between a motion and the centre of the universe, there are, overall, four possibilities. The distance between a moving body and the centre of the universe can either be constant, decreasing, increasing, or randomly changing. When the distance is randomly changing, it may sometimes be smaller, sometimes larger, and possibly sometimes stay unchanged. Corresponding to these four cases, a moving body can either (1) revolve around the centre, or (2) approach the centre, or (3) move away from the centre, or (4) a combination of the first three cases. In this fourth case, the process of motion can be analysed into different phases in which the body moves either towards the

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1 See also *Physics* VIII.8, 261b28-29, and VIII.9, 265a13-15.
centre, away from the centre, or around the centre. In the sense that the fourth case can be identified as a combination of the first three cases, the motions in the first three cases are more fundamental than those in the last case. In order to pick out the simplest and most elemental types of movements among all the possibilities, we only need to consider the first three cases.

In the first case, since the distance of the moving body from the centre of the universe is constant, the moving body must be revolving around the centre. In accordance with revolution, the character of the moving body is a circle, and the centre of the universe is coincident with the centre of the circle. This is a relatively simple case, whereas the next two cases are more complex.

Both the second case and the third case raise two additional possibilities. In the second case, even though a moving body approaches the centre of the universe and the distance of the moving body from the centre of the universe continuously shortens, the distance to the centre can either (2a) decrease radically, or (2b) decrease gradually. In other words, it can either move straight towards the centre (see Diagram 1), or gradually, and indirectly, towards the centre (see Diagram 2 and Diagram 3). Similarly, in the third case, while moving away from the centre constantly, the distance of a moving body from the centre can either (3a) increase radically, or (3b) increase in a gradual way. If the distance of a moving body from the centre decreases or increases radically, then it moves straight towards or straight away from the centre. In these two cases, namely, 2a and 3a, the characters are straight lines; on the other hand, if the distance decreases or increases gradually (2b and 3b), then the character of the moving body would be a curved line.

According to Aristotle, both (2b) and (3b) can be analysed into two distinct motions, namely, the motion straight towards the centre (2a) and the motion straight away from the centre.
centre (3a). In explaining why hair does not grow straight and appears to be curly, he says:

For it is twisted as being carried with a double motion: the earthy part tending downwards and the hot upwards. (Generation of Animals, V.3, 782b21-22)\(^1\)

In this passage, Aristotle explicitly explains the growth of hair in the motion of a curve in terms of two opposite movements, i.e., downwards and upwards. This description of the two elemental motions echoes what he has explicitly put forward in [4] of 268b17-24, where the upward motion is identified with the motion away from the centre (3a), and the downward motion with the motion towards the centre (2a). In light of this account, both the movements, shown in Diagram 2 and Diagram 3, or their contrary motions, can in effect be identified with a combination of the two straight motions.\(^2\) If a body just moves with one of the two straight motions, its motion must be straight. But as long as this motion is resisted by the tendency of moving towards the opposite direction, it can no longer move directly towards the original destination, but moves in an indirect way and follows a curve.\(^3\)

From what has been considered, it immediately follows that, in the sense that all possible locomotion that falls into the second and the third cases is either straight upward motion, or straight downward motion, or a combination of these two straight motions, these two straight motions are the simple motions into which all motions, which are either towards the centre of the universe or away from the centre, can be analysed. Furthermore, as we have shown, the motions of the fourth case are combinations of those of the first three cases; and the two straight motions, either towards the centre or away from the centre, along with the circular motion around the centre, are the elemental motions to which all possible motions in the first three cases can be reduced. All possible motion, in all its complexity and variety, can be analysed into these three simple motions.\(^4\)

Now, I am at the position to draw a clear distinction between my interpretation and the

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\(^1\) κάμπτεται γάρ διὰ τὸ δῶ ϕέρεσθαι φορὰς· τὸ μὲν γὰρ γεωδές κάτω τὸ δὲ θερμὸν ἄνω ϕέρεται.

\(^2\) It is remarkable that in Aristotle’s explanation of the formation of curly hair, circular motion is not a factor. The reason for this is that the body, which can and can only move with a circular motion, cannot be supposed to exist in the field that is composed of the other types of simple bodies. This will be explained fully in Chapter 3.

\(^3\) It is notable that this analysis and the quoted passage from Generation of Animals are just qualitative analyses: in it Aristotle is not bothered to consider the way in which the combination of some simple motions would result in a certain complex motion.

\(^4\) Hankinson (2009, 85) claims that ‘it is doubtful’ whether Aristotle suggests ‘that every conceivable motion can be represented as some combination of straight and circular components’ in this chapter.
traditional ones that have been put forward by Xenarchus, Alexander, and Leggatt. As I have pointed out at the beginning of this chapter, all that these interpretations are concerned with is how, and how completely, Aristotle uses the differentiation of simple magnitudes to differentiate simple bodies (Xenarchus and Leggatt think he does so in a complete way, but Alexander denies this). According to my interpretation, however, this is not what Aristotle has done in *DC I.2*, since it is clear that not all motions whose characters are simple magnitudes are simple motions. For example, the rectilinear motion from north celestial pole to the south celestial pole, though moving in a straight line, is not a simple motion, but a combination of two simple motions. As Aristotle makes clear in [4] and [5], only if a motion moves straight away from the centre of the universe, or straight towards the centre of the universe, or just around the centre of the universe, is it a simple motion.

In opposition to Xenarchus and Leggatt’s interpretations, I propose an alternative interpretation on account of which the simplicity of simple motions can be satisfactorily explained. According to my interpretation, the simplicity of simple motions is not determined by the simplicity of simple magnitudes, rather it is derived from an analysis of all possible locomotion within the universe. Since any locomotion can be identified with either a type of simple motion or a combination of several simple motions, these simple motions can be regarded as the logical components of all possible natural motions. Therefore, by reducing the complexity and the variety of locomotion to simple motions, the simplicity of simple motions is properly understood.

Alexander correctly points out that it is not because of the geometrical simplicity of straight lines and circles that the motions moving in straight lines or circles are simple, but he fails to notice that simple magnitudes are used to describe simple motions in *DC I.2*. According to my interpretation, however, what Aristotle means in *DC I.2* is that the simple magnitudes can be utilized in describing the characters of simple motions. From the analysis of locomotion above, we realize that the only possible characters of simple motions are straight lines or circles. As I have at pains to argue, the simplicity of simple motions is not due to the simplicity of their characters in geometry. But by examining the character of a motion, we are able to identify an indicator of whether the motion is simple or not. As these two simple magnitudes, straight lines and circles, can be used to describe simple motions, they contribute to the characterizations of simple motions, and consequently the distinction between two types of simple magnitudes is sufficient for making it manifest that
simple motions are either straight or circular and cannot be otherwise.

The reason why simple motions are simple—and this is the crux issue—is based on the fact that they are the fundamental explanatory factors to which any possible locomotion of any natural body can be reduced. By dividing locomotion into more fundamental logical factors, simple motions and the simplicity of simple motions are recognized.

Let us now turn from simple motions to simple bodies. The discovery of simple motions is crucial for the identification and the differentiation of simple bodies. Since simple motions are the fundamental factors to which all possible locomotion can be reduced, in order to make sense of the complexity and variety of locomotion, one must commit to the existence of simple motions. Simple motions, however, cannot exist independently. They must be attributed to some bodies which occupy some space and at the same time have the capacity to move in a certain way, that is, with a kind of simple motion in this context. Therefore, in order to achieve a better understanding of the locomotion of all possible physical things, the existence of simple bodies, which are identified as the seats of things’ capacities of moving with simple motions, must be admitted. In the next section, I shall examine the relationship between simple motion and simple body, and consider how the notion of simple body is derived from the notion of simple motion and serves as a factor in explaining the complexity and variety of locomotion.

2.2 The simple body as the subject of simple motion

Thus far, I have argued that simple motions are differentiated on the basis of an analysis of the complexity and the variety of all possible locomotion. In this section, I shall consider the explanatory role that simple bodies play in explaining the locomotion of natural things. I argue that simple bodies are not only capable of moving with simple motions, but are also the relevant factors in explaining the locomotion of all possible physical things. It is in virtue of having simple bodies as their components that complex natural bodies, which move with complex motions, possess the capacities to perform the simple motions that are not only assigned to simple bodies, but are also combined to comprise the apparent complex motions. In this way, simple bodies contribute to the explanation of locomotion, in all its variety and complexity.
Even though the complexity and variety of locomotions can be explained by reducing them to three simple motions, Aristotle is not willing to conclude his explanation of locomotion by providing us with explanatory factors that exist solely in a logical analysis. Simple motions cannot exist independently and these factors cannot contribute to the explanation of the complexity and variety of locomotion in and by themselves, because any movement, no matter whether it is a simple motion or a complex motion, as long as it exists, must belong to a subject. Therefore, having differentiated three types of simple motions in [4], Aristotle moves directly from his analysis of locomotion to his commitment to natural bodies.

The commitment to the existence of simple motions entails the existence of some subjects to which the simple motions belong. Such subjects, moreover, are necessarily natural bodies. On the one hand, however a subject moves, it must possess a location which is changeable, or the subject cannot change its place at all. For this reason, any subject of locomotion must have a body, which extends within its location. Owing to the fact that they possess bodies, these subjects can be called bodies. On the other hand, inasmuch as the locomotion in question is a kind of natural change, whatever the agent of the motion is (in particular, whether it is an external or an internal cause), the motion which belongs to a corporeal thing must be performed in accordance with the nature of the subject of the motion, because nature in [1] is defined as the principle of natural motions. Therefore, as a conclusion, any possible locomotion must belong to a subject which has both a nature proper to it and a body proper to it, so as to be a natural body. In other words, as long as a locomotion is performed, it must belong to a natural body.

It is indeed correct that all natural motions, as long as they exist, have to belong to some natural bodies. Nevertheless, it might seem that it is not necessary that each of the simple motions should be attributed to only one kind of natural body. This is an objections that is also levelled by several traditional commentators (as we shall see at the end of the chapter). If all that were needed were subjects to which simple motions belong, it would be unnecessary to commit to the notion of a simple body which can, and can only, move with one type of simple motion. Therefore, it might seem that Hankinson is correct in objecting that the existence of simple motions, in virtue of being natural motions, does not entail the

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1 Cf. *DC* III.2, 301b18; *Physics* II.1, 192b21-23.
existence of a kind of simple body, which moves with this simple motion.

At this point in my argument, I will, if only provisionally, be content to concede that, on the supposition that both simple bodies and complex bodies exist in the first place, natural bodies can be distinguished into simple bodies and complex bodies in virtue of the types of motions with which they move.¹ Later, when we turn to the supposition itself (that both simple bodies and complex bodies exist in the first place), I will show why one kind of simple body can move with one, and only one, type of simple motion.

If a natural body moves by nature with a single type of simple motion, it is a simple body; otherwise, it is a complex body. This is compatible with what I established in the first section of this chapter, namely, that the simple bodies are characterized by simple motions, but it does not establish the necessity that one simple body can, and can only, move with a single type of simple motion. Now, it is well worth remembering the twofold significance of the notion of a simple body. Being the subject of a simple motion does not exhaust the meaning of the notion of simple body. Just as a simple motion fails to serve as a sufficient explanatory factor of locomotion, because it lacks independence, simple bodies, as the proper subjects on which simple motions depend, can be identified as the elements to which the complexity of locomotion can be reduced. It is because of their role in explaining the locomotion of physical things that Aristotle commits to the existence of some natural bodies, each of which by nature moves with only one type of simple motion.

In the previous section, I argued that all possible locomotion can be identified with either a simple motion or a combination of several simple motions, so that a complex body, which moves with a compound motion, can be understood to be moving with several simple motions to which the compound motion can be reduced. Since the nature of a natural body in Aristotle’s system of natural philosophy is defined as the internal principle or cause on account of which their natural motions are performed,² complex bodies, which act in

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¹ It seems that some complex bodies, which consist of different simple bodies, can only move with a single type of simple motion. For example, wax can only move downward in the air without any resistance. But this is not true, since wax will move upwards in water without resistance. On the other hand, at this stage, only three groups of simple bodies are distinguished, namely, the heavy simple body, which moves downward, the light simple body, which moves upward, and the simple body that is neither heavy nor light, which moves around the centre. On the basis of this distinction, for Aristotle, none of these simple bodies can move with a simple motion different from the one assigned to it.

² DC I.2, 268b17.
complex ways, must possess a nature that enables each of them to move with a compound motion. Since the compound motions of complex bodies are equivalent to several combined simple motions, these complex bodies must possess some capacities or principles in virtue of which they can move with the simple motions as well. Otherwise, if it were the case that complex bodies could not move with the simple motions to which compound motions are reducible, it would be impossible to reduce the compound motions with which they move to the simple motions. Therefore, by attributing the principles or causes that enable complex bodies to move with elemental simple motions to the distinct natures of some components of the complex bodies, the complexity of locomotion is eventually reduced to the complexity of the constitution of complex bodies. Our task now has switched to determining what exactly these components of natural bodies are. With the purpose of discerning these components, the previous analysis of locomotion will be extended to the notion of a complex body as a unitary whole.

As we have seen from the previous discussion, simple motions are not only the explanatory factors to which all possible locomotion can be reduced, but they are also the typical characters on the basis of which simple bodies are distinguished from other types of natural bodies. These two roles of simple motion entail that the simple bodies must be recognized as the fundamental components of complex bodies. On the one hand, because simple bodies are characterized as natural bodies, each of which by nature moves with only one type of simple motion, each of them must possess a principle or cause that explains why it moves in a certain way. Moreover, owing to the fact that simple bodies, by nature, cannot move with any other motions besides the single type of simple motion that is assigned to each of them, every one of their internal principles can be responsible only for a single type of simple motion. Therefore, in responding to the question of why complex bodies can move with various simple motions—though they appear to move with complex motions as a result of combinations—the natures of simple bodies are introduced as the exclusive causes of moving with simple motions, and afford complex bodies with the capacity to move with simple motions. The natures of simple bodies, however, cannot exist independently of simple bodies. As long as complex bodies have the natures of simple bodies as the explanatory factors of their activities, simple bodies must be somehow taken as the constituents of the complex bodies. Therefore, according to my interpretation, Aristotle’s view is that in virtue of consisting of simple bodies, complex bodies obtain the
capacities of moving with simple motions, which are then combined in some way and consequently manifested as compound motions. In this way, the complexity of locomotion is ultimately explained by the constitutional structure of complex bodies.

It is true, as Wildberg points out, that not all natural bodies that move with simple motions are simple bodies. But it does not follow that moving with simple motions is not essential for simple bodies. The significance of the capacity of a simple body to move with a simple motion is present in the causal power. Although a complex body, say a stone, might by nature move with only a simple motion, this motion, along with any other movements of complex natural bodies, either simple or complex, can be explained by the simple motions of the simple bodies. Only by supposing that it reduces to the capacities of simple bodies can the complexity of all possible locomotion be analysed into something simple, and so be explained.

If simple bodies do indeed play a role in explaining the complexity of locomotion, as has been shown above, then, contrary to the traditional view, each simple motion must be assigned to at least one type of simple body. As I have argued just above, in Aristotle’s explanation of locomotion, simple bodies are identified as the subjects of simple motions, and the cause of performing a simple motion, namely the nature of the thing, exists in each of the simple bodies. It is these simple bodies that enable natural bodies to move with simple motions. On the other hand, as has been shown, simple motions are the most basic components to which compound motions are reducible. In other words, if a simple motion were absent from the explanation, some of the compound motions would not be capable of being reconstructed. Therefore, as long as there are some simple motions to which the compound motions are reducible, the complex bodies to which the complex motions are properly assigned must have the capacity to move with these simple motions by having the simple bodies to which these simple motions are assigned as their components. Through this analysis, the notion of a simple body, which is initially characterized as a type of natural body moving with simple motions, is gradually recognized as the constituent of natural bodies, and contributes to the overall explanation by affording the complex bodies their specific motive capacities.

1 Wildberg 1988, 50.
2 See DC 1.2, 269a4-5, where the explanatory role of simple bodies is emphasized. See also Generation of Animals, V.3, 782b21-22, quoted above.
2.3 The derivation of simple bodies from the differentiation of simple motions

In the previous parts of this chapter it has been argued that it is through the differentiation of simple motions that the role of simple bodies in explaining the complexity and variety of all possible locomotion is revealed. This role of simple bodies in turn explains why Aristotle feels the need to commit to the existence of simple bodies as the most fundamental components of individual things in the universe. Therefore, according to my interpretation of DC I.2, it is the differentiation among simple motions that grounds the commitment to the existence of simple bodies, which are identified with the fundamental components of the universe.

In the final section of this chapter, I shall consider a traditional interpretation of the quoted passage from DC I.2, according to which Aristotle’s commitment to the existence of simple bodies is independent of the differentiation of simple motions. By highlighting the disadvantages of this traditional interpretation, the advantages of my interpretation of the first section of DC I.2 will become clear.

There is a traditional interpretation of the first section of DC I.2, which can be traced back to Alexander. As has been outlined in the first part of this chapter, according to this interpretation, in the passage quoted from DC I.2 Aristotle does not explain why there are some simple bodies that serve as the most fundamental components of the universe; he rather is to engage in a characterization of simple bodies by attributing a type of simple motion to each type of simple body. It is by distinguishing three types of simple motions that three types of simple bodies are correspondingly distinguished and characterized. According to this interpretation, the commitment to the existence of simple bodies, however they are understood, is not based on the discovery of three types of simple motions. In other words, the differentiation of simple motions cannot explain why one should commit to the existence of simple bodies. Therefore, on this interpretation, it remains unclear why simple bodies, each of which can, and can only, move with a certain type of simple motion, should be identified with the components of the universe, and, therefore, fit into an investigation into the specific parts of the universe, as we find in [1].

Recently, Hankinson has taken up a similar position to Alexander. While admitting
that each simple body, in virtue of its nature, does necessarily move with a type of simple motion,\(^1\) he explicitly denies that Aristotle’s commitment to the simple bodies is derived from the discovery of simple motions. As he declares, ‘Aristotle is not, as is sometimes claimed, committed to supposing that there must be an individual element associated with each of the possible types of simple motion, however they are to be individuated.’\(^2\) In other words, according to Hankinson, it is possible for a type of simple motion to exist with which none of the simple bodies moves. Even if there exists another simple motion besides these three, this (he thinks) does no harm to the overall thesis of *DC* I.2, since the three types of simple bodies can still be differentiated on the basis of the three types of simple motions with which they move. Therefore, in Hankinson’s opinion, there is not a one-to-one correspondence between simple motions and simple bodies. The existence of a simple motion is no more than a necessary but insufficient condition for Aristotle’s commitment to the existence of a simple body.\(^3\)

This traditional interpretation, shared by Alexander and Hankinson, seems unconvincing, because it is difficult to explain how exactly this characterization of simple bodies fits into the general task of *DC* I.2. As has been pointed out, Aristotle makes it clear at the beginning of the quoted passage that the task of this chapter is to explore ‘those parts of the whole which are specifically distinct’. If simple bodies were just some natural bodies, each of which moves with only one type of simple motion, it would not, as far as I can see, be at all clear why such natural bodies are the ultimate constituents of the universe. In other words, the idea that the simplicity of the movement of a simple body entails its simplicity in composition is unconvincing. If the subject being characterized in terms of the differentiation of simple motions, i.e. the natural body to which only one simple motion is assigned, were different from the thing that is declared at the beginning of *DC* I.2 to be the subject of the whole investigation, Aristotle would not be able to undertake the task he

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\(^1\) Hankinson’s original formulation is that, ‘if x is a simple body, then x has only one natural motion’ (2009, 85). And according to Hankinson’s reading, the notion of natural motion is identical with that of simple motion. See Hankinson 2009, 88, n.16.

\(^2\) Hankinson 2009, 84 and 92. Wildberg shares the same position with Hankinson. He claims explicitly that ‘in Aristotle the conception of simple and compound bodies is independent of the conception of the simplicity or compoundness of their movements’ (1988, 50).

\(^3\) Hankinson makes this point explicitly, when he says: ‘if a motion is natural (in the sense of being the expression of an essential tendency of an elemental body), then it must conform to one of the simple trajectories; but there is no converse necessity that every determinable simple trajectory must have some simple body whose nature it is to move along it’ (2009, 84). And notably, he traces this tradition of interpretation back to Alexander.
undertakes as he characterizes it.

One seemingly appealing way out of this difficulty for this interpretation would be to argue that the reason why simple bodies are identified with the specific components of the universe is not that they move only with simple motions, but conversely, because they are the elements of the universe, each of them moves with only one specific simple motion, according to which different simple bodies can be distinguished from each other.¹ Thus, the traditional interpretation may defend the view that Aristotle’s commitment to the existence of simple bodies, in virtue of being the fundamental components of the universe, is independent of the characterization of simple bodies in terms of simple motions in DC I.2. On this view, before a type of simple motion is assigned to a simple body, the notion of a simple body is already assumed from the start.

At first glance, the speculation above seems reasonable. But, as a modern chemist will recognize, even if simple bodies are identified with the most fundamental constituents of the universe and cannot be analysed into any more basic components, the simplicity of the microstructure of the simple bodies does not entail the simplicity of their movements.² In other words, even if each of the simple bodies de facto performs only one single type of simple motion according to some simple nature, it is not proper to attribute this nature to the simplicity of its microstructure. Therefore, if such a nature were really derived from the simplicity of the forms of simple bodies, as the critics maintain, it would then be necessary for Aristotle to provide an argument in support of this proposition (i.e. that a nature by

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¹ This is generally accepted in the scholarship. Guthrie explicitly claims that ‘since they [sc. simple bodies] are simple, their natural movement is also simple’ (1939, 8). This is also what Elders has in mind in his commentary. He says: ‘simple bodies must have simple movements, since their movements are conceived of as movement towards form, and as the external manifestation of the form aspired’ (1965, 86). Similarly, in explaining why Aristotle attributes only one natural motion to a simple body, having appealed to the empirical facts that a sublunary simple body always moves by nature in the same direction, Falcon argues that ‘since the nature of a simple body is one, its natural motion too must be one’ (2005, 59). In my view, this interpretation indicates that the simplicity of the movement of a simple body is derived from the simplicity of its nature, whereas the simplicity of its nature is determined by the simplicity of its structure. Therefore, the simplicity of its movement is attributed to the simplicity of its structure. This interpretation, however, fails to explain why Aristotle claims that the nature of a simple body is one, or why a group of natural bodies has to be differentiated by their simple natures. According to my reading, the reason why each of the simple bodies moves with only one type of simple motion is not because of the simplicity of its constitution, but because of its role in explaining the complexity of the locomotion of all possible natural things. As we shall see, it is in DC I.2 that Aristotle provides us with an answer to the question of why simple bodies, as explanatory factors of locomotion, are assigned simple natures, according to which each of them moves with a single type of simple motion.

² According to modern chemistry, elements are differentiated on account of the number of protons in their atomic nuclei. This criterion serves as an explanation of the properties of elements, rather than the locomotion of macroscopic objects.
which a simple body moves with a single type of simple motion is derived from the simplicity of the forms of simple bodies) and he would have to explain how simple bodies, which are characterized as having one and only one simple motion, can fit into an investigation of the specific parts of the universe. However, what we read in [7] is that he has directly identified, without any argument, the simple bodies, each of which moves with only one type of simple motion, with the ultimate components of compound bodies. Due to this obvious gap between the characterization of simple bodies in terms of simple motions and the role that simple bodies play in constituting complex bodies, it is highly questionable that Aristotle’s commitment to the existence of simple bodies is independent of the differentiation among simple motions.

On my interpretation, on the other hand, both the differentiation among simple bodies, and the introduction of the very distinction between simple bodies and complex bodies is achieved by differentiating simple motions and all that follows from that in the account of the physical subjects of simple and complex motions. We can now also see why Aristotle thinks, and is right in thinking, based on his argument, that each simple body can move with one and only one type of simple motion.

If what I have argued is on the mark, then the attribution of a simple motion to a simple body does not simply serve the aim of characterizing the simple bodies, but also explains why these simple bodies, which are so characterized, play a role in explaining the constitution of all physical things. As we have seen earlier in the chapter, it is from an analysis of the role that simple bodies play in explaining the complexity and variety of the locomotion of physical things that we realize the need to identify this notion with the components of complex physical things.
3. What is responsible for the changes other than locomotion (I)

In the previous chapter, I argued that Aristotle’s investigation into simple bodies is associated with his explanation of change: it is in terms of the simple bodies that the variety and the complexity of locomotion are explained; at the same time, it is in terms of the notion of simple motions that the very notion of a simple body is introduced. In this chapter, I argue that simple bodies do not just have their explanatory role in Aristotle’s account of locomotion, but also contribute to his explanation of the changes other than locomotion. According to my interpretation, before stepping into an inquiry into the way in which simple bodies contribute to Aristotle’s explanation of change (this will be examined in Part II), Aristotle feels it necessary in De Cealo to provide an exhaustive list of the simple bodies that are going to contribute to his explanation of change, not only locomotion, but also generation and corruption. Aristotle’s list of simple bodies serves as the starting point of his enquiry into the changes other than locomotion. It is on the basis of the answers the two questions that have been addressed in De Cealo that the inquiry, which is dedicated to the discussion of, particularly, generation and corruption, can be conducted in De Generatione et Corruptione.

I shall defend this interpretation of De Cealo in Chapters 3 and 4. My task in these chapters is to consider: (1) the kinds of simple bodies that are involved in the natural changes, other than locomotion, and which contribute to the explanation of these changes, since it is possible that not all simple bodies are responsible for them; and, (2) the exact number of simple bodies that are going to serve as explanatory factors in the enquiry into generation and corruption, growth and diminution, and alteration. The account of the first issue will rest on my interpretation of DC I.3 and I.4 in this chapter (i.e., Chapter 3), while the account of the second issue will draw on my interpretation of DC III and IV in Chapter 4. By the end of Chapter 4, we will arrive at the conclusion that there are four simple bodies, of which the subjects of all possible changes other than locomotion are composed.

According to an influential traditional view, even if it is supposed that a complete list of simple bodies has been put forward in De Caelo, the investigation into simple bodies in De Caelo cannot explain the number of simple bodies within its own context. On the traditional view, a sufficient deduction of the number of simple bodies has not been provided until the second book of De Generatione et Corruptione. This is the view I argue
against in Chapters 3 and 4. Instead, I propose that Aristotle has provided us, in *De Caelo*, with a strict deduction of the number of simple bodies that contribute to an explanation of the changes other than locomotion, especially generation and corruption.

3.1 An outline of Aristotle’s discussion of the incorruptible simple body

As soon as the simple bodies are introduced and differentiated in terms of simple motions, and ultimately characterized as the fundamental components, or the corporeal elements, of natural things, the investigation of simple bodies, as I shall argue, is conducted for the sake of an explanation of the changes other than locomotion, especially generation and corruption. It is for this purpose that Aristotle distinguishes simple bodies into two groups, i.e., the simple body that moves with one circular motion and those that each move with one rectilinear simple motion. These two groups are investigated one after the other. The first group of simple bodies under discussion is that which moves only with circular motion. The existence of this type of simple body is confirmed in *DC* I.2 by three arguments, which are mainly formed on the basis of the principles put forward in the previous discussion.\footnote{DC I.2, 269a2-9; a9-18; a32-b2. The particle οὖν (268b26) indicates that the subsequent arguments about the simple body that moves only with circular motion are derived from the previous discussion on the notion of simple body. About these arguments, see Falcon 2005, 57-62.} Through these arguments, Aristotle emphasizes that the simple body that moves only with circular motion, namely ether, is distinct from any other simple bodies and has its own nature. Moreover, in virtue of the completeness of its loci in geometry, this type of simple body is asserted to be the most complete simple body, and thought to be more divine and more prior to the other simple bodies.\footnote{DC I.2, 269a18-21: Ἀλλὰ μὴν καὶ πρῶτην γε ἀναγκαῖον εἶναι τὴν τοιαύτην φοράν. Τὸ γὰρ τέλειον πρότερον τῇ φύσει τοῦ ἀπελοῦς, ὡς κοῦκλος τῶν τέλεων, εὐθείᾳ δὲ γραμμῇ σύνειμαι. And also, 269a30-32: Ἐκ τε δὴ τούτων φανερὸν ὅτι πέρυκε τις οὐσία σύμφωνα ἀλλή παρὰ τὰς ἐνταῦθα συστάσεις, θειοτέρα καὶ πρωτέρα τούτων ἀπάντων.} In regard to the questions of how its priority affects natural phenomena, and how it contributes to the explanation to natural changes, Aristotle’s answers are, I think it must be admitted, less than immediately clear. This obscurity, however, is clarified in the succeeding two chapters of *DC* I. It is in *DC* I.3, with a supplement in I.4, that the body that moves only with circular motion is eventually identified with ‘the first body’ for the reasons that it alone belongs to a separated field of the universe, and is independent from the world of generation and corruption. Furthermore,
based on the speculations above, it is revealed that ether cannot be subdivided into different species. In other words, there is only a single kind of simple body that moves with only circular motion.

In order to reveal Aristotle’s characterization of ether and its impact on his explanation of the changes besides locomotion, first, in § 3.2, I shall explain the reasons for which ether is separated from the other simple bodies and constitutes a distinct realm. Then, in § 3.3 and § 3.4, I shall explore the reasons for which ether is not subject to any changes besides circular motion. *DC* I.3 and I.4 are the chapters on which I mainly focus in this section. I argue that, in *DC* I.3, ether is excluded from the field of generation and corruption, growth and diminution, and alteration. In order to reinforce this conclusion, in *DC* I.4, Aristotle argues that ether has no opposite, nor can it be subdivided into two contrary kinds.

The arguments in *DC* I.3 and *DC* I.4 can be summarized as follows. Since there is only one type of simple body that moves with only circular motions, which has been justified in *DC* I.4, and all generations or any other type of changes besides locomotion require a pair of opposites that can transform into each other, which has been argued in *DC* I.3, ether does not have an opposite into which it can be transformed, and it is thus necessary that it be excluded from the realm of the changes besides locomotion. An interpretation of these two chapters will have articulated Aristotle’s characterization of ether. It is on account of this characterization of ether that Aristotle concludes that the discussion of the changes besides locomotion only concerns the other types of simple bodies besides ether.

Before we step into the details of this chapter, I would like briefly to explain why Aristotle feels the need to discuss ether in his natural philosophy. It is well known that there is an influential tradition of defending the existence of ether in ancient Greek philosophy. This tradition, as we shall see in this chapter, earns Aristotle’s respect and is referred to in his own discussion. However, Aristotle’s respect of this tradition alone cannot explain why he is at pains to argue that ether is not subject to the changes other than locomotion, since it wouldn’t be plausible that Aristotle, a creative and systematic philosopher, builds his own arguments entirely on the views of his predecessors.

My answer to this question has two parts. First, as we have seen in the previous chapter, Aristotle has committed to the existence of ether, i.e., a type of simple body that can only move in a circular motion. It is on the basis of the differentiation of this type and the other
two types of simple bodies that the complexity and variety of locomotion is explained. Since Aristotle is committed to the existence of ether in his investigation into the causes of the changes other than locomotion, he naturally deems it necessary to consider whether or not ether is a component of the subjects of the changes other than locomotion. Only if it has been proven that ether is neither subject to any change other than locomotion, nor does it exist in the sublunary world in which the changes other than locomotion take place, can we safely exclude ether from the list of the components of the subjects of the changes other than locomotion, and conduct an investigation into the way in which the other types of simple bodies, namely, the simple bodies each of which can only move with a rectilinear simple motion, contribute to Aristotle’s explanation of the change other than locomotion.

Secondly, Aristotle’s arguments, as I will show in this chapter, lead to the conclusion that both ether and its circular motion are everlasting.¹ This conclusion is not irrelevant to Aristotle’s overall investigation into the role of the sublunary simple bodies in explaining of the change other than locomotion in De Caelo and De Generatione et Corruptione. On the contrary, the circular motion of the everlasting ether provides the other simple bodies with a paradigm of change. This is clear in GC II.10. In his explanation of the continuity of the generation and corruption in the sublunary field, Aristotle explicitly points out that,

The cause of this [sc. that generation and corruption is always continuous] as we have often said, is circular motion; for that is the only motion which is continuous. That, too, is why all the other things—the things, I mean, which are reciprocally transformed in virtue of their qualities and their powers, e.g. the simple bodies—imitate circular motion. For when Water is transformed into Air, Air into Fire, and the Fire back into Water, we say the coming-to-be has completed the circle, because it reverts again to the beginning. Hence it is by imitating circular motion that rectilinear motion too is continuous. (336b34-337a7)²

In this passage, Aristotle expressly identifies the circular motion of ether as the cause of the continuity of generation and corruption. On his view, the simple bodies that are subject to generation and corruption are restricted in the sublunary field. Since the sublunary field

¹ As has been shown in Chapter 2, ether by nature moves, and can only move, with a circular motion. Moreover, as I will show in §3.2.1, ether cannot be in an unnatural state by force. For this reason, the circular motion of ether, as long as it exists, cannot stop. Finally, in §3.3 I will show that ether is everlasting. Therefore, both ether and its circular motion are everlasting.

² Τούτου δ’ αὖτιν, ὴσπερ εἰρήται πολλάκις, ἡ κύκλῳ φορά: μόνη γὰρ συνεχής. Διό καὶ τὰλλα ὅσα μεταβάλλει εἰς ἄλληλα κατὰ τὰ πάθη καὶ τὰς δυνάμεις, ὅσον τὰ ἄσημα σώματα, μιμᾶται τὴν κύκλῳ φοράν: ὅταν γὰρ ἐξ θάλατος ἄρχε γένεσθαι καὶ ἐξ ἀέρος πῦρ καὶ πάλιν ἐκ πυρὸς ἔσχας, κύκλῳ φαίμην περιεξελθόνθαι τὴν γένεσιν διὰ τὸ πάλιν ἀνακάμπτειν. Ψάντε καὶ ἡ εὐθεία φορά μιμουμένη τὴν κύκλῳ συνεχής ἄστιν.
is limited, the rectilinear simple motions of the sublunar simple bodies cannot be unlimited. However, the changes of the sublunar simple bodies have to be as everlasting as the change of ether, since, according to Aristotle’s theory, the sublunar simple bodies by nature imitate the change distinctive of ether, which is continuous and everlasting. In order to perform everlasting rectilinear simple motions in the sublunar field, one simple body has to be destroyed and generated into another in time, otherwise the simple motion to which this simple body is assigned will be limited by the boundary of the sublunar world, and will come to an end. For Aristotle, this explains why simple bodies are transformed into each other all the time: it is for the sake of imitating the circular motion distinctive of ether. For this reason, it is conspicuous that ether has to be discussed in Aristotle’s natural philosophy. Even if it is not directly involved in the various changes in the sublunar world, the circular motion of ether is still the paradigm imitated by the changes of the sublunar simple bodies.

Now let’s move on to Aristotle’s discussion of ether.

3.2 The distinction between the two worlds

In *DC I.2*, three types of simple bodies are distinguished on the basis of the particular simple motion with which each of them moves by nature. It is true that the whole universe consists of these three types of simple bodies, but it does not follow that every one of the natural bodies in this universe is composed of all of them. On the contrary, as is widely known, the simple body that moves with only circular motion, that is, ether, is exclusively assigned to the superlunar field, while the other two groups of simple bodies are identified with the ingredients of the natural bodies existing in the sublunar world. In other words, according to Aristotle’s system, a certain simple body, namely ether, does not exist among the other types of simple bodies at all. It is necessary, then, to clarify the reasons why the universe is divided into distinct fields, each of which contains certain groups of components. According to my interpretation, this is exactly what the first part of *DC I.3* does.

It is on this point that my interpretation differs from other interpretations. It is apparent that, in *DC I.3*, Aristotle is occupied with a clarification of the particular nature of ether. He argues in this chapter that the superlunar simple body, different from any type of
sublunary simple body, cannot move with rectilinear motions either by nature or by force. But critics, as far as I know, have been satisfied with pointing out that ether moves with a circular motion, and is not subject to generation and corruption. They have not considered why Aristotle thinks it is necessary to reveal this distinct nature of ether. According to my interpretation, it is for the sake of distinguishing the universe into two distinct fields—one subject to generation and corruption, the other not—that this particular aspect of ether is spelled out in *DC* I.3. More specifically, I argue that it is for this reason that ether cannot exist in the world of things either heavy or light. In this way, a sharp distinction between the world of ether and the world of weight and lightness can be clearly drawn.

3.2.1 Ether cannot move with rectilinear motion

In the first part of *DC* I.3, Aristotle considers whether ether, the simple body that by nature moves only with circular motions, can at the same time move straight upward or downward like the other two groups of simple bodies do. The argument begins with a preliminary clarification of the notions of weight and lightness. In 269b18-29, the nature of moving upward is provisionally attributed to lightness, and the nature of moving downward to heaviness. Then, Aristotle sets out to argue that ether has neither lightness nor weight. His argument is twofold. In 269b32-b35, it is revealed that ether, according to its nature, cannot move with any other type of linear motion besides circular motion; in 269b35-270a3, on the other hand, Aristotle proves that this type of simple body cannot move with rectilinear motion as a result of being constrained. Hence, as a conclusion, the simple body that by nature moves only with circular motion cannot move with rectilinear motion. Aristotle’s justification is conducted as follows.

First, it is obvious that, if ether, as it is demarcated, by nature moves only with circular motion, it is impossible to move by nature with any other motion besides circular motion. Since rectilinear motion is not circular motion, it cannot move in such a way by nature.4

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2 This clarification is only provisionally satisfactory. Aristotle himself admits here that a further discussion of the nature of weight and lightness will be conducted later, which has been generally accepted to be a reference to the last book of *De Caelo*.
3 269b23-24: Βαρὰ μὲν οὖν ἔστω τὸ φέρεσθαι περιφροκὸς ἐπὶ τὸ μέσου, καῦσον δὲ τὸ ἀπὸ τοῦ μέσου. This explicitly indicates that moving upward or downward is not the nature of lightness or weight, which will only be revealed in the last Book of *De Caelo*.
4 As Simplicius notes, it is also correct to argue that ether by nature cannot move with a rectilinear motion on the premise that each simple can only move with a single type of simple motion. In other words, if a natural body were able to move with both a circular motion and a rectilinear motion, then it
On the other hand, this simple body cannot move with any other motions even by force. This proposition is derived from a premise that has already been laid down:

For we laid down that, with contraries, when one movement is counter-natural for a thing, the other movement is natural. (270a2-3)¹

It is supposed to be clear from what has been laid down that, if a motion is unnatural for a thing, then the contrary motion of this motion would be its natural motion. For this reason, if ether were able to move by force with an upward motion, or a downward motion, then the other type of motion would have to be natural for ether, which is not true of ether according to what has already been proved above. Therefore, ether cannot move with either an upward motion, or a downward motion, even by force.²

The first argument can be easily accepted. In regard to the second argument, people may be curious about why it is the case that, when one motion is unnatural for a natural body, the contrary motion, if it has one, must be natural for this body. In other words, why it is not possible for both pairs of contrary motions to be unnatural for a natural body at the same time. This question pertains to the premise quoted from DC I.3, 270a2-3. Simplicius takes it as an Aristotelian axiom; the translator of Simplicius’ commentary, however, admits that ‘it is not clear where it has been posited’.³ In his commentary on this sentence, Leggatt refers ἐδείξεν (viz., we laid down) to 269a33-34,⁴ where Aristotle affirms that for any movement x, if x is unnatural to a natural body E, then it must be natural to another body F.⁵ But this is conspicuously different from the proposition at issue. In 270a2-3, the proposition that has been ‘laid down’ in the previous discussion is that, if movements x and y are contrary, and x is natural to a natural body E, then y is unnatural to E.

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¹ ἐδείξεν γάρ τοῦ ἐναντίου ὃ ἢ ἐπέρα παρὰ φύσιν, τῆς ἐπέραν εἶναι κατὰ φύσιν.
² Note that this argumentation is not applicable to any of the sublunary simple bodies. As we shall see in the next section, since circular motion does not have its contrary, it does not follow that the contrary motion of circular motion is natural for the body which moves with the circular motion by force, since such a contrary motion does not exist at all. Therefore, it seems to be possible at this stage for the sublunary simple bodies and the compounded bodies, which are composed of the sublunary simple bodies, to move with circular motions by force.
³ See Simplicius 2011, 96 and 136.
⁴ See Leggatt 1995, 182.
⁵ DC I.2, 269a33-34: καὶ τὴν ἄλλη παρὰ φύσιν ἐπέρα κατὰ φύσιν.
In my view, it is true that the proposition that is accepted in 270a2-3 has not been put forward explicitly in the previous discussion, but it does sufficiently derive from the premises which have already been raised. The related premises are the following four propositions, all of which are given in DC 1.2: (a) all movements of a natural body are either natural to this body or unnatural to it;¹ (b) each of the simple bodies has one natural movement only;² (c) the unnatural movement of a natural body is contrary to its natural movement;³ (d) one thing is contrary to one thing.⁴ On the basis of these premises, the proposition put forward in 270a2-3 can be justified in the following way.

In regard to premise (a), for any simple body E and a pair of contrary movements x and y, if x and y are the movements of E, there are overall three possibilities. First, both x and y are natural to E; secondly, both x and y are unnatural to E; thirdly, only one of x and y is natural to E, while the other is unnatural to E. The third possibility is exactly the proposition which is requested to be proved on the basis of aforementioned premises, so as to support Aristotle’s argument in 269b35-270a3. Among the three possibilities listed above, as long as premise (a) is granted, at least one of them is correct. Thus, were the first two possibilities excluded, the third would be proved to be true, and, in this way, the justification that ether can move rectilinearly by force would be reinforced. The first possibility can be easily rejected on the basis of premise (b). Now, in order to show that the third possibility is the only one that obtains, I am in the position to prove, on the basis of premises listed above, that the second is also impossible as well. My rejection of this possibility is a reductio ad absurdum. It begins with the hypothesis that both pairs of the contrary movements, x and y, are unnatural to F. The rejection to this hypothesis can be demonstrated as follows:

(1) If x and y were movements unnatural to F, then x would be unnatural to F, and y would be unnatural to F.

(2) According to premise (c), the movement unnatural to F is contrary to the movement natural to F.

(3) Hence, according to (1) and (2), x is contrary to the movement natural to F.

(4) According to premise (d), one thing x is contrary to only one thing.

¹ DC 1.2, 269a32-33: πᾶσαν εἶναι κίνησιν ἢ κατὰ φύσιν ἢ παρὰ φύσιν.
³ DC 1.2, 269a9-10: Ἐτι εἰ ἡ παρὰ φύσιν ἐναντία τῇ κατὰ φύσιν.
⁴ DC 1.2, 269a10: ἐν ἕνι ἐναντίον.
(5) And \( x \) is contrary to \( y \).

(6) Hence, according to (3), (4) and (5), \( y \) and the movement natural to \( F \) is the same thing.

(7) According to (1) and (6), \( y \) is both a movement unnatural to \( F \) and a movement natural to \( F \).

(8) According to premise (a), \( y \) is either natural to \( F \) or unnatural to \( F \).

(9) Hence, (7) and (8) contradict each other.

(10) Hence, the hypothesis that both \( x \) and \( y \) are movements unnatural to \( F \) is impossible.

Since both the first and the second cases have been proved to be impossible, the third possibility, viz., only one of the contrary movements can be natural to a simple body, while the other is unnatural to this simple body, turns to be the only possible case on the basis of premises (a), (b), (c), and (d). Therefore, we may safely conclude that the simple body that by nature moves only with circular motion cannot move in any type of rectilinear motion, either by themselves or by force.

3.2.2 Ether is separated from the other simple bodies

Having confirmed that ether cannot move with upward or downward motions, either by nature or by force, Aristotle proceeds to argue that this conclusion is applicable not only to ether, as a whole, but also to any part of this simple body. He says:

But since the natural movement of the whole and of its part—of earth, for instance, as a whole and of a small clod—have one and the same direction, it results, in the first place, that this body can possess no lightness or heaviness at all (for that would mean that it could move by its own nature either from or towards the center); and, secondly, that it cannot possibly move in the way of locomotion by being dragged upwards or pulled downwards. For neither naturally nor unnaturally can it move with any other motion but its own, since the reasoning which applies to the whole applies also to the part. (270a3-a12)

Leggatt complains that this argument is desultory, and takes it as reinforcing the previous argument, which reveals that ether cannot move with upward or downward motions either...
naturally or by constraint. However, in my view, this passage is clear in revealing that the nature of ether, on account of which it cannot move rectilinearly either by nature or by force, has nothing to do with the size of its body. According to this reading, the argument quoted above does not bring any fresh proof that ether cannot move in a rectilinear way, rather, it emphasizes that this incapacity is true of any parts of ether, no matter how small the particle is. Therefore, it is an extension of the conclusion derived from the Aristotle’s argument in 269b32-270a3, rather than a reinforcement.

In regard to the subject matter of the above argument, if we take the argument as Leggatt does, it would be a deviation from the previous discussion. Nevertheless, if we pay attention to Aristotle’s emphasis of the distinction between the part and the whole, and consider what would happen if a part of ether were separated from the whole, we would, then, realize that the conclusion of the quoted argument from 270a3-a12 may contribute to a different thesis, namely, the separation of ether from the other types of simple bodies. Since the existence of void has been explicitly denied in the Physics, the world is filled with either ether, or the sublunary simple bodies, which move with rectilinear simple motions, or the compounded natural bodies, which consist of the simple bodies. Since, by having the sublunary simple bodies as their components, compounded natural bodies have either heaviness or lightness or both, in regard to the position of a piece of ether, if it were separated from the ether as a whole, there are only two possibilities. It might remain within ether, or it might be among the natural bodies that can move with rectilinear motions, and entangled with them. The second case, however, Aristotle argues is impossible. I conclude that we may understand the argument in the above passage as an argument for the thesis that ether is separate from the other types of simple bodies; that is, separate not only in regard to its parts, but also in regard to the whole of ether. This is, it seems to me, a very significant conclusion.

As I have shown in §2.1.2, any possible locomotion can be identified with either a

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1 See Leggatt 1995, 182.
2 Cf. Metaphysics Δ.25, 1023b12-15, according to which the notion of part is understood as the body divided from the whole.
3 Actually, this is exactly the subject to which Aristotle turns immediately after the quoted passage. In 270a12ff., Aristotle sets out to argue that the superlunary field is separated from the sublunary world because of its everlasting.
5 We shall see immediately that ether is not one of the simple bodies of which compounded natural bodies consist.
circular motion, or a straight upward motion, or a straight downward motion, or a combination of some of these simple motions. Anything that moves with any motion besides the perfect circular motion must be somehow involved in at least a type of rectilinear movement. On the other hand, as has just been revealed, ether, whatever its size, can by no means be involved in any type of rectilinear motion. The only motion with which it moves is circular motion. If a thing were able to move with a motion that involves a rectilinear motion, it would be impossible for the piece of ether either to be attached to the thing, or to be in the thing, otherwise it would have to be moved along with it. In other words, if it were the case that a piece of ether were mixed or just located in a body of one of the other types, the piece of ether would be forced into moving with the same rectilinear motion (or the motion which involves some rectilinear motion) as the natural body to which it is attached. But ether, however small it may be, can never move with rectilinear motion even by force. Therefore, it cannot be the components of any natural body that are able to move with any motion besides circular motion, or be entangled with the natural bodies that possess weight or lightness. In this way, this particular type of simple body, ether, is excluded from the world in which rectilinear motions can be conducted everywhere, and assigned to a realm of its own, in which it moves only with perfect circular motion.

It is correct that Aristotle has not explicitly pointed out in the first part of *DC* I.3 that the realm of ether is exclusively separated from the field of rectilinear motions. But, as I have shown, this conclusion can be drawn from the arguments that has already been provided in this part. The separation of ether from the field of rectilinear motions lays a firm foundation for the subsequent arguments, according to which ether is characterized as the simple body that is unchangeable and immutable, and in this respect it differs from the sublunary bodies and the sublunary simple bodies of which the lower part of the universe is composed. As we shall see, even if there is generation and corruption and any other change other than locomotion taking place in the sublunary world, the physical things, which are subject to such changes, cannot have ether as one of their components. Ether, therefore, does not play any role in explaining these changes. What compose the subjects of such changes turn out to be the simple bodies other than ether.

In the next section, I shall argue that, not only is it the case that ether cannot be responsible for the changes other than locomotion, on the supposition that it is a constituent of bodies that are subject to such changes, but also that, on its own, it does not experience
any type of change other than the motion to which it is assigned. Only if the field of ether is torn from the other natural bodies and proven to be immune from any change other than locomotion, can we safely focus on the sublunar field in the enquiry into the phenomenon of change, especially into generation and corruption.

3.3 Ether is everlasting

Having assigned ether to a distinct field in which any type of rectilinear movements is ruled out, Aristotle concentrates on an inquiry into that simple body that moves only in a circular motion, and considers whether it is subject to the other types of natural changes other than locomotion, viz., generation and corruption, growth and diminution, and alteration. As we shall see in this section, the answer to this question is negative. On the basis of this consideration, ether is characterized as an everlasting simple body and denied to be responsible for generation and corruption by composing compound bodies. For this reason, ether, though characterized as a kind of simple body, along with the sublunary simple bodies, is completely absent from the discussion of *De Generatione et Corruptione*. In this section, by clarifying the way in which this conclusion is eventually drawn, we can see how the discussion of *De Caelo* can contribute to Aristotle’s further investigations into the changes other than locomotion.

3.3.1 Ether is ungenerated and uncorrupted

It is in *DC* I.3 that all natural changes other than locomotion are excluded from the realm of ether one after another. In this chapter, Aristotle proves that ether is neither generable nor corruptible in the first place. The exclusion of ether from the realm of the changes besides locomotion is based on the denial that something contrary to ether exists. As soon as ether is separated from the other types of simple bodies, and the bodies that are composed of the simple bodies other than ether, Aristotle begins his justification of the eternal nature of ether. He says:

It is equally reasonable to assume that this body will be ungenerated and indestructible and exempt from increase and alteration, since everything that comes to be comes into being from a contrary and some underlying thing, and passes away likewise with some underlying thing and by the action of a contrary and into a contrary, as we explained in
our opening discussions; and the motions of contraries are contrary. (270a12-18)\(^1\)

Here Aristotle first argues that ether is not subject to generation and corruption. In his view, generation or corruption, must take place between contraries. Thus, if ether is involved in a process of generation or corruption, there must be something contrary to ether, from which it comes into being, or into which it perishes. However, Aristotle argues that such a contrary does not exist, since if there were a contrary to ether, it would move only with a motion that is contrary to the motion of ether, but, as will be shown in DC I.4, there is no contrary to the circular motion of ether. Therefore, the contrary of ether does not exist, nor is ether subject to generation or corruption.

The argument above presupposes that, on the one hand, all changes in respect of substance take place between contraries, and, on the other hand, circular motion does not have a contrary. The justification of the second assumption is postponed to DC I.4. Aristotle is going to examine it carefully in the later section (§3.4), but in this section he provisionally accepts it, just as he does in DC I.3. The most pressing question concerns the first assumption; for the meaning of the contrary of ether in this assumption is not immediately obvious. It is generally agreed that in this assumption Aristotle refers back to Physics I.7-9,\(^2\) where he maintains that changes take place between a pair of contraries, viz., privation and form. Privation is the starting point and the result of the change is the form. If we apply this theory to what Aristotle argues in 270a12-18, then it turns out that, if it is possible that ether is generated from something, it must come into being from something that lacks the form that characterizes ether. Since ether is characterized as the simple body that moves only in a circular motion, the contrary of ether refers to something that lacks the capacity to move only in a circular motion.

However, the thing from which ether may come into being, if it exists at all, cannot be anything that lacks the nature by which ether is characterized. In Physics I.5 we read:

Our first presupposition must be that in nature nothing acts on, or is acted on by, any other thing at random, nor may anything come from anything else, unless we mean that it does so accidentally. For how could white come from musical, unless musical happened to be an attribute of the not-white or of the black? No, white comes from not-

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\(^1\) Ὄμοιος δ’ εἴλογον ὑπολαμβανεῖν περὶ αὐτοῦ καὶ ὃτι ἁγένητον καὶ ἐφθαρτόν καὶ ἀναπληγές καὶ ἀναπληγίου, διὰ τὸ γέννησθαι μὲν ἀπ’ ἄνευντων, καὶ ἐπὶ ἀναπληγίου περὶ τοῦ ἀναπληγίου τινὸς, καὶ ἐπὶ ἀναπληγίου ὁ ὑποκειμένου τέ τινος καὶ ὃτι ἐνάντιον καὶ ἐν ἀναπληγίων, καθάπερ ἐν τοῖς πρώτοις ἔχθεται λόγοις τοῦ ἐνάντιων καὶ ἀναφέρει ἀνάντας.

\(^2\) See Stocks 1922, in his note of this passage; Elders 1965, 92; Leggatt 1995, 182.
white—and not from any not-white, but from black or some intermediate. Similarly, musical comes to be from non-musical, but not from any thing other than musical, but from unmusical or any intermediate state there may be. (188a31-b3)

In this passage Aristotle argues on the basis of a logical speculation that changes must take place within certain ranges. For instance, both white and musical, if either of them comes to be, must come to be from their corresponding contraries or some intermediate states of the corresponding contraries. This argument emphasizes that contraries must share the same genus, or even the same species, e.g., both black and white are colors, and both musical and unmusical are states of a soul. This is why it is the case that not anything that is not-white is the contrary of white, and can, on that basis, generate white. Moreover, even if two different things are of the same genus, or even of the same species, they are not necessarily a pair of contraries. Only if two things are contrary in the same respect, do they count as a pair of contraries. So, in the case of ether, which is characterized as a simple body that possesses the capacity of moving only in a circular motion, if, in respect of capacity, there were a contrary of ether from which it can be generated, or into which it can change, it would have to possess the opposite capacity from ether; and the opposite capacity of moving only with a circular motion, for Aristotle, is to move only with the opposite motion of the circular motion with which ether moves. Therefore, as a conclusion, the contrary of the generated natural body which moves only with a circular motion, if it exists, must also be a simple body, and possess the capacity of moving only with the motion which is exactly contrary to the circular motion with which the generated ether moves.

It is true that in Categories 5, 3b24-32, Aristotle says that substance has no contrary, and, according to DC I.1, 268a3, simple bodies are substances; so, it seems unnecessary to argue here that ‘this body’ or ether has no contrary at all. This is the criticism that Philoponus levels against Aristotle. But in 270a12-18, as Leggatt correctly points out, Aristotle is not indicating that there might be something that is contrary to ether in virtue of its being a substance. Here he just considers whether or not there is a pair of things, one

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1 ἱπτεόν δὴ πρῶτον ὅτι πάντων τῶν ὄντων οὐδὲν ὀφεῖ ποιεῖν πέροικον ὀφεῖ πάσχειν τὸ τυχόν ὑπὸ τοῦ τυχόντος, οὐδὲ γίγνεται ὃτιοι ἐξ ὁπουοῖν, ἐν μὴ τὶς λαμβάνῃ κατὰ συμβεβηκός· πῦς γὰρ ἂν γένοιτο λευκὸν ἢ μουσικὸν, πλὴν εἴ μὴ συμβεβηκός εἶ ὑπὸ τὸ μὴ λευκὸν ἢ τὸ μέλαιν τὸ μουσικόν· ἀλλὰ λευκὸν μὲν γίγνεται ἢ τὸ μελαιόν, καὶ τοῦτον ὅποι ἢ παντός ἢ πᾶς μέλαιν ἢ μέλαιν ἢ παντός ἢ μελαιόν, καὶ μουσικόν σὺν ἢ μουσικόν, πλὴν ὅποι ἢ παντός ἢ μουσικὸν ἢ μελαιόν ἢ μελαιόν ἢ μουσικόν ἢ παντός ἢ μουσικόν ἢ μελαιόν ἢ μελαιόν. Καὶ ἀπὸ τοῦτο πάντων ἢ πάντων ἢ μελαιούσον ἢ μελαιοῦσον ἢ μουσικούσον ἢ μουσικούσον ἢ παντοτέρον ἢ παντοτέρον ἢ μελαιότερον ἢ μελαιότερον ἢ μουσικότερον ἢ μουσικότερον. 

2 As Charlton correctly points out, this doctrine is purely logical rather than empirical. See Charlton 1970, 66.

3 Cf. Topics 4.3, 123b1-8.

of which has the capacity of moving only in a circular motion, while the other moves only in the motion contrary to the circular motion. 1 If there were such contrary bodies, they would be contraries in so far as they possess opposite capacities. This is why, at 270a18, Aristotle states with certainty that if such contraries exist, they must move with contrary motions.

The same argument applies to corruption as well. So, on account of the quoted passages above, as long as a piece of ether is involved in generation and corruption, it must have a contrary body to which a simple motion that is contrary to the certain circular motion conducted by the generated ether, if it can be generated at all, is assigned. Nevertheless, as has been proved that there is no movement contrary to any circular movement. It follows that it is impossible for any piece of ether to be involved in generation and corruption.

3.3.2 Ether is not subject to the changes in respect of quantity and quality

After excluding generation and corruption from the realm of ether, Aristotle proceeds to address growth and diminution. He says,

Again, everything which is subject to growth increases by adding a kindred body, and which is subject to diminution diminishes by dissolving into its matter. But there is nothing out of which this body can have been generated. (270a22-25) 2

It is true that, if there are two pieces of ether, and if part of one piece is cut off and added to another piece, then the quantity of the second piece would be larger while that of the first would be smaller at the same time. But, according to my understanding, the question under discussion is whether ether, by nature, admits of growth and diminution or not. Thus, in the aforementioned case, even if, say, the first piece of ether is increased, this piece of ether does not undergo the change as ether, but as an individual. Only if there were something that is not ether but changes into ether and attaches itself to the totality of ether, would the ether that has been attached be regarded as having been increased in virtue of being ether. But this is impossible, as Elders has pointed out in his comment on this passage: ‘Since there is no generation there is no increase. For increase supposes the addition of material from another body which perishes. But this corruption is impossible, as has been outlined

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1 See Leggatt 1995, 183.
2 Ἀλλὰ μὴν καὶ τὸ αὐξανόμενον ἄπαν αὐξάνεται [καὶ τὸ φθίνον φθίνει] ὑπὸ συγγενοῦς προσιόντος καὶ ἀναλυομένου εἰς τὴν ὕλην· τούτῳ δ’ οὐκ ἐστίν ἐξ ὃ τῇ γέγονεν.
According to Elders’ interpretation, the reason why growth is impossible for ether is that the ‘kindred body’, which is added to the increased piece of ether, would have to have changed into ether from something other than ether. Because this cannot take place at all, it is revealed that ether does not admit of growth. The same argument, *mutatis mutandis*, is applicable to diminution as well. Thus, change in respect of quantity is also excluded from the realm of ether.

The justification that ether does not admit of growth and diminution leads directly to an argument that this type of simple body is not subject to alteration either.

We see, however, all natural bodies which change their properties to be subject to increase and diminution. This is the case, for instance, with the bodies of animals and their parts and with vegetable bodies, and similarly also with those of the elements. And so, if the body which moves with a circular motion cannot admit of increase or diminution, it is reasonable to suppose that it is also unalterable. (270a29-35)

The arguments above is simple. According to our observation (κατὰ πάθος) of both living beings and inanimate bodies, which are composed of the elements, as long as a natural body is alterable, it is subject to growth and diminution; therefore, if a natural body is not subject to growth and diminution, it is unalterable. Because, as has been already proved, ether does not admit of increase and diminution, it cannot undergo alteration either.3

In this way, it has been proved that any simple body that moves only in circular motion, is everlasting and is not involved in any change besides locomotion to which it is assigned. In keeping with the tradition in ancient Greek philosophy,4 it is recognized as the celestial body, or ether, or the first body, as it is called in 270b3.

As we shall see, this conclusion has already been accepted and presupposed in Aristotle’s further investigations in *De Generatione et Corruptione*. In his explanation of natural phenomena, especially the generation and corruption around us, only the sublunary simple bodies, namely, the simple bodies that move straight toward the center and those

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1 Elders 1965, 93.
2 Κατὰ δὲ πάθος Μία μεταβάλλεται τῶν φυσικῶν σωμάτων, ἔχονθ’ ὄρθων πάντα καὶ αὔξησιν καὶ φθίσιν, όπως τὰ τῶν ζώων σώματα καὶ τὰ μόρια αὐτῶν καὶ τὰ τῶν φυτῶν, ὅμοιος δὲ καὶ τὰ τῶν στοιχείων· ὡσ’ ἐξερτήθη ἡ κύκλωσις σώμα μῆτ’ αὔξησιν ἐχειν ἐνδέχεται μήτε φθίσιν, εἰδολογον καὶ ἀναλλοίωτον εἶναι.
3 As Leggatt points out, because the premise of this argument is empirical, Aristotle can only come to a conclusion which is reasonable, rather than absolute (1995, 183-184).
4 Burnet holds that this tradition can be traced back as far as to the primitive religion of the Greeks, which, however, is rejected by the Ionian philosophers (1930, 14-15).
that move directly away from the center, might be appealed to directly.

Before I proceed to investigate the exact number of simple bodies, which will also contribute substantially to further inquiries, in order to finish the current justification, it is necessary to spell out why it is the case that, according to Aristotle, there is no contrary motion to any circular movement. This is the last step to complete Aristotle’s argument that ether is immune from any type of change other than locomotion. Only if this proposition, which was just provisionally accepted in the previous argument, is successfully defended, can we eventually come to the conclusion that ether is not involved in generation and corruption, either in virtue of itself or as a component of compounded bodies.

3.4 Circular motion does not have a contrary

I have argued in the previous section that, in the second part of DC I.3, Aristotle confirms that ether is not subject to the changes in respect of substance, quantity and quality. This confirmation, as I have shown in the previous section, is justified on the basis of an assumption that any circular motion does not have a contrary motion. This assumption, however, has not yet been defended. In DC I.4, several strict arguments are supplied in support of this assumption. It is on the basis of these arguments that the justification that ether is excluded from the changes besides locomotion, ultimately rests. Owing to their important role in Aristotle’s overall justification, these arguments are worth a close look.

In this section, I will interpret Aristotle’s arguments provided in DC I.4. I will argue that, in this chapter, Aristotle excludes all possible candidate contraries to circular motion. As I have shown in §3.3.1, all contraries belong to the same genus, and the motion that is contrary to the circular motion with which the piece of generated ether moves, if it can be generated at all, must be a simple motion as well. On the other hand, as has been shown in §2.1.2, there are only three types of simple motions, two of which are rectilinear simple motions, and one of which is a circular motion. In order to prove that the contrary of a circular motion does not exist, the strategy is, naturally, the method of exclusion. As long as all candidates are eliminated, it can be proved that there is no simple motion contrary to circular motion.

First, as I will show in §3.4.1, none of the other types of simple motions, i.e., the two
types of rectilinear simple motion, is contrary to a circular motion; then, in §3.4.2, I will show that, for any specific circular motion, there is no circular motion contrary to that motion. Accordingly, two further conclusions can be drawn from these two propositions: on the one hand, none of the other types of simple bodies is contrary to the kind of simple body that moves only in a circular motion; and, on the other hand, this kind of simple body cannot be differentiated into distinct types. Only once these arguments have been expounded, can we safely declare that each of the simple bodies moving only in a circular motion does not have a contrary, and, therefore, can we ultimately come to the conclusion that ether does not admit of any type of natural change besides locomotion, that is, it does not admit of generation and corruption, growth and diminution, and alteration.

3.4.1 Rectilinear movement is not contrary to circular movement

The first candidate contrary to circular motion that is eliminated is rectilinear motion. As Aristotle indicates at the beginning of DC I.4, it seems natural to suppose that rectilinear movement is contrary to circular movement.\(^1\) This candidate, however, is excluded without hesitation:

But the rectilinear motions are opposed to one another by reason of their places; for up and down is both a difference and a contrary in place. (271a3-5)\(^2\)

In this passage, Aristotle denies that rectilinear motion can be identified with the contrary of circular motion, but this argument is conspicuously elliptical. Here he has just pointed out that rectilinear simple motion itself consists of a pair of contrary simple motions. It is not yet clear why it is the case that rectilinear motion, which can be further distinguished into a pair of contrary motions, cannot be the contrary of circular motion at the same time. There are two traditional ways of interpreting this justification.

One interpretation is preserved in Simplicius’ commentary. It can be traced back to Alexander, and in modern times is advocated by Guthrie.\(^3\) This interpretation can be formulized as a *reductio ad absurdum*:

(1) Suppose that rectilinear motion is contrary to circular motion.

(2) Rectilinear motion can be further distinguished into straight upward motion and

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\(^1\) See DC I.4, 270b33: πρώτον μὲν ὃτι τῇ περιφέρει τὴν εὐθείαν ἀντικείσθαι μᾶλλον τίθησιν.

\(^2\) Αἱ δὲ ἐπὶ τῆς εὐθείας ἄλληλας ἀντίκεινται διὰ τοῦς τόπους· τὸ γὰρ ἄνω κάτω τόπου τέ ἐστι διαφορὰ καὶ ἑναντίωσις.

straight downward motion.

(3) Straight upward motion is contrary to straight downward motion.

(4) One thing is contrary to one thing

(5) Hence, according to (1) and (2), both straight upward motion and straight downward motion are contrary to circular motion.

(6) Hence, according to (3) and (5), straight upward motion is contrary to both straight downward motion and circular motion.

(7) Hence, according to (3) and (5), straight downward motion is contrary to both straight upward motion and circular motion.

(8) Both (6) and (7) contradict (4).

(9) The original assumption that rectilinear motion is contrary to circular motion is not correct.

This deductive justification, in my view, is not unproblematic. For instance, in (5), it is indeed correct that both straight upward motion and straight downward motion can be identified with the contrary of circular motion, but this fails to recognize that it is in virtue of being a type of rectilinear motion, rather than in virtue of itself, that straight upward motion, or straight downward motion, is identified with the contrary of circular motion. In (3), however, it is in virtue of being itself, rather than in virtue of being a type of rectilinear motion that straight upward motion is contrary to straight downward motion. Therefore, it seems to me that, in (6), it is not in the same sense that straight upward motion is contrary to straight downward motion on the one hand, and contrary to circular motion on the other hand. This is the case in (7). It is, of course, possible for X, in virtue of being the genus of X, to be contrary to A, and, at the same time, to be contrary to B in virtue of itself.1 If this were what Aristotle has in mind, he definitely would have to add further arguments to supplement the justification above, which is not adequate as it stands.

In addition to Alexander’s proposal, Stock provides us with an alternative interpretation of Aristotle’s denial that rectilinear motion is contrary to circular motion.2 According to Stock, it is because circular motion and rectilinear motion do not move towards contrary places that they cannot be regarded as a pair of contrary motions. It seems to me that this interpretation is more plausible. In Physics V.5, Aristotle gives us an account

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1 Hankinson mentions the example of virtue of character (2009, 112-113, n.60).
2 Stock 1922, n.1 at 271a6.
of the contrary changes. He says,

Thus two changes are contrary to each other only when one is a change from a contrary to the opposite contrary and the other is a change from the latter to the former. (229b21-22)\(^1\)

Based on this passage, only if the ends of two changes, or, specifically in the case of locomotion, the destinations of two movements, are contraries, are the movements through which the contrary destinations are reached by also contraries. That this account is applicable to the present discussion is confirmed several lines later at 271a19.\(^2\) According to this criterion, only those two rectilinear simple motions are contrary motions, since one of them moves straight to the upper region, while the other moves straight downward, and up and down are a pair of contrary places. On the other hand, the body which moves only with circular motion, as this type of motion is defined, does not change its place at all, so it is reasonable to exclude rectilinear motion as a candidate motion contrary to circular motion. This interpretation is also the interpretation endorsed by Elders in his commentary.\(^3\)

Now, in order to nail the conclusion that ether is not subject to any type of natural change besides locomotion, we must explain why it cannot be the case that one circular motion is contrary to another circular motion.

3.4.2 Circular motions are not contrary to circular motions

Since the contrary of a circular motion must be a simple motion as well, and rectilinear motion cannot be the contrary of circular motion, the only remaining candidate motion that could be the contrary of circular motion is another circular motion. In the succeeding discussion, I largely accept Noble’s interpretation of the remaining arguments in DC I.4,\(^4\) and, especially, his emendation of the final passage of the same chapter, viz., 271a19-33. Now, I am going to associate Aristotle’s arguments with what he has argued in DC I.2. This connection will, in turn, support Noble’s general understanding of DC I.4.

3.4.2.1 Clockwise circular motion versus counterclockwise circular motion

In his refutation of the idea that a circular motion can be the contrary of another circular

\(^1\) κίνησις μὲν δὴ κινήσει ἑναντία οὕτως ἢ ἐξ ἑναντίου εἰς ἑναντίον τῇ ἐξ ἑναντίου εἰς ἑναντίον.
\(^2\) Cf. DC I.6, 273a8-9, ἑναντίαι γὰρ αἱ φοραὶ ἢ ἄνω καὶ ἢ κάτω, αἱ δ’ ἑναντίαι εἰς ἑναντίοις τόπους.
\(^3\) See Elders 1965, 99.
\(^4\) The only disagreement between Noble and I, as we shall see in §3.4.2.2, is about the interpretation of the reductio argument in 271a28-33.
motion, Aristotle begins by emphasizing the distinction between circular motion and other linear motions. In his view, of all types the of locomotion, only circular motion is unlimited. In contrast with circular motion, any linear motion, whether it moves over a straight line or a semicircle, is limited, since it is limited by its starting point and ending point. In the case of circular motions, however, there are no such limits. Therefore, circular motion is regarded as the only type of unlimited motion, and distinguished from any linear motion in this respect.¹

Then, from 271a19-a33, Aristotle focuses on the case of true circular motions. Noble reconstructs the first argument in this passage in the following way:

But surely, not even the circular motion from A to B is contrary to the circular motion from A to Γ. For the motion is from the same to the same, whereas contrary motion is defined as motion from contrary to contrary. (271a19-22) … For it would be to the same, it is necessary that what moves in a circle from any point arrive at all the contrary places alike (and the contraries of place are above and below, in front and behind, right and left), and the contraries in motion are in accordance with the contraries of places. (271a23-28)²

¹ Cf. Noble 2013, 397-404. The crux of the matter is how to understand 271a9-10, αὖτη γὰρ πεπέρανται, περιφερείς δ᾽ ἄπειροι ἀν ἐλέν περὶ τὰ αὐτὰ σημεῖα. There is a traditional interpretation of this passage according to which the πεπέρανται and the ἄπειροι in this text are construed as the limited and the unlimited number of loci through which an object may travel across the same start-and endpoints. Leggatt translates the sentence in the following way: ‘for this [sc. the straight line between two points] is limited, but there would be an unlimited number of curves about the same points’ (1995, 59). On the other hand, according to Noble, the comparison between πεπέρανται and ἄπειροι indicates that circular motion ‘traverses a series of unbounded (or an unlimited series of) circular paths’, while any other linear motion, regardless of whether it moves over a semicircle or a straight line, traverses a finite path. Cf. Noble 2013, 399-404.

² Besides what Noble has put in his paper, according to what I have argued in § 2.1.2, it is true that the locus of the circular motion in questions is a circle, but not any locomotion whose locus is a circle is a circular motion. Strictly speaking, if, and only if, the center of the figure over which a body moves is exactly the center of the universe, the locomotion with which the body moves is a circular motion. So, if there were a body moving in a proper circular motion through two points, by which a linear motion is limited, there would be only one possible circle over which it moves, since the center of the circle must be exactly the center of the universe. Therefore, it is more reasonable to construe the πεπέρανται as the finitude of the locus of linear motion, rather than its singularity, and the ἄπειροι as the endlessness of the circular motion, rather than the multiplicity of the possible loci over which a body can move through two points.

In this way, the ὀμοίως at 271a10 and at 271a13, which sets off the two subsequent arguments, can be better understood. According to this reading, in these two arguments, Aristotle argues that it is because the motions over semicircles, regardless of direction, are as limited as rectilinear motions that they are distinct from circular motions.

Moraux and Leggatt suggest that 271a23-28 should be placed after 271a17-19 and constitutes an integrated argument. In repudiating this proposal, see Noble 2013, 403-408, esp., n.19.
According to Noble’s emendation, the text of 271a19-22 and 271a23-28 quoted above form a single integrated argument (while 271a22-23 and 271a28-33 constitute another argument). It is in these two arguments that Aristotle directly answers the question of why it is the case that a proper circular motion, i.e., a motion whose locus is a whole circle rather than any part of a circle (this has been discussed in his previous arguments), cannot be the contrary motion of another. For Aristotle, even if two circular motions share the same loci but move in different directions, viz., one moves clockwise while the other moves counterclockwise, they are still not contrary motions. In support of this view, Aristotle explains in 271a20-22 that, only if the endpoint of a motion is the contrary place of its start point, is it possible for this movement to have a contrary motion. In regard to circular motion, the starting point and the ending point of a circular motion are the same; therefore, it is impossible for a circular motion to have a contrary.

This argument is apparently built on the basis of Aristotle’s definition of contrary motion, which he puts forward in Physics V.5. According to this definition, only those motions whose starting and ending points are contraries are contrary motions. More specifically, the criterion according to which two motions are recognized as a pair of contraries can be formulated in the following way: only if a body moves with a motion \( M_1 \) from \( X \) to \( Y \), and a body moves with a motion \( M_2 \) from \( Y \) to \( X \), and \( X \) and \( Y \) are contrary places, are \( M_1 \) and \( M_2 \) contrary motions. But circular motions do not have two distinct starting points and ending points. As Aristotle emphasizes at 271a20 and 271a23, the destination to which a circular motion moves, regardless of the direction, is the same as its starting point.\(^1\) Suppose that, over a same circle \( O \), there are two circular motions, \( C_1 \) and \( C_2 \), that start from a certain point, \( A \), and move back to point \( A \) along the circle \( O \), and \( C_1 \) moves clockwise, while \( C_2 \) moves counterclockwise. In a case such as this, both \( C_1 \) and \( C_2 \) can be understood as moving from \( A \) to \( A \). Since \( A \) is not the contrary of \( A \), it is apparent that \( C_1 \) and \( C_2 \) are not contrary motions, according to the criterion mooted above, even though they move in opposite directions.

The above argument has, apparently, already eliminated the possibility that one circular motion is contrary to another, but in 271a23-28, Aristotle envisages another

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\(^1\) Cf. Physics VIII.8, 264b9-19.
possibility, which he rules out. Suppose two points, B and Γ, are diametrically opposed to one another on a same circle, O, over which two circular motions, C₁ and C₂, move, and suppose that C₁ goes from B to B, while C₂ goes from Γ to Γ. In this case, since the starting point of C₁, namely B, is the contrary of the starting point of C₂, namely Γ, and the ending point of C₁, namely B, is also the contrary of the ending point of C₂, namely Γ, then should we admit that, according to the definition of contrary motion, formulated above, C₁ is contrary to C₂? Aristotle’s answer to this is ‘No’ as well. His rejection of this view is derived from the idea that circular motion is infinite. It has been shown that, in contrast with limited linear motions, any true circular motion is endless; from which it follows that any point on its circuit, regardless of the direction of the motion, can be regarded as its starting point and/or ending point. Thus, no circular motion specifically starts from a certain point on the circle whose circumference it traces. In other words, for any circular motion over the circle O, both B and Γ can be regarded as the destination of both C₁ and C₂. Thus, the last possible way in which one circular motion could be the contrary of another is ruled out.

To conclude, moving in opposite directions turns out to be a necessary but not a sufficient condition for being contrary motions. In the case of rectilinear motions, it is correct that the directions of a pair of contrary motions are contrary, but the contrariety of the opposite directions is fundamentally determined by the contrariety of the starting and ending points of the contrary motions. If the contrary directions does not indicate the contrariety of the starting point and ending point of the two motions, as in the case of the clockwise and counterclockwise circular motions over the same circle, then the pair of motions cannot be classified as contrary to one another.

3.4.2.2 The reductio argument

The whole argument at 271a19-22 and 271a23-28 is built on the basis of Aristotle’s own definition of contrary motion. Its conclusion, that a clockwise circular motion is not contrary to another counterclockwise circular motion over the same circle, however, is counterintuitive. In our everyday language, it seems to be acceptable to assert that a clockwise circular motion is contrary to a counterclockwise circular motion as long as they both trace the same circle. Aristotle himself admits in DC II.2, some heavenly bodies rotate westwards while some others rotate eastwards, and Philoponus holds that Aristotle in fact
has two distinct understandings of contrary motion, one applied to circular motion, and the other to rectilinear motion.\(^1\) Aristotle is well-aware that his conclusion, drawn on the basis of his definition of contrary motion, is not so easy to accept. Immediately after this argument, he gives a *reductio ad absurdum*. Though it is independent of his definition of contrary motion, which was appealed to in the previous arguments, it reaches the same conclusion. He says:

But even if circular motion were contrary to circular motion, one of the two circular motions would be in vain. (271a22-23) … For if the motions were equal, there would not be a motion of the bodies, but if one of the two motions were to prevail, the other motion would not exist. As a result, if there were both bodies, one of the two bodies would be in vain since it would not be moving with its natural motion. For we say that the shoe which is not worn is in vain. But god and nature make nothing in vain. (271a28-33)\(^2\)

As has been revealed above, 271a23-28 is considered to be part of the previous argument, which appeals to Aristotle’s specific definition of contrary motion. The *reductio* under discussion, therefore, runs from 271a22-23 and 271a28-33. Hankinson is correct in pointing out that, in this last argument, Aristotle reveals the significance of his exclusion of circular motion from the realm of contrariety in his natural investigation.\(^3\) But his interpretation of the details of these passages is problematic. Hankinson admits that the circular motions in opposite directions, viz., clockwise circular motion and counterclockwise circular motion, exist *de facto* in Aristotle’s cosmological system. He argues, then, that it is because they do not impede each other that such circular motions cannot be regarded as contrary motions.\(^4\) But as Noble points out, this reading requires that clockwise and counterclockwise motions on the same path count as contrary motions, and that they are contrary in virtue of impeding each other.\(^5\) This, however, appears to contradict what Aristotle has proved in the previous argument, according to which circular motions are not contraries in any case.

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2. Εἰ δὲ καὶ ἦν τῇ κύκλῳ τῇ κύκλῳ ἕναντι, μάτην ἄν ἦν ἢ ἐτέρα: … … εἰ μὲν γάρ Ἰσαί ἦσαν, οὐκ ἂν ἦν κίνησις αὐτῶν, εἰ δὲ ἢ ἐτέρα κίνησις ἑκράτει, ἢ ἐτέρα οὐκ ἂν ἦν. Ὡσ′ εἰ ᾑμφότερα ἦν, μάτην ἄν θάτερον ἦν σῶμα μὴ κινούμενον τὴν αὐτὸς κίνησιν: μάτην γὰρ ὑπόδημα τούτο λέγομεν, οὐ μῆ ἔστιν ὑπόδημα. Ὅ δὲ θεός καὶ ἡ φύσις οὐδὲν μάτην ποιοῦσιν.
3. See Hankinson 2009, 115. He says, “why should Aristotle be so concerned to abstract circular motion from the realms of contrariety? The answer to that is to be found not in logic or mathematics, but in physics. The final considerations of *De caelo* 1.4 are physical—and metaphysical—in nature.”
Noble correctly points out that Aristotle indicates here that the simple body that moves only in a circular motion cannot be subdivided into more than one species. Moreover, according to his interpretation of the quoted passages, if two circular motions were contrary to one another, then at least two types of elements that move only in a circular motion would be distinguished. However, on this interpretation, Noble has supposed that if there were two types of elements, each of which moves only in one of the contrary circular motions, some of them would have to be mixed with each other. According to Noble, it is this supposition upon which the *reductio* in 271a28-33 is based. His argument can be reconstructed in the following way:

1. If there were two contrary circular motions, then the simple bodies that move only in a circular motion would be distinguished into two species.¹
2. If there were two types of elements, each of which moves only in one of the contrary circular motions, then some of them would have to be mixed with each other.
3. But, if they were mixed with each other, at least one of the elements would not fulfill its natural motion, and the existence of this element in the mixture would be in vain.
4. According to (3), there cannot be two distinct simple bodies that move only in a circular motion mixed with each other.
5. According to (2) and (4), the simple bodies that move only in a circular motion cannot be distinguished into two species.
6. Therefore, according to (1) and (5), no circular motion has a contrary motion.

It seems to me that, premise (2) above is questionable, and Noble goes to a great effort arguing that it is questionable.² However, if we relate the *reductio* argument at 271a28-33 to Aristotle’s characterization of simple motion as an explanatory factor of the complexity of locomotion in *DC* I.2, as I have argued in §2.1.3, then the difficulty can be avoided.

It is conspicuous that, at 271a28-33, Aristotle suggests that even if a circular motion is

¹ Noble 2013, 410. On his view, it is not altogether clear whether Aristotle thinks that the existence of an additional kind of simple motion would imply the existence of a corresponding element or only the possibility of its existence. But, as I have shown in chapter 2, as long as there is a type of simple motion to which other motions can be reduced, it would be assigned to a particular type of simple body that is different from other natural bodies in virtue of itself.
² Noble 2013, 407. Here he admits that ‘the problematic scenario Aristotle describes could perhaps be avoided if the two proposed elements were to move along different paths in the heavens. Nothing in the argument, so far as I can tell, positively rules this scenario out.’
identified with a combination of two contrary circular motions, if there were such contrary circular motions, at least one of these two motions would fail in fulfilling and expressing its explanatory power properly. In the interest of economy, it is not necessary to make this identification. Therefore, in my view, if we realize that the differentiation of contrary circular motions does not contribute to a better understanding of any circular motion, since any circular motion does not have to be analyzed into a combination of contrary circular motions, we may safely come to the conclusion that this differentiation is in vain in the explanation of the locomotion taking place in the superlunar field. In other words, even if, tracing the same circle, there were a pair of contrary circular motions, say, clockwise and counterclockwise circular motions, they would not be necessary to explain any circular movement performed by the heavenly bodies.

If this interpretation is reasonable, what Aristotle denies in the reductio is hardly the existence of contrary motions. What he indicates here is that two circular motions tracing the same circle but in opposite directions do not necessarily count as contrary circular motions, or, more specifically, two distinct simple motions in virtue of themselves.\footnote{In this case, their differences are accidental, rather than essential. In contrast with this, if they were contrary motions, as Aristotle assumes in the text, they would be different in virtue of themselves, but be the same in virtue of being circular motions.} At the beginning of DC II.5, Aristotle explicitly admits that there are circular motions in different, or even opposite, directions.\footnote{DC II.5, 287b22ff., Ἐπεὶ δὲ ἐστι διοχός ἐπὶ τοῦ κύκλου κινηθῆναι, οὗν ἀπὸ τοῦ Α τὴν μὲν ἐπὶ τὸ Β τὴν δὲ ἐπὶ τὸ Γ, ὅτι μὲν οὖν οὐκ εἰσὶν ἐναντίαι αὐταί, πρῶτερον εἶρηται.} We do not have to presume that the passages quoted above are in conflict with the passages several chapters later. As I have argued above, however, since the distinction between clockwise and counterclockwise circular motions does not contribute to the explanation of the complexity of the locomotion of the heavenly bodies, they do not necessarily have to be regarded as two distinct types of simple motions. On the contrary, if the circular motions over the same circle, but in opposite directions, are not contrary motions, then the circular motions performed by heavenly bodies would be as simple as they are. In this way, what Aristotle really suggests in 271a22-23 is that the assumption that one of circular motions is the contrary of another is purposeless. For Aristotle, it is just pointless to assume that one circular motion is contrary to another circular motion, even if they de facto move in opposed directions, say, one moves clockwise while the other moves counterclockwise.
Thus, as has been argued in this section, neither a rectilinear simple motion nor a circular motion can be the contrary of any circular motion. Since the contrary of a circular motion, if it exists at all, must be as simple as the circular motion, and since there are no other simple motions besides rectilinear simple motions and circular motions, it follows that no circular motion has a contrary motion. This is what is added in *DC* I.4 in support of *DC* I.3, where Aristotle makes it clear that ether, the simple body of which the superlunary realm is composed, does not admit of any change other than locomotion. Therefore, ether is excluded from the list of simple bodies that are directly involved in generation and corruption, growth and diminution, and alteration.

In the next chapter, in order to single out the ingredients of the physical things that are subject to the changes other than locomotion, I shall consider the number of the simple bodies of which those physical bodies are composed and explain why they are involved in such changes.
4. What is responsible for the change other than locomotion (II)

As has been shown in the previous chapter, only the sublunary simple bodies are subject to the changes besides locomotion. In order to make it clear what exactly are the simple bodies that serve as explanatory factors of the enquiry into such changes, especially generation and corruption, are, Aristotle is now in a position to answer the second question that was posed at the beginning of the Chapter 3 chapter: What is the exact number of the terrestrial simple bodies? And he is in a position to provide us with an exhaustive list of these simple bodies.

This question, as I understand it, is completely answered in De Caelo III and IV. According to my interpretation of these two books, Aristotle here moves from an explanation of locomotion to an investigation into coming-to-be and passing-away, and determines the final list of the corporeal elements of which the changeable and mutable individuals are composed.

The deduction of simple bodies in De Caelo is often take to be as incomplete. As Solmsen claims, ‘in the sublunary world Aristotle could find only two natural movements that would correspond to the circular motion of the body in the celestial zone. Yet as he has no thought of reducing the four elements to two, he has in the end to employ arguments of a somewhat different type - ungenerous critics might speak of special pleading - to arrive at the four that the Timaeus and the Academy had recognized.’\(^1\) This position, which in my view underestimates the completeness and strictness of the deduction of simple bodies in De Caelo, has many supporters.\(^2\) As I shall argue, if De Caelo is read carefully, a rigorous argument about the number of simple bodies can be reconstructed. In this chapter, I shall present the complete deduction of the number of simple bodies, on account of which the way simple bodies are characterized is revealed.

In this chapter, I shall first explain why Aristotelle feels the need to explore the exact

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\(^2\) According to Gill 2009, 145, the reason why intermediate elements, viz. water and air, exist is to be found in De Generatione et Corruptione, rather than De Caelo. In the same collection, Matthen explicitly declares that ‘Aristotle’s main motivation for positing four sublunary elements instead of two comes not from considerations of natural place and natural movement, but from the qualitative considerations—four elements are needed to accommodate all compatible pairings of hot-cold and dry-wet (De gen. et corr. 2.2)’ (Matthen 2009, 125-127); see also Berman 2018, 3, n. 6. This understanding can be traced back as far as Simplicius, who complains that the deduction in De Generatione et Corruptione is more precise than that in De Caelo. See Simplicius 2009, 115.
number of the sublunary simple bodies. Then, I shall reconstruct Aristotle’s deduction according to which, as I shall argue, the number of the sublunary simple bodies that is ultimately settled in *De Caelo* is as rigorous as that in *De Generatione et Corruptione*. Finally, the way in which the sublunary simple bodies are characterized will be spelled out.

4.1 Elements and Aristotle’s investigation into the corruptible things

At the beginning of *DC* III.1, after summarizing what has been discussed in the first two books, and reiterating the scope of natural investigations, which has been addressed at the beginning of the treatise, Aristotle immediately points out the close connection between the foregoing investigation into the sublunary simple bodies and the phenomena of generation and corruption. He says:

> Since, then, we have spoken of the primary element, of its nature, and of its freedom from destruction and generation, it remains to speak of the other two. In speaking of them we shall be obliged also to inquire into generation and destruction. For if there is generation anywhere, it must be in these elements and things composed of them. (298b6-11)

In this passage, as soon as the sublunary simple bodies are distinguished from the primary element, namely ether, they are immediately associated with an inquiry into generation and corruption. Here Aristotle’s recalls the conclusion previous discussion that ether, or the primary element, is excluded from generation and corruption, and is separated from the other two groups of simple bodies, namely, the sublunary simple bodies, which move directly towards the center of the universe and directly away from the center of the universe. On the basis of the fact that ether is not involved in the changes other than locomotion, Aristotle maintains that, if generation and corruption exist, they must take place in the realm of the simple bodies, other than ether. In this way, those simple bodies apart from ether are characterized as the corporeal elements, or the fundamental components of corruptible things.

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1 298a24-27: Περὶ μὲν οὖν τοῦ πρῶτου οὐρανοῦ καὶ τῶν μερῶν, ἐτὶ δὲ περὶ τῶν ἐν αὐτῷ φερομένων ἀστρῶν, ἐκ τίνων τε συνεστάσι καὶ ποῖ’ ἀττα τὴν φύσιν ἐστί, πρὸς δὲ τούτως ὀτὶ ἀγένητα καὶ ἀφθαρτα.

2 298a28: τὰ μὲν ἐστὶν οὐσίαι, τὰ δ’ ἔργα καὶ πάθη τούτων. Cf. 268aff.

3 Περὶ μὲν οὖν τοῦ πρῶτου τῶν στοιχείων εἰρήται, καὶ ποιόν τι τὴν φύσιν, καὶ ὅτι ἀφθαρτον καὶ ἀγένητον λουπὸν δὲ περὶ τῶν δυοῖν εἰπεῖν. ΄Αμα δὲ συμβῆσαι περὶ τούτων λέγουσι καὶ περὶ γενέσεως καὶ φθορᾶς διασκέδασθαι γένεσις γὰρ ἦτοι τὸ παράσαν οὐκ ἔστιν, ὡς μόνον ἐν τούτοις τοῖς στοιχείοις καὶ τοῖς ἐκ τούτων ἔστιν.
Having this in mind, Aristotle deviates from the discussion of simple bodies to a series of arguments in support of the idea that generation is a fact, rather than an illusion.\(^1\) It is not before the beginning of \textit{DC} III.3 that Aristotle returns to the investigation into simple bodies, in the interest of an inquiry into generation and corruption. Here he declares that the sublunary elements serve their role of important explanatory factors with respect to the phenomena of generation and corruption. He says:

It remains to say what bodies are subject to generation, and why. Since in every case knowledge depends on what is primary, and the elements are the primary constituents of bodies, we must ask which of such bodies are elements, and why; and after that what is their number and character. (302a10-14)\(^2\)

In explaining the necessity of his clarification of the realm of generation, Aristotle echoes what he has articulated in the preamble to \textit{Physics} I.\(^3\) In his view, in any inquiry, only if the first principles and the elements of things are grasped, can we claim that these things have been understood. Likewise, since the notion of simple body, or the corporeal elements, has been introduced through an analysis of the complexity and variety of locomotion, in order to arrive at a better understanding of the changes other than locomotion, especially generation and corruption, to which a certain group of physical things are subject, it is necessary to make clear the primary constituents of these physical things at the first place. Thus, Aristotle poses the following four questions here concerning the corporeal elements of which the corruptible things are composed: (1) Which are the elements?\(^4\) (2) Why are there elements?\(^5\) (3) What is their number? (4) What is their character?

\(^1\) In \textit{DC} III.1, Aristotle splits the views of his predecessors on generation into three groups: (1) generation is merely an illusion, only what-is is free from generation and corruption; (2) all physical things are in a flux of generation and corruption, nothing is ingenerated and incorruptible; (3) all physical things, which are subject to generation and corruption, are composed of surfaces and lines, which are ungenerated and incorruptible by themselves. In this chapter, Aristotle criticizes the third view, so as to reveal that all physical bodies, either simple bodies or complex bodies, cannot be reduced to some simpler geometrical figure. Therefore, the fundamental components of physical things, if they exist, must be bodies, rather than surfaces or lines. In \textit{DC} III.2, Aristotle confirms the way in which the two groups of sublunary simple bodies are characterized in the \textit{DC} I.2 in terms of the straight downward motion and the straight upward motion, or heavy and light.

\(^2\) Λοιπὸν δ’ εἰπεῖν τίνος τέ ἐστι γένεσις σωμάτων, καὶ διὰ τί ἐστιν. Ἐπεὶ οὖν ἐν Ἰάσιν ἡ γνώσις διὰ τῶν πρῶτων, πρῶτα δὲ τῶν ἐνυπαρχόντων τὰ στοιχεῖα, σκεπτόντων ποία τῶν τοιούτων σωμάτων ἐστὶ στοιχεῖα, καὶ διὰ τί ἐστιν, ἔπειτα μετὰ ταύτα πόσα καὶ ποῖ ἂν.

\(^3\) \textit{Physics} A. 1, 184a12-14, τότε γὰρ οἰκεῖαι γιγνόσκειν ἔκαστον, οὐκ ἂν τὰ αὕτη γνωρίσ往来ν τὰ πρῶτα καὶ τὰς ἀρχὰς τὰς πρῶτας καὶ μέχρι τῶν στοιχείων.

\(^4\) As Kouremenos correctly points out, the phrase τῶν τοιούτων σωμάτων at 302a13 refers to all bodies such as those Aristotle mentions in 302a21-22. See Kouremenos 2013, 77.

\(^5\) Here I follow Elders’ interpretation, see Elders 1965, 293. In his opinion, the phrase διὰ τί ἐστιν means why elements exist, rather than why bodies as such are the elements of the other natural bodies. This understanding, in my opinion, is supported by 302a19-20, εἰ δὴ τὸ εἰρημένον ἐστὶ στοιχεῖον,
In response to the first question, he defines the notion of element as a body into which other bodies may be analyzed, and which is not itself divisible into bodies different in form. ¹ This definition is derived from his characterization of a simple body as a thing of which the compounds are composed in *DC* I.2. ² Through this definition, Aristotle for the first time asks how the corporeal elements exist in the compound bodies. Since this question is to be answered in *De Generatione et Corruptione*, I will postpone the examination of this definition to the second part of this dissertation.

Regarding question 2 (Why do the elements exist?), Aristotle picks up his argument in *DC* I.2, and argues that:

> But since every natural body has its proper movement, and movements are either simple or mixed, mixed in mixed bodies and simple in simple, there must obviously be simple bodies; for there are simple movements. (302b5-9)³

As has been explained in chapter 2, the notion of a simple body is introduced in terms of an analysis of the complexity and variety of all possible locomotion of physical things. According to this analysis, simple motions are the explanatory factors to which all complex motions can be reduced. Since these factors cannot exist independently, their explanatory power should, if it exists, be assigned to, at least, one type of simple body as its proper subject. Therefore, simple bodies are identified with the natural bodies, each of which by nature can, and can only, move with a single kind of simple motion to which all possible locomotion can be reduced. This is why Aristotle feels the need to commit to the existence of simple bodies. By the end of *DC* III.3, the first two of the questions listed above have been answered.

Although the number of the simple bodies of the corruptible things has been explored immediately after *DC* III.3, the subsequent two chapters, i.e., chapters 4 and 5, in which Aristotle argues that the number of the corporeal elements is neither infinite nor one, are

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¹ *DC* III.3, 302a16-18: εἰς δὲ τάλα σώματα διαιρεῖται, ἐνοπάρχουν δυνάμει ἢ ἐνεργείᾳ (τοῦτο γὰρ ποτέρως, ἐτὶ ὁμοφαντήσιμον), αὐτὸ δὲ ἐστὶν ἀδιαίρετον εἰς ἑταρὰ τῆς ἐλείν.

² *DC* I.2, 268b26-27: Ἐπεὶ δὲ τῶν σωμάτων τὰ μὲν ἐστὶν ἀπλά τὰ δὲ συνθέτα ἐκ τούτων.

³ Ἐπεὶ δὲ ἐστὶν ποινός φυσικὸν σώματος κίνησις οὐκεία, τῶν δὲ κινήσεων αἱ μὲν ἀπλαὶ αἱ δὲ μικταὶ, καὶ αἱ μὲν μικταὶ τῶν μικτῶν, αἱ δὲ ἀπλαὶ τῶν ἀπλῶν εἰσὶ, φανερὸν δὲ ἐστὶν ἀπλῶν ἀπλαὶ. Ἐισ γὰρ καὶ κινήσεις ἀπλαἰ.
polemic.\textsuperscript{1} It is from \textit{DC} III.6 that Aristotle begins to provide us with his own deduction of these simple bodies. Now we shall consider how he comes to the conclusion that the number of the sublunary simple bodies is four and differentiates them from one another.

4.2 Two contraries and the immediate simple bodies

In \textit{DC} I.2, Aristotle distinguishes three kinds of simple bodies in accordance with his differentiation of three types of simple motions. As has been shown in the previous chapters, there is one type of simple body, moving with only circular simple motion, which belongs to the celestial field, and two types of simple bodies which belong to the sublunary field. Because one sublunary simple body moves away from the center of the universe, while the other towards the center, they are called either heavy or light.\textsuperscript{2}

The fact that the simple bodies which are subject to generation and corruption are distinguished into two groups is reiterated in \textit{DC} III.1.\textsuperscript{3} In Book IV, however, Aristotle posits, as his ultimate conclusion, that the number of the sublunary simple bodies is four rather than two. Each of these two sublunary simple bodies, the heavy simple body and the light simple body, is further distinguished into two kinds in Book IV. The ultimate number of sublunary simple bodies, therefore, turns out to be four. This apparent inconsistency between these two deductions of the number of sublunary simple bodies in \textit{De Caelo} compels us to ask, how Aristotle arrives at the conclusion that there are four sublunary

\textsuperscript{1} In \textit{DC} III.4 Aristotle argues against the view that the number of bodily elements of corruptible things is infinite, and in \textit{DC} III.5 he argues against the early monistic scientists. The arguments in these two chapters are not purely negative. In his refutation of his predecessors, Aristotle explicates some general principles on account of which his own theory of the number of the corporeal elements is to be built. For example, in \textit{DC} III.4, in his refutation of Anaxagoras and the atomists, Aristotle argues that the number of the elements must be finite. At the end of his argument, Aristotle puts forward a principle which will play an important role in the determination of the number of the sublunary elements in his own system. We shall come back and consider this principle later.

\textsuperscript{2} \textit{DC} I.3, 269b23-24: βαρύ μὲν οὖν ἔστω τὸ φέρει θαλ περικός ἐπὶ τὸ μέσον, κοίμον δὲ τὸ ἀπὸ τοῦ μέσου. As we shall see in §4.2.3, not all natural bodies have either weight or lightness. Since there are some natural bodies that have both weight and lightness, it is clear that there are some heaviest body, and some lightest body. Heaviest is defined in 269b24-26 as those which move only towards the center of the universe, and lightest as those which move only away from the center. Aristotle admits in \textit{DC} I.3 that this is not the strict sense of heavy and light. It is announced that a more precise inquiry into the nature of weight and lightness will be put forward in later discussion. See 269b21-26. As we shall see in \textit{DC} IV, heavy and light in the strict sense are not defined in terms of the direction of a natural motion, but the proper place of a simple body.

\textsuperscript{3} See 298b8. At 277b13, Aristotle has confirmed several times that there are three types of simple bodies, each of which moves with only one type of simple motion.
simple bodies from the initial differentiation of these simple bodies into two groups in the first book of this treatise. As has been shown at the beginning of this chapter, critics usually complain that, in the context of *De Caelo*, Aristotle cannot convince his reader of his move from committing to the existence of two sublunary simple bodies to that of four sublunary simple bodies. This is the view that I am going to refute. In the next section, I shall explain why Aristotle thinks that the differentiation of sublunary simple bodies into two groups is not sufficient, and the way in which the ultimate differentiation of sublunary simple bodies is conducted.

4.2.1 An outline of Aristotle’s method

Having argued against the views of his predecessors that the number of elements is either infinite or just one, Aristotle returns to the last two questions posed in *DC* III.3 (i.e., What is the number of the elements? What is the character of each element?) at the beginning of *DC* III.6 and focuses on the differentiation among simple bodies. Here Aristotle introduces a new question and declares that an answer to this question will contribute to answering the questions about the number and character of the elements. He says,

First we must inquire into whether the elements are eternal or subject to generation and destruction; for when this question had been answered their number and character will be manifest. (304b23–25)

According to this passage, the number and the character of simple bodies will be spelled out by answering the question of whether the sublunary simple bodies or the elements are eternal or subject to generation and corruption. In order to determine the number and character of the elements, he must first determine whether or not simple bodies themselves are subject to generation and corruption. This is exactly what Aristotle deals with in *DC* III.6. By the end of this chapter, he arrives at the conclusion that simple bodies can only transform into one another by excluding any other possibilities.

It is not immediately clear how the answer to this new question, i.e., whether or not...
the elements are subject to generation and corruption, will open a way for the deduction of the simple bodies. No less obscure is the way in which they should be related at all. It seems that these two questions (i.e., the question about the corruptibility of the elements, and the question about the number and the differentiation of simple bodies) are irrelevant. As far as I know, none of the exiting commentators even attempts to establish how this inquiry can contribute to the determination of the number and character of the elements. In this section, I shall outline an interpretation on account of which Aristotle’s investigation in DC III.6 does intelligibly contribute to his ultimate differentiation of the sublunar simple bodies.

According to my interpretation, which will be explained carefully in the next two sections, the main purpose of DC III.6 is to justify that light simple bodies and heavy simple bodies are contraries. More precisely, since substances are opposed to one another, not insofar as they are substances, but insofar as they are endowed with contrary qualities, it is in fact revealed in DC III.6 that the lightness and the weight of simple bodies are contraries, rather than the simple bodies that have been differentiated in DC I.2 in terms of weight and lightness themselves.

It is crucial for Aristotle’s investigation into the number of simple bodies to prove that heavy and light are contraries. Only if it has been shown that they are contraries, can we then consider whether or not there is any intermediate between them. Once it has been proven that there are intermediates between heavy and light, we can commit to the existence of the intermediates between the heavy simple bodies and the light simple bodies. This is because, according to my interpretation of DC I.2, simple bodies are differentiated in terms of being either heavy (i.e., moving towards the center) or light (i.e., moving away from the center). If there were any intermediates between heavy and light, then the criteria on account of which the two groups of simple bodies are initially distinguished would have to be refined, and the ultimate number of sublunar simple bodies would be conspicuously more than two.

As mentioned above, the reason why scholars tend to deny that Aristotle has

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1 In his commentary on the passage, Simplicius merely paraphrases Aristotle’s assertion without providing any further explanation, see Simplicius 2009, 105. Elders says that this is simply a ‘conviction’, see Elders 1965, 311. Kouremenos admits that ‘the arguments in ch. 6 do not fix their [sc. the elements’] number’ (Kouremenos 2013, 99).

2 Categories 3b24; Philoponus 2015, 100.
conducted a rigorous deduction of the number of simple bodies in *De Caelo* is that they cannot understand why he thinks it is necessary to further differentiate heavy simple bodies and light simple bodies and commit to the existence of two intermediate simple bodies in addition to what has been arrived at in *DC* I.2. Now, if we could make good sense of Aristotle’s commitment to the existence of intermediate simple bodies between the heavy simple bodies and the light simple bodies, it would be an important step towards a successful reconstruction of Aristotle’s rigorous deduction of the number of simple bodies in *De Caelo*, which scholars have so far neglected.

The resolution to the above issue can be found in a passage outside of *De Caelo*. In *Categories* 10, Aristotle spells out the condition under which contraries have intermediates between them. Here we read:

If contraries are such that it is necessary for one or the other of them to belong to the things they naturally occur in or are predicated of, there is nothing intermediate between them…… But if it is not necessary for one or the other to belong, there is something intermediate between them. (11b38-12a11)

In this passage, Aristotle clearly distinguishes between two types of contraries. This distinction is drawn on the basis of the question of whether or not one of the contraries necessarily belongs to the things to which they naturally belong. It is clear that, by nature, contraries belong to things, e.g., even and odd by nature belong to rational numbers, sickness and health to living beings. Since any rational number is either even or odd, and any living being is either healthy or sick, there is no room for an intermediate between even and odd, sickness and health. On the other hand, even though black and white by nature belong to living beings as do sickness and health, it is not necessary for, say, Socrates to be either black or white. It is possible for him to be brown. Therefore, there should be at least one intermediate between these two extremes in the domain of colours.

This distinction between two types of contraries plays a significant role in Aristotle’s deduction of the number of simple bodies in *De Caelo*. If we, provisionally, accept my contention that in *DC* III.6 Aristotle arrives at the conclusion that heavy and light are contraries, which will be strongly supported in the next two sections, it would be natural to

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1 ὅσα δὲ τῶν ἐναντίων τωστά ἐστιν ὡς ἀνάμεσα ἔν οἷς πέροις γίγνεσθαι ἢ ὅν κατηγορεῖται ἀναγκαῖον αὐτῶν θάτερον ὑπάρχειν, τούτον οὐδὲν ἐστιν ἀνά μέσον’ [ὅν δὲ γε μὴ ἀναγκαῖον θάτερον ὑπάρχειν, τούτον ἐστι τι ἀνὰ μέσον πάντως.] …… ὅν δὲ γε μὴ ἀναγκαῖον θάτερον ὑπάρχειν, τούτον ἐστι τι ἀνὰ μέσον’
wonder what type of contraries heavy and light are. Since sublunary bodies are composed of sublunary simple bodies, they, by nature, move either upward or downward. But it is not necessary that a natural thing has either lightness or weight. For instance, the same piece of wood moves upward in water, while downward in air. If it were heavy, then it would not move upward in air; conversely, if it were light, then it would not move downward in water. It follows that a natural body can be neither just heavy nor just light. According to what has been shown in *Categories* 10, if it is not necessary for the things to which heavy and light naturally belong, namely sublunary bodies, to be either absolutely light or absolutely heavy, there must be at least one intermediate between absolutely light and absolutely heavy. Since, as has been explained, the sublunary simple bodies are distinguished on the basis of the differentiation of heavy and light, the number of the sublunary simple bodies would be more than two. This is why the initial distinction among simple bodies in *DC* I.2 is gradually realized to be insufficient. Before deciding on the number of intermediates between heavy and light, and correspondingly the number of intermediates between heavy simple bodies and light simple bodies, we must first spell out the way in which Aristotle proves that simple bodies are contraries.

4.2.2 Sublunary elements are contraries

In the previous section, I have requested that my reader provisionally accept my interpretation of *DC* III.6 that Aristotle in this chapter arrives at the conclusion that heavy and light are contraries. In this section, I am in a position to explain why this is the case. What I am doing here is necessary, because only if Aristotle has proven that heavy and light are contraries, as has been outlined in § 4.2.1, can we continue to argue that it is on the basis of this observation that Aristotle realizes that there are further simple that can be classified under the categories of heavy and light simple bodies. This, as we shall see in § 4.2.3, will contribute significantly to our understanding of Aristotle’s transition from his commitment to the existence of two sublunary simple bodies, to his theory of four simple bodies.

Aristotle’s argument for the contrariety of heavy and light in *DC* III.6 divides into two parts. According to my interpretation, it is through these two parts that Aristotle finally arrives at his conclusion that heavy and light are contraries. In the first part of the argument
(304b25-305a14), Aristotle maintains that elements are not eternal. This argument begins with an empirical fact. Since simple bodies are observed to be destroyed and generated all the time, it is clear that they are subject to destruction and generation.\(^1\) On the other hand, even if simple bodies are subject to generation and destruction, there is still a possibility that they can exist forever, that is, the destruction of a simple body is infinite and never comes to an end. If this were the case, this simple body would exist forever before its infinite destruction comes to an end. In this case, this simple body is subject to generation and corruption, and can exist forever. In refuting this possibility, Aristotle assumes that (1) generation and corruption take place in time, and (2) the time of generation cannot be shorter than that of corruption, and (3) no element can be generated and destroyed at the same time.\(^2\) On the basis of these assumptions, the possibility that a simple body is infinitely destroyed is excluded, since it indicates that, beside an infinite time, there is another infinite time. Aristotle’s arguments can be summarized as follows.

Aristotle has pointed out that simple bodies are observed to be subject to both generation and corruption. Since, as Simplicius adds, the generation of a simple body is not easier than its corruption, the duration of the generation of a simple body cannot be less than that of its corruption. Moreover, if the decay of a simple body were infinite, then the duration of this process would be infinite in time. If this were the case, then the duration of the generation of a simple body would also be infinite in time. According to the principle of non-contradiction, no simple body can be both destroyed and not destroyed simultaneously. It follows that the generation and corruption of a simple body cannot take place at the same time. Therefore, if the decay of a simple body were taking place in infinite time, there would be another infinite time in which this simple body is generated. This, however, is impossible, since there cannot be an infinite time beside an infinite time. It follows that simple bodies cannot undergo an infinite destruction. On the basis of this *reductio ad absurdum*, Aristotle arrives at the conclusion that no simple body can exist in this world forever, and all simple bodies must be subject to a finite generation and corruption.

Having excluded the only two possibilities in which simple bodies may exist in this

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\(^1\) In his own arguments (304b26-27), Aristotle refers only to the empirical fact of destruction, but as Simplicius points out in his commentary, Aristotle has assumed that simple bodies are subject to generation for the same reason (2009, 106).

\(^2\) DC III.6, 304b27ff.; cf. Simplicius 2009, 106.
universe permanently (i.e., either simple bodies themselves are eternal, or they are subject to a process of decay which never comes to an end), Aristotle proceeds to argue that what is generated from the destruction of simple bodies can neither be indivisible nor dissolvable. In the first part, however, Aristotle has not made it clear what simple bodies are generated from and what will, in turn, be generated from the simple bodies. This is addressed in the second part of *DC* III.6, in which he makes it clear that simple bodies can, and can only, be generated from other simple bodies.

The second part of chapter 6 also consists of a chain of arguments *per exclusio* enem. According to Aristotle, since simple bodies are generated from something, the generation of simple bodies must be either from something corporeal or form something incorporeal. But it is impossible for a simple body to be generated from something incorporeal, since it would then follow that we would have to commit to the existence of void, which has already been rejected in the *Physics*.\(^1\) Moreover, if simple bodies were generated from some bodies, they would either be generated from something other than themselves or from themselves. But it cannot be the case that simple bodies are generated from any other body besides themselves. In order to eliminate this possibility, Aristotle provides two distinct arguments.

The first argument emphasizes the priority of the elements. If there were any body from which the elements can be generated, then the body as such would be prior to the elements. According to the definition of an element, however, elements are the primary constituents of things. If there were any other thing from which simple bodies could be generated, then simple bodies would no longer be primary, but those things form which simple bodies are generated should be identified with the elements in the strict sense. This runs counter to the fact that, as has been shown in *DC* I.2, simple bodies are the elements. Therefore, it cannot be the case that there is anything other than simple bodies themselves from which a simple body is generated.

On the basis of the argument above, Aristotle provides us with an alternative way of proving that the corporeal thing from which a simple body is generated is an element. As has been proved, simple bodies must be generated from something corporeal. Such a body, however, must be either movable or unmovable. If it were not subject to movement, it would simply be a mathematical object. On the other hand, if it were a physical body and

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\(^1\) *DC* III.6, 305a16-22. Simplicius provides a detailed explanation of this argument (2009, 108-109).
able to move, as has been shown, it would be an element, otherwise there would be something more prior to the generated element. Since simple bodies are understood to be the elements, or the primary constituents, of all physical things, if they must be generated from something, they can only be generated from some other simple bodies. In this way, by excluding all of the impossibilities, Aristotle finally arrives at the conclusion that the sublunary simple bodies transform into each other.

I take this conclusion as saying that simple bodies are contraries. As has been shown from a passage quoted from *DC* I.3 in §3.3.1, generation and corruption can only take place between contraries:

[…] everything that comes to be comes into being from a contrary and some underlying thing, and passes away likewise with some underlying thing and by the action of a contrary and into a contrary […] (270a14-17)\(^1\)

Thus, if heavy simple bodies can be generated from light simple bodies, then they must be contraries, since one thing, if it is generated, can only be generated from a contrary.\(^2\) Moreover, owing to the fact that heavy simple bodies and light simple bodies are opposed to one another, not insofar as they are substances, but insofar as they are endowed with contrary qualities (namely, heaviness and lightness), what has been revealed in *DC* III.6 is that the heaviness and the lightness on account of which two types of simple bodies are initially differentiated in *DC* I.2 are contraries. That heavy and light are a pair of contraries seems apparent to common sense, but the argument above convincingly shows that Aristotle’s deduction of simple bodies in *De Caelo* is not conducted on the basis of intuition, but rigorous deduction.\(^3\)

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1. διὰ τὸ γίγνεσθαι μὲν ἀπὸν τὸ γεγόνομεν ἐξ ἐναντίου τε καὶ ὑποκειμένου τινός, καὶ φθείρεσθαι ὡςαυτὸς ὑποκειμένου τὸ τινος καὶ ὑπ’ ἐναντίου καὶ εἰς ἐναντίον.
2. Cf. *DC* IV. 3, 310a25-27. People may point out that intermediates can also change from one to another. For example, a red thing can change into a gray thing, although red and gray are contraries. Similarly, it seems to be possible that at least one of the two simple bodies (i.e., the heavy simple body and the light simple body) is an intermediate, rather than a contrary. But, since there are altogether two differentiated simple bodies, both of them must be contraries.
3. People may take it for granted that the heavy simple bodies and the light simple bodies are contraries because each of them properly occupy one of the opposite places within the sublunary field. But having opposite places does not at all imply that the things that occupy these places are themselves contraries. For example, in *DC* I.8, 277b12ff., Aristotle points out that the heavy simple bodies occupy the center of the universe, and ether occupy the circumference of the universe. Even though the center and the circumference are contrary places within the universe, it does not follow that the heavy simple bodies and ether are contraries. Here I adopt Longo’s interpretation of 277b12ff., see Leggatt 1995, 200.
It is true that, from these deductions, it remains unclear how the transformation of simple bodies proceeds.\(^1\) But, the mechanism of their transformation is not of special interest in this treatise. What Aristotle intends to do here is to prove that the previous distinction among simple bodies is not satisfactory. This is why, after considering several related views of his predecessors, in the subsequent two chapters, Aristotle continues his investigation into the number of simple bodies.

### 4.2.3 The number of intermediate simple bodies

As we saw in Chapter 2, in order to have a better understanding of the complexity and variety of all possible motions, three types of simple bodies are distinguished. One of the types of simple bodies can only move in a circular simple motion. This type of simple body serves as an explanation for the eternal movements of celestial bodies. The other two types, one being the heavy, the other being the light, contribute to an explanation of the constitution and movements of all terrestrial natural bodies. In other words, with the purpose of understanding the complexity and variety of the movements of sublunary bodies, it is enough to commit to the existence of only two types of simple bodies as the sublunary elements.

As I have shown in §4.2.2, the heavy simple bodies and the light simple bodies make up a pair of contraries. Since they are contraries, they must conform to Aristotle’s theory of contraries, which is spelled out in §4.2.1. The theory of contraries, however, compels Aristotle to differentiate further simple bodies among the two groups of sublunary simple bodies. This is because, if his initial differentiation of simple bodies in DC I.2 were insisted on, a difficulty would arise. (a) If there were just two groups of sublunary simple bodies, which were differentiated in terms of heavy and light, then, according to Aristotle’s theory of contraries in *Categories* 10, the total number of sublunary simple bodies would be greater than two, because there must be at least one intermediate simple body between the contraries. As a conclusion of (a), the number of the sublunary simple bodies must be more than two. (b) Meanwhile, if there were a third type of sublunary simple body existing along with the two differentiated simple bodies, the explanation of the complexity and variety of

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\(^1\) In *DC* III.7 and 8, several traditional views about the mutual transformation of simple bodies are refuted, but no positive conclusion is put forward. Aristotle’s own theory is postponed until *GC* II.4.
all possible locomotion of natural things would be threatened. According to my interpretation of *DC* I.2, the complexity and variety of the sublunary bodies is explained as composing two groups of simple bodies (i.e., one that moves towards the center, and one that moves away from the center), rather than three or even more. Therefore, the conclusion of (b) is that there cannot be a third type of sublunary simple body in addition to the heavy simple bodies and the light simple bodies.

Now, it seems that the conclusions of (a) and (b) contradict each other; for, how is it possible to have more than two types of simple bodies without introducing new types of simple bodies in addition to the two sublunary simple bodies that are already on the list? It seems that there is no room for the existence of an intermediate between the two simple bodies in Aristotle’s explanation of the sublunary motions. According to my interpretation, the key to solving this difficulty is to maintain, according to the conclusion of (b), that there are only two groups among the sublunary simple bodies. Moreover, each group of the two sublunary simple bodies has to be distinguished further into at least two types. In this way, more than two types of simple bodies can be differentiated, which is in conformity with the conclusion of (a), that is, the number of the sublunary simple bodies must be more than two; and at the same time, the intermediate simple bodies do not belong to a third party besides the two types which have already been differentiated, which is in conformity with the conclusion of (b).

The further differentiation among each group of simple bodies is made on the basis of a distinction between the absolute and the relative sense of heavy and light. At the beginning of *DC* IV.1, immediately after his discussion of the mutual transformation among simple bodies, Aristotle recalls his provisional definition of heavy and light in *DC* I.3 and distinguishes each of them into the absolutely heavy and the relatively heavy, the absolutely light and the relatively light. Aristotle defines the absolutely heavy as that which moves downward or to the center, and the absolutely light as that which moves upward or to the extremity. 

1 Corresponding to this distinction, each group of the two differentiated simple bodies allows a further distinction: heavy simple bodies can be distinguished into absolutely heavy simple bodies and relatively heavy simple bodies; light simple bodies can

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1 *DC* IV.1, 308a29-33, Ἀπλῶς μὲν οὖν κούφον λέγομεν τὸ ἄνω φερόμενον καὶ πρὸς τὸ ἔσχατον, βαρύ δὲ ἀπλῶς τὸ κάτω καὶ πρὸς τὸ µέσον· πρὸς ἄλλο δὲ κούφον καὶ κουφότερον, ὅτε δεύοιν ἐχώντων βάρος καὶ τὸν ἄγκον Ἰσον, κάτω φέρεται θάτερον φύσει θᾶττον. Cf. *DC* I.3, 269b24-26. These definitions and those of the relatively heavy and light will be discussed more carefully in §4.4.
be distinguished into absolutely light simple bodies and relatively light simple bodies. In this way, the twofold distinction among all sublunary simple bodies is retained; the relatively heavy and the heavier light can be taken as the intermediates between the heaviest and the lightest, so as to satisfy Aristotle’s theory of contraries.

It is true that, if both heavy simple bodies and light simple bodies, which are distinguished in DC I.2 for the sake of an explanation of the complexity and variety of all possible locomotion in the sublunary world, were further distinguished into three or four or even more kinds, the dilemma between the twofold distinction among sublunary simple bodies and Aristotle’s theory of contraries would also be solved. For example, if each group of the two simple bodies were distinguished into three kinds, there would be three kinds of heavy simple bodies and three kinds of light simple bodies. While retaining the twofold distinction among the sublunary simple bodies, there would be four intermediate simple bodies between the heaviest simple body and the lightest simple body.\(^1\)

It seems that this is indeed an alternative solution of the dilemma. If this were the case, then the ultimate number of simple bodies, instead of being four, would be six, eight, or even more. Such possibilities, however, have already been excluded on a principle is articulated in DC III.4. In this chapter, and as part of his criticism of Anaxagoras’ assumption that there are an infinite number of elements, Aristotle says:

Obviously then it would be better to assume a finite number of principles. They should, in fact, be as few as possible, consistently with proving what has to be proved. (302b26-28)\(^2\)

In his explanation of natural phenomena, Anaxagoras assumes an infinite number of elements. Such an assumption, however, is unhelpful, for Aristotle, since, on his view, a theory that assumes a finite number of elements can do the same job. If a large number of elements and a smaller number of elements have the same explanatory power, then, according to Aristotle, one should commit to the smaller number, rather than the larger. The assumed elements, as Aristotle makes it clear in the quoted passage, should be as few as possible.

\(^1\) Cf. DC IV.5, 312a33-b2, Ὅδεν γὰρ κολύει τὸν ἐναντίων εἶναι μεταξὺ καὶ ἐν καὶ πλείω, ὡσπερ ἐν γρώμασιν; πολλαχῶς γὰρ λέγεται τὸ μεταξὺ καὶ τὸ μέσον.
\(^2\) φανερὸν ὅτι πολλῷ βέλτιον πεπερασμένας ποιεῖν τὰς ἀρχάς, καὶ ταύτας ὡς ἐλαχίστας πάντων γε τῶν αὐτῶν μελλόντων δείκνυσθαι.
That one should assume the fewest elements possible is taken as a principle in Aristotle’s investigation of the number of elements, or simple bodies—the principle of simplification or parsimony. On account of this principle, even though the dilemma between the twofold distinction of simple bodies and Aristotle’s theory of contraries can be solved by distinguishing the heavy simple bodies from the light simple bodies, each of them, into either two kinds or three kinds, or even some more kinds, it is preferable to dividing each of the two groups into two kinds. In this way, we finally have four simple bodies, namely, the absolutely heavy body, the relatively heavy body, the relatively light body, and the absolutely light body. In accordance with the tradition, these four simple bodies are called earth, water, air, and fire. Even though this distinction is randomly mentioned in the previous discussion,\(^1\) this is the first time Aristotle provides us with a deduction of this distinction.

Solmsen complains that ether and the sublunary simple bodies are differentiated in different ways.\(^2\) In his view, the existence of circular motion has already entailed the existence of ether. In contrast, the number of the sublunary simple bodies cannot be determined just on the basis of the distinction between the two kinds of linear motions, since different kinds of sublunary simple bodies, say earth and water, may perform the same type of locomotion. This criticism is, to some extent, right. Even according to my interpretation, sublunary simple bodies cannot, ultimately, be differentiated without introducing Aristotle’s theory of intermediates and the principle of simplification. This, however, does not deny the fact that the deductions of the number of simple bodies, both of ether and of the sublunary simple bodies, belong to the same investigation and serve the same purpose. As has been shown, both the commitment to the singularity of the celestial simple body and the deduction of the sublunary simple bodies are derived from a distinction among three types of simple motions, which explains the complexity and variety of all possible locomotion. It is because the differentiation of the four simple bodies is conducted on the basis of the distinction of the two types of rectilinear motions that the twofold structure of the sublunary simple bodies has to be preserved. Moreover, both deductions serve to explain what the fundamental components of physical things are that are involved in the changes besides locomotion. In the previous chapter we saw that, because of the singularity

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\(^1\) Cf. *DC* II.3, 286a30ff.

\(^2\) See Solmsen 1960, 295. As has been pointed out at the beginning of this chapter, Solmsen’s view is followed by Gill 2009, 145; Matthen 2009, 125-127; Berman 2018, 3, n. 6.
and the independence of ether, it is not subject to generation and corruption. After a careful
deduction of the sublunary simple bodies, however, we can see that the material
components of all corruptible things are four simple bodies.

The deduction of the number of simple bodies that has been reconstructed in this
chapter has been neglected by critics. As has been shown, Aristotle has good reason to
make every move within the argument. In opposition to the traditional view, the deduction
of the number of simple bodies provided in *De Caelo* is complete and strict in virtue of
itself. It is on the basis of this deduction that Aristotle confirms that the number of simple
bodies involved in sublunary physical phenomena, especially generation and corruption, is
four, rather than two.

4.3 The characters of the corruptible elements

If what I have argued in §4.2 is correct, we may safely accept that even in *De Caelo*
Aristotle has already committed, through a strict and complete deduction, to the existence
of four sublunary simple bodies in the universe, namely, the absolutely light simple body
(fire), the relatively light simple body (air), the relatively heavy simple body (water), and
the absolutely heavy simple body (earth). This should be identified with Aristotle’s answer
to the third question which is put forward at the beginning of *DC* III.3. Now, of the four
questions raised in that chapter, only the last one, namely, ‘What are the characters of these
simple bodies?’, remains to be answered. Just like the other questions, the answer to
this one is also controversial. The controversy surrounding this question is derived from
various interpretations of the nature of heavy and light. For Solmsen and Gill, either heavy
and light refer to certain motive tendencies. More precisely, being heavy is the tendency
to move toward the center of the universe, while being light is the tendency to move toward
the periphery of the universe. In contrast to this interpretation, Cohen and Katayama hold
that, in the strict sense, being heavy or light is to stay at a certain place within the universe.
It is this second view that I shall defend in this section. I argue that the fourth question put
forward at the beginning of *DC* III.3 is answered in terms of a distinction between the
absolutely heavy the relatively heavy, the absolutely light and the relatively light.

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1 Solmsen 1960, 276; Gill 1989, 239; 2009, 143.
According to my interpretation, this distinction is made by cutting the whole sublunary world into four layers, each of which is assigned to a kind of simple body that moves toward it. Earth and fire will respectively move toward the inner layer and the outmost layer. Water will move to the layer that embraces the earth, and, in turn, is embraced by the layer to which air moves. These layers are identified as the proper places of the simple bodies. In this way, simple bodies find their proper places within the universe and are characterized.

4.3.1 Why is the definition of heavy and light in DC I.3 not enough?

In DC I.3, Aristotle provides a provisional definition of heavy and light. According to this definition, heavy and light are the capacities on account of which physical things move either straight towards the centre of the universe, or straight away from the centre of the universe. If a thing moves towards the centre, it is heavy, otherwise it is light.\(^1\) Therefore, heavy and light in DC I.3 are differentiated in terms of the direction of movement. Aristotle makes it explicit that this definition is just provisional. Before articulating the definition, he says,

> We must explain in what sense we are using the words ‘heavy’ and ‘light’, sufficiently, at least, for our present purposes: we can examine the terms more precisely later, when we come to consider their essential nature. (269b20-23)\(^2\)

For Aristotle, this definition of heavy and light in DC I.3 serves only for the discussion at hand. It is not as precise as that which will be put forward later. Now, it has been accepted that this refers to Book IV of the same treatise, in which heavy and light are related to the places proper to simple bodies.\(^3\) Before stepping into an examination of his more precise characterization of heavy and light, I shall first explain why Aristotle thinks it is necessary in Book IV to abandon the previous characterization from DC I.3.

Aristotle did not develop the distinctions between the absolutely heavy and the relatively heavy, the absolutely light and the relatively light until DC IV.1. Since this distinction is put forward immediately after Aristotle’s argument of the mutual

\(^1\) DC I.3, 269b23-26, Βαρύ μὲν οὖν ἄστω τὸ φέρεσθαι περικός ἐπὶ τὸ μέσον, κοῦφον δὲ τὸ ἀπό τοῦ μέσου.

\(^2\) δὲ δὲ ὑποθέσθαι τῇ λέγομεν τὸ βαρύ καὶ τὸ κοῦφον, νῦν μὲν ἰκανός ὡς πρὸς τὴν παροῦσαν χρείαν, ἀκριβέστερον δὲ πάλιν, ὅταν ἐπισκόπωμεν περὶ τῆς ὀφέλειας αὐτῶν.

\(^3\) Guthrie 1939, 18 note; Elders 1965, 91; Leggatt 1995, 182; Katayama 2011, 167.
transformation of simple bodies, if what I have argued in previous section is on the mark, it must contribute to the characterization of the newly differentiated simple bodies. As I have argued in chapter two, the existence of the two sublunary simple bodies, i.e., the heavy simple body and the light simple body, is affirmed in accordance with the differentiation of two rectilinear simple motions. It is widely accepted in the the scholarship that the distinction among the four kinds of sublunary simple bodies cannot be derived from this distinction between two simple motions. In order to make room for the existence of the intermediate simple bodies, we need more precise definitions of heavy and light, so as to meet the requirement of the characterization of four sublunary simple bodies.

In *DC* IV.1, Aristotle attempts to distinguish two distinct senses of light and heavy on the basis of the initial definition of heavy and light in *DC* I.3. On account of the characterization in *DC* IV.1, both the absolutely heavy and the relatively heavy enable a subject to move downward or to the centre. Likewise, both the absolutely light and the relatively light enable a thing to move upward or away from the centre. In order to distinguish the absolute senses of heavy and light from the relative senses, Aristotle cannot but introduce the notion of velocity. In his opinion, things that are heavy (or light) in the relative sense move slower than things that are heavy (or light) in the absolute sense.\(^1\)

The disadvantage of this distinction between the absolute and the relative senses of heavy and light is obvious. On the one hand, the distinction between the absolutely heavy, the relatively heavy, the absolutely light and the relatively light rest on different criteria. The distinction between heavy and light rests the two contrary directions of movements, i.e., straight towards the centre and straight away from the centre, while the two senses of heavy and light are distinguished on the basis of the velocity of the movement. On the other hand, what exactly is slower remains obscure. It remains to be seen why some simple body moves faster than any other simple body.

All these disadvantages of the initial distinction between heavy and light motivate Aristotle to seek a more precise definition. This is exactly what Aristotle does in *DC* IV. As we shall see in the following section, the place to which heavy or light enables a simple body move is not just any place in the universe, but its proper place. It is the direction

\(^1\) *DC* IV.1, 380a31-33 πρὸς ἄλλο δὲ κόψον καὶ κοινώτερον, οὐ δυσίων ἐχόντων βάρος καὶ τὸν ὅγκον ἰσον, κάτω φέρεται θάτερον φύσει θάττον. Matthen 2009, 125.
towards a proper place of a simple body that distinguishes heavy or light, either in the absolute sense or in the relative sense, from the others.

4.3.2 Heavy and light and the proper place of a simple body

We have now arrived at the final section of Aristotle’s answer to the fourth question in DC III.3: What are the characters of the simple bodies? As we have seen, simple bodies are differentiated and characterized in terms of the absolutely light (fire), the relatively light (air), the relatively heavy (water), and the absolutely heavy (earth). In order to make it clear what these notions actually mean, we are compelled to ask: What is the true nature of heavy and light? Only if this question has been satisfactorily answered, can we finally understand Aristotle’s distinction among simple bodies and his characterization of them in De Caelo.

In regard to the question of the nature of heavy and light, the critics agree that the absolutely heavy and the relatively heavy, and the absolutely light and the relatively light cannot be differentiated without the distinction among the four proper places of four distinct sublunary simple bodies, but in regard to the way in which the latter distinction contributes to the former, there are three general views. Solmsen and Gill hold that there is no substantial distinction between the definition of heavy and light in DC I.3 and in DC IV. According to this reading, heavy and light, no matter if it is absolute or relative, are consistently identified in De Caelo with the capacities because of which a simple body moves straight towards its proper place. In contrast to this dynamic reading of heavy and light, Cohen adopts a static reading. He argues that the true nature of heavy (and light) is not to move towards the proper place of a simple body, but to be there. Thirdly, Katayama distinguishes between an imprecise sense and a strict sense of heavy and light in De Caelo. In his view, it is true that heavy and light can be regarded as the locomotive tendencies of simple bodies in a broad sense, but strictly speaking, even though the locomotion toward a proper place stems from heavy or light, the true nature of heavy and light is to make a simple body stay in its proper place, rather than moving towards the place. This last view is the one I support. According to this interpretation, each of the four simple bodies is

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1 Solmsen 1960, 276; Gill 1989, 239; 2009, 143.
2 Cohen 1994, 159.
3 Katayama 2011, 167ff.
characterized as a natural body which moves straight towards a certain layer of the universe, so as to stay in its proper place. In support of this characterization of simple bodies, I shall explain why the first view is incorrect. This is the main task of this section.

Against Solmsen and Gill’s understanding of heavy and light, Cohen presents a *reductio ad absurdum.* First, he points out that heavy and light characterize the nature of simple bodies. Then, if, as Solmsen and Gill maintain, moving to a certain place is the nature of a simple body, e.g., if being a clod of earth is nothing more than a certain type of locomotion, it will be difficult to explain how simple bodies realize themselves, since simple bodies cannot tend upwards or downwards consistently in a limited universe. Aristotle, moreover, does not see the world as a system structured by thwarting the actualization of natural potentialities. So, in Cohen’s view, ‘the nature of the heavy is not to move towards some place, or in a certain direction, but to be in that place, and it actualizes that nature not by falling, but by being where fallen things end up.’

In responding to Cohen’s attack on the dynamic reading, Sisko refers to *DC* IV.5, 312b3-20, where Aristotle suggests that, if the earth in the center of the universe is removed, water will abandon its proper place and rest eventually in the proper place of earth. He argues that, if the static reading were true, water would not give up its proper place even if earth is moved away. As Matthen points out, the dynamic interpretation of heavy and light, however, cannot provide a better explanation, because, if, as the dynamic interpretation supposes, simple bodies move toward their proper places by nature, water would move in a contra-natural direction when the earth below is removed. When earth is moved away from the center, it does not follow that the proper place of earth has been changed. Similarly, even if water moves downwards and provisionally occupies the proper place of earth, the proper place of water remains the original place, namely, the layer surrounding the proper place of earth.

There is a passage in *DC* IV.3 in which Aristotle distinctively implies the static interpretation of heavy and light. We read:

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1 Cohen 1994, sec. 4.
3 Cohen 1994, 150-159.
4 Sisko 2002.
5 Matthen 2009, 126.
Now whenever air comes into being out of water, light out of heavy, it goes to the upper place. It is forthwith light: and no longer becomes [light], but in that place it has being [light]. Obviously, then, it is a potentiality, which, in its passage to actuality, comes into that place and quantity and quality which belong to its actuality. (311a1-6)

This passage makes it clear that, according to the strict sense of heavy and light, the property of being light is not an upward motion, but a state of being in a place, namely, the place which is proper to the simple body. A similar expression can be found in the *Physics* as well: “the activity of lightness consists in the light thing being in a certain place, namely high up.”

Hence, even though heavy and light, in a broad sense, can be understood as moving tendencies, strictly speaking, resting in the proper place is the true nature of heavy and light. If we connect this conclusion with 269b23-29, in which Aristotle distinguishes absolute weight from relative weight, and absolute lightness from relative lightness, we realize that the distinction between these four characters, each of which is assigned to a single kind of sublunary simple body, lies in the distinction of four layers of sublunary world, each of which is attributed to a sublunary simple body in terms of the four as its proper place. Since earth is the heaviest sublunary simple body, the first layer around the centre of the universe is assigned to earth. For similar reasons, the second layer around the centre is assigned to water, the third is assigned to air, and fire occupies the most external layer of the sublunary world. Therefore, it is on account of the place that each of these bodies aims to occupy and rest that the sublunary simple bodies are ultimately differentiated.

This clarification of the terms heavy and light contributes greatly to the characterization of simple bodies. As soon as we know that each of the simple bodies owns a particular nature, i.e., has one of the four layers of the sublunary world as its proper place, it has, thereby, been immediately well characterized.

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1 Ὅταν μὲν οὖν γίγνεται ἐξ ὅς ὁδός ἄηρ καὶ ἐκ βαρέως κοῦφος, ἐρχεται εἰς τὸ ἄνω. Ἄμα δέ ἐστι κοῦφος, καὶ οὐκέτα γίνεται, ἀλλ’ ἐκεῖ ἐστιν. Φανερὸν δὴ ὅτι δύναμιν ἄν, εἰς ἐντελέχειαν ἰὼν ἐρχεται ἐκαὶ καὶ εἰς τὸ τοσοῦτον καὶ τὸ τοιοῦτον, οὗ ἢ ἐντελέχεια καὶ ὅσον καὶ ὅσον [καὶ ὅσον].

2 *Physics* VIII.4, 255b11: ἐνέργεια δὲ τοῦ κοῦφου τὸ ποῦ εἶναι καὶ ἄνω.
Part II

The task of this dissertation is to spell out the way in which Aristotle’s theory of simple bodies contributes to his explanation of change. In Part I we saw that in De Caelo Aristotle has, on the one hand, explained the way in which his commitment to the existence of simple bodies contributes to an explanation of the complexity and variety of all possible locomotion, and, on the other hand, provided a complete distinction, and an exhaustive list based on it, of simple bodies which will serve as an explanation of generation and corruption in general. As I have mentioned in the Introduction, the reason why Aristotle begins his explanation of change from locomotion is that locomotion is prior to all the other types of change. After Aristotle’s identification of simple bodies as the explanatory factors of locomotion, and his differentiation and characterization of simple bodies on the basis of this identification, we can now move on to Aristotle’s investigation into the other kinds of change, especially generation and corruption.

In Part II, I am going to explain how exactly these simple bodies help us to better understand those changes that have not been explained yet. This analysis will proceed mainly on the basis of a careful reading of De Generatione et Corruptione, which is traditionally thought to immediately follow De Caelo. In this, the second part of the dissertation, I shall argue that physical things cannot undergo any change without their matter, and that it is by forming the matter of physical things that the four simple bodies contribute to Aristotle’s explanation of the generation and corruption, growth and diminution, and alteration of physical things.

It is conspicuous that the simple bodies are characterized in an alternative way in De Generatione et Corruptione than in De Caelo. So, in the first chapter of this part (Chapter 5), I shall begin by considering why Aristotle characterizes simple bodies in a new way in De Generatione et Corruptione. I argue that the new characterization in GC is put forward for the sake of explaining change in general. More specifically, only if simple bodies are characterized in an alternative way, will the eternality of change be satisfactorily explained. On the contrary, if the characterization provided in De Caelo were retained, changes would ultimately cease to exist.
Then, in the last two chapters of this dissertation, I shall explain how Aristotle’s investigation into simple bodies contributes to his theory of change. This explanation proceeds in two parts. In Chapter 6, I shall set out the way in which simple bodies comprise and form the matter of natural things, which enables them to undergo all of the kinds of change in addition to locomotion. I argue that the matter, or more specifically, the concurrent matter, of physical things is generated from simple bodies. This is how simple bodies contribute to Aristotle’s explanation of change. Then, if we can explain why it is the case that matter is pivotal for Aristotle’s explanation of change, the role of simple bodies in that explanation will be satisfactorily shown. This will be spelled out in the last chapter of this dissertation. In Chapter 7, I shall articulate the role that simple bodies play in explaining the changes other than locomotion. I argue on the basis of Physics I and GC I that change cannot take place without matter that functions as an underlying thing. More specifically, the notion of matter not only serves as an account of the possibility of substantial changes, but also contributes to Aristotle’s distinction between substantial changes and non-substantial changes. Since the notion of matter contributes to Aristotle’s theory of change in these two ways, it follows that the simple bodies, given that they are the constituents of the matter, contribute significantly to this explanation of change.
5. Why does Aristotle characterize simple bodies in an alternative way

in De Generatione et Corruptione?

It is widely known that there are two characterizations of simple bodies. In De Caelo, simple bodies are characterized in terms of the absolutely heavy (earth), the relatively heavy (water), the relatively light (air), and the absolutely light (fire). Each of them is assigned a distinct layer of the sublunary world as its proper place. In De Generatione et Corruptione, on the other hand, simple bodies are characterized in terms of four combinations of the primary contraries, that is, cold and dry (earth), cold and wet (water), hot and wet (air), hot and dry (fire).

There is an influential tradition of interpretation, according to which Aristotle’s characterization of simple bodies in De Caelo is significantly different from that in De Generatione et Corruptione. Some critics, even if they admit that these two characterizations are not totally unrelated, complain that Aristotle’s characterization of simple bodies in De Caelo cannot differentiate simple bodies into four groups sufficiently. In their view, it is for the sake of providing us with a stricter deduction of the number of simple bodies that the characterization of simple bodies in De Generatione et Corruptione is put forward. For this reason, some of these critics even attempt to reduce the first characterization in De Caelo to the second one in De Generatione et Corruptione.

Against these views, I shall argue in this chapter that Aristotle’s two characterizations of simple bodies are not unrelated. It is true that the first characterization in De Caelo is insufficient, but it does not follow that it lacks its own significance, or even can be reduced to the later characterization in De Generatione et Corruption. As has been shown in chapter 4, De Caelo provides a complete and rigorous deduction of the number of simple bodies.

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1 This tradition can be traced back as far as to Avicenna, cf. Gannagé 2005, 28, note 105. Gill makes a similar, but different, observation on this distinction. She says: ‘De gen. et corr. is interested in the ways in which the elements act on and respond to one another in the composition of compound bodies and in their own transformations […] The De caelo, by contrast, is interested in how the elements behave in their own right (καθ’ αὐτόν), independent of one another’ (Gill 2009, 140). According to Falcon’s report, Averroes shares a similar view similar to that defended by Gill: ‘This study [of simple bodies] is conducted in the four books of On the Heavens and two books of On generation and Corruption. While the first treatise deals with simple bodies as such, the second deals with simple bodies as elements of homogeneous bodies’ (Falcon 2016, 423).


3 Krizan 2018a, 103-110; Berman 2018, 8-14.
It is on the basis of this investigation that Aristotle moves on to his investigation into the principles and causes of the changes other than locomotion. In contrast with the traditional views of Aristotle’s characterization of simple bodies in *De Caelo*, in this chapter, I will argue that this characterization is insufficient, but for another reason. This characterization, as I shall show in §5.2, cannot by itself explain the mutual transformation of simple bodies. This insufficiency makes it impossible to ensure the eternality of change in the sublunary field, which, as I shall show in §5.1, is insisted on by Aristotle throughout his natural philosophy. It is for this reason that a new characterization of simple bodies must be put forward, that is, because it overcomes the insufficiency of Aristotle’s characterization in *De Caelo*. If what I argue in this chapter is on the mark, then we may conclude that the second characterization in *De Generatione et Corruptione* does not supercede the one in *De Caelo*, but complements it as part of Aristotle’s theory of change. Much of my interpretation of the role that simple bodies play in explaining the changes, especially generation and corruption, will be worked out in Chapters 6 and Chapter 7. In this chapter, however, I am going to explain why Aristotle thinks it necessary to move from the one characterization of simple bodies to the other. I argue that this transition serves to help explain the changes other than locomotion, especially generation and corruption.

In the first section of this chapter (§5.1), I shall first lay out the initial theoretical motivation for Aristotle’s transition from his characterization of simple bodies in *De Caelo* to his new characterization in *De Generatione et Corruptione*. I argue that this transition serves the purpose of securing the supposition that change in this universe is everlasting. This supposition is not accepted uncritically. As we shall see in §5.1, Aristotle has provided us with a rigorous justification of this proposition. Moreover, if the supposition that change is everlasting is accepted, it is necessary to develop an alternative characterization of simple bodies. As I shall explain in §5.2, if simple bodies, as they are characterized in *De Caelo*, were not subject to mutual transformation, the generation and the growth of natural things would be more and more difficult and eventually it would cease. On the other hand, generation and corruption cannot take place without some necessary conditions, such as the capabilities of acting and being affected. But, heavy and light, through which simple bodies are characterized in *De Caelo*, are not the capabilities or powers that enable things to act or to be affected. In order to meet the conditions of generation and corruption and save the natural world from running into a dead end, an alternative characterization of
simple bodies is demanded. Finally, in §5.3, I shall arrive at Aristotle’s characterization of simple bodies in *De Generatione et Corruptione*, and consider the relationship between Aristotle’s two characterizations of simple bodies in the context of his explanation of change in §5.4.

5.1 The natural world is everlasting

In this section, I shall explain why the characterization of simple bodies that is put forward in *De Caelo* is not sufficient as an explanation of change, especially generation and corruption. In my view, if Aristotle were solely insisting on his characterization of simple bodies in *De Caelo*, changes in the sublunar world would ultimately run into a dead end. This result, however, goes against his supposition that change is eternal. Thus his initial characterization of simple bodies in *De Caelo* must be developed.

Aristotle believes that we live in a world in which coming-to-be, including substantial generation and changes in respect of quality and quantity, takes place all the time and ceaselessly. This supposition, as I shall argue in this section, is not baseless. Arguments in support of it can be found in *Physics* VIII.1, and I shall consider Aristotle’s arguments for this supposition. As we shall see, this task is necessary, because it exposes the deficiency in Aristotle’s characterization of simple bodies in *De Caelo*. This, as I shall argue, is not the deficiency that critics usually point out when they observe the difference between *De Caelo* and *GC* on this issue. My account will lead to the recognition that both of Aristotle’s characterizations of simple bodies in these texts contribute to a single, coherent theory of change.

At the beginning of *Physics* VIII.1, Aristotle immediately poses the question of whether or not change is everlasting. Since the natural world would cease to be if there were no motion at all, Aristotle’s real concern here, as Graham points out, is whether or not the natural world has a beginning and an end. His answer to this question is that change has neither beginning nor end. After reviewing his predecessors on this issue, he begins his formal discussion and provides us with his own rigorous justifications. First, he

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1 *Physics* VIII.1, 250b11-13, Πότερον γέγονέ ποτε κίνησις οὐκ οὔσα πρότερον, καὶ φθείρεται πάλιν ὦτως ὡστε κινεῖσθαι μηδέν, ἢ οὔτ’ ἐγένετο οὔτε φθείρεται, ὡλλ’ ἀεὶ ἢ καὶ ἀεὶ ἔσται.
2 Graham 1999, 37.
provides us with a justification of the view that change has no beginning. Then he argues for the imperishability of change. As we shall see in the subsequent sections, it is on the basis of this supposition that Aristotle develops an alternative characterization in the treatise after *De Caelo*.

5.1.1 Change has no beginning

First, at *Physics* 251a17-28, Aristotle argues that change cannot have a beginning. His argument here is built on the assumption that any change to a movable thing requires a mover. In other words, if there is a thing $X_1$ undergoing a change $C_1$, there must be an agent $Y_1$ by which $X_1$ is moved.\(^1\) On the basis of this assumption, if we suppose that $C_1$ is the first change, and there is no change taking place before it, then there are two possibilities: (1) both the moved thing $X_1$ and the mover $Y_1$ are generated, or (2) both $X_1$ and $Y_1$ are everlasting.

It is obvious that the first possibility is impossible. If either $X_1$ or $Y_1$ were generated, there would be at least one generation of the moved thing or the mover. Since the change $C_1$ cannot take place without $X_1$ and $Y_1$, before they are generated—if they were generated—$C_1$ cannot take place at all. Therefore, there must be at least a generation of $X_1$ or $Y_1$ before $C_1$ takes place. But generation is a change. This goes against the major premise that $C_1$ is the first change, which indicates that the assumption that $X_1$ and $Y_1$ are generated is incorrect.

The second possibility, namely, both $X_1$ and $Y_1$ are everlasting, cannot be accepted either. For, as Aristotle puts it:

To suppose, on the other hand, that these things were in being throughout all previous time without there being any motion appears unreasonable on a moment’s thought, and still more unreasonable, we shall find, on further consideration. (250a20-23)\(^2\)

In the several lines that follow, Aristotle provides an argument for denying this possibility:

For if we are to say that, while there are on the one hand things that are movable, and on the other hand things that are motive, there is a time when there is a first mover and a first moved, and another time when there is no such thing but only something that is at rest, then this thing must previously have been in process of change; for there must

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1 Cf. 251a9-17.

2 εἰ δ’ ὅταν προσέπηκαν ἀεὶ κινήσεως μὴ οὖσας, ἄλλοις μὲν φαίνεται καὶ αὐτόθιν ἐπιστήμους, οὐ μὴν ἄλλα μᾶλλον ἐπὶ προάγουσι τούτῳ συμβαίνειν ἄναγκαιον.
have been some cause of its rest, rest being the privation of motion. (250a23-28)\(^1\)

If the moved thing, \(X_1\), and the mover, \(Y_1\), exist for all time before the first change, \(C_1\), \(X_1\) and \(Y_1\) must only rest, otherwise \(C_1\) would not be the first change. But, according to Aristotle’s kinetics, even being at rest requires a cause. This leads him to conclude that there must be a change before the so-called first change \(C_1\). Graham objects that it is problematic for Aristotle to claim that a thing requires a cause of its being at rest.\(^2\) It seems to me, however, that this is not the point for his current purpose. What matters here is that before \(C_1\), either \(X_1\) or \(Y_1\) has to be changed from one state to another. Let me further explain my response to Graham’s objection.

As noted in the first paragraph of this section, \(Y_1\) acts on \(X_1\) and causes \(X_1\) to undergo \(C_1\) at some time, \(t_1\). It is reasonable to ask what makes it possible for \(Y_1\) to act on \(X_1\) at \(t_1\), when nothing happened before \(t_1\). If \(Y_1\) acts on \(X_1\) at \(t_1\), it would be the case that either (a) \(Y_1\) has been transformed from one state, in which it does not act on \(X_1\), to another state, in which it acts on \(X_1\), or (b) \(X_1\) has experienced a transformation from one state, in which it cannot be moved by \(Y_1\), to another state, in which it can be moved by \(Y_1\). At least one of these transformations must have taken place before \(t_1\), otherwise \(Y_1\) cannot act on \(X_1\) (or \(X_1\) cannot be moved by \(Y_1\)) at \(t_1\). This transformation is the cause of the interaction between \(X_1\) and \(Y_1\) at \(t_1\), rather than at any other time. Thus, what matters for Aristotle here is not whether or not being at rest requires a cause. What matters is, rather, that \(X_1\) or \(Y_1\) has to be altered from one state to another prior to \(t_1\). Since the alterations of \(X_1\) and \(Y_1\) are changes, there must be some change before \(C_1\), otherwise \(Y_1\) cannot act upon \(X_1\) as the mover.

Let us now summarize Aristotle’s argument. Even if both \(X_1\) and \(Y_1\) were everlasting, it would still follow that \(C_1\) is not the first change. The conclusion that there must be an antecedent change to \(Y_1\) goes against the major premise that \(C_1\) is the first change. Therefore, the moved thing \(X_1\) and the mover \(Y_1\) of the first change \(C_1\), if there were a first change, can neither be generated nor be everlasting. Since everything must be either generated or everlasting, there can be neither a first moved thing \(X_1\), nor a first mover \(Y_1\), nor a first change \(C_1\). The conclusion is that, changes do not have a beginning.

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1 εἰ γάρ τῶν μὲν κινητῶν ὄντων τῶν δὲ κινητικῶν ὅτε μὲν ἦσται τι πρώτον κινοῦν, τὸ δὲ κινούμενον, ὥστε δ’ οὐθέν, ἀλλ’ ἠρεμεῖ, ἀναγκαῖον τὸντο μεταβάλλειν πρῶτον· ἦν γάρ τι αἴτιον τῆς ἁρεμίας· ἢ γὰρ ἡ ἡμέρησις στέρησις κινήσεως, ὥστε πρὸ τῆς πρώτης μεταβολῆς ἦσται μεταβολὴ προτέρα.

2 See Graham 1999, 43.
5.1.2 Change does not have an end

As has been shown, the task of Physics VIII.1 is to justify that change is everlasting. An everlasting change has neither beginning nor end. Having shown that change does not have a beginning, Aristotle moves on to argue that change has no end. The way he argues for the endlessness (or imperishability) of change is similar to the way he has argued in the previous two justifications. According to his view, if it is proved that there is no last change, it will follow that change has no end. He says:

The same reasoning will also serve to show the imperishability of motion: just as a becoming of motion would involve, as we saw, a change previous to the first, in the same way a perishing of motion would involve a change subsequent to the last. (251b28-b31)

In comparison with his previous justifications, the argument quoted above is even more compressed. It is, however, similar to the first justification. There, Aristotle assumes that there is a last change \( C_2 \), which involves a moved thing, \( X_2 \), and a mover \( Y_2 \). The overall strategy of this justification is to prove that \( X_2 \) and \( Y_2 \) can be neither corruptible nor eternal. Since everything is either corruptible or eternal, otherwise it does not exist at all, a pair such as \( X_2 \) and \( Y_2 \) does not exist, nor is there a last change \( C_2 \) that depends on \( X_2 \) and \( Y_2 \).

First, Aristotle commits to the existence of \( X_2 \) and \( Y_2 \) on which \( C_2 \) depends. In his view, even if \( C_2 \) has finished, \( X_2 \) remains movable and \( Y_2 \) remains a mover. He says:

For when a thing ceases to be moved, it does not therefore at the same time cease to be movable—e.g. the cessation of being burned does not involve the cessation of the capacity of being burned, since a thing may be capable of being burned without being burned—nor, when a thing ceases to be a mover, does it therefore at the same time cease to be motive. Again, the destructive agent will have to be destroyed when it has destroyed, and then that which has the capacity of destroying it will have to be

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1 Between the first argument and Aristotle’s justification of the endlessness or imperishability of change, there is a third argument in 251b10-28. This is a general argument on the eternity of change, which is built on Aristotle’s argument of the eternity of time. It has been generally accepted that this argument is a digression, or a later insertion, cf. Ross 1936, 688; Graham 1999, 45. In order to treat Aristotle’s main argument in this chapter as complete, without interruption, this inserted argument has been omitted here. For a careful examination of this passage, see Graham 1999, 45-49.

2 ὁ δ’ αὐτὸς λόγος καὶ περὶ τοῦ ἀφθαρτοῦ εἶναι τὴν κίνησιν καθάπερ γὰρ ἐπὶ τοῦ γενέσθαι κίνησιν συνέβαινεν προτέρων εἶναι τινα μεταβολὴν τῆς πρώτης, οὕτως ἐνταῦθα ὑστέραν τῆς τελευταίας.
destroyed afterwards; for being destroyed is a kind of change. (251b31-252a3)\(^1\)

According to Aristotle, the capacities of moving and being moved are independent of any change. In regard to C\(_2\), if there were a last change, even when it has been completed, X\(_2\) is still movable, and the Y\(_2\) is still able to make things move. This is what Aristotle tells us; but, in the justification he does not explain why C\(_2\) cannot be the last change. On the basis of what has been shown in previous section, this justification can be completed by explaining why C\(_2\) is not the last change.

As has been shown, if Y\(_1\) acts on X\(_1\) at t\(_1\), it would be the case that either (a) Y\(_1\) has been transformed from one state, in which it does not act on X\(_1\), to another state, in which it acts on X\(_1\), or (b) X\(_1\) has undergone a transformation from one state, in which it cannot be moved by Y\(_1\), to another state, in which it can be moved by Y\(_1\). At least one of these transformations must have taken place before t\(_1\), otherwise Y\(_1\) cannot act on X\(_1\) (or X\(_1\) cannot be moved by Y\(_1\)) at t\(_1\). This transformation is the cause of the interaction between X\(_1\) and Y\(_1\) at t\(_1\), rather than any other time. Similarly, if Y\(_2\) acts on X\(_2\) at t\(_2\), there must be at least one of the two additional conditions: (a') Y\(_2\) has been transformed from one state, in which it act on X\(_2\), to another state, in which it does not act on X\(_2\), or (b') X\(_2\) has experienced a transformation from one state, in which it is moved by Y\(_2\), to another state, in which it can no longer be moved by Y\(_2\). If C\(_2\) is, ineed, the last change, then there cannot be any change after t\(_2\). If this were the case, Y\(_2\) could not act on X\(_2\) after t\(_2\). Therefore, at least one of the two conditions, (a') or (b'), must obtain, otherwise it is impossible to explain why Y\(_2\) can act on X\(_2\) (or X\(_2\) can be moved by Y\(_2\)) at t\(_2\), but things have been changed afterwards. However, both (a') and (b') are changes. Therefore, there must be at least one change that takes place after C\(_2\), this, however, goes against the major premise that C\(_2\) is the last change. This contradiction leads to the conclusion that there is no last change. As Aristotle summarizes:

If, then, this is impossible, it is clear that motion is eternal and cannot have existed at one time and not at another: in fact, such a view can hardly be described as anything else than fantastic. (252a3-252a5)\(^2\)

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\(^1\) οὐ γὰρ ἢμα παύεται κινούμενον καὶ κινητὸν ὅν, οἶον καιόμενον καὶ καυστὸν ὅν (ἐνδέχεται γὰρ καυστὸν εἶναι μὴ καιόμενον), οὔδε κινητικὸν καὶ κινοῦν. καὶ τὸ φθαρτικὸν ὃς δεήσει φθαρῆται ὅταν φθείρῃ καὶ τὸ τούτου φθαρτικὸν πάλιν ἔστερον· καὶ γὰρ ἢ φθορά μεταβολὴ ὑμὲν.  

\(^2\) εἰ δὴ ταῦτ' ἀδύνατα, δήλου ὡς ἔστιν ἀδίος κίνησις, ἀλλ' οὐχ ὦτε μὲν ἢν ὦτε δ' οὐ· καὶ γὰρ ἐνιὸκε τὸ ὄντω λέγειν πλάσματι μᾶλλον.
Thus, by arguing that there is a last change, Aristotle makes it clear that change is imperishable. Finally, Aristotle arrives at his conclusion that ‘there never was a time when there was not motion, and never will be a time when there will not be motion.’

5.2 The insufficiency of the characterization in De CaeIo

In the previous section it was shown that, according to Aristotle, we live in a world in which changes take place without beginning and ending. This conclusion, as I shall argue in this section, not only reveals the deficiency of Aristotle’s characterization of simple bodies in De CaeIo, but also lays a firm foundation for Aristotle’s further investigations in his natural philosophy. More specifically, it is on the basis of this supposition that Aristotle explores the way in which simple bodies contribute to an explanation of the changes other than locomotion in De Generatione et Corruptione. This can be seen from the fact that, in GC I.3, he reiterates that the changes other than locomotion never come to an end, immediately after a review of the traditional views about generation and corruption. This indicates that, whatever factors are introduced to explain the changes other than locomotion, they must guarantee that the explanandum, i.e. any change other than locomotion, is everlasting. This is the starting point of my investigation (in this section). I shall argue that, if we consider Aristotle’s characterization of simple bodies in DC carefully, we will discover that this characterization comes into direct conflict with his theoretical starting point in GC. It is this conflict between Aristotle’s characterization of simple bodies in DC and his supposition that change is everlasting, rather than the insufficiency of Aristotle’s characterization of simple bodies in DC in differentiating simple bodies into four groups, which requires Aristotle to develop an alternative characterization of the fundamental constituents of the universe in GC.

This section consists of two parts. First I argue that, if change never comes to an end, simple bodies, since they are characterized by weight and lightness, must be subject to mutual transformation. On the other hand, as I shall argue in the second part of this section, Aristotle’s characterization of simple bodies in De CaeIo cannot explain the mechanism of

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1 *Physics* VIII.1, 252b5-6, ὅτι μὲν οὖν οὐδὲς ἢν χρόνος οὐδὲ ἐσται ὅτε κίνησις οὐκ ἢ οὐκ ἔσται, ἐγρήγορος τοσαῦτα.
their transformation. Therefore, Aristotle thinks it necessary to characterize simple bodies in a different way in *De Generatione et Corruptione*.

5.2.1 Simple bodies are subject to mutual transformation

In my justification of the contrariety of simple bodies in §4.2.2, we have already seen Aristotle’s view that simple bodies are subject to mutual transformation. This observation not only contributes to our determination of the number of simple bodies, but also serves for our present consideration of the disadvantages of the way in which simple bodies are characterized in *De Caelo*. In this section, instead of repeating Aristotle’s rigorous but dull justification of the mutual transformability of simple bodies, I shall argue that if simple bodies were *not* subject to mutual transformation, all change would come to a dead end, which is incompatible with what has been shown in previous section (§5.1).

As they are defined in *De Caelo*, it is of the simple bodies of which the complex things, especially the animate beings, are composed.¹ When destroyed, complex bodies will resolve into the corporeal elements of which they are composed. There are two possible outcomes for the generated simple bodies. They either enter into some fresh combination, or exist independently in their own right. As has been shown in §4.3, simple bodies in *De Caelo* are differentiated and characterized in terms of the absolutely heavy (earth), the relatively heavy (water), the relatively light (air), and the absolutely light (fire). Each of these is assigned a layer of the sublunary world as its proper place. In accordance with this characterization, once a simple body is separated from a complex body and exists independently, it would by nature return to its proper place and join its kind. If there were not an external force separating this simple body from the simple mass, and if it were eternal and could not transform into another simple body, it would be in its proper place and with its kind forever. For this reason, there would be more and more simple bodies restored to their proper layers of the sublunary universe, whereas those simple bodies that are left for the formation of complex bodies would be fewer and fewer. With fewer simple bodies being available to form complex bodies, the generation of new complex bodies would be

¹ On the definition of simple bodies, see chapter 2 of this dissertation. A more detailed examination of this definition and the way in which simple bodies exist in complex bodies will be provided in chapter 7.
more and more difficult. It follows that the generation of new complex bodies would ultimately cease.

If simple bodies were eternal and by nature tend to rest in their proper places, it would be possible for Aristotle to introduce some external power, such as Empedocles’ Love or Anaxagoras’ Mind, to remove simple bodies from their permanent places so as to form complex bodies. However, if this were done, it would follow that, in Aristotle’s system of natural philosophy, the formation of complex bodies cannot take place unless simple bodies are moved by the external force against their natures. In other words, the formation of the physical world would occur contrary to the natures of simple bodies. This would be a strange consequence for Aristotle. For, on his view, every phase in the process of natural generation has to take place by nature, rather than against nature.

Thus far in §4.2, we have seen that Aristotle has made it clear that simple bodies are subject to mutual transformation in *De Caelo*. But it is only now that we fully understand his theoretical motivation of doing this. As a conclusion, if simple bodies were not subject to mutual transformation, the way in which they are characterized in *De Caelo* would lead to the consequence that change is ultimately perishable. This is obviously unacceptable for Aristotle. Therefore, it is necessary for him to maintain that simple bodies are subject to mutual transformation.

### 5.2.2 The conditions of generation and corruption

In the previous sections we have seen why Aristotle is compelled to argue that simple bodies are subject to mutual transformation. In this section, I shall spell out why it is the case that the way in which he characterizes simple bodies in *De Caelo* cannot explain the mechanism of their mutual transformation. I argue that the reason for this is that it fails to meet the conditions of generation and corruption in general. It is clear that the mutual transformation of simple bodies must satisfy these conditions, since it cannot occur without generation and corruption. Whenever a simple body is transformed into another simple body, the first is destroyed and the second is generated. This is the how the mutual
transformation among simple bodies take place.¹

As has been pointed out at the beginning of this chapter, I agree with the critics that Aristotle’s characterization of simple bodies in *De Caelo* is, to some extent, incomplete. But, in opposition to the critics, I argue (in this section) that the insufficiency of this characterization is that it fails to explain the mutual transformation among simple bodies, which is not the traditional view of critics. It is this disadvantage that compels Aristotle to consider an alternative characterization in his treatise on generation and corruption, namely, *De Generatione et Corruptione*. As we shall see in this section, Aristotle’s characterization of simple bodies in *De Generatione et Corruptione* has not abandoned his characterization in *De Caelo*, but has rather complemented it within an integrated theory of change. In what follows I shall first spell out the necessary condition for generation and corruption, which Aristotle’s characterization of simple bodies in *De Caelo* fails to meet, then I shall explain why it fails to meet the condition.

In *De Generatione et Corruptione*, having distinguished the substantial changes from alteration and the changes in respect of quantities, Aristotle moves on to his discussion of the conditions under which all these changes, especially generation and corruption, are possible. As he observes, all those philosophers who make the elements come to be and those who make things generate from the elements, or, in a word, the pluralists, make use of aggregation and segregation, contact, and qualitative affection.² According to Aristotle’s interpretation of his predecessors, since aggregation is mixing,³ and the formation of mixture necessarily involves alteration,⁴ neither alteration nor aggregation and segregation can take place without qualitative affection:

But, again, there cannot be alteration, or aggregation and segregation, unless there is something which acts and something which is affected. For not only those who postulate a plurality of elements make them come to be by their reciprocal action and passion; those who derive things from a single element are equally compelled to speak

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¹ At the outset of *GC* II.4, Aristotle has pointed out explicitly that the mutual transformation of simple bodies is substantial change, rather than alteration.
² *GC* I.6, 322b6-8, πάντες γὰρ ὃι τά στοιχεῖα γεννώντες καὶ οἴ τά ἐκ τῶν στοιχείων διακρίσεως χρώνται καὶ συγκρίσεως καὶ τῶν τῶν καὶ σάρκα. Here I adopt Wildberg’s view on the translation of ποιεῖν and πάσχειν. See Wildberg 2004, 222-223.
³ *GC* I.6, 322b8, ἐντὶ δὲ ἡ σύγκρισις μέις.
⁴ Cf. *GC* I.10, 328b22, ἡ δὲ μέις τῶν μικτῶν ἀλλοιωθέντων ἐνωσις. A more in-depth discussion of mixture can be found in chapter 7.
of action. (322b9-13)¹

In this passage, Aristotle takes qualitative affection as a necessary condition for alteration, or aggregation and segregation. This, according to Aristotle, is derived from the agreement between all the monists and pluralists before him. It has been noted by critics that the division of the Presocratic philosophers into two groups in GC I.6 echoes that in GC I.1.²

In GC I.1, Aristotle has already pointed out that the monists are obliged to identify coming to be with alteration, while the pluralists are not.³ Thus, in the passage quoted above, when he refers to conditions of the occurrence of alteration, what Aristotle probably has in mind is that coming to be and passing away, for all those monists who have identified the substantial changes with alteration, cannot take place without qualitative affection. On the other hand, since aggregation and segregation cannot take place without the mutual affection, the pluralists, who have explained substantial changes in terms of aggregation and segregation, are obliged to admit that qualitative affection is a necessary condition of all substantial changes. Therefore, on the basis of an analysis of the systems of his predecessors, Aristotle arrives at the conclusion that generation and corruption presuppose qualitative affection. It is on the basis of this conclusion that he precedes to his discussion on acting and being affected in GC I.7-9.

That simple bodies are subject to generation and corruption entails that they must be subject to action and affection at the same time. In other words, if simple bodies are subject to mutual transformation, they are also subject to, specifically, qualitative affection. Therefore, whatever the properties by which simple bodies are characterized are, they must make it possible for the simple bodies to be capable of affecting each other. However, Aristotle’s characterization of simple bodies in De Caelo fails to meet this requirement.

After spelling out the necessary conditions of the changes other than locomotion in

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¹ Ἀλλὰ μὴν οὐδ' ἄλλοιςθαί δυνατὸν, οὐδὲ διακρίνεσθαι καὶ συγκρίνεσθαι, μηδὲνός ποιοῦντος μηδὲ πάσχοντος· καὶ γὰρ οἱ πλείο τὰ στοιχεῖα ποιοῦντες γεννόσι τῷ ποιεῖν καὶ πάσχειν ὑπ' ἄλληλον, καὶ τοῖς ἔξ ἔνος ἰόγκῃ λέγειν τὴν ποίησιν.
² See Natali 2004, 198.
³ Cf. 314a8-13, δι' οὗδ' ἐν τῷ πάν λέγουσιν εἶναι καὶ πάντα ἔξ ἔνος γεννόσι, τούτοις μὲν ἰόγκῃ τὴν γένεσιν ἄλλοιςθαι φάναι καὶ τῷ κυρίῳ γινόμενον ἄλλοιςθαι. δι' οὗδ' ἐπεί τὴν ὑλὴν ἔνος τιθέασι, οἷον Ἐμπεδόκλης καὶ Ἀναξαγόρας καὶ Λεύκηπος, τούτους δὲ ἔτερον. Aristotle has omitted that, similarly, the pluralists are obliged to identify coming to be with aggregation, and passing away with segregation. But this is clear according to GC I.6 322b6-8.
the last chapters of GC I,\(^1\) Aristotle moves towards an investigation into the corporeal elements in the next book of this treatise, and considers their differential qualities in GC II.2. He is keenly aware that his characterization of simple bodies must make it possible for them to be capable of mutual action and affection. He says:

Contrarieties correlative to touch are the following: hot-cold, dry-moist, heavy-light, hard-soft, viscous-brittle, rough-smooth, coarse-fine. Of these heavy and light are neither active nor susceptible. Things are not called heavy and light because they act upon, or suffer action from, other things. Things are not called heavy and light because they act upon, or suffer action from, other things. But the elements must be reciprocally active and susceptible, since they combine and are transformed into one another. (329b17-23)\(^2\)

Natural bodies can be differentiated and characterized by opposite properties. However, in order to guarantee that simple bodies are subject to qualitative affections, some of the properties by which simple bodies are differentiated and characterized must possess the powers of acting and being acted upon. This is why Aristotle develops an alternative characterization of simple bodies from the one he has provided in De Caelo.

As has been shown, in De Caelo, simple bodies are differentiated and characterized in terms of the absolutely heavy (earth), the relatively heavy (water), the relatively light (air), and the absolutely light (fire). It is for this reason that things can be called heavy or light, but owing to the fact that a heavy thing cannot make another thing heavier by touching it, nor can a light thing make another thing lighter by contact, neither heavy nor light—in either the absolute or relative sense—are capable of acting and being affected. Therefore, even though simple bodies can be differentiated and characterized in terms of heavy and light, they are not capable of acting and being acted on by one another in virtue of these differences. In other words, if heavy and light were the only properties by which simple bodies were characterized, these simple bodies would not be subject to qualitative affection at all.

On the other hand, the eternality of change and the transformability of simple bodies

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\(^1\) Being capable of contact and mixing are also the necessary conditions of changes. They have been correspondingly dealt with in GC I.6 and I.10. But for the present purpose, in this chapter, only simple bodies’ capability of having qualitative affection is discussed.

\(^2\) Εἰς δὲ ἑναντίωσις κατὰ τὴν ἀκόν ἄδε, θερμὸν ψύχρον, ξηρὸν ύγρόν, βαρὺ κοῖδον, σκληρὸν μαλακόν, γλύσχρον κραδόρον, τραχὺ λεπτόν, παχὺ λεπτόν. τούτων δὲ βαρὺ μὲν καὶ κοῖδον οὐ ποιητικὰ οὐδὲ παθητικὰ· οὐ γὰρ τὸ ποιεῖν τε ἔτερον ἢ πάσχειν ὧν ἐτέρου λέγονται, δεῖ δὲ ποιητικὰ καὶ παθητικὰ εἶναι ἅλληλῳ τὰ στοιχεῖα· μίγνυται γὰρ καὶ μεταβάλλει εἰς ἅλληλα.
entail that simple bodies must be capable of acting and being acted upon by one another. This contradiction exposes the insufficiency of Aristotle’s characterization of simple bodies in *De Caelo*. It indicates that only if simple bodies are characterized in an alternative way, according to which simple bodies are capable of mutual affection, can the mechanism of the mutual transformation of simple bodies be explained, and the eternity of change in the sublunary world be understood.

5.3 The characterization of simple bodies in *De Generatione et Corruptione*

In the previous sections, we have seen that the simple bodies, i.e., the corporeal elements of the sublunary universe, have to be capable of changing into one another, otherwise the changes around us cannot be everlasting. In order to convince his reader of the eternality of change, especially the eternality of generation and corruption, Aristotle thinks it necessary to characterize simple bodies, as required by the conditions of generation and corruption, so as to provide an explanation of the mechanism of the mutual transformation among the elements. Only if it has been explained why it is the case that the corruption of one element leads to the generation of another element, can the endlessness of the sublunary changes be satisfactorily understood. However, since qualitative affection is one of the most crucial conditions for the existence and explanation of generation and corruption, and since the characterization of simple bodies in *De Caelo* does not make them mutually active and passive, Aristotle is compelled to put forward an alternative characterization of simple bodies in *De Generatione et Corruptione*. It is this new characterization of simple bodies that makes it possible for him to provide an explanation of these mutual transformation.

It is widely known that, in *De Generatione et Corruptione*, each of the simple bodies is characterized by a certain combination hot/cold and wet/dry. These four properties, in Aristotle’s terminology, are the primary contraries or differentiae. With respect to the relationship between the primary contraries and the simple bodies, there is an influential tradition according to which these contraries are identified with the constituents of simple bodies, or, in contrast to the so-called elements, they are even identified with the true
elements.¹ In this section, I am not going to enter this controversy and argue directly against this tradition. Rather, I am going to follow my previous argument and spell out the way in which Aristotle’s new characterization of simple bodies in De Generatione et Corruptione overcomes the insufficiency of his initial characterization in De Caelo. In this way, the close connection between Aristotle’s two characterizations of simple bodies in two distinct treatises will be revealed and emphasized. If what I argue in this section is on the mark, it will provide us with a fresh perspective not only on the role of simple bodies in explaining the changes of the sublunary field, but also on our the relationship between these two characterizations of simple bodies in De Caelo and in De Generatione et Corruptione.

5.3.1 The primary contraries

That the simple bodies are capable of changing into each other is accepted in De Generatione et Corruptione as a fact.² In order to provide us with an account of the elemental transformations, which contribute to an account of the eternality of the terrestrial changes, Aristotle is in a position to characterize simple bodies as capable of acting and being acted upon by one another. This task can be accomplished by picking out certain qualities that are subject to qualitative affection in virtue of themselves, and assigning these qualities to the simple bodies. Only if a simple body possesses at least one such quality, is it capable of activity or passivity in regard to this quality. Now, Aristotle’s main task is to single out certain qualities by which simple bodies can be differentiated and endowed with capacities of mutual affection.

This work has been done in GC II.2. In this chapter, the domain of the affective qualities is confined to perceptible qualities. It is reasonable to start with perceptible qualities in his search for the qualities capable of acting and being affected; for, since perceptions cannot take place without the affection of an external object,³ whenever a perceptible quality is perceived, it must be either an affective quality itself, or a

¹ For a detailed literature review of the traditional and revisionary interpretations, see Krizan 2013, 205-212.
² See GC II.2, 329b20–6; II.4, 331a7, 331a12-14, a20-21.
³ Cf. De Anima II.5, 416b33-34, ἢ δ’ αἰσθησις ἐν τῷ κινεῖσθαι τε καὶ πάσχειν συμβαίνει; 417a4, ἀνευ τῶν ἐξω οὐ ποιοῦσιν αἰσθησιν.
psychological phenomenon resulting from an affective quality. As Krizan points out, heat, for example, is not only a natural capacity to heat things easily, but also an affective quality to the touch.\(^1\) On the one hand, it is capable of heating things; on the other hand, it can impact on the skin and produce the sensation of hotness in a perceiver. This is exactly what we look for in our discovery of the qualities capable of acting and being affected. An investigation into the sources of our perceptions can reveal the affective qualities that produce the corresponding perceptible qualities.

It is true that we cannot identify perceptible qualities with affective qualities. There might be some affective qualities that cannot be perceived because of the limitation of our sense-perception. For example, there are some affective qualities that are perceptible to a dog, but cannot be perceived by human being; these are not perceptible qualities for human being. Even if these qualities exist, Aristotle will not use them in his characterization of simple bodies, since simple bodies cannot be characterized in terms of qualities that we cannot perceive. For this reason, those affective qualities, that are used in Aristotle’s characterization of simple bodies, must be perceptible by human beings.

However, not all perceptible qualities may be used for the differentiation and characterization of simple bodies. Aristotle narrows down the scope of his discrimination of the ultimate differentiae, namely, the four primary contraries in two steps in GC II.2 to narrow down the scope of his discrimination to the ultimate differentiae. First, he moves from perceptible qualities to tangible qualities. This step is made on the basis of the priority of the sense of touch over any other senses. In his commentary on GC II.2, 329b7, Williams reminds us to connect this passage with Aristotle’s De Anima II.2-3.\(^2\) In these two chapters, Aristotle argues that the sense of touch can exist without the other senses, but not vice versa.\(^3\) This indicates that touch is more basic than any other senses. It is on the basis of this observation that Aristotle privileges the tangible qualities over the other perceptible qualities.\(^4\)

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1 Krizan 2018a, 95.
3 For example, in De Anima II.2, 413b4-7, we read: αἰσθήσεως δὲ πρῶτον ὑπάρχει πᾶσιν ἄρη ὃς περὶ δὲ τὸ θρεπτικόν δῶναιναι χωρίζεσθαι τῆς ἄρης καὶ πᾶσης αἰσθήσεως, οὕτως ἢ ἄρη τῶν ἄλλων αἰσθήσεων. See also II.3, 415a3-5, πάλιν δ’ ἄνευ μὲν τοῦ ἀπτικοῦ τῶν ἄλλων αἰσθήσεων οὐδὲμία ὑπάρχει, ἄρη δ’ ἄνευ τῶν ἄλλων ὑπάρχει.
4 This can be contrasted with what Plato says at Sophist, 246a10-b, ‘when they take hold of all these things they insist that only what offers tangible contact is, since they define being as the same as body’ (trans. White). According to this passage, some philosophers equate being with what is tangible. It is,
As has been said in 329b17, there are several kinds of tangible contraries, such as hot-cold, dry-moist, heavy-light, hard-soft, viscous-brittle, rough-smooth, coarse-fine, but only hot-cold, dry-wet constitute the ultimate differentiae that all one to differentiate and characterize simple bodies. These four are the primary contraries:

Hot is that which associates things of the same kind (for dissociating, which people attribute to Fire as its function, is associating things of the same class, since its effect is to eliminate what is foreign), while cold is that which brings together, i.e. associates, homogeneous and heterogeneous things alike. And wet is that which, being readily adaptable in shape, is not determinable by any limit of its own; while dry is that which is readily determinable by its own limit, but not readily adaptable in shape. (329b25-31)

According to Aristotle’s definition, the primary contraries are not only perceptible qualities, but they are the fundamental capacities of acting and being affected. It is due to their possession of some of these affective qualities that simple bodies are capable of mutual affection and transformation.

In contrast with these four tangible qualities, even though heavy and light can be felt as well, owing to the fact that they are ‘neither active nor susceptible’, they are not affective qualities, as the primary contraries are. For this reason, they are not candidates for the ultimate differentiae of simple bodies subject to mutual transformation. On the other hand, other non-primary contraries are also excluded as candidates for the differentiae. As Aristotle articulates in several examples:

From these [sc. hot and cold, dry and moist] are derived the fine and coarse, viscous and brittle, hard and soft, and the remaining differences. For since the wet has no determinate shape, but is readily adaptable and follows the outline of that which is in contact with it, it is characteristic of it to be such as to fill up. Now the fine is such as to fill up. For the fine consists of subtle particles; but that which consists of small particles is such as to fill up, inasmuch as it is in contact whole with whole—and the fine exhibits this character in a superlative degree. Hence it is evident that the fine...
derives from the moist, while the coarse derives from the dry. Again the viscous derives from the moist; for the viscous, e.g. oil, is a wet thing modified in a certain way. The brittle, on the other hand, derives from the dry; for brittle is that which is completely dry—so completely, that it has actually solidified due to failure of moisture. Further the soft derives from the moist. For soft is that which yields by retiring into itself, though it does change position, as the wet does—which explains why the wet is not soft, although the soft derives from the moist. The hard, on the other hand, derives from the dry; for hard is that which is solidified, and the solidified is dry. (329b34-330a12, brackets added)\(^1\)

According to Aristotle’s reduction, all these tangible qualities are derived from the primary contraries.\(^2\) Therefore, hot/cold, dry/moist, given that they are the most fundamental tangible qualities, are identified with the most appropriate differentiae by which the four sublunary simple bodies are differentiated and characterized. More specifically, hot and dry are identified with the differentiae of fire, hot and wet with air, cold and wet with water, and cold and dry with earth.\(^3\) It is on the basis of this characterization that the transformation of simple bodies is explained. According Aristotle’s theory in GC II.4, a simple body is transformed into another simple body by altering one of its differentiae into its contrary affective quality.\(^4\)

Since the aim of this chapter is to explain why Aristotle thinks it is necessary to put forward an alternative characterization of simple bodies in *De Generatione et Corruptione*, and how this new characterization contributes to Aristotle’s theory of change, I am not going to step into the details of the mechanism of the mutual transformation of simple bodies. For present purposes, it is sufficient to note that, only if the second characterization of simple bodies is put forward, can simple bodies be subject to mutual transformation, which, in turn, underpins the idea that the changes of the sublunary world, especially the generation and corruption of physical things, will never arrive at a dead end.

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1. ὅ ὁ δὲ λεπτὸν καὶ παχὺ καὶ γλίσχρον καὶ κραφὸν καὶ σκληρὸν καὶ μαλακὸν καὶ άι ἄλλαι διαφοραὶ ἐκ τούτων· ἐπεὶ γὰρ τὸ ἀνάπληστικόν ἐστὶ τὸῦ ύγροῦ διὰ τὸ μὴ ὀρίσθαι μὲν εὐόριστον δ’ εἶναι καὶ ἀκολουθεῖν τὸ ἀπὸμένον, τὸ δὲ λεπτὸν ἀνάπληστικόν (λεπτομερές γάρ, καὶ τὸ μικρομερές ἀνάπληστικόν ὁλον γὰρ ὅλου ἄπεται· τὸ δὲ λεπτὸν μάλιστα τοιοῦτον), φανερὸν ὅτι τὸ μὲν λεπτὸν ἐστὶ τοῦ ύγροῦ, τὸ δὲ παχῦ τοῦ ἔνστατος. Πάλιν ὅτι τὸ μὲν γλίσχρον τοῦ ύγροῦ (τὸ γὰρ γλίσχρον ύγρὸν πεπονθὸς τι ἐστίν, οἷον τὸ ἐλαίου), τὸ δὲ κραφὸν τοῦ ἠμαρτου· κραφὸν γὰρ τὸ τελέος ἔριον, ὧστε καὶ πεπηγόνται δι’ ἔλειψιν υγρότητος. ἔτι τὸ μὲν μαλακὸν τοῦ ύγροῦ (μαλακὸν γὰρ τὸ ὑπείκον εἰς ἐαυτῷ καὶ μὴ μεθεστάμενον, διὰποιεῖ τὸ ύγρὸν· διὸ καὶ οὔκ ἐστὶ τὸ ύγρὸν μαλακὸν, ἀλλὰ τὸ μαλακὸν τοῦ ύγροῦ), τὸ δὲ σκληρὸν τοῦ ἔριον· σκληρὸν γὰρ ἐστὶ τὸ πεπηγός, τὸ δὲ πεπηγός ἔριον. Besides, in Meteorology IV.8, Aristotle also explains the way in which some other affective qualities result from hot and cold.

2. On the exact meaning of the derivation from the primary contraries, see Krizan 2018a, 97-103.

3. GC II.4, 3301-5.

4. See GC II.4.
5.3.2 The relation between the two characterizations of simple bodies

Critics are generally agreed that *De Caelo* contains an investigation into the sublunary elements. As has been mentioned at the outset of this chapter, there is a long tradition, which can be traced back, at least, to Avicenna, that holds that this investigation is significantly distinct from that in *De Generatione et Corruptione*.\(^1\) Some within this influential tradition have even attempted to reduce Aristotle’s characterization of simple bodies in *DC* to that in *GC*.\(^2\) This influential view of the relationship between the investigations in these two treatises, in my view, neglects the fact that they both contribute to an integrated theory of change, especially generation and corruption in the sublunary field.

As mentioned at the very beginning of the chapter 3 (see also Introduction), the investigation in *De Generatione et Corruptione* is conducted on the basis of that in *De Caelo*, since only if it has been articulated that ether is excluded from the realm of generation and corruption, and a complete list of the simple bodies involved in generation and corruption is provided in *De Caelo*, it is possible for Aristotle to begin with an inquiry into the definition and the causes of generation and corruption and the changes in respect of quantity and quality in the subsequent treatise. This explains why Aristotle doesn’t consider ether in his explanation of the changes other than locomotion in *De Generatione et Corruptione*. The absence of ether from this treatise indicates that Aristotle’s investigation of the changes other than locomotion, especially generation and corruption, in *De Generatione et Corruptione*, is conducted on the basis of what he has already made clear in *De Caelo*.\(^3\) This is what I have shown in Part I of this dissertation. It is in *De Caelo* that Aristotle explains why this universe is composed of the corporeal elements, and for the first time proves that all natural changes other than locomotion involve at least four simple bodies, rather than five. This, in fact, is accepted in *De Generatione et Corruptione* as the starting point of his further inquiry into generation and corruption, and the other types of changes.\(^4\)

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2. Krizan 2018a, 103-110; Berman 2018, 8-14.
3. It is remarkable that, for example in 335a31, he takes it for granted that neither is involved in generation and corruption.
4. See *GC* I.3, 319a30ff., fire is characterized as the light element, while earth the heavy element.
Aristotle’s characterization in *De Generatione et Corruptione*, on the other hand, cannot explain why there are five simple bodies of which our universe is composed. In *GC* II.2, he does not attempt to explain why ether, which was called the primary body in *De Caelo*, is not included in his characterization. This fact not only suggests that Aristotle’s investigation in *De Generatione et Corruptione* is conducted on the basis of what he has done in *De Caelo*, but it also indicates that his differentiation and characterization of simple bodies in *De Caelo* cannot be reduced to that in *De Generatione et Corruptione*. If what Aristotle does in *GC* II were his final way to characterize the four sublunary simple bodies, then the existence of ether, of which the celestial world is composed, would not be explained in the same way as the four terrestrial simple bodies. This would tear Aristotle’s theory of simple bodies into two distinct investigations, each of which proceeds on the basis of a distinct characterization.

As I have argued in this chapter, in order to provide a consistent and sufficient explanation of change, Aristotle cannot rest content with his characterization of simple bodies in *De Caelo*, since if simple bodies can only be differentiated and characterized by their proper places, then the generation and corruption among thems cannot be satisfactorily explained. It is in terms of the second characterization of simple bodies, namely the one which is put forward in *De Generatione et Corruptione*, that Aristotle ensures that change, especially the generation and corruption of physical things, is imperishable. On account of the role that the new characterization in *De Generatione et Corruptione* plays, this characterization still concerns the integrated theory of change. But this is not the only benefit that is afforded to Aristotle’s explanation of the sublunary changes by his alternative characterization of simple bodies. In the next two chapters, we shall see that it is by forming the matter of physical things that the simple bodies, or the corporeal elements of physical things, contribute to Aristotle’s explanation of the changes in *De Generatione et Corruptione*. The formation of matter, however, cannot take place without the characterization of simple bodies in terms of the primary contraries.

To conclude, Aristotle’s characterization of simple bodies in *De Generatione et Corruptione* has to go further than his first characterization in *De Caelo*. Both of these characterizations contribute to an integrated theory of change. In the next two chapters, I shall explain how exactly those four simple bodies, as they are characterized in *De Generatione et Corruptione*, serve as explanatory factors in Aristotle’s explanation of the
changes other than locomotion.
6. How does the matter of physical things come to be form simple bodies?

Why is it necessary for Aristotle to consider simple bodies in *De Generatione et Corruptione*? In what way do simple bodies contribute to the explanation of coming-to-be, especially to that of substantial generation and corruption? According to my understanding, the answers to these questions lie in the fact that simple bodies are identified with the corporeal elements of all physical things. It is of these simple bodies that the matter of physical things is composed. Therefore, through an investigation into simple bodies, particularly an investigation into the formation of the matter of physical things, we can better understand an important cause of change, i.e., the material cause.

Much of my interpretation of the way in which simple bodies contribute to Aristotle’s explanation of the changes in addition to locomotion, especially generation and corruption, will be elaborated in the last chapter, i.e., Chapter 7. This chapter, however, is no less crucial. In this chapter, I shall explain the relation between simple bodies, namely, the corporeal elements, and the material cause of physical things. Only if this has been clearly explained, can we finally move on to the role that simple bodies play, by forming the matter of physical things, in Aristotle’s explanation of the changes other than locomotion.

My interpretation in this chapter relies crucially on my proposal that, in *De Generatione et Corruptione*, Aristotle distinguishes the mixture of simple bodies from the homogenous parts of substances, which leads to a further distinction between matter and the corporeal elements. I propose that, for Aristotle, the mixture of simple bodies is that from which a physical thing is generated, while the homogenous parts of physical things are those of which a physical thing is directly composed. According to my interpretation, the homogenous parts of a physical thing are generated from the mixture of simple bodies. At the same time, I argue, Aristotle does not identify or equate homogenous parts and the mixture of simple bodies; on the contrary, he distinguishes between them, and does so on the grounds that they have different forms. This is because simple bodies are wholly destroyed in the homogenous parts of physical things, whereas they still exist in virtue of themselves in the mixtures from which the homogenous parts of physical things come to be.

This interpretation of the role that simple bodies play in Aristotle’s explanation of change is not entirely new, since there are some critics who have already made a similar
point with regard to *Metaphysics* Θ. For example, Makin has identified the homogenous parts of a physical thing as the concurrent matter of a substance, and simple bodies as the pre-existing matter of the substance.\(^1\) However, in Chapter 6, I show that this distinction, or something very similar, is present and operative in Aristotle’s theory of mixture in *De Generatione et Corruptione*; and, in Chapter 7, I use this point in regard to the *Physics* and, in particular, the question why *De Generatione et Corruptione* has to supplement the *Physics* (I consider this question more closely, below in this Introduction). This, as far as I know, is new. Critics have made a similar point with regard to *Metaphysics* Θ, but nobody, to my knowledge, has made this point with regard to *De Generatione et Corruptione* or the relation between that work and the *Physics*.

6.1 Matter as a cause in *De Generatione et Corruptione*

Aristotle makes it clear at the outset of *De Generatione et Corruptione* that, in this treatise, he is occupied with the definitions and the causes of the changes other than locomotion. He says,

Our next task is to study coming-to-be and passing-away. We are to distinguish the causes, and to state the definitions, of these processes considered in general—as they apply uniformly to all the things that come-to-be and pass-away by nature. Further, we are to study growth and alteration. We must inquire what each of them is; and whether alteration has the same nature as coming-to-be, or whether to these different names there correspond two separate processes with distinct natures. (314a1-314a6)\(^2\)

It is conspicuous that, in this treatise which comes after *De Caelo*, Aristotle’s task is twofold. He is primarily going to study the changes in respect of substance. In his study of such changes, he is going (1) to provide us with definitions of generation and corruption, and (2) to distinguish the causes of these changes. Then he is going to conduct an investigation into non-substantial changes, namely, alteration, growth and diminution. On the one hand, each

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\(^1\) Makin 2006, 139-140; 167.

\(^2\) Περὶ δὲ γενέσεως καὶ φθορᾶς τῶν φύσει γενομένων καὶ φθειρομένων, ὡμοίους κατὰ πάντων, τὰς τε αἰτίας διαιρέτων καὶ τοὺς λόγους αὐτῶν, ἢ ἐνεπερπέτων καὶ ἄλλωσθαι, τὸ ἐκάτερον, καὶ πότερον τὴν αὐτὴν ὑπολείπετον φύσιν εἶναι ἄλλωσθαι καὶ γενέσθαι, ἢ χωρίς, ὅσπερ διώμεται καὶ τοῖς ὄνομασιν. Τῶν μὲν οὖν ἄρχαιν οἱ μὲν τὴν καλουμένην αὐτὴν γένεσιν ἄλλωσθαι εἶναι φασίν, οἱ δὲ ἐπιθέσθαι ἄλλωσθαι καὶ γένεσιν. Ὁσοὶ μὲν γὰρ ἔν τι τὸ πάντα λέγουσιν εἶναι καὶ πάντα ἕξ ἐνὸς γενόσθαι, τούτος μὲν ἁνέγκη τὴν γένεσιν ἄλλωσθαι φάναι καὶ τὸ κυρίως γινόμενον ἄλλοισθαι. In Brunschwig 2004, 34-37, the view according to which 318a9-11 is attributed to the last book of *De Caelo* is considered and refuted.
of these changes has to be defined; on the other hand, it is also necessary to articulate the distinction between generation and the non-substantial changes, especially alteration (this will be examined carefully in § 7.2.3). It is true that Aristotle does not mention here that he is going to investigate the causes of growth and alteration, but, as we shall see in next chapter, i.e., Chapter 7, he has in fact considered what causes that provide for the possibility of growth and alteration.

Philoponus explicitly connects the passage quoted above with Aristotle’s theory of the four causes. In his explanation of the question why Aristotle uses the plural form of the notion of cause in 314a3, he says:

For the substratum is a cause, and <so is> the form itself and the source from which change begins, i.e. the efficient cause, and that-for-the-sake-of-which is a cause, namely, the end.1

By substratum, assuming he is using it in the same sense as Aristotle does, Philoponus means the matter of a thing.2 This interpretation is correct, since in GC II.9, when Aristotle approaches to the end of this treatise, he poses the question of how many principles there are of generation and corruption and what they are.3 In responding to this question, Aristotle points out that generation and corruption have to be explained in terms of three factors:

For there is one in the sense of matter, and a second in the sense of form; and, in addition, the third must be present as well. (335a29-31)4

According to Aristotle’s subsequent arguments, the form of a thing is not only the formal cause of a thing, but also the final cause, because it is that for the sake of which a thing changes.5 In regard to the third cause which has not been articulated in this outline, it is that which acts and causes movement, or the efficient cause.6 This is exactly the subject matter of his discussion from the second half of GC II.9 to the end of GC II.10. Therefore,

1 Philoponus 2014, 25.
2 In GC I.3, 319a19, Aristotle explicitly identifies the substratum with the material cause of a thing. See also Metaphysics A.3, 983a29: ἔτέραν δὲ τὴν ὠλην καὶ τὸ ὑπόκειμενον. This interpretation, i.e., that Aristotle identifies the ‘causes’ in 314a3 as the formal, material, efficient, and final causes, is also held by Joachim. See Joachim 1929, 62.
3 GC II.6, 335a26, πόσατα τε καὶ τίνες αὐτῆς ἀρχαί.
4 ὡς μὲν γάρ ἐστιν ὡς ὠλη, ἡ δ' ὡς μορφή, δεῖ δὲ καὶ τὴν τρίτην ἐπι προσωπάρχειν.
5 GC II.9, 335b6: ὡς δὲ τοῦ σῷ ἐνεκέν ὡς μορφὴ καὶ τὸ ἐδος.
6 GC II.9, 335b30: τὸ δὲ κυνάειν καὶ ποιεῖν. Cf. Joachim’s summary of GC II.9 and II.10, see Joachim 1929, 246-247.
all of Aristotle’s four causes are addressed in *De Generatione et Corruptione*, which confirms that the causes mentioned in 314a3 are these four causes, i.e., the formal, material, efficient, and final causes of generation and corruption.

Of all the four causes, the material cause has been considered most carefully in *De Generatione et Corruptione*. It is in his inquiry into the cause of matter that he makes clear the role of simple bodies, or the corporeal elements of physical things.

At the beginning of *GC* I.6, simple bodies are explicitly connected with the matter of physical things. Aristotle says that ‘we must first investigate the matter, καί the so-called elements.’¹ The reason why I have left the ‘καί’ untranslated in the sentence is that the translation of this word is controversial. As Natali notes, ‘this καί has been understood as an explicative connective by most interpreters, from Philoponus to Zabarella, Joachim, and Migliori, who translate it as “i.e”. Only a minority (Williams, Mugler) translate it as “and”’.² In this chapter, I argue that it should be translated as ‘and’, since simple bodies, or the corporeal elements, cannot be identified with the matter of the physical things, even though, in my view, matter is composed of simple bodies. We will see that what I am doing in this chapter is necessary, because it is on the basis of the connection between simple bodies and the matter of physical things that the role that simple bodies play in Aristotle’s explanation of the changes in addition to locomotion can be fully understood in Chapter 7.

In the subsequent sections of the present chapter, I shall begin with Aristotle’s definition of the corporeal elements in § 6.2. Based on this definition, I shall argue that the corporeal elements are not the matter of physical substances in the strict sense. I argue that, according to Aristotle’s definition, there are some compounded things in which the corporeal elements exist in virtue of themselves. However, these compounded things that are directly composed of the corporeal elements cannot be identified with the individual substances around us with which we are familiar. This will be explained in this chapter through a *reductio ad absurdum*. More specifically, I shall argue that if they were the individual physical things, a radical dilemma would arise within Aristotle’s system. In § 6.2–3, I argue that the only way to solve this problem is to distinguish physical substances from the things that are composed of the elements in the way outlined in Aristotle’s

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¹ *GC* I.6, 322b1–2, ἐπεὶ δὲ πρῶτον δεῖ περὶ τῆς ὤλης καὶ τῶν καλουμένων στοιχείων εἰπεῖν.
² Natali 2004, 197.
definition. In § 6.4, I explain what exactly the compounded things involved in Aristotle’s definition of the corporeal elements are mixtures. In this section, I spell out the way in which mixtures come to be from simple bodies and the way in which simple bodies exist in mixtures. Finally, in §6.5, I set out to explain of the relationship between mixture and the physical individuals. I argue that the mixtures which simple bodies immediately compose are the matter of physical individuals. It is from these mixtures that the homogenous parts (or the like-parted things), especially the organic homogenous parts, of which physical individuals are composed are generated. In this way, the way in which simple bodies contribute to the formation of the matter of substances will be clarified.

6.2 Corporeal elements do not exist in substances

In the philosophical lexicon of the *Metaphysics*, Aristotle puts forward his definition of an element. He says,

> We call an element that which is the primary component immanent in a thing, and indivisible in kind into other kinds. (Δ 3, 1014a26–27)\(^1\)

This definition concerns the notion of an element in general. In the subsequent examples, which illustrate this notion, we notice that not only body, but also speech, geometrical figure, and even a piece of syllogism, can be identified with compounded entities which their corresponding elements compose (1014a28, a32, a35-37). In this chapter, we shall not consider the concept of element in general, but specifically the corporeal element, or the primary factor of which physical things are composed.

The notion of corporeal element is defined in *DC* III.3 as follows:

> A corporeal element, we take it, is a body into which other bodies may be divided, present in them potentially or in actuality (which of these, is still disputable), and not itself divisible into bodies different in form. (302a15-18)\(^2\)

In this definition, Aristotle indicates that the corporeal elements can be discovered through dividing complex bodies into their constituents. As I have argued above, these constituents are the simple bodies, each of which moves with a single type of simple motion. Moreover,

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\(^1\) Στοιχεῖον λέγεται ἐξ οὗ σύγκειται πρώτου ἐνυπάρχοντος ἀδιαιρέτου τῷ εἴδει εἰς ἕτερον εἴδος.

\(^2\) Ἐστω δὴ στοιχεῖον τῶν σωμάτων, εἰς ὧν τάλα σώματα διαιρέται, ἐνυπάρχον δυνάμει ἢ ἐνεργείᾳ (τοῦτο γὰρ ποτέρως, ἐτὶ ἀμφισβητήσιμον), αὐτὸ δ’ ἐστὶν ἀδιαιρέτον εἰς ἕτερα τῷ εἴδει.
Aristotle raises the question of how corporeal elements exist in complex bodies before they separate out. According to the *Metaphysics*, the ways of being are distinguished into being in potentiality and being in actuality. In other words, any given thing, say wood, exists as a piece of wood either in potentiality or in actuality, there is no third possibility. It would be extremely helpful if we keep this in mind as we go back to Aristotle’s consideration of the way in which simple bodies exists in compounded bodies. Aristotle admits here that the question of the way in which elements are present in compounded bodies is still controversial, but his answer to this question is immediately indicated. In his view, simple bodies exist potentially in compounded bodies. This is explicitly expressed in his subsequent examples.

For flesh and wood and all other similar bodies contain potentially fire and earth, since one sees these elements exuded from them. (302a21-22)

Appealing to these examples, Aristotle makes it clear that the corporeal elements (e.g. fire and earth) exist in some compounded bodies, such as flesh and wood, in a potential way. This is reasonable, since what we have perceived in reality are flesh and wood, which are distinct in characterization from the elements of which flesh and wood are composed. If the corporeal elements were in the things in actuality, what we perceive would be elements, rather than the compounded things, e.g. flesh and wood.

It is remarkable that, in the passage quoted above, Aristotle compares the potentiality of fire and earth with the state they are in after being separated from a compounded thing. Owing to the fact that the corporeal elements, after being exuded from compounded things, can be discerned, they must exist in actuality in their own right. According to Aristotle, the reason for confirming that there are corporeal elements contained in compounded things is that we have witnessed that the elements, e.g., fire and earth, which are present potentially in flesh and wood, can be separated from the compounded things and exist in virtue of

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1 In *Metaphysics*, Δ 3, 1014a26, Aristotle emphasizes that elements are immanent in things. In DC III.3, however, in his definition of the corporeal elements, Aristotle considers more carefully the way in which the corporeal elements are immanent in things, since, as we shall see, either existing in potentiality or in actuality are ways of being immanent.  
2 *Metaphysics*, Δ 7, 1017a35-b2, ἐτὶ τὸ εἶναι σημαίνει καὶ τὸ ὅν τὸ μὲν δύναμις ῥητὸν τὸ δ’ ἐντελεχεία τῶν εἰρημένων τούτων. See also *Metaphysics*, E 2, 1026b1.  
3 In his commentary on this passage, Simplicius explains, ‘for that the elements inhere actually follows for those, such as Empedocles and Anaxagoras, who say that coming to be is the result of blending and separation out, but that they inhere potentially follows for those who say it is a result of qualitative change.’ See Simplicius 2009, 77.  
4 Ἐν μὲν γὰρ σάρκι καὶ ξύλῳ καὶ ἐκάστῳ τῶν τοιούτων ἔνεστι δυνάμει πῦρ καὶ γῆ.
themselves. This transformation, on the other hand, indicates that each element has undergone a transition from a state of potentiality to one of actuality. Through this process, an element, which used to present in potentiality in a compounded body, has been actualized and exists in its own right. The state form which it is actualized is of course that of being potentially in virtue of itself. It can be proved by the following contradiction. If what exist potentially in a compounded thing were not the elements existing potentially in virtue of themselves but, say, a piece of wood in potentiality, then the actualized thing from the potential elements would be a piece of wood, rather than the elements existing in virtue of themselves. This, however, goes against Aristotle’s description of a corporeal element in 302a21-22, since the entities generated from the potential elements are the actual elements, which can be seen. In other words, they are the corporeal elements existing in their own right, rather than a piece of wood or anything else.\(^1\)

Aristotle emphasizes in these quoted passages that the corporeal elements exist potentially in the compounded things they compose. Only if they are separated from compounded bodies, would they exist independently and in actuality. For this reason, we see that, according to Aristotle’s definition in DC III.3, corporeal elements, namely the simple bodies into which any other natural bodies can ultimately be divided, can either be present in some compounded bodies in potentiality as their constituents, or be separated from these bodies and exist actually in virtue of themselves.

But what exactly are these compounded bodies that are composed of simple bodies in

\(^1\) In fact, when it is admitted that elements present in wood or flesh in potentiality, Aristotle has already suggested that the relationship between the corporeal elements and wood or flesh, and that between wood and table are totally different. As I have argued, the elements exist in wood in potentiality in their own right. On the contrary, it is not the case that wood, which exists potentially in a wooden table, exists in virtue of itself as well. In Metaphysics, H 5, 1044b35, Aristotle tells us that, even though all men by nature will die, a living man is not a dead man in potentiality at all. Similarly, it is a fact indeed that a wooden table is made of wood, and wood comes to be when the table is finally destroyed into its parts, but Aristotle by no means will regard the wood in a table as being in potentiality in virtue of itself. It is potentially a table rather than a piece of wood in potentiality. As we shall see in the next two sections, the potentiality of elements in compounded bodies is distinct from the potentiality of matter in a hylomorphic compound. Strictly speaking, the compounded bodies, which corporeal elements compose, are not hylomorphic compounds, they are mixtures. According to Aristotle’s description of a mixture in GC I.10, elements are altered but not destroyed in their formation of a mixture, so that, in mixtures, they still exist in their own right. In the generation of a hylomorphic compound, however, matter is substantially destroyed and gives up its own identity. Thus the matter of a wooden table is no longer wood in its own right, but a potential table. Philoponus recognizes the distinction between these two types of potentiality, see Philoponus 2005, 68. But he does not connected this distinction, to Aristotle’s distinction of being in virtue of itself potentially and being potentially another thing as I have done here. Philoponus’ exegesis is further interpreted in Cooper 2004, 148-160.
the definition of corporeal element in *DC* III.3? More specifically, we must ask whether or not all corporeal things are composed of the simple bodies that exist in potentiality in virtue of themselves. This question is important. It concerns the way in which simple bodies exist in physical things in general, rather than just in the compounded bodies that are directly composed of simple bodies. In other words, it asks: can we hold, according to Aristotle, that the corporeal elements exist in all complex natural bodies in the way indicated in Aristotle’s definition of corporeal element in *DC* III.3, that is, existing potentially in their own right? As I shall argue in the next section, the answer to this question is, no. The compounded bodies that the elements compose cannot be the hylomorphic compounds, because Aristotle’s theory of corporeal elements, which is built on his definition of this notion in *DC* III.3, cannot fit directly into his hylomorphism. The tension between these two theories will be spelled out presently.

6.3 The tension between Aristotle’s hylomorphism and his theory of the elements

According to the post-Parmenidean natural philosophers, all physical bodies are identified with the compounded bodies, which are composed of some more fundamental. Some may assume that Aristotle holds the same view as his predecessors. In fact, this is the traditional understanding of Aristotle’s theory of the elements, and can be traced back at least to Aquinas. According to Aquinas’ reading, the way in which the elements exist in a mixture is the same as that in which they exist in other natural bodies. This is why so many scholars, when reading *GC* I.6, 322b1-2, tend to identify the elements with the matter of physical things.

It is true that in his definition of the corporeal elements, Aristotle says in *DC* III.3 that the corporeal elements exist potentially in some compounded things, and it is natural for critics to take it for granted that the elements are the constituents of all physical things in the same way. But if we consider carefully the relationship between the elements and

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1 We are informed by Aristotle that, according to Empedocles, all bones, whether in an organic body or not, are formed by earth, water and fire in accordance with the proportion of 1:1:2. See *De anima*, A 5, 410a1-6; Similarly, cf. *Metaphysics*, 993a17-22, 1092b17; *De anima*, 408a14, 429b6; *De Partibus Animalium*, 642a18-23; *De generatione animalium*, 7346b33. Similarly, seeds are the fundamental constituents of all things for Anaxagoras, and atoms for the atomists.

2 See Bobik 1998, 48.
hylomorphic compounds, on the basis of Aristotle’s theory of matter and form and his theory of potentiality and actuality, we will see that it is much too hasty to identify such compounded things with all physical things. As I shall argue in this section, if hylomorphic compounds were also included among the compounded things, which are composed of simple bodies, difficulties emerge; and these are difficulties of which Aristotle is aware, and against which he tries to guard in his *Metaphysics*. One of the most obvious difficulties is that a thing cannot be two different things in potentiality at the same time.

As has been pointed out, the way in which the elements exist in compounded things is to be potentially in their own right, whereas, once they are separated out, they exist in actuality as themselves. Thus, according to the nature of the elements, if they were not prevented, elements in compounded bodies would be separated out and exist actually in their own right. But if we assume that hylomorphic compounds, each of which possesses its own form and essence, are also included among the compounded bodies in which corporeal elements exist potentially, we shall see that these elements, on the one hand, can be actualized into some separated simple bodies, and on the other hand, can be identified with the matter of the hylomorphic compounds. Just as the function of a man can be actualized from his matter, the form and the function of a hylomorphic compound can be actualized from the corporeal elements, which are the matter of this compound.

The difficulty lies in the tension between these two roles: even though corporeal elements are present potentially in the compounded things that they compose, according to Aristotle’s definition, they can be separated out and exist in their own right in actuality; on the other hand, if the corporeal elements were also the matter of which hylomorphic compounds and their parts are composed at the same time, their forms and functions would be actualized from the elements. Here arises the problem of whether what is actualized from the constituents are the elements themselves or the forms and functions of the compounds and their parts. This question is usually neglected in the commentaries on *De Caelo* and *De Generatione et Corruotione*, but an answer to this question can be found in Aristotle’s theory of potentiality and his theory of matter in *Metaphysics* Θ.

According to Aristotle, since each single thing cannot be determined by two distinct forms at the same time, nothing can be two different things in potentiality at the same time. On the one hand, if hylomorphic compounds were composed of simple bodies in the way
that has been clarified in Aristotle’s definition of corporeal elements in *DC* III.3, then simple bodies would be the material causes of the hylomorphic compounds, such as this man and this horse. If this were the case, then the form of a hylomorphic compound would also determines the elements of which the compound is composed. On the other hand, according to our analysis of Aristotle’s definition of the corporeal elements, if the elements in compounded bodies can be actualized from being potentially in their own right, then these elements preserve all through their own forms, and in this way exist in compounded bodies as themselves in potentiality. But the elements cannot exist as potential hylomorphic bodies and in themselves at the same time. In *Metaphysics* Θ.8, we read:

Further, matter exists in a potential state, just because it may attain to its form; and when it exists actually, then it is in its form. (1050a15-16)

In other words, if A exists potentially as B, it has already been determined by the form of B. Since something cannot be determined by two different things at the same time, it can only be B in potentiality but nothing else. Similarly, Aristotle emphasizes in *Metaphysics* Θ.7:

Similarly, there is potentially a house, if nothing in the thing acted on—i.e. in the matter—prevents it from becoming a house, and if there is nothing which must be added or taken away or changed. (1049a9-11)

According to this passage, if we assume that, while being potentially themselves, elements also exist as the matter of hylomorphic bodies, then it follows that the elements, without any obstacles, would be actualized both into some separated simple bodies, and into functioning hylomorphic bodies. But this is impossible. In order to avoid this absurdity, we have to give up the claim that hylomorphic bodies are included in Aristotle’s definition of the corporeal elements in *DC* III.3.

The same difficulty appears when a similar analysis is applied to the homogenous parts of hylomorphic bodies. According to Aristotle’s natural philosophy, a hylomorphic substance is composed of the homogenous parts, or the homoeomers. Each part of a homoeomer, in his view, is the same as the whole. For example, as Aristotle points out in
De Generatione et Corruptione, ‘any part of water is water’.\textsuperscript{1} If we assume that homoeomers were included in the compounded bodies which is indicated in DC III.3, it would be also difficult to explain the way in which simple bodies compose them.

Aristotle has confirmed that simple bodies are the matter that compose the homogeneous parts, such as bones and flesh, in different places.\textsuperscript{2} For example, he points out explicitly in De generatione animalium:

The material of animals is their parts—of the whole animal the non-homogeneous parts, of these again the homogeneous, and of these last the so-called elements of bodies. (715a9-11)\textsuperscript{3}

According to the description in Meteorology IV, the homogeneous parts of living bodies refer to

for instance, the stuffs that are mined—gold, copper, silver, tin, iron, stone, and everything else of this kind and the bodies that are extracted from them; also the substances found in animals and plants, for instance, flesh, bones, sinew, skin, viscera, hair, fibres, veins (these are the elements of which the non-homogeneous bodies like the face, a hand, a foot, and everything of that kind are made up), and in plants, wood, bark, leaves, roots, and the rest like them. (388a14-20)\textsuperscript{4}

Let us take wood as an example. According to what Aristotle says at DGA 715a9-11, corporeal elements are the matter of the wood in an organic body. Just as in the case of a man. The matter of a man is his body. He himself can be actualized from the blood and flesh of which he is composed. His body, therefore, is potentially a man with all the functions of life.\textsuperscript{5} Similarly, wood exists potentially in the elements that compose the wood. Meanwhile, the elements are the piece of wood in potentiality. On the other hand, if we

\textsuperscript{1} GC I.10, 328a10-11, φαμὲν δ’, εἴπερ δὲι μεµίχθατι τι, τὸ μιχθὲν ὀμοιομερὲς ἐστι, καὶ ὀσσὰ τοῦ ὃδατος τὸ μέρος ὄδωρ, οὕτω καὶ τὸν κραθέντος. Cf. also 328a3-4. It is still controversial how simple bodies interact with each other in the formation of mixture. Cf. Cooper 2004, 161-173; Wood & Weisberg 2004, 684-704.

\textsuperscript{2} Aristotle points out at the beginning of Metaphysics Z.16 that parts of substances are not substances in the strict sense. But, since such parts can be predicated by the insubstantial categories as the subjects, they can be taken as substances in a loose sense (Cf. DC III.1, 298a29-32; Metaphysics Z.2, 1028b8-13, H. 1, 1042a7-11), and can be analyzed into form and matter.

\textsuperscript{3} ἡ ὑλή τῶν ζῴων τὰ μέρη: παντὶ μὲν τὸ ὄλο τὰ ἀνυμοιομέρη, τοῖς δ’ ἀνυμοιομερέσι τὰ ὀμοιομερῆ, τούτοις δὲ τὰ καλοῦμενα στοιχεῖα τῶν σωμάτων. Cf. Metaphysics 1041b23.

\textsuperscript{4} οἷον τὰ τὲ μεταλλευόμενα – γαλλόν, χρυσάν, χρυσόν, ἄργυρον, καττίτερον, σίδηρον, λίθον, καὶ τάλα τὰ τοιαῦτα, καὶ δάσα ἐκ τούτων γίγνεται ἐκκρινόμενα – καὶ τὰ ἐν τοῖς ζῴως καὶ φυτῶς, οἷον σάρκες, ὀστά, νεῦρων, δέρμα, σπάλαγχνον, τρίχες, Ἰνες, φλέβες, ἐς ὃν ἦδη συνεστήκα τὰ ἀνυμοιομέρη, οἷον πρόσοπον, χεῖρ, πούς, καὶ τάλα τὰ τοιαῦτα, καὶ ἐν φυτῶς ξύλον, φλοιός, φύλλον, ρίζα, καὶ ὅσα τοιαῦτα. Cf. Historia animalium, 486a5ff.

\textsuperscript{5} See De anima, II.1, 412a20-b9. In this famous passage, Aristotle reiterates that body potentially possesses life.
hold that the corporeal elements compose the wood in the same way as what has been revealed in our discussion of DC 302a16-18, then the elements that compose the wood would exist in the wood potentially in their own right. If this were the case, then the earth, water, air and fire, as the matter of homoeomers, would exist potentially as homoeomers, and potentially as themselves at the same time. This, as has been shown, is incompatible with Aristotle’s hylomorphism and his understanding of potentiality. Therefore, in Metaphysics Θ.7, in terms of a discussion of the language we use in speaking of matter, Aristotle emphasizes that the matter of any hylomorphic compound — including its homogenous parts — cannot exist in virtue of itself:

It seems that what we call is not this else but thaten (e.g. a casket is not wood but wooden, and wood is not earth but rather earthen […] (1049a18-20)\(^1\)

In this passage, wood and earth, respectively, are identified with the matter of casket and the matter of wood.\(^2\) In this case, Aristotle points out that, if one thing is A in actuality, it cannot at the same time be anything else in actuality, even if it is made of something else.\(^3\)

Therefore, if we keep this in mind and go back to our discussion of the homogenous parts of individual substances, we must realize that, even if they have the corporeal elements as their matter, the elements of which they are composed by no means exist in virtue of themselves. As the matter of the homogenous parts, elements exist in potentiality as parts of hylomorphic compounds and have been totally destroyed. It is because these elements have already been destroyed, and, therefore, any part of, say, the wood of a tree, would not exist in virtue of earth or any other element, that the wood cannot be called earth in any sense, it can only be called earthen.

The significance of the distinction between simple bodies and the matter of a substance is often overlooked in the commentaries on De Caelo and De Generatione et Corruotione, but it is recognized by the commentators on Metaphysics Θ. For example, in Makin’s commentary on Metaphysics Θ.7, 1049a18-20, he draws a distinction between the pre-existing matter and the concurrent matter of a substance.\(^4\) According to Makin’s

\(^1\) ἐδικε δὲ δὲ λέγομεν εἶναι οὐ τόδε ἄλλα ἐκείνων – οἷον τὸ κιβώτιον ὃν ἔστασαν ἄλλα ἔστασαν, οὐδὲ τὸ κιβώτιον γῇ ἄλλὰ γῆν.

\(^2\) Cf. Metaphysics Z.7, 1033a6-8, “And as for that out of which as matter they are produced, some things are said, when they have been produced, to be not it but thaten, e.g. the statue is not stone but of stony.” In this passage, Aristotle explicitly connects thaten with the matter of a thing.

\(^3\) For a more careful discussion of this matter, cf. Beere 2006, 309-316.

\(^4\) Makin 2006, 167. See also Beere 2006, 309-316; 2009, 268-273. It should to be noted that I am not using the notion of the pre-existing matter in the exactly same way as Makin. According to his
interpretation, the pre-existing matter is that from which a substance is generated. When the substance is generated, it is then composed of the concurrent matter. In accordance with Aristotle’s examples in 1049a18-20, Makin identifies the corporeal elements, say, earth, with the pre-existing matter of the casket, and wood with the concurrent matter of the casket. But it is a pity that none of the critics has made this point with regard to Aristotle’s discussion in De Caelo and in De Generatione et Corruptione.

So far I have highlighted the absurdity if one takes it that hylomorphic compounds, either individual substances or their homogenous parts, are composed of simple bodies in the same way as Aristotle clarifies in his definition of the corporeal elements. We must admit that, in accordance with Aristotle’s hylomorphism, neither hylomorphic compounds nor their parts are referred to in DC III.3, 302a15-18. Therefore, not all physical things are composed of the corporeal elements in the same way. However, it seems that we have not yet solved the problem of what exactly those things in which the corporeal elements are present in potentiality are. Since even if individual substances, such as this man and this horse, can be easily excluded from these compounded things, it is still difficult to immediately declare that their homogenous parts can be excluded as well. As we have seen, in DC III.3, 302a21-22, Aristotle explicitly appeals to the ‘flesh and wood and all other similar bodies’ as his examples of the compounded bodies in which the corporeal elements are present potentially. If these bodies in his examples are exactly the same things as the homogenous parts of individuals in De generatione animalium 715a9-11, then how should we understand this inconsistency?

6.4 Elements and mixture

In previous section I argued that, according to Aristotle, simple bodies do not constitute all physical things in the same way. If the matter of any hylomorphic compound is enformed by the form of this compound, then we cannot at the same time hold that such a compound is composed of some elements, each of which has its own form and identity.
This contradiction reveals the tension between the traditional theory of the elements and Aristotle’s hylomorphism. In this section, we shall see that, in order to connect these two theories and resolve the contradiction between them, Aristotle draws a clear distinction between a mixture and a hylomorphic compound, and excludes the latter from the compounded bodies that are composed of simple bodies.

In *GC* I.10, Aristotle provides us with his answer to the question of what the compounded thing in which simple bodies are present potentially is. Here we are told clearly that these compounded bodies are mixtures. Having pointed out that the mixed things can exist independently in their own right, he continues:

Since, however, some things are potentially while others are actually, the constituents can be in a sense and yet not be. The compound may be actually other than the constituents from which it has resulted; nevertheless, each of them may still be potentially what it was before they were combined, and both of them may survive undestroyed. (327b22-29)

According to Aristotle’s description of a mixture above, the mixing of elements is totally different from substantial generation. In the mixtures of elements, the mixed elements have not been destroyed in the process of mixing; they still exist potentially in their own right. As we have seen, the way in which simple bodies exist in mixtures is the same as the way in which Aristotle has clarified in *DC* III.3, 302a15-18. Moreover, in the passage quoted above, the mixed simple bodies can be separated out of the mixture and exist as independent bodies again. This exactly echoes *De Caelo* 302a21-22 where Aristotle explicitly points out that the corporeal elements can be separated from ‘flesh and wood and all other similar bodies’. Therefore, the mixture under discussion can be identified with the compounded bodies referred in *De Caelo* III.3.

If the ‘flesh and wood and all other similar bodies’ in *De Caelo* 302a21-22 refer, specifically, to mixtures, then, according to what I have argued about the homogenous parts of living bodies, we have to admit that the ‘flesh and wood and all other similar bodies’ mentioned in this passage cannot be homogenous parts of the organic individuals, even though, as has been shown, flesh and wood and other similar bodies are called homoeomers.

1 Ἐπεὶ δ’ ἐστι τὰ μὲν δυνάμει τὰ δ’ ἐνεργεία τῶν ὄντων, ἐνδέχεται τὰ μιχθέντα εἶναι πως καὶ μή εἶναι, ἐνεργεία μὲν ἐτέρου ὄντος τοῦ γεγονότος ἐξ αὐτῶν, δυνάμει δ’ ἐτι ἑκατέρου ἀπερ ἦσαν πρὶν μιχθήναι, καὶ οὑκ ἀπολολότα τοῦτο γὰρ ὁ λόγος διήρει πρότερον φαίνεται δὲ τὰ μιχθόμενα πρότερόν τε ἕκ κεχωρισμένων συνόντα καὶ δυνάμενα χωρίζεσθαι πάλιν.
in *Meteorology* IV, 388a14-20. In his elaboration of the way in which mixtures come into being, Aristotle tells us in *GC* I.10 that, after a sufficient interaction among simple bodies, the result of mixing is to have a homogenous body, any part of which is the same as the whole, ‘just as any part of water is water.’\(^1\) Thus, uniformity is recognized as a crucial character of a mixture,\(^2\) and both mixtures of elements and the homogenous parts of natural substances are homoeomers. But a significant difference between these two kinds of homoeomers is that, as has been pointed out, the elements presenting within mixtures have not been destroyed, and exist in mixtures in virtue of themselves. In the previous section, we saw that none of the corporal elements exists in its own right in any homogenous part of a natural substance. In natural substances, elements have already been destroyed. They just exist as homogenous parts in potentiality. Therefore, the ‘flesh and wood and all other similar bodies’ mentioned at *De Caelo* 302a21-22 are not homogenous parts of substances, but just mixtures. Even though these mixtures, which are called flesh and wood and any other things are as homogenous as the organic homogenous parts, and they even share the same name, they have to be distinguished into two different things, since they have distinct relations with the corporeal elements. According to Aristotle’s theory of homonymy, the flesh and wood, as mixtures, and those as organic parts of a substance are nothing but homonymies.\(^3\)

On the basis of the distinction between two types of like-parted things, namely, mixtures and the homogenous parts of hylomorphic compounds, and the identification of mixtures with the compounded bodies indicated in the definition of the corporeal element, we have succeeded in avoiding the difficulty that arises from assuming that simple bodies exist potentially in all physical things. But here arises a further question. According to Aristotle’s definition of the corporeal element, it is the most fundamental constituent existing potentially in composed things. If it is only in mixtures in which simple bodies

\(^1\) *GC* I.10, 328a10-11.

\(^2\) According to Wood & Weisberg’s summarize, there are six characters for being a mixture, which are (1) uniformity, (2) recoverability, (3) potentiality, (4) equilibrium, (5) alteration, (6) incompleteness. See Wood & Weisberg 2004, 683.

\(^3\) The distinction between mixtures and the homogenous parts is also recently been recognised by Krizan, see Krizan 2018b, 187-226. But she approaches this conclusion in a different way. According her interpretation, mixture and the homogenous parts cannot be formed in the same way, so they must be two different types of entities.
exist, then how is it that simple bodies can be identified with the corporeal elements of all physical things, rather than just the elements of mixtures?

We shall see in the next section that simple bodies are, indeed, the elements of all physical things, because there is a special relation between mixtures and the homogenous parts of hylomorphic individuals—they are homonymies in a special sense. Owing to this special homonymous relationship, the mixtures that simple bodies compose, and in which they potentially exist, form a cause because of which hylomorphic compounds can be generated. Therefore, even though simple bodies do not exist in hylomorphic compounds, they are still identified with the corporeal elements of all physical things. It is for this reason that they are also called principles in De Generatione et Corruptione.¹

6.5 Mixtures and homoeomers

Aristotle tells us in his Categories that, ‘when things have only a name in common and the definition of being which corresponds to the name is different, they are called homonymous.'² The examples he uses to illustrate this point are a man and a picture. Even though these are two different things with totally different definitions, they share the same name ‘ζῷον' in ancient Greek, and are each a ζῷον homonymously. Through considering the homonymous relation between a man and a picture, we can see that the homonymous relation between a mixture and a homogenous part of a hylomorphic body is even more special.

In Meteorology IV. 12, Aristotle explicitly applies the theory of homonymy to his discussion of the organic bodies and their homogenous parts. He says,

What a thing is is always determined by its function: a thing really is itself when it can perform its function; an eye, for instance, when it can see. When a thing cannot do so it is that thing only in name, like a dead eye or one made of stone, …… The same, then, is true of flesh, except that its function is less clear than that of the tongue. (390a10-15)³

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¹ Cf. GC II.1, 329a5-6: ὅτι μὲν οὖν τὰ πρῶτα ἄρχάς καὶ στοιχεῖα καλῶς ἔχει λέγειν.
² Categories 1α1-α2, Ὅμωνομα λέγεται ὅν ὅνομα μόνον κοινὸν, ὅ δὲ κατὰ τοῦνομα λόγος τῆς οὕσιας ἔτερος.
³ ἀπαντά δ' ἐστὶν ὁρισμένα τῷ ἔργῳ τὸ μὲν γὰρ δυνάμενα ποιεῖν τὸ αὐτῶν ἔργον ἀληθῶς ἐστὶν ἔκαστον, οἷον ὃρθιόν τις ὁ δὲ μὴ δυνάμενον ὁμονύμος, οἷον ὁ τεθνεὼς ἢ ὁ λίθινος …… ἄλλα τὸ ἔργον αὐτής ἢ τῶν δήλων ἢ τῷ τῆς γλώττης.
Similarly, he says in *De generatione animalium* II that,

For there is no such thing as face or flesh without soul in it; it is only homonymously that they will be called face or flesh if the life has gone out of them, just as if they had been made of stone or wood. (734b24-27)\(^1\)

According to these two passages, the definition of any part of an organic body, including both its homogenous parts (e.g., flesh) and its non-homogeneous parts (e.g., eyes and face), is determined by the soul, which is that in virtue of which the body is alive. For our present purposes, I focus on the organic homogenous parts and take flesh as an example.\(^2\) It is conspicuous that organic flesh, or flesh in the strict sense, belongs to an organic whole. Moreover, in accordance with the determination of the soul, flesh is assigned a function and serves for the organic whole. It is by performing this function that flesh in the strict sense exists as what it is. On the other hand, since flesh by nature possesses a certain function, by which it is able to serve as an organic whole, having such function, if it cannot be identified with its definition, must be an important part of its definition. However, once flesh is separated from the soul, it can no longer be determined by the soul, and the description of the “what it is” would no longer involve the determination of the soul. In that case, even if something has the same properties as the organic flesh, it is no longer flesh in the strict sense, but a totally different thing, i.e., a homonymous flesh.

It is generally accepted that the flesh that is independent from the determination of the soul is a mixture, which has been discussed in the previous section.\(^3\) Since it is independent of the determination of a soul, the corporeal elements, which are present in mixtures, can be preserved and exist in their own right. Specifically, while flesh exists as a homogenous part of a living body, the reason why it is called flesh is not only because of its particular properties and functions, but also because it is determined continuously by the soul of the living body. It is because the organic part is brought into a functional whole that the

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\(^1\) οὐ γὰρ ἐστὶ πρόσωπον μὴ ἐχον ψυχήν οὐδὲ σάρξ, ἀλλὰ φθαρέντα ὀμοιώμως λειχηθεῖται τὸ μὲν εἶναι πρόσωπον τὸ δὲ σάρξ, ὅπερ κἂν εἰ ἐγίνετο λίθινα ἢ ξύλινα. It is conspicuous that Aristotle has applies his theory of homonymy to his discussion of homogenous bodies. In *De anima* 412b10-22, *De Partibus Animalium* 640b34-641a34, *Metaphysics* 1035b23-25, and *Politics* 1253a19-25, the theory of homonymy is also referred to in a similar way.

\(^2\) Makin (2006, 139) identifies the organic homogenous parts of a substance as the concurrent matter.

\(^3\) Whiting distinguishes the functional matter from the constitutional matter, and identifies the latter with mixture. But, within the context of her argument, this distinction does not serve the purpose of explaining the relationship between elements and individual substances, but rather supports her view that there is some matter of living beings that exists independently. See Whiting 1992, 81. Cf. Gill 2014, 347.
corporeal elements, which previously constituted the part, can no longer exist in their own right, but must be determined by the soul. Under the determination of the soul, each part of whole is assigned certain function, which serves the whole. With its function, the organic parts can be coordinated with each other. As a result of this determination and coordination, each of the organic parts can preserve its being and actualize its function at any time.

In contrast with the organic homogenous parts, mixtures do not possess a unitary power by which each of them can be determined and sustained. The elements of which mixtures are composed are preserved in mixtures and have not been destroyed. Even if it is possible for a determined mixture, or one that has not yet been determined, to share the same characters with an organic homogenous part, it does not follow that they are the same thing, since the reasons why each of them has their particular characters are different. Any part of an organic homogenous body is consistently determined by the soul. Because of this determination of the soul, it necessarily possesses its properties. In regard to mixtures, even if the possess the same characters as an organic homogenous part, since their constituents exist in their own right, and lack determination of and coordination by the soul, the occurrence of these properties is just by accident, so as to be unstable. For this reason, as soon as a human body loses the determination of the soul, and becomes a corpse, it will immediately turn into an aggregation of mixtures, and will soon break up into the corporeal elements of which the mixtures are composed.\(^1\)

Even though mixtures and the homogenous parts of organic bodies are homonymies, which are substantially different, this type of homonymy is obviously different from the homonymous relationship between a man and his statue. The homonymous relationship between, say, flesh as a mixture and an organic body is much more special. The generation and corruption of the organic flesh is either from or into the flesh as a mixture. On the one hand, the homogenous parts of a natural substance are generated in terms of extending the power of the soul over certain mixtures. Once the mixtures are determined by the soul, the corporeal elements no longer exist in their own right and become homogenous parts of organic wholes.\(^2\) On the other hand, once a living being is dead, its homogenous parts

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2. On the generation of organic homogenous parts from mixtures, see Kit Fine 1996, 93. In the third section of his PhD dissertation, Crowley argues on the basis of *GC* II.1 that mixtures are the matter from which all phycial things, besides the corporeal elements, are generated. See Crowley 2009, 122-176. In Aristotle’s biological studies, in different places, he provides us with his explanations of some
corrupt into inanimate mixtures. Conversely, mixtures are immediately composed of simple bodies; from these mixtures, organic homogenous parts come to be. It is in this sense that, in Meteorology IV. 12 (as well as in De generatione animalium 715a9-11), elements are identified with the matter of organic homoeomers:

The homogeneous bodies are made up of the elements, and all the works of nature in turn of the homogeneous bodies as matter. All the homogeneous bodies consist of the elements described, as matter, but their essence is determined by their definition. (389b26-29)\(^1\)

Therefore, on the basis of the special homonymous relationship between mixtures and the organic homoeomers, the corporeal elements are not only the immediate constituents of mixtures, but are also those from which the homogenous parts of living being are generated. If the homogenous parts, as Makin proposes, can be identified as the concurrent matter of a substance, then the elements, of which a mixture is immediately composed, can be identified as the pre-existing matter from which the concurrent matter comes to be.\(^2\) In the sense of being the material from which organic homoeomers come to be, simple bodies can be identified with the matter of all organic homoeomers, which are the matter of all physical substances.

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\(^1\) ἐκ μὲν γὰρ τῶν στοιχείων τὰ ὁμοομερή, ἐκ δὲ τούτων ὡς ὀλίγης τὰ ὄλα ἔργα τῆς φύσεως. ἦστιν δὲ ἄπαντα ὡς μὲν ἐξ ὀλίγης ἐκ τῶν εἴρημένων, ὡς δὲ κατ’ οὐσίαν τὸ λόγον.

\(^2\) Makin 2006, 139-140.
7. How do simple bodies contribute to Aristotle’s explanation of the changes other than locomotion?

We have finally arrived at the last piece of the jigsaw that is my explanation of the way in which simple bodies, or the corporeal elements of physical things, contribute to Aristotle’s explanation of the changes other than locomotion. In this chapter, I argue that simple bodies contribute to Aristotle’s explanation of changes by forming the matter of physical things. As has been shown in Chapter 6, the matter, or to use Makin’s terminology, the concurrent matter, of physical things is generated from a mixture, in which simple bodies exist in virtue of themselves. Thus, if we can explain in this chapter why it is the case that matter, and matter so understood, is pivotal for Aristotle’s explanation of change, then the role that simple bodies play in Aristotle’s explanation of change will be satisfactorily shown.

The way in which matter contributes to Aristotle’s explanation of change has already been widely discussed in the scholarship. But few of the critics have considered the question of the distinction between a mixture, of which simple bodies exist in virtue of themselves, and the homogenous parts, or the concurrent matter of a substance. As we shall see in this chapter, especially in § 7.3, this distinction between a mixture and the homogenous parts of substance, which has been drawn in Chapter 6, will greatly contribute to my solutions to several of the controversies that have arisen among critics.

My discussion in this chapter is mainly based on my interpretation of *Physics* I and *GC* I. As I shall argue, in the absence of matter, changes are impossible and unintelligible. It seems that Aristotle has already said a lot on the notion of matter in *Physics* I. In his response to the Eleatic challenge to the existence of change, Aristotle identifies matter as the underlying thing of a change, and argues that it is necessary to commit to the existence of matter in any change, otherwise the possibility of change will be radically challenged in the way the Eleatics argue. Since matter has already been carefully discussed in *Physics* I, one may wonder, why Aristotle still thinks it necessary to embark on a further investigation into this notion in *De Generatione et Corruptione*? In other words, why is matter still an

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1 As we shall see in this chapter, the underlying thing, or the substratum, of a change, strictly speaking, is a complex of privation and matter. But since privation is a non-being in virtue of itself, the underlying thing, in virtue of being the complex of privation and matter, can be identified as matter in a loose sense.
issue for Aristotle after the *Physics*?

The answer to this question is that Aristotle’s account of matter in the *Physics* is not adequate as it stands and is in need of supplementation by further investigations. I set out in §§7.1 and 7.2 how the notion of matter is introduced into Aristotle’s natural philosophy in *Physics* I, and contributes to Aristotle’s response to the Eleatic challenge to the possibility of change. At this stage, matter is characterized as a being in one way but a non-being in another way. This characterization of matter, as we shall see in §7.2, serves as Aristotle’s response to the Eleatic challenge to the possibility of change in the *Physics*. At the same time, Aristotle is well aware that this characterization of matter is incomplete, since, as I will show in §7.2.3, it remains unclear what the relationship between the matter and the form of a hylomorphic compound is. For this reason, I argue that Aristotle is compelled to reconsider the notion of matter in the treatises after the *Physics* because what he has achieved in the *Physics* is not sufficient or adequate. This is why Aristotle anticipates an alternative characterization of matter in terms of actuality and potentiality immediately after his characterization in *Physics* I.8.¹ As we shall see in §7.3, this alternative characterization refers to *GC* I.3, where the matter in a generation simpliciter is defined as a substance that is in potentiality but is not yet in actuality. I will show in §7.3.1 that his new definition of matter in *GC* I.3 opens a way in which matter can be directly related to form. As a potential entity, matter can be actualized by receiving a form. In this way, in terms of the notions of actuality and potentiality, the gap between matter and form, which is left hanging in the *Physics*, can, ultimately, be supplemented and bridged in *De Generatione et Corruptione*.

My final explanation of the specific roles that matter plays in Aristotle’s theory of change will be provided in §§7.3.2 and 7.3.3. In §7.3.2, I shall set out the way in which the notion of matter contributes to Aristotle’s explanation of substantial change. In § 7.3.3, I shall explain how this notion serves an important explanatory role in Aristotle’s distinction between the substantial changes, especially generation simpliciter, and the non-substantial changes, e.g., alteration and growth. In this way, matter’s contribution to Aristotle’s explanation of change will be spelled out. Moreover, since the matter of physical things is generated from simple bodies, the significance of simple bodies in Aristotle’s theory of

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change can be adequately grasped.

7.1 The Eleatic challenge and Aristotle’s response

Change was not always an issue in early Greek philosophy. In fact, for a long time it was taken for granted that change unproblematically exists.¹ The possibility of change was denied for the first time by Parmenides and his followers. It was from the Eleatics that the question of whether or not there is change had to be considered. This is the starting point of Aristotle’s theory of change. The Eleatic challenge has been carefully discussed by Aristotle in the first book of his Physics. It is in his response to this challenge that the notion of matter is introduced into his system of natural philosophy for the first time. In order to understand the way in which matter contributes to Aristotle’s theory of change, it is necessary for us to examine his solution to the Eleatic challenge to the possibility of change.

In Physics I.8, Aristotle presents a series of arguments on account of which the possibility of change is radically challenged. He says,

The first of those who studied philosophy were misled in their search for truth and the nature of things by their inexperience, which as it were thrust them into another path. So they say that none of the things that are either comes to be or passes out of existence, because what comes to be must do so either from what is (όντος) or from what is not (μὴ ὄντος), both of which are impossible. For what is cannot come to be (because it is already), and from what is not nothing could have come to be (because something must be underlying). (191a23-31)²

The arguments above are usually attributed to the Eleatics.³ According to Aristotle’s formulation, if one commits to the existence of change, then a dilemma arises: the result of the change must either come to be from ‘what is’ or ‘what is not’. Ross claims that this sentence seems to be read in an alternative way, i.e., ‘either from what is it or from what is

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¹ Cf. Burnet 1930, 12.
² Ὅτι δὲ μοναχάς οὗτο λύεται καὶ ἡ τῶν ἀρχαίων ἀπορία, λέγομεν μετὰ ταύτα, ζητοῦντες γὰρ οἱ κατὰ φιλοσοφίαν πρῶτοι τὴν ἀλήθειαν καὶ τὴν ὀψιν τῶν ὄντων ἐξετάζοντες οἷον ὄδιν τινα ἄλλην ἀποκαθάνεις ὑπὸ ἀπείρας, καὶ φασιν οὔτε γίγνεσθαι τῶν ὄντων οὐδὲν οὔτε φθείρεσθαι διὰ τὸ ἀναγκαίον μὲν εἶναι γίγνεσθαι τὸ γεγονόμενον ἢ ἐξ ὄντος ἢ ἐκ μὴ ὄντος, ἢκ δὲ τούτων ἀμφοτέρων ἀδύνατον εἶναι οὔτε γάρ τὸ ὃν γίγνεσθαι (εἶναι γὰρ ἡδή) ἢκ τε μὴ ὄντος οὐδὲν ἢν γενέσθαι ὑποκείσθαι γάρ τι δέν. ὑποκείσθαι γάρ τι δέν.
not it.¹ In Ross’ view, the ὅντος at 191a29 and the μὴ ὅντος at 191a30 do not refer to ‘what exists’ and ‘what does not exist’, but some individual beings, such as ‘what is-F’ and ‘what is not-F’. This reading, however, is unconvincing. As Henry points out, it is reasonable to suppose that Aristotle in this passage understand the original Eleatic puzzle in the same terms.² The Eleatics, however, cannot mean any individual thing by the ὅντος, because, in their view, there is no individual thing that exists independently from the One. In a fragment of Parmenides, he tells us that ‘[…] nor is it [sc. the One] divisible, since it is all alike.’³ If any part of the One cannot be distinguished from another part, then it would be unreasonable to call one part of it F while the other not F, and identify them as two distinct individuals. Therefore, the ὅντος and the μὴ ὅντος in the quoted passage refer respectively to ‘what exists’ and ‘what does not exist’ in a general sense.

Henry refers to this interpretation of the Eleatic challenge as ‘the orthodox view’.⁴ According to this reading, change is impossible for the Eleatics because it is either from ‘what is’ or from ‘what is not’. Since what comes to be at the end of a change must be ‘what is’, it can neither come to be from ‘what is’, nor from ‘what is not’. This is because, on the one hand, ‘what is not’ does not exist. Since nothing can be generated ex nihilo, ‘what is’ cannot come to be from ‘what is not’; on the other hand, it cannot come to be from ‘what is’ either, since if this were the case, then ‘what is’ would have already existed before it is generated, but this is impossible. Therefore, if what is exists, it cannot be involved in any change. It is remarkable that, according to the Eleatics, there is nothing besides ‘what is’, so that there cannot be anything to which a change may belong. In this way, the Eleatics deny that there is any change.

The difficulty that Parmenides has left for his successors is that, if one commits to the existence of change, then one must account for what the terminus a quo from which a change starts is, since it seems that there is nothing left besides ‘what is’ and ‘what is not’. The strategy that Aristotle adopts in his responding to the Eleatic challenge is to argue that, on the one hand, even if a change takes place from ‘what is not’, it is not from a ‘what is not’ in an unqualified sense, rather, it is from a ‘what is not’ accidentally. On the other hand, the thing from which a change starts is something that is, but it is not exactly the same thing

¹ See Ross 1936, 494.
³ Translated by Burnet 1930, 175.
as the generated object. It lacks the form of the generated thing. This is what I am going to examine in this section. As we shall see, it is in his response to the Eleatic challenge to change that the significance of matter is highlighted.

7.2 Aristotle’s first characterization of matter

It is generally accepted that the notion of matter is introduced in Aristotle’s system in the first book of the *Physics*, especially in *Physics* I.7.1 As we shall see in this section, this notion is put forward for the sake of a general account of the possibility of change in this chapter (sc., *Physics* I.7). In order to sketch the significance of the notion of matter in Aristotle’s theory of change, it is necessary for us to consider the way in which this notion contributes to Aristotle’s solution to the Eleatic challenge. This solution, as we shall see in §7.2.3, is not final. It has to be supplemented by Aristotle’s account in *GC* I. As we shall see in section §7.3, it is in the first book of *De Generatione et Corruptione* that Aristotle’s final account of the role of matter in his explanation of change is ultimately put forward. But what we are going to do in this section is still necessary, since only if Aristotle’s general account of the role that matter plays in his defence of change in *Physics* I is elaborated, can we spell out the relationship between his characterizations of matter in *Physics* I and in *GC* I (§7.3.1), and in §§7.3.2-7.3.3 move on to his final characterization of matter and his explanation of change in terms of the second characterization of matter, that is, the one we have been preparing for and which goes beyond the *Physics*.

7.2.1 The way in which matter is introduced in *Physics* I

In order to make it clear that the starting point of change is not absolutely nothing, Aristotle conducts an inquiry into the general structure of change. According to this structure, he argues that changes take place from something that *is*, rather than from something that *is not*, as the Eleatics claims. Aristotle’s own view of the structure of change

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1 Cf. Charlton 1970, 70. Here he says that ‘this chapter [sc. *Physics* I.7] […] is generally agreed to constitute his formal introduction of the notions […] of matter and form’. There are scholars who maintain that Aristotle has already come up with a theory of matter even at the beginning of his philosophical career, e.g. Happ 1971, 270. Graham (1984, 37-51), however, has argued against this view.
is put forward in Physics I.7. In his view, the starting point of a change is neither absolutely nothing, nor that which is going to come to be. At the beginning of this chapter (i.e., Physics I.7), Aristotle makes it clear that his discussion concerns the coming-to-be in general, rather than any specific type of change. As a conclusion of his discussion in Physics I.7, all changes possess three factors. They are, as Aristotle himself says, the countable matter, the privation and the form. This conclusion is achieved through an analysis of our daily language. Our task in this section is to explain the way in which the notion of matter is introduced into Aristotle’s explanation of change. It is true that this has been widely addressed in the scholarship, but it is necessary for me to sketch it here. This is in preparation for arguing that Aristotle’s characterization of matter in the Physics is inadequate as it stands and needs supplementing by his alternative characterization of matter in De Generatione et Corruptione.

First, he notes that all our talk of coming-to-be in our daily life can be distinguished into two types, one is about simple things, while the other is about complex things,

We say that ‘one thing comes to be from another thing, and something from something different, in the case both of simple and of complex things. I mean the following. We can say the man becomes musical, or what is not-musical becomes musical, or the not-musical man becomes a musical man. So then I call that which becomes—man and not-musical—simple, and the thing which it becomes—musical—simple also. But when we say the not-musical man becomes a musical man, both that which becomes and that which it becomes are complex. (189b32-a5)

On the basis of the distinction between the coming-to-be of simple things and the coming-to-be of complex things, Aristotle puts forward an analysis of the elements involved in all possible locutions. In regard to coming-to-be, there are three types of statements: (1) the man becomes musical, (2) what is not-musical becomes musical, and (3) the not-musical man becomes a musical man. Man, not-musical, and musical in (1) and (2) are the three simple items, while both the not-musical man and the musical man in (3) are complex. Of

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3. φαμέν γὰρ γίγνεσθαι ἐξ ἄλλου ἄλλο καὶ ἐξ ἑτέρου ἑτέρου ἢ τὰ ἀπλὰ λέγοντες ἢ τὰ συγκείμενα, λέγω δὲ τοῦτο ὡδέ. Ἐστι γὰρ γίγνεσθαι ἀνθρωπον μουσικον, ἔστι δὲ τὸ μὴ μουσικὸν γίγνεσθαι μουσικον ἢ τὸν μὴ μουσικὸν ἀνθρωπον ἀνθρωπον μουσικον, ἄπλον μὲν οὖν λέγω τὸ γεγονόμενον τὸν ἀνθρωπον καὶ τὸ μὴ μουσικὸν, καὶ δὲ γίγνεται ἄπλον, τὸ μουσικόν· συγκείμενον δὲ καὶ δὲ γίγνεται καὶ τὸ γεγονόμενον, ὅταν τὸν μὴ μουσικὸν ἀνθρωπον φόμεν γίγνεσθαι μουσικὸν ἀνθρωπον.
4. Gill explains that the ‘simple’ items refers to those which are each involved only in a single category (e.g. man [substance], unmusical [quality]) while ‘complex’ items are those which are each involved in more than one category (Gill 1989, 99). In Morison’s commentary on this passage, these three items are called ‘Simple Gignomenon which Remains (or SGR)’, ‘Simple Gignomenon which does not
all these items, the man, not-musical, and the not-musical man are the items which do the coming to be. It is obvious that the musical and the what is not-musical constitute a pair of contraries. This pair of contraries, according to Aristotle’s terminology, is called the form and its privation. These two factors can even be adapted into the Eleatic challenge to change, since musical can be included in the group of what is, and what is not-musical in the group of what is not. It has been shown that, just on the basis of these two factors, the occurrence of change cannot be explained.

Comparing Aristotle’s system to the Eleatic theory of change, what is new in the former is the third factor. In addition to form and privation, there is a third simple factor in (1) and (3), viz. the man, which is obviously distinct from both the form and the privation. It is the substratum that acts as a terminus a quo of a change and persists throughout the change. On the one hand, unlike musical, which is the terminus of a change, the man, as has been shown in (1), is that from which a coming-to-be proceeds. On the other hand, even though unmusical is also the terminus a quo of a change, it cannot persist though the change. The persistence of the man can be seen clearly in (3). In regard to the character of this third factor, Aristotle argues as follows:

When a simple thing is said to become something, in one case it survives through the process, in the other it does not. For the man remains a man and is such even when he becomes musical, whereas what is not musical or is unmusical does not survive, either simply or combined with the subject. (190a9-190a12)

In this way, Aristotle distinguishes a third simple factor from which a change starts. Even though both the man and that which is not musical are the items from which a change proceeds, they are totally different from each other. That which differentiates them, viz., one persists through a change, while the other does not, indicates that they are two distinct factors in Aristotle’s description of change. In the passages quoted above (sc. 190a9-190a12), we are not explicitly informed of the exact name of this third factor, but on account of Aristotle’s conclusive description of the three principles later in 190b24-b28, the substratum, say, the man from which the musical thing comes to be in (1), exemplifies matter.
Matter is of great significance in Aristotle’s explanation of change. Even though it has been shown in this section that matter is an important factor in our descriptions of change, it is not yet clear what role matter plays in all possible changes. More specifically, with respect to all simple changes, it is not clear why some are described as starting from privation, while the others are described as starting from matter. What, we may wonder, is the starting point of a change?

7.2.2 Matter exists in all changes

The fact that there is matter in any change is observed by Aristotle when he acknowledges that any change involves a substratum. Substratum, as Aristotle articulates, is a complex of those two simple factors that have been distinguished through an analysis of locutions in 189b32-a5, viz., the privation and the matter. Since the substratum, which necessarily underlies in any change, is a complex of privation and matter, no changes can take place without matter. (Whether matter not only exists, but also persists throughout the changes, is a question I shall take up in § 7.3.3.)

In Physics I.7, immediately after he commits to the existence of matter, Aristotle associates this notion with the notion of a substratum. He argues as follows:

These distinctions drawn, one can gather from surveying the various cases of becoming in the way we are describing that there must always be an underlying something, namely that which becomes, and that this, though always one numerically, in form at least is not one. (By ‘in form’ I mean the same as ‘in account’.) For to be a man is not the same as to be unmusical. One part survives, the other does not: what is not an opposite survives (for the man survives), but not -musical or unmusical does not survive, nor does the compound of the two, namely the unmusical man. (190a13-190a21)

The first sentence of this passage makes it clear that the underlying thing, or the substratum of a change, is precisely that which comes to be. Then, Aristotle indicates that this underlying thing is one in number but two in form. In other words, it is a complex thing that becomes. This refers back to ‘the not-musical man’ in the case (3), i.e., that the not-

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1 άρωςιμένον δέ τούτων, εξ ἀπάντων τῶν γιανιμένων τούτο ἐστι λαβείν, ὅπως ἡ ἐπιβλέψη ὠφερ λέγομεν, ὅτι δέ τι ἂν ὑποκείσηθαι τὸ γιανιμένον, καὶ τούτῳ εἰ καὶ ἄριθμῳ ἐστιν ἢν, ἄλλ᾽ εἴδει γε οὐχ ἢν τῷ γὰρ εἶδει λέγει καὶ λόγῳ ταὐτόν· οὐ γὰρ ταὐτὸν τὸ ἀνθρώπον καὶ τὸ ἀμῦσιον εἶναι, καὶ τὸ μὲν ὑπομένει, τὸ δ᾽ οὐχ ὑπομένει· τὸ μὲν μὴ ἀντικείμενον ὑπομένει (ὁ γὰρ ἀνθρώπος ὑπομένει), τὸ μὴ μουσικόν δὲ καὶ τὸ ἀμῦσιον οὐχ ὑπομένει, οὐδὲ τὸ εξ ἁμοιον συγκείμενον, οἰον ὁ ἀμῦσιος ἀνθρώπος.

musical man becomes a musical man. Therefore, the underlying thing of a change is a complex of privation and matter.¹

After identifying the substratum as a complex of matter and privation, Aristotle continues to argue that a substratum is a factor in all types of change. First, he distinguishes all possible changes, according to our way of describing them, into two types, substantial change and non-substantial change.² This distinction is also derived from an analysis of our locutions of change. As Aristotle says, substantial change and non-substantial change differ from each other in their descriptions. A non-substantial change is described as ‘come to be so-and-so’; on the other hand, only substantial changes can be said to come to be without qualification. Then, on the basis of this distinction, Aristotle considers these two types of change. He concludes that both types of change have presupposed the existence of a substratum.

Now in all cases other than substance it is plain that there must be something underlying, namely, that which becomes. For when a thing comes to be of such a quantity or quality or in such a relation, time, or place, a subject is always presupposed, since substance alone is not predicated of another subject, but everything else of substance. But that substances too, and anything that can be said to be without qualification, come to be from some underlying thing, will appear on examination. For we find in every case something that underlies from which proceeds that which comes to be; for instance, animals and plants from seed. (190a34-190b)³

The underlying thing, at this stage, just refers to the complex of privation and matter: that (a) from which a change proceeds and (b) which persists throughout the change. This has already been made clear at 190a13-190a21. As we shall see in §7.3.3, the substratum of a substantial change, to some extent, can be identified with matter, but on the other hand, strictly speaking, what persists through a non-substantial change is a hylomorphic compound, which can be analyzed into its matter and its form. But this distinction has not been drawn in Physics I, since, as he points out at the outset of I.7, Aristotle is occupied in

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¹ Kelsey provides an alternative reading of this passage (2008, 192). This interpretation, however, is unconvincing to me, and has been criticized in Morison 2019, 243.
² Physics I.7, 190a31-190a33: πολλαρχὸς δὲ λεγομένου τοῦ γίγνεσθαι, καὶ τῶν μὲν οὐ γίγνεσθαι ἄλλα τόδε τι γίγνεσθαι, ἀπλῶς δὲ γίγνεσθαι τὸν οὐσίαν μόνον.
³ κατὰ μὲν τάλλα φανερὸν ὅτι ἀνάγκη ὑποκείθαι τί τὸ γιγνόμενον (καὶ γάρ ποιόν καὶ ποῖον καὶ πρός ἕτερον [καὶ ποτὲ] καὶ ποὺ γίνεται ὑποκειμένου τινός διὰ τὸ μόνιμον τὴν οὐσίαν μηθενός κατ’ ἄλλου λέγεσθαι ὑποκειμένου, τὰ δ’ ἄλλα πάντα κατὰ τῆς οὐσίας· ὅτι δὲ καὶ αἱ οὐσίαι καὶ ὀσία [ἄλλα] ἀπλῶς ὅταν ἐξ ὑποκειμένου τινός γίγνεται, ἐπισκοπούντων γένοιτο ἃν φανερόν. ἀλλ’ γάρ ἐστι ὁ ὑπόκειται, ἐξ οὗ τὸ γιγνόμενον, οὗν τὰ φυτὰ καὶ τὰ ζῷα ἐκ σπέρματος. Morison holds that Aristotle’s arguments in this passage is fundamentally derived from the Categories. In regard to Aristotle’s transition from predicative discussion to his analysis of actual change, see Morison 2019, 252.
this chapter with the general characteristics of change. As we shall see in §7.3.3, this distinction is going to be emphasized in GC I. After all these analyses, Aristotle concludes that ‘it is plain that these are all cases of coming to be from some underlying thing.’ It is controversial whether or not the substratum in a substantial change is as persistent as that in a non-substantial change. But it is not necessary for me to step into the controversy on the persistence of the substratum here. It is enough for me to recognize that Aristotle explicitly admits that any change, no matter if it is a substantial change or a non-substantial change, has a substratum, which is a compound of matter and privation. This observation highlights the role that matter plays in Aristotle’s reconstruction of the structure of change.

Moreover, as I have mentioned in §6.1, the substratum is identified as matter in GC I.3, 319a19, among other passages. This is also what Aristotle indicates in Physics I.7, 190b13, i.e., that the substratum is matter. On the apparent inconsistency between Aristotle’s two claims, Morison explains that, since Aristotle identifies the privation as a non-being per se (which has been explicitly pointed out in Physics I.9, 192a3-6), ‘Aristotle here chooses to refer to the complex of matter plus something which is a per se non-being as, simply, the matter.’ For this reason, we can safely draw the conclusion that the substratum, or simply the matter, is that from which a change proceeds. As we shall see in next section, it is precisely by appealing to the notion of matter that Aristotle puts forward his first response to the Eleatic challenge to change.

This characterization of matter, however, is not enough. As I shall argue in the next section, it cannot explain why it is the case that matter can be determined by a form and, in this way, come to be a new substance. For this reason, as we shall see in §7.3, Aristotle’s investigation of matter in Physics I has to be complemented by his characterization of matter in GC I. Before I move on to De Generatione et Corruptione, I would like to summarize the way in which the notion of matter contributes to Aristotle’s defence of the possibility of change in Physics I, and why this defence is not sufficient.

7.2.3 Aristotle’s first response and its limitations

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1 *Physics* I.7, 190b10: ὥστε δὴ λόγον ἐκ τῶν εἰρημένων ὅτι τὸ γεγονόμενον ἀπαν ἂν ἀδίστοις ἐστι.

2 See Morison 2019, 259-261.
As I have shown in §7.1.1, the Eleatics left to their successors a radical challenge to the possibility of change. In their view, if one commits to the existence of change, then the *terminus a quo* of a change would be either ‘what is’ or ‘what is not’, but neither option is impossible. Therefore, as they have argued, change is impossible. Now Aristotle has made all necessary preparations to respond this challenge, and save change and the science of change from the Eleatic challenge.

Aristotle has made it clear that, as we have seen in the previous sections, the *terminus a quo* of a change is the substratum, a complex of privation and matter. Privation is a ‘what is not’, but on the other hand, matter is a ‘what is’. This is even clearer in *Physics* I.9, 192a3-6, where Aristotle explicitly concludes that matter is a ‘what is not’ *per accidens*, whereas privation is a ‘what is not’ *per se*. Since a change proceeds from both the matter and the privation, it is not correct to claim that it is either from a ‘what is not’ absolutely, or from a ‘what is’ absolutely. In fact, it is in different senses that a change is from a ‘what is not’ and a ‘what is’. In other words, as Aristotle argues, a change in one sense proceeds from a ‘what is not’, but in another sense does not. He says:

> We ourselves are in agreement with them in holding that nothing can be said without qualification to come from what is not. But nevertheless we maintain that a thing may come to be from what is not in a qualified sense, i.e. accidentally. For a thing comes to be from the privation, which in its own nature is something which is not—this not surviving as a constituent of the result. Yet this causes surprise, and it is thought impossible that something should come to be in the way described from what is not. (191b13-191b17)

In this passage, Aristotle provides us with his first respond to the Eleatic puzzle. Here he appeals to his distinction between the two senses of ‘what is not’, namely, the ‘what is not’ without qualification and ‘what is not’ in a qualified sense, i.e. *per accidens*. The example that has been used for illustrating this distinction is a doctor building a house. As Aristotle explains, it is possible for a doctor to build a house, but when he is building the house, he is not building the house as a doctor, but as a housebuilder. In other words, the doctor does not build a house in virtue of being himself, but *per accidens*. Similarly, a thing can be a ‘what is not’ *per accidens*, rather than a ‘what is not’ without qualification. This distinction

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1. ἡμεῖς δὲ καὶ αὐτοὶ φαμεν γίγνεσθαι μὲν μηθὲν ἀπλῶς ἐκ μὴ ὄντος, πῶς μέντοι γίγνεσθαι ἐκ μὴ ὄντος, οἶνον κατὰ συμβεβηκός (ἐκ ἀρ τῆς στερήσεως, δέ ἐστι καθ’ αὐτό μὴ ὅν, οὐκ ἐνυπάρχοντος γίγνεται τι θωμᾶζεται δέ τοῦτο καὶ ἀδύνατον οὗτο ὁδῷ γίγνεσθαι τι, ἐκ μὴ ὄντος).
2. His second response is provided in GC I.3, which will be considered in §7.2.1.
between being \textit{per accident} and being without qualification lays a firm foundation of Aristotle’s solution of the Eleatic puzzle, since it is possible for a thing to come to be from ‘what is not’, although it does not come to be from ‘what is not’ without qualification. For example, when a musical man comes to be from a not-musical man, he does not come to be musical in virtue of being not-musical, but we can say that a not-musical man comes to be musical as a man. Therefore, it is \textit{per accident}, rather than without qualification, that a \textit{terminus}, say, a musical man, comes to be from privation, i.e., from not-musical; on the other hand, it is in virtue of himself that the musical man becomes musical from the matter, i.e., the man.

Privation, as has been shown, is a kind of ‘what is not’. When a thing, say, a musical man, comes to be from its privation, i.e., being unmusical, it comes to be from a ‘what is not’. But it does not follow that, as the Eleatics have challenged, a coming-to-be can proceed \textit{ex nihilo}. On the basis of the distinction between being \textit{per accident} and being \textit{per se}, Aristotle explains that it is true indeed that, in one sense, a coming-to-be is from a ‘what is not’, but in another sense, it is not. It is in the sense of \textit{per accident} that a coming-to-be is from a ‘what is not’, but in the sense that a coming-to-be is not from a ‘what is not’ without qualification, it is not. In this way, Aristotle opens a third possibility in addition to coming to be from ‘what is’ and from ‘what is not’, and solves the Eleatic dilemma which has radically challenged the possibility of change. The significance of matter can be clearly seen in Aristotle’s solution to the Eleatic dilemma. Without the notion of matter, the sense in which a thing does not come to be from a ‘what is not’ it cannot be explained. For this reason, we can conclude that matter plays a significant role in Aristotle’s theory of change. It is in terms of the notion of matter that the possibility of change is explained.

However, this characterization of matter in \textit{Physics} I is not enough. It remains unclear what the relationship between matter and form is, and why matter can be determined by a form. Let me make this point clearer through Aristotle’s example of a statue that comes to be from a bulk of bronze.

According to the Eleatic challenge, the generation of a statue from a bulk of bronze is impossible, since bronze is not a statue, and the statue, as a ‘what-is’, cannot come to be from a ‘not-statue’, or a ‘what-is-not’. As has been shown in the previous discussion, in Aristotle’s defence of the possibility of change, he argues in \textit{Physics} I.8 that the matter,
from which a change proceeds, is a ‘what is not’ *per accidens*, rather than a ‘what is not’ *per se*. In the case of the generation of a statue, the ‘not-statue’ *per accidens*, which is the matter of the statue, is still something, rather than nothing at all. Therefore, it is not the case that the statue comes to be from a ‘what is not’ without qualification, since *per accidens* is a qualification. But even if it has been pointed out that the bronze is a ‘not-statue’ *per accidens*, it remains unclear what exactly it is *per se*. It is conspicuously not a statue in actuality, since a statue cannot be generated from a statue in actuality. Neither can it be only some bronze *per se*, since bronze and a statue are two totally different things. It is impossible that a statue can be generated from just any odd thing that is not a statue. For example, a statue cannot come to be from a parrot. The bronze that is a ‘not-statue’ *per accidens* cannot be just a bronze *per se*, it must be something relevant to the statue, otherwise it cannot be explained why a statue can be a ‘not-statue’ *per accidens*, but a parrot cannot. For this reason, matter is neither the generated substance in actuality, nor something that is totally irrelevant to the form of the generated substance. The relationship between matter and form remains quite obscure in *Physics* I. Due to this obscurity, Aristotle thinks it necessary to embark on a further investigation into the notion of matter, and to clarify the relationship between matter and form. As we shall see in §7.3, this will be articulated in *GC* I.

7.3 Aristotle’s second characterization of matter

It has been shown in §§7.1 and 7.2 that, according to *Physics* I, it is the notion of matter that makes the occurrence of change possible. This conclusion is derived from the fact that every change proceeds from an underlying thing, or a substratum, which is a complex of the privation and the matter. As I have explained through §7.2.2, because the privation is a ‘what is not’ *per se*, the substratum, loosely speaking, can be identified with the matter. Since the substratum, or the matter, from which a change proceeds is a ‘what is’ *per se*, but a ‘what is not’ *per accidens*, Aristotle finds a way of responding to the Eleatic challenge and showing how change is possible. This is the way in which the matter is initially characterized and contributes to Aristotle’s theory of change in general.

However, as I have argued in §7.2.3, Aristotle’s characterization of matter and his explanation of the possibility of change in the *Physics* is much too general and introductory,
and indeed problematic and inadequate as it stands. It requires some further investigations into matter and change to supplement it. According to my interpretation, it is in *De Generatione et Corruptione* that Aristotle characterizes the notion of matter in an improved way, and indicates the specific roles that matter plays in Aristotle’s explanation of change, i.e., the substantial change and the non-substantial change. In this section, I am going to bring in my distinction of the mixture of simple bodies and the homogenous parts of physical substances from Chapter 6. This distinction, as I will show in this section, will provide a new perspective on several extended controversies in the scholarship. It will significantly contribute to my interpretation of role that simple bodies play in Aristotle’s explanation of substantial change and my interpretation of Aristotle’s distinction between substantial change and non-substantial change.

First, in §7.3.1, I shall set out the real difference between Aristotle’s characterizations of matter in *Physics* I and in *GC* I. I shall argue, against Henry, that Aristotle has defended the view in both *Physics* I and *GC* I that the substratum, or the matter, of a change is not a not-being simpliciter. The difference between Aristotle’s characterizations in *Physics* I and *GC* I is, rather, that, in *Physics* I, Aristotle holds that the matter from which a change proceeds is a ‘what is not’ *per accidens*, but a ‘what is’ *per se*; but in *GC* I.3, according to Aristotle, that from which a substance comes to be is a ‘what is not’ in actuality, and a ‘what is’ potentially. It is in this way, according to my interpretation, that Aristotle sets out the relationship between form and matter and the way in which his account in *GC* I supplements that in *Physics* I.

In §7.3.2, I spell out the way in which Aristotle’s characterization of matter in *GC* I.3 supplements his characterization in *Physics* I by clarifying the relationship between matter and form. In this section, on the basis of my distinction between the mixture of simple bodies and the homogenous parts of physical substances, I argue that, because matter can be determined by the form of a substance, it is identified by Aristotle as a substance in potentiality. It is in this way that the notion of matter serves as an important explanatory factor in Aristotle’s account of the generation simpliciter.

Moreover, in §7.3.3, I shall focus on the role that matter plays in Aristotle’s distinction between the substantial changes and the non-substantial changes. I argue, on the basis of my interpretation of *GC* I.4 and I.5, that what makes a non-substantial change distinct from
a substantial change is the persistence of matter. More specifically, the matter persists through a non-substantial change, but it does not persist through a substantial change. In order to establish this point, I revisit Aristotle’s analysis of change in Physics I.7, where Aristotle seems to imply that the matter in substantial changes persists as well. In order to solve this apparent inconsistency between Physics I.7 and GC I, in §7.3.3, I bring in my distinction between the mixture of simple bodies and the homogenous parts of physical substances, and spell out, on the basis of this distinction, why Aristotle implies that matter persists through all changes in Physics I.7, but expressly denies this in GC I.4 and I.5.

7.3.1 The distinction between Physics I.8 and GC I.3

In GC I.3, Aristotle is occupied with the role that matter plays in his explanation of substantial change, especially generation simpliciter. It is remarkable that, in contradistinction to Aristotle’s first response to the Eleatic challenge in Physics I.8, which is achieved through an analysis of the notion of change in general, in this chapter (i.e., GC I.3), Aristotle provides an alternative solution. In this chapter, the substratum, or the matter, from which a change proceeds is characterized as the generated substance in potentiality, but a not-being in actuality, rather than, as it is characterized in Physics I.8, as a ‘what is not’ per accidens.

Some commentators have noticed this difference between Aristotle’s solutions in Physics I.8 and in GC I.3.¹ In a recent book Henry addresses this distinction carefully and puts forward a novel way of making Aristotle’s arguments in these two chapters compatible. According to his interpretation, however, in GC I.3 Aristotle affirms that generation simpliciter proceeds from a simpliciter not-being.² On the basis of this interpretation, Henry argues that Aristotle’s solution in GC I.3 represents a further development of that in Physics I.8.³ This is the view I argue against in this section. I agree with Henry that GC I.3 represents a further development to Physics I.8, but I argue that in both chapters, Aristotle has defended the view that the substratum, or the matter, of a change, irrespective of whether it is a change in general or a generation simpliciter, is not

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¹ Williams 83-85; Algra 2004, 110-116. As Henry complains, the distinction between these two chapters was not taken seriously by modern commentators (2019, 35).
² Henry 2019, 28-32.
³ Ibid, 35-38.
by a simpliciter not-being. According to my interpretation, Aristotle characterizes the notion of matter in both chapters, viz., in *Physics* I.8 and in *GC* I.3, as that which, in one sense, is a ‘what is’, but in another sense, it is a ‘what is not’. The difference between his characterizations in these two chapters is, rather, that, in *Physics* I.8, Aristotle holds that the matter from which a change proceeds is a ‘what is not’ *per accidens*; but in *GC* I.3, for Aristotle, that from which a substance comes to be is a ‘what is not’ in actuality, and a ‘what is’ in potentiality.

My refutation of Henry’s view is necessary; for only if the real difference between Aristotle’s arguments in *Physics* I and in *GC* I.3 is understood, can we move on to a clarification of Aristotle’s second characterization of the notion of matter, and explain in what way this new characterization of matter overcomes the limitation of his first characterization of matter in *Physics* I and contributes to Aristotle’s final explanation of substantial change, especially generation simpliciter.

Henry’s view that Aristotle holds in *GC* I.3 that generation simpliciter comes from not-being simpliciter, is derived from his interpretation of *GC* I.3, 317b1-b5, where Aristotle says:

> For if there is to be generation simpliciter, something must come-to-be out of not-being without qualification, so that it would be true to say that not-being is an attribute of some things. For qualified coming-to-be is a process out of qualified not-being (e.g. out of not-white or not-beautiful), but coming-to-be simpliciter is a process out of not-being simpliciter. (317b1-b5)

In this passage, Aristotle distinguishes generation simpliciter from qualified generation, and considers whether there is generation simpliciter. It seems that, for Aristotle, because qualified coming-to-be is from qualified not-being, e.g., the coming-to-be of beautiful is from not-beautiful, if generation simpliciter exists, it must be out of some not-being simpliciter by analogy. This is why Henry holds that Aristotle’s position in *GC* I.3 has changed from his position in *Physics* I.8, where he has denied that change comes from a not-being simpliciter.

But according to my interpretation of this passage, Aristotle is not providing us in this

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1 Ἐι γὰρ ἁπλὸς ἐστι γένεσις, ἁπλός ἂν τι γίνοιτο ἐκ μὴ ὅντος, ὥστε ἁληθὴς ἂν εἶ ὁ λέγειν ὅτι ὑπάρχῃ τοῦ μὴ ὑπὲρ τις μὲν γὰρ γένεσις ἐκ μὴ ὅντος τινός, ὁδὸν ἐκ μὴ λευκοῦ ἢ μὴ καλοῦ, ἤ δὲ ἁπλῆ ἢς ἁπλός μὴ ὅντος.
passage with his ultimate answer to the question of whether or not there is generation simpliciter. It seems to me that Aristotle argues in *GC* I.3 that, even if there is generation simpliciter, it cannot proceed from a not-being simpliciter. This is why, immediately after the passage 317b1-b5, which has been quoted above, Aristotle articulates that generation cannot be from a not-being simpliciter at 317b5-13. First, in order to explain what a ‘not-being simpliciter’ is, Aristotle spells out the meaning of the simpliciter being. In his view, simpliciter means either ‘the primary within each category, or the universal, i.e. the all-comprehensive.’

Thus, simpliciter being refers either to substance or being as a whole. Correspondingly, ‘not-being simpliciter’ refers either to what is not a substance or to absolute non-existence. But neither of these two meanings would be applicable to generation simpliciter, if it were from a ‘not-being simpliciter’. On the one hand, if generation simpliciter proceeds from what is not a substance, it would indicate that a substance is generated from a non-substantial being. This, however, is impossible, since if it were the case, then the non-substantial being would be the underlying thing of the generation and exist before the substance is generated; but non-substantial categories cannot, of course, exist independent of a substance. ‘Not-being simpliciter’ does not denote absolute non-existence either, since if this were the case, then generation simpliciter would be *ex nihilo*, which has already been proved to be impossible by the Eleatics. For this reason, it is safe to draw the conclusion that, even if there is generation simpliciter, that from which it proceeds, i.e., its matter, cannot be a not-being simpliciter.

This observation compels Aristotle to draw the conclusion that is perfectly compatible with that which has been drawn in *Physics* I.8. Specifically, generation simpliciter, as a kind of change, cannot proceed from an absolute ‘what is not’. The matter from which a change proceeds must be, in one sense, a being, but, in another sense, a not-being. The different between *GC* I.3 and *Physics* I.8 in expression and philosophy is, rather, that the characterization of the underlying thing in *GC* I.3 appeals to Aristotle’s distinction between potentiality and actuality, rather than his distinction between *per accidens* and *per se*. He says:

In one sense it is from what is not that a thing comes to be simpliciter; yet in another sense it is always from what is; for there must pre-exist something which potentially is,

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1 *GC* I.3, 317b5-7: Τὸ δ’ ἄπλος ἢτοι τὸ πρῶτον σημαίνει καθ’ ἐκάστην κατηγορίαν τοῦ ὄντος, ἢ τὸ καθόλου καὶ τὸ πάντα περιέχον.

2 This reading is also adopted by Henry. See Henry 2019, 30. Cf. Joachim 1926, 90.
but actually is not; and this something is spoken of both as being and as not-being.

(317b15-18)

In opposition to Henry’s interpretation, Aristotle is explicit in this passage that the matter, or the pre-existing thing, of generation simpliciter, just as any other change, is not a ‘not-being simpliciter’. It is both a ‘what is’ and a ‘what is not’. More specifically, it is a substance in potentiality, on the other hand, it is not a substance that is going to be generated in actuality.

People may argue that, because (1) generation simpliciter does not proceed from a substance in actuality, and (2) substance can be identified as a simpliciter being, it seems reasonable to claim that generation simpliciter proceeds from a not-substance, viz., a not-being simpliciter, in actuality. But this is incorrect. This fallacy rests on the confusion between ‘a simpliciter not-being’ and ‘not a simpliciter being’. A simpliciter not-being refers to a not-being without qualification. It is an absolute non-existence. But the notion of ‘not a simpliciter being’ implies that it is, to some extent, not a substance. The correct inference to draw from premises (1) and (2) is that, in actuality, that from which a generation simpliciter proceeds is not a simpliciter not-being (a substance), rather than a simpliciter not-being.

7.3.2 Matter and generation simpliciter

Having shown that the real difference between Aristotle’s two characterizations of the notion of matter in Physics I and in GC I.3, I am now in a position to explain how exactly Aristotle’s new characterization in GC I.3 supplements his characterization of matter in Physics I, and contributes to his explanation of substantial change, especially generation simpliciter. In this section, I argue that, in GC I.3, the notion of matter is characterized as the generated substance in potentiality. As I shall spell out in this section, this new characterization of matter in GC I.3 opens a new perspective on our understanding of the relationship between the matter, from which generation simpliciter proceeds, and the form, with which generation simpliciter ends up. In my interpretation of Aristotle’s characterization of matter in GC I.3, I am going to bring in my distinction between the

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1 ὅτι τρόπον μὲν τινα ἐκ μὴ ὄντος ἄπλος γίνεται, τρόπον δὲ ἄλλον ἐξ ὄντος ἄει· τὸ γὰρ δυνάμει ὃν ἐντελεχεία δὲ μὴ ἢ ἀνάγκη προσπάρχειν λεγόμενον ἁμφωτέρος.
mixture of simple bodies and the homogenous parts of physical substances from Chaper 6. This distinction, as I will show in this section, will contribute significantly to an explanation of the role that simple bodies play in Aristotle’s account of the substantial change.

As I have shown through §7.2.3, Aristotle’s characterization of matter as a ‘what is not’ per accidens cannot explain how matter is related to form. This issue is important, since only if the relationship between matter and form is perfectly clarified, can we explain what the thing from which a new substance comes to be is. Owing to the fact that Aristotle’s characterization of matter as a ‘what is not’ per accidens fails to provide us with the explanation we need, he thinks it necessary to move on to an alternative characterization of matter in GC I.3. According to his new theory, as it is anticipated in Physics I.8, 191b28, matter is identified as a substance in potentiality. This passage has been quoted in §7.3.1. For the convenience of discussion, I will quote it again here:

In one sense it is from what is not that a thing comes to be simpliciter; yet in another sense it is always from what is; for there must pre-exist something which potentially is, but actually is not; and this something is spoken of both as being and as not-being. (317b15-18)

In this passage, as has been shown in the previous discussion, matter is identified as a ‘what is not’ in actuality and a ‘what is’ in potentiality. If we use Aristotle’s example that a statue comes to be from bronze in this case, we may say that the bronze, according to the quoted passage, is a potential statue and, meanwhile, a ‘not-statue’ in actuality. On the basis of this characterization, Aristotle provides his final response to the Eleatic challenge to the possibility of change. According to the Eleatics, it is not possible for a being to come to be, since it can neither come to be from a being—since it has already existed, nor from a non-being—since non-being does not exist at all. However, according to Aristotle’s characterization of matter at 317b15-18, matter is neither a thing that has already been generated, nor an absolute non-being. More specifically, because, for example, the bronze is just a potential statue, the generated statue does not come to be from a statue that has existed already in actuality. On the other hand, because bronze is a ‘not-statue’ in actuality, it is not a ‘not-statue’ without qualification. Now, on the basis of his characterization of matter in GC I.3, Aristotle makes it clear that generation simpliciter is neither ex nihilo, nor does it proceed from some non-substantial being, nor from a substance which has already existed in reality.
It is not until this point that we can understand why it is the case that a statue can be generated from bronze, but cannot be generated from any odd thing, say, a parrot, which is totally irrelevant to the statue. It is true indeed that bronze and a parrot are both essentially different from a statue in virtue of themselves, but bronze by nature can be a statue in potentiality, even if it is not yet a statue in actuality. For this reason, bronze, as a potential statue, is a ‘not-statue’ *per accidens*.

One may continue to wonder why it is that case that bronze can be a potential statue, but a parrot cannot. In order to make this point clearer, I would like to draw on what on the distinction between mixture and the homogenous parts of a substance that I drew in Chapter 6. The reason why bronze can be a potential statue while a parrot cannot is that the bronze can be determined by the form of a statue, but a parrot cannot.

According to my interpretation of Aristotle in Chapter 6, the matter from which generation simpliciter takes place is in fact a mixture. In Aristotle’s example of the generation of a statue, the bulk of bronze is exactly such a kind of mixture of simple bodies. The reason why I take bronze as a mixture, rather than as an individual substance that has its own form and identity, is that it is impossible to differentiate one piece of bronze from another in advance of the spatial distribution.\(^\text{1}\) It is this character of a mixture (that is, it lacks its own form and identity) that allows it to serve as the pre-existing matter in a generation. As has been shown in §6.5, the mixture, from which a substance comes to be, stands in a relation of homonymy with the concurrent matter, or the homogenous parts, of the substance. It is because of this special relationship that mixture can be directly transformed into the homogenous parts of a substance. For example, in the case of a bronze statue, even if the statue is composed of bronze, the bronze, which is concurrent with the statue, is essentially different from the bronze from which the statue comes to be. They are homonymously bronze, since they are determined by different forms and essences. This affinity makes it easy for them to transform into one another. The bronze, which is an independent mixture, as soon as it comes under the determination of a form, is transformed into the homogenous part of a statue, and turns into its concurrent matter. Conversely, as soon as the homogenous part loses the determination of the form of the statue, it corrupts

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\(^\text{1}\) It seems me that bronze in this sense is similar to water, and can be identified as a scattered body, as Quine calls it. Each piece of bronze, therefore, is just a part of the whole bronze on the earth. Cf. Quine 2013, 90. According to this theory, any piece of bronze cannot be identified as a substance. In contrast with a substance, it lacks its own form and identity and is just a part of a larger entity.
into a bulk of bronze *per se* and exists as an entity independent from the statue. Since the bronze can be easily transformed into the concurrent matter of a statue, it by nature can serve as the pre-existing matter of a statue. It is for this reason that a mixture of simple bodies can be identified as the potential substance that is going to come to be, and contributes to Aristotle’s final explanation of the possibility of generation simpliciter.

7.3.3 Matter and the distinction between substantial change and non-substantial change

The existence of matter not only accounts for the possibility of substantial change, but also contributes to Aristotle’s distinction between substantial change and the non-substantial change, e.g., alteration and growth. For Aristotle, even though all changes proceed from a substratum and end up achieving a certain form (irrespective of whether it is a substantial form or an accidental form), substantial change is distinguished from non-substantial change in a certain way. This is explicit in *GC* I.4.

In order to distinguish alteration from substantial generation, alteration is characterized as follows:

Since, then, we must distinguish the substratum, and the property whose nature it is to be predicated of the substratum; and since change of each of these occurs; there is alteration when the substratum is perceptible and persists, but changes in its own properties, the properties in question being either contraries or intermediates. *(319b8-12)*

According to this passage, there are three factors of which an alteration is composed: a pair of properties, which are either contraries or intermediates, and a perceptible substratum which persists throughout the course of the alteration. For example, when a body alters from being ill to being healthy, the body that was ill is the same as that which is now healthy. In contradistinction to alteration, there is not a persisting substratum in any substantial change:

But when nothing perceptible persists in its identity as a substratum, and the thing changes as a whole (when e.g. the seed as a whole is converted into blood, or water into air, or air as a whole into water), such an occurrence is a coming-to-be of one substance

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1 Ἐπειδή οὖν ἔστι τὸ ὑποκείμενον καὶ ἔτερον τὸ πάθος δὲ κατὰ τοῦ ὑποκείμενου λέγεσθαι περιφέρειαν, καὶ ἔστι μεταβολὴ ἐκατέρω τούτων, ἀλλοίως μὲν ἔστιν, ὅταν ὑπομένοντος τοῦ ὑποκείμενου, αἰσθητοῦ δὲ μεταβάλλῃ ἐν τοῖς αὐτοῦ πάθεσιν, ἢ ἕναντίοις οὖσιν ἢ μεταξύ.
and a passing-away of the other. (319b14-18)\(^1\)

Similarly, in GC I.5, it is for the same reason, namely, the substratum of a substantial change does not persist, that the distinction between substantial change and the non-substantial changes is drawn:

For whereas a thing does not persist in the processes of unqualified coming-to-be or passing-away, that which grows or alters persists in its identity through the altering and through the growing or diminishing, though the quality (in alteration) and the size (in growth) do not remain the same. (321a22-26)\(^2\)

So, it is clear that, according to Aristotle’s view of alteration and the changes in respect of quantity, there is always a persisting substratum that remains the same throughout a non-substantial change, but it is not the case in substantial change. In any substantial change, there is no matter that persists through the course of the change. It is on account of the criterion— whether or not the substratum of a change persists— that a substantial change is distinguished from a non-substantial change.

According to a traditional interpretation of Physics I.7, however, this criterion for distinguishing between substantial change and non-substantial change is not without difficulties. According to this tradition, Aristotle holds that the substratum of a change is not only that from which a change starts, but it persists throughout the change as well. This interpretation is not without evidence. In Physics I.7, Aristotle expressly tell us:

We speak of ‘becoming that from this’ instead of ‘this becoming that’ more in the case of what does not survive the change— ‘becoming musical from un-musical’, not ‘from man’— but we sometimes use the latter form of expression even of what survives; we speak of a statue coming to be from bronze, not of the bronze becoming a statue. The change, however, from an opposite which does not survive is described in both ways, ‘becoming that from this’ or ‘this becoming that’. We say both that the unmusical becomes musical, and that from unmusical he becomes musical. And so both forms are used of the complex, ‘becoming a musical from an unmusical man’, and ‘an unmusical man becoming musical’. (190a21-29, my emphasis)\(^3\)

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\(^1\) Ὅταν δ’ ὄλον μεταβάλλῃ μὴ ὑπομένοντος αἰσθήτου τινὸς ὡς ὑποκειμένου τοῦ αὐτοῦ, ἀλλ’ οἰόν ἐκ τῆς γονῆς οἷα πάσης ἢ ἔξ ὑδατὸς ἄηρ ἢ ἔξ ἄρος παντὸς ὑδὸρ, γένεσις ἡδὴ τὸ τοιοῦτον, τοῦ δὲ φθορά.

\(^2\) ἐν μὲν γὰρ τοῦ γίνεσθαι τι ἀπλὸς ἢ φθείρεσθαι οὕτω ὑπομένει, ἐν δὲ τῷ ἀλλοιώσθαι ἢ αὐξάνεσθαι ἢ φθινεν ὑπομένει τὸ αὐτὸ τοῦ αὐξανόμενον καὶ ἀλλοιώμενον. ἀλλ’ ἐνθα μὲν τὸ πάθος ἐνθα δὲ τὸ μέγεθος τὸ αὐτὸ οὐ μένει.

\(^3\) τὸ δ’ ἐκ τινὸς γίγνεσθαι τι, καὶ μὴ τόδε γίγνεσθαι τι, μᾶλλον μὲν λέγεται ἐπὶ τῶν μὴ ὑπομενόντων, οἰόν ἐξ ἁμοίου μοσακίδον γίγνεσθαι, ἐξ ἀνθρώπου δὲ οὐ ὡς ὡς ὡς ἁλλὰ καὶ ἐπὶ τῶν ὑπομενόντων ἐντὸς λέγεται ὡςάετος· ἐκ γὰρ χάλκου ἀνάριάντα γίγνεσθαι φαμεν, οὐ τὸν χαλκὸν ἀνάριάντα. τὸ μέντοι ἐκ τοῦ ἀντικειμένου καὶ μὴ
In this passage, the locution ‘becoming that from this’ is usually applied to non-substantial changes. Any one of such changes, which is compatible with Aristotle’s assertions in GC I.4 and I.5, involves a persisting substratum. But it seems that, according to the italized sentence in the passage above, the ‘this becoming that’, which is applicable to both substantial change and non-substantial change, can also imply a surviving substratum. In the view of those who support the traditional interpretation, the following example is even more clear: that, in the course of the generation of a statue, which is explicitly classed as generation simpliciter in 190b6, the matter of generated substance, i.e., the bronze, persists throughout the generation of the statue and ultimately survives. Therefore, as Bostock summarizes, the substratum has two roles in Aristotle’s theory of change: on the one hand, it is the starting point from which a change proceeds; on the other hand, it is a continuant which persists throughout a change. ¹ If this were the case, there would be an obvious conflict between Aristotle’s arguments in Physics I and in GC I.

This traditional interpretation, however, has been challenged by several critics. ² Charlton is the first modern commentator to argue against this interpretation, but his challenge is not successful, because he has neglected the crux of the quoted passage 190a21-29. ³ Broadie acknowledges that the passage quoted above indicates that the substratum persists through the generation of a statue, but she immediately points out that, in Physics I.7, Aristotle does not concern himself with whether or not the substratum persists through a change. This is the reason why Aristotle also gives an example of biological genesis in which the substratum does not persist at the same time in Physics I.7. ⁴ Therefore, according to Broadie, Aristotle’s example of the generation of a statue does not reflect his decisive view about the distinction between substantial change and non-substantial change. ⁵ Henry takes a similar view to that of Broadie. He argues that

¹ Bostock 2006, 9. For a similar view, see also Gill 1989, 6, 90, 106; Witt 1989, 66.
³ In Charlton’s commentary to 190a21-29, he says, “in a24-6 Aristotle says that a thing is usually said to come to be out of the factor which does not remain, but sometimes out of the factor which does; for instance, we say that a statue arises out of bronze, not that bronze becomes a statue.” But later he omits to say about bronze at all! Cf. Nie 2019, 87-90.
⁴ This interpretation of biological genesis is also held by Frey 2007. Charles, however, provides an alternative interpretation of this example in Physics I.7, see Charles 2018, 185-186.
⁵ As Broadie explains, “although in Physics I.7 Aristotle was definite that the coming to be of substance is the coming to be of something in a different category from the others, he did not dwell on

υπομένοντος ἁμαρτόνας λέγεται, καὶ ἐκ τοῦτο τὸ τὸ καὶ τὸ τὸ τὸ: καὶ γάρ ἐξ ἀμέσου καὶ ὁ ἀμέσος γίγνεται μουσικός.

1 Bostock 2006, 9. For a similar view, see also Gill 1989, 6, 90, 106; Witt 1989, 66.
3 In Charlton’s commentary to 190a21-29, he says, “in a24-6 Aristotle says that a thing is usually said to come to be out of the factor which does not remain, but sometimes out of the factor which does; for instance, we say that a statue arises out of bronze, not that bronze becomes a statue.” But later he omits to say about bronze at all! Cf. Nie 2019, 87-90.
4 This interpretation of biological genesis is also held by Frey 2007. Charles, however, provides an alternative interpretation of this example in Physics I.7, see Charles 2018, 185-186.
5 As Broadie explains, “although in Physics I.7 Aristotle was definite that the coming to be of substance is the coming to be of something in a different category from the others, he did not dwell on
Aristotle’s task in *Physics* I.7 is to show that any change does proceed from a pre-existing thing. For this reason, ‘although Aristotle supports this conclusion by drawing on cases where the subject survives the change (190a22-6), his general point in no way defends on that.’\(^1\)

All these challenges to the traditional interpretation fail to explain why Aristotle, at least, seems to have held that, in his example of the generation of a statue, the substratum of the change, i.e., the bronze, persists throughout the change. Even if Broadie and Henry are correct that the persistence of the bronze is not important at all in the context of *Physics* I.7, it remains to be answered why, if his arguments in *Physics* I.7 is compatible with those in *GC* I.4 and I.5, Aristotle indicates that some generation simpliciter cannot be differentiated from non-substantial changes. For this reason, if we are going to accept that substantial changes can be distinguished from non-substantial changes in the way suggested in *GC* I.4 and I.5, then it is necessary to explain in what sense the bronze in Aristotle’s example of the generation of a statue does persist throughout the change, as is indicated in *Physics* I.7, but in what sense it does not, as is indicated in *GC* I.4 and I.5.

In order to make it clear why Aristotle affirms that matter does not persist through a generation simpliciter in one place, while denying this in another place, I would like to bring in my distinction between the mixture of simple bodies and the homogenous parts of physical substances from Chaper 6. In fact, as we shall see in what follows, the question of the sense in which the bronze in Aristotle’s example of the generation of a statue does persist throughout the change, and the sense in which it does not, can be easily answered in terms of my distinction between mixture and the homogenous parts of substances.

As has been shown in chapter 6, the concurrent matter of a thing, i.e., its homogenous parts, shares exactly the same properties with the mixture from which the thing comes to be. In this case, if one bases one’s judgement just one’s sense-perception, one would definitely have the impression that the mixture has persisted through the generation and remained as the homogenous parts in the generated thing. But, as we have seen in §6.5, since the mixture, which exists independently of a substance, and the homogenous parts of a substance are not determined by the same form, even if the latter comes to be from the

\(^{1}\) Henry 2019, 47-50.
mixture, they are by nature two distinct things. Therefore, strictly speaking, the mixture has not persisted and remained in the generated substance. It has been completely destroyed when it is transformed into the homogenous parts of the substance.

The distinction between the mixture and the homogenous parts of substance is absent from Physics I.7, because only if the way in which simple bodies exist in substances has been completely explained, can this distinction be successfully drawn. In Physics I, however, the notion of simple body has not been introduced yet. For this reason, it is natural for Aristotle to speak, apparently unguarded, that the bronze, which is initially a mixture, persists through the formation of a statue and remains as the bronze, which is the homogenous part of a substance, in the statue. But as soon as these two homonymous instances of bronze have been distinguished, he immediately realizes that, strictly speaking, the matter in a substantial change does not persist at all. On the basis of this observation, he argues in De Generatione et Corruptione that substantial change can be distinguished from the non-substantial change because their matter does not persist. It is in this way that Aristotle’s investigation into the simple bodies contributes to his distinction between substantial change and non-substantial change.
Bibliography

Primary Sources


Secondary Sources


