

**Aristotle on the limits of final causes.
The case of extended teleology**

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ABSTRACT

In this thesis, I discuss the concept of Aristotelian extended teleology (i.e., non-theistic teleological causation in which more than one substance is involved). I argue that some passages of Aristotle's corpus and Theophrastus' *Metaphysics* can be read as arguments of extended teleology. To interpret those passages, I introduce the concept of "axiarchism", according to which X is actual because X is good. The thesis is composed of five chapters. In chapter 1, I introduce both the doctrine of Aristotle's four causes and the discussion of the reach of final causes according to the second book of the *Physics*. In chapter 2, I discuss the teleological arguments that can be found in the first book of Aristotle's *Politics*. I argue that some of these arguments can be read as arguments for extended teleology. In chapter 3, I argue that it is reasonable to suppose that, for Aristotle, the sublunary is not a random result of the superlunary and that, therefore, there is some form of order in all the parts of the universe. In this chapter, I focus particularly on *Physics* VIII, *Generation and Corruption* II 10. In the fourth chapter, I discuss *Metaphysics* XII. I defend the view that the tenth chapter of book Lambda can be read as an explicit question about the order and unity of all the parts of the world. In chapter 5, I discuss Theophrastus' *Metaphysics*. I argue that Theophrastus is pointing towards the need for an account of extended teleology. He claims that not everything can be the result of a final cause, because some natural phenomena (e.g., the rotation of the sun that causes the yearly seasons) cannot be explained in teleological terms. In questioning the possibility of explaining these phenomena in teleological terms, however, Theophrastus is already thinking in terms of extended teleology.

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INTRODUCTION

Establishing precisely what is supposed to be accounted for when it comes to the doctrine of Aristotelian final causes can be difficult. It is widely accepted that, in accordance with Aristotle's doctrine, final causes are supposed to explain at least some features of living beings. For instance, that animals and plants have parts that serve a function and are useful for them. Similarly, reproduction is good for any living being insofar as it perpetuates biological species. Any living being that has existed or will exist depends on an infinite series of ancestors that make its existence possible. Therefore, at least these two features of living beings are supposed to be explained by final causes, the disposition of their organs and reproduction. Moreover, in some cases, explanations that invoke a final cause are better than those that refer exclusively to the material components of the explanandum. In the case of some animals, for example, it is good to explain how the material properties of earth explain why they have horns. But, to explain the benefit that the horns report to the animal, a teleological explanation is merited. In general, the usefulness of some body parts cannot be explained with reference to material causes alone, because the presence of these beneficial parts would merely be the result of chance. Material properties are not, for Aristotle, complex enough to explain good and beneficial natural dispositions. And given that he finds the input of chance in the case of useful body parts unacceptable, he offers an alternative theory: if something is non-sporadic and beneficial—such as the presence of horns or the disposition of teeth in the mouth of some animals—it must be explained in terms of final causes.

But are living beings' disposition and reproduction all that merits an explanation in terms of final causes? It seems that there are many other instances of arrangements that are beneficial for living beings. For instance, there are many cases in which there is a good fit between a living being and its environment. Tropical fish, for example, happen to live in bodies of water with the right temperature and the right sources of food for them. Furthermore, there is another noticeable case of 'good fit': this is the case of the arrangement of the whole cosmos. Here, a first mover causes the movement of celestial bodies, the first heaven, the planets, and the sun. In turn, the sun is the cause of yearly seasons, which are the source of many environmental conditions that enable life on Earth. It is hard to believe that Aristotle would be willing to accept that life on Earth is just a by-product of the superlunary, the more worthy section of the cosmos. Similarly, the possibility of the good fit between living beings and

their environment resulting from chance seems to be un-Aristotelian. However, even if these suppositions are correct, it is hard to explain how exactly the good fit between the parts of the cosmos or living beings and their habitats can be explained by using the standardly accepted toolkit of Aristotelian teleology.

There are two main reasons for this. One of them is related to some of the more established Aristotelian metaphysical theories, the second is inherent to any non-theistic teleological account. Let us turn to the first of these. According to Aristotle, final causes presuppose a formal cause. A living being has a formal principle that actualises some features, which in turn are purposeful. The form of a bird is responsible for the beak proper to that kind of bird, for instance, a pointy and sharp beak. A beak with these features is good for tearing meat, which is good for the bird because it is of a carnivorous species. The good—in this case, tearing meat—explains why the beak has the features in question and why the formal cause actualised those very features. Now, formal causes are inherent to substances, and so it seems that teleological causation presupposes a formal principle and therefore a substance. If this is correct, in order to account for the good fit between the two parts of the cosmos with final causes, we would require a formal principle and a substance. For example, the cosmos should be conceived as a substance. The problem with an object of this kind is that substances are concrete particulars, specifically living beings, and cannot be reduced to a more basic entity, that, in turn, could be considered part of a new whole. There cannot be an Aristotelian substance whose parts are also substances.

The second problem is that non-theistic teleological theories, like Aristotle's, just have a hard time explaining states of affairs in which there is more than one individual involved. More precisely, they have a harder time explaining these cases than theistic teleology or a theory such as that of natural selection. Consider the following case. Some bacteria that live inside the Hawaiian squid produce light as a result of some chemical reaction. The illumination is induced by a molecule that these very bacteria produce, so they light up when there is a considerable concentration of them. In turn, the illuminated spots produced by the bacteria provide some sort of camouflage to the squids. As a result, the shadow of the squid is not cast down to their predators when there is moonlight. In this case, it seems that both squids and bacteria benefit from their relationship. A squid's body is a good habitat for the bacteria, which in turn provides camouflage by means of this illumination.¹ The proponent of some

¹ I am taking this example from Peter Godfrey-Smith (2016, pp. 18–19).

version of theistic teleology could easily claim that God is somehow responsible for a symbiotic relationship of this kind. The proponent of species' evolution, in turn, could argue that this mutually beneficial relationship is not something to be accounted for in terms of the good of the particular individuals involved, but rather in terms of natural selection.

Aristotle, on the other hand, cannot explain the squid-bacteria relationship that easily. The difficulty is, partly, that the latter can neither just be a happy accident, nor the intended result of the deliberation of a deity. Additionally, Aristotle cannot resort to his own concept of final cause, because the object composed of the ocean, the moonlight, the bacteria, and the squid cannot be a substance. What Aristotle seems to need is an account of extended teleology, namely, a teleological account of states of affairs in which more than one substance (or a substance and its environment) is involved.

Many scholars, however, reject the possibility of extended teleology and claim that Aristotelian teleology is supposed to be relevant only in the context of individual substances (Judson, 1991; Scharle, 2008; Wardy, 1993). This view is partly motivated by the metaphysical problem of substances composed of substances. It might also be motivated, though, by what seems to be a comparative advantage of Aristotelian final causes for explaining the relation between individuals and their parts over the relation between living beings and their environments. Living beings have a lot of self-regulated and useful functions. Even if one is not committed to the existence of final causes, a teleological understanding of the functioning of body organs or of how individuals can be successful at preserving their own species can be fairly useful for organizing our information about the phenomena.

The purpose of this thesis is to examine the possibility of Aristotelian extended teleology. I argue that some of the arguments advanced by Aristotle exhibit the development of a conceptual tool that is meant to explain cases of extended teleology. This conceptual tool can be understood in terms of axiarchism, a metaphysical theory that claims that there is a direct link between value and existence. This theory opposes the view that some features of the universe (e.g., the existence of regular and discoverable mathematical laws, the intelligibility of nature, the presence of the right conditions for the emergence of life) are just brute facts (T. Mulgan, 2015, pp. 105–109). Rather, these features of the universe are explained by the fact that they are valuable. According to the axiarchic principle, the goodness of X explains why X is actual. Some forms of axiarchism also oppose theism. The universe is life-enabling, intelligible, and mathematically elegant not because it is God's design, but in virtue of the goodness of the universe. So, we do not need a provident God that chooses to actualise this world

out of many possible worlds, but rather the goodness of this world makes it actual (Leslie, 2016; T. Mulgan, 2015, 2017).

Aristotle advances some arguments that can be read in similar terms. For him, some objects, like households, cities, and the universe, have a somehow robust unity (i.e., weaker than a natural substance but stronger than just some random set of things). Additionally, he explains the disposition of the parts in terms of being good. Consider the case of the cosmos. This reading is based on *Generation and Corruption* II 10, 336b 25-34, where Aristotle says that everlasting existence is preferable to temporal existence and that existence in general is better than non-existence. These principles guarantee that the sublunary creatures exist in the best possible way: i.e., as a successive chain of individuals. This principle, namely, that things exist in the most complete way that they are capable of, is a form of axiarchic teleology; and its cosmological implications are considerable. It follows, from it, that the whole architecture of the cosmos is axiarchic: the universe is a single object, spatially finite, with an unmoved mover that guarantees the eternal movement of the first heaven. The latter, as mentioned, is responsible for the sun's trajectory which, in turn, guarantees the cyclical environmental conditions that enable the existence of living beings. This arrangement is not the result of chance. Instead, this arrangement is good, and its existence must be explained by the fact that it is as perfect as possible.

Similarly, some social institutions are natural in the sense that their members stand in a hierarchical relationship and serve a common purpose. These hierarchical relationships are explained by Aristotle in terms of an axiarchic teleology, too. Whenever it is possible, the superior rules over the inferior (*Politics* I 5, 1254a 28-1254b 2). The superior is defined as that which is more valuable and worthy. If this is so, social arrangements are explained in virtue of being ordered and, consequently, in terms of being good. Additionally, if these social institutions are "by nature" in the sense that their structure is not intended by a human mind (*Politics* I 2, 1252b 27-1252a1), then nature is responsible for the order of the structure in question.

Axiarchic teleology can operate without a formal principle, namely, a formal cause inherent in a particular substance (e.g., a soul). It is the value of a state of affairs what explains why it is actual. This removes the need for a formal principle that explains how something good is actualised. In other words, axiarchic teleology can work for objects that are not necessarily an Aristotelian substance.

The view I develop in this thesis builds on what other scholars have presented as either biocentric or anthropocentric accounts of extended teleology (Furley, 1985, 1999; Sedley, 1991; Matthen, 2001). My

aim is to explain how exactly teleological causation works in scenarios where there is more than one individual substance involved, an often-overlooked issue within proposals of extended teleology.²

It is important to notice that there is not a single and paradigmatic textual source where Aristotle presents a developed account of extended teleology (i.e., something akin to what *Physics* IV 10-14 is to his account of time). Rather, there are some passages where Aristotle seems to advance teleological explanations that involve more than one substance or a substance and the environment. It is from these passages that I reconstruct an account of extended teleology. The thesis is divided into five chapters and four parts. Each chapter focuses on one of the main textual sources for the concept of extended teleology. I also discuss the academic literature that is relevant both to the issue of extended teleology and to the interpretation of the passages discussed in each chapter. I decided to divide the chapters in four parts for two reasons. Firstly, while each chapter focuses on one of the central sources of extended teleology, part III incorporates two sources that contain somehow parallel arguments, namely, *Physics* VIII and *Metaphysics* XII. Secondly, part IV moves from Aristotle to Theophrastus and examines the latter's criticisms of Aristotelian teleology. In what follows, I briefly summarize each chapter.

In part I, chapter 1, I focus on the central arguments of *Physics* II. I start by presenting both Aristotle's theory of the four causes and his account of teleological causation. I then discuss some arguments by Xenophon and Plato and introduce those of Theophrastus. These are all arguments that can be taken as accounts of extended teleology. Moreover, I argue that these passages can indicate that Aristotle is at least aware of the possibility of extended teleology. I then discuss why an account of extended teleology is relevant for Aristotle. I also discuss the well-known rainfall passage of *Physics* II 8 and the academic debate that has arisen around the purpose of that argument. My view is that it is reasonable to read the argument in such a way that the rainfall is one of the things that are supposed to be explained in teleological terms. However, it remains unclear how the doctrine of final causes presented in *Physics* II can accommodate a purposeful rain.

In part II, chapter 2, I discuss the teleological arguments advanced by Aristotle in the first book of the *Politics*. I begin by discussing the relevance to the debate on extended teleology of some of the claims Aristotle makes regarding cities (i.e., cities being natural and prior to human beings). I also examine the academic debate surrounding these claims. Finally, I analyse some of Aristotle's

² Extended teleology has also received the name of 'global teleology' (see David Sedley (1991)).

arguments for explaining the hierarchical nature of some political institutions. I argue that these hierarchical arguments can be understood as axiarchic arguments. These axiarchic explanations include both households, as well as a natural trophic chain that has human beings as its main beneficiary.

Part III of the thesis is comprised of two chapters and an appendix. This section is concerned with what would be the, let us say, most cosmological arguments related to extended teleology. In chapter 3, I discuss *Physics* VIII and some passages of both *Generation and Corruption* and *On the Heavens*. In this chapter, I reconstruct the arguments of *Physics* VIII in which Aristotle explains how the structure of cosmos is supposed to work (i.e., that movement is eternal and, so, there must be a first mover that guarantees the eternity of movement). I also argue that the structure of the cosmos can be understood in axiarchic terms. To support this, I present some arguments from other natural philosophy works in which Aristotle seems to develop the concept of axiarchism.

In part III, chapter 4, I discuss some of the central arguments of *Metaphysics* XII. I concentrate, particularly, on the tenth and last chapter. I discuss some of the different readings available in the literature regarding the meaning of Aristotle's remarks on the unity and ordered nature of the cosmos. For Aristotle, the order of the cosmos is similar to the order of an army. According to this view, the latter is explained both by the existence of the general and by the relation between the general and all the other parts of the army. I discuss, too, Aristotle's claim that the universe is akin to a household, the members of which work toward the same goal. My view is that, by means of these two analogies, Aristotle tries to explain the relationship not only of the unmoved mover and the first heaven, but rather the relationship of all the parts of the cosmos, including both the superlunary and the sublunary. I argue that these arguments can be read in terms of axiarchic teleology: the universe is an object with some unity and all of its parts are ordered because this is a good way for the parts to be disposed.

As mentioned, the third part of the thesis also includes a brief appendix about the Aristotelian environment. I discuss a view according to which the environment is included in the essence of living beings (i.e., being fit to live in water is coessential to aquatic animals). I argue that this view does not provide a complete account of the good fit between living beings and their environment. Given that Aristotle cannot explain this good fit in terms of adaptation, the fact that living beings happen to live wherever it is good for them is either a random brute fact or for the sake of something. There are reasons to suppose that Aristotle would reject the former possibility.

Finally, in Part IV, chapter 5, I discuss Theophrastus' *Metaphysics*. In this part of the thesis, I explore the conceptual relation between Theophrastus' criticism of final causes and Aristotle's views of teleology. I begin by discussing the chronological relation between Theophrastus' *Metaphysics* and Aristotle's works. I argue that there is some sort of dialectic between some of the Theophrastus' objections against Aristotelian final causes and Aristotle. Theophrastus argues that not everything can be for the sake of something. To illustrate this, he mentions natural phenomena that cannot be explained in teleological terms. Some of these problematic cases are addressed in Aristotle's works on natural philosophy. Now, one of the problematic cases that Theophrastus mentions is that of the sun's movement and its relation to yearly seasons and the earth's environment. *Generation and Corruption* II 10, 336b 25-34 can be read as a reply to this argument. Moreover, it appears to be a reply to Theophrastus' objection posed in terms of extended teleology. I also examine Theophrastus' concern about accounting for the relation between the two parts of the universe. Theophrastus objects that the Aristotelian view of an unmoved mover that is imitated by the first heaven (which in turn sets the motion of the spheres and so on) seems to imply that the cosmos is composed of two tiers with barely any cohesion. In light of this, he suggests that it is perhaps convenient to conceive the cosmos as something with a robust form of unity, like a city or an animal. I argue that this argument is relevant for the discussion on extended teleology and compare Theophrastus' strategy in this argument with some of the claims Aristotle makes about cities and the cosmos. Theophrastus' suggestion is, then, to somehow embrace extended teleology.

What I aim at showing throughout this thesis is that the Aristotelian cosmos requires an account of extended teleology. Aristotle does not thematize the issue of extended teleology, as such. Instead, he presents teleological arguments to account for states of affairs that involve more than one substance. The arguments that point in this direction suggests that what is at play is a kind of causation that can be understood as some version of axiarchism.

NOTE ON TRANSLATIONS

Throughout this work, I have used the following translations for verbatim quotations:

Aristotle

Metaphysics XII, Lindsay Judson 2019.

Metaphysics, W. D. Ross (in Barnes 1984).

Physics II, William Charlton 1992.

Physics VIII, Daniel W. Graham 1999.

Physics, R.P. Hardie and R.K. Gaye (in Barnes 1984).

Politics I and II, Trevor J. Saunders 1995.

Politics, B. Jowett (in Barnes 1984).

Nicomachean Ethics, C.D.C. Reeve 2014.

On the Heavens, J. L., Stocks (in Barnes 1984).

On the Soul, J. A. Smith (in Barnes 1984)

Posterior Analytics, Jonathan Barnes 1993.

Plato and Theophrastus

Timaeus, Robin Waterfield 2008.

Theophrastus' *Metaphysics*, W.D. Ross and F.H. Fobes 1929

PART I. ARISTOTELIAN TELEOLOGY

Chapter 1. The Aristotelian Four Causes

1.1 Proper knowledge and causal explanations

Aristotle's notion of proper knowledge is closely tied to his theory of causality. What we may call Aristotelian proper knowledge, (*ἐπιστήμη*) or scientific knowledge consists in a certain causal account. Thus, for a demonstrative argument to be scientific, it is not sufficient for its premises to be true, necessary, and universal. While these properties are necessary, something else is required. In demonstrative arguments, the premises are brought together in the conclusion by means of the middle term, which does not feature in the conclusion. By drawing the inference, however, the middle term is displayed *as* the cause of the conjunction of the terms that do appear in the conclusion (*Posterior Analytics* I 1, 71b 9-12, 20-22). In other words, what constitutes episteme or proper knowledge is the conclusion of a syllogistic deduction seen as following from premises that are true, primitive, more familiar, and, in being immediately explanatory, they are the cause of the conclusion (*αἰτίων τοῦ συμπεράσματος*) (*Posterior Analytics* I 2, 71b 20-25). A few chapters later in *Posterior Analytics* (I 13), Aristotle explains this in more detail. He claims that there are some valid syllogistic demonstrations that are limited to show a certain fact (*τὸ ὅτι*), while other equally valid syllogistic demonstrations go further and explain the cause of a certain state of affairs (*τὸ διότι*):

(...) so that the demonstration will occur through this. E.g. that the planets are near, through their not twinkling: let *C* be the planets, *B* not twinkling, *A* being near. Thus it is true to say *B* of *C*; for the planets do not twinkle. But also to say *A* of *B*; for what does not twinkle is near (let this be got through induction or through perception). So it is necessary that *A* belongs to *C*; so that it has been demonstrated that the planets are near. Now this deduction is not of the reason why but of the fact (*οὗτος οὖν ὁ συλλογισμὸς οὐ τοῦ διότι ἀλλὰ τοῦ ὅτι ἐστίν*); for it is not because they do not twinkle that they are near, but because they are near they do not twinkle. But it is also possible for the latter to be proved through the former, and the demonstration will be of the reason why—e.g. let *C* be the planets, *B* being near, *A* not twinkling. Thus *B* belongs to *C* and *A* to *B*; so that *A* belongs to *C*. And the deduction is of the reason why; for the primitive explanation has been assumed. (*Posterior Analytics* I 13, 78a 29-b 3).

So, for Aristotle, only those syllogistic demonstrations that are provided with a causal statement are susceptible of being considered a genuine instance of episteme. For example:

(i) Everything that does not twinkle is close.

Planets do not twinkle.

Therefore, planets are close.

(ii) Everything that is close does not twinkle.

Planets are close.

Therefore, planets do not twinkle.

Accordingly, only ii. is informative of the cause (i.e., that planets do not twinkle in virtue of being close) and constitutes, thus, the only case of true knowledge, albeit both (i) and (ii) are valid syllogisms of the first figure. It is important to notice, here, that the causal character of the premises must be understood in two ways. On the one hand, they are the cause of the conclusion insofar as it is supported by the premises, i.e., it is inferred from them. On the other, there is also an ontological dependence between the objects referred to in the premises, e.g., X, a real object, causes Y³. Providing support to the latter—i.e., to the claim that there is an ontological dependence between the objects of the premises—is the goal of this kind of argument.

A very similar account of knowledge and of the causal character of its premises can be found in another of Aristotle's works. In *Physics*, he claims that “we think we have knowledge of a thing only when we can answer the question about it ‘On account of what?’ (τὸ διὰ τί) and that is to grasp the primary cause” (*Physics* II 3, 194b 18-20). Asking “on account of what?” or searching for an explanation is a decisive aspect of Aristotle's approach to causality. This kind of enquiry goes beyond the search for an account regarding, e.g., the modal relation of events and consequences. This is the role fulfilled by Aristotle's theory of causality. Aristotle's theory of the four causes is devised to show the primary aspects of the composition of a natural substance. These include both the material and formal aspects

³ Although some interpreters claim that the causal condition of scientific syllogisms is purely logical (see, e.g., Richard D. McKirahan (1992)), there are good reasons for preferring the twofold account just mentioned. Aristotle does not give any other criteria for preferring syllogism (ii) over (i). If the premises are causal insofar as some conclusion follows from them, then both (i) and (ii) are equally causal (see José Tomás Alvarado Marambio (1999)).

of a natural substance, the conditions that bring it about, as well as the goal-driven features of a living being. The causal inquiry Aristotle has in mind could be described as an ontological description of living things. Moreover, it is the account he thinks we should pursue in order to have proper knowledge.

In this chapter, I present an overview of Aristotle's causal theory and teleology. I begin by presenting a brief account of the Aristotelian four causes, both the aim of this theory and how it relates to its historical predecessors. I then present a more detailed account of how final causes work (i.e., the conditions for there to be teleological causation), and the reach of explanations based on final causes. Finally, I introduce the academic discussion concerned with the reach of teleological explanations. My focus, here, will be the rainfall example and I will present the two general views surrounding this matter. While some scholars claim that Aristotle takes rain to be *for the sake of*, e.g., crops, others claim that a materialistic account can be generalized to this case. The latter view involves not taking the rainfall example at face value. By opposition, I argue that there are good reasons to take this example at face value. Rather than committing to the view that Aristotle has a full-fledged notion of extended teleology, however, I argue for a more moderate view. The view I defend is that Aristotle is interested in providing an explanation of these puzzling cases that are recurrent and beneficial. Nonetheless, the response he provides is not fully articulated.

To get a better grasp of Aristotle's theory of causes, it becomes relevant to pay attention to what he has to say about early Greek philosophers and their accounts of nature. Let me turn to this next.

1.2 Aristotle on his predecessors

Aristotle thought that his predecessors were already on the track of developing some sort of causal account of nature. Their view, however, remains limited. While the accounts of nature of the first cosmologists could be stated in a causal manner, this can only be done with limited success. The reason for this lies, precisely, in the emphasis of asking only for the material constituents of things, leaving the formal aspects out of the picture, or, conversely, relying excessively on formal metaphysical explanations, as in the case of Plato. In any case, for Aristotle, only his own view states distinctly each of the four causes and explains the extent and importance of their ontological role (*Metaphysics* I 3, 938b 1-3; 6, 988b 16-17).

Aristotle is very critical of earlier philosophical theories of nature. A global recount of his view on these theories can be found in the first book of the *Metaphysics*, which is closely related to the second book of the *Physics*. Aristotle uses his own theory of the four causes as the main conceptual framework for laying out his historical survey (*Metaphysics* I 7, 988a 20-23). He discusses the thought of early philosophers who supposedly held that the only principles that composed things were of a material kind:

Of the first philosophers, then, most thought the principles which were of the nature of matter were the only principles of all things. That of which all things that are consist, the first from which they come to be, the last into which they are resolved (the substance remaining, but changing in its modifications), this they say is the element and this the principle of things, and therefore they think nothing is either generated or destroyed, since this sort of entity is always conserved, as we say Socrates neither comes to be absolutely when he comes to be beautiful or musical, nor ceases to be when loses these characteristics, because the substratum, Socrates himself remains. (*Metaphysics* I 3, 983b 9-15).

According to this passage, the materialist position is based on the idea that whenever we see an entity that undergoes some transformation, there is some kind of persistent material base or substance (οὐσία) that endures those changes. Aristotle will describe this substance as a substratum (ὑποκείμενον) which is the subject of a series of changes, although, qua substratum, it remains the same throughout the process of change. Aristotle is dissatisfied with this account. He objects to the claim that an account of this material substrate is the only relevant feature that needs to be explained to fully understand what a living being is, e.g., Socrates.

Despite Aristotle's own resistance to the latter claim, it is difficult not to notice the similarity between this claim and Aristotle's own view of the material causes of natural entities. In fact, it is very close to the theory of substance portrayed in the *Categories*. Something is a primary substance if (i) it does not depend on a subject for its existence (e.g., the dependence relation between a subject and its properties); and (ii) is not predicated of a particular entity. Individuals like Socrates or an individual horse would be primary substances. Although in the passage in question, Aristotle mentions an individual concrete substance such as Socrates, the subject could also refer to water, earth, wind, fire, or a mixture of the four (*Metaphysics* I 3, 984a 10-15). More precisely, Aristotle refers to Thales's view of water as the substratum; Anaximenes' and Diogenes' views on air; Heraclitus' and Hipassos of

Metapontium's views on fire; and Empedocles' view concerning a mix of the four elements (*Metaphysics* I 3, 983b 19-984a 15).

Leaving aside the question of whether those early philosophers really conceived the world's structure in this way, we see that Aristotle seems to think that they were on their path to an understanding of nature articulated in terms of a material cause:

From these facts one might think that the only cause is the so-called material cause; but as men thus advanced, the very facts opened the way for them and joined in forcing them to investigate the subject. However true it may be that all generation and destruction proceed from someone or (for that matter) from more elements, why does this happen and what is the cause? For at least the substratum itself does not make itself change; e.g. neither the wood nor the bronze causes the change of either of them, nor does the wood manufacture a bed and the bronze a statue, but something else is the cause of the change. And to seek this is to seek the second cause, as we should say, that from which comes the beginning of the movement. (*Metaphysics* I 3, 984a 18-27).

Nonetheless, Aristotle continues, these philosophers must at some point realize that material explanations are incomplete. Material substrata by themselves cannot explain the property of being something definite, and are, therefore, insufficient for explaining why an entity comes to be or is organized in a certain way. As can be seen, Aristotle sets out the narrative thread of the development of these theories in terms of his own account of natural causality. He even illustrates them with the examples he uses for his account of material causes in *Physics* II (i.e., wood and bronze as the material of which beds and statues are made, respectively). However, according to Aristotle, once these early philosophers realize that they were not able to make sense of natural entities with purely material causes, they postulated “the second cause”. This is what is traditionally known as the efficient cause or the source of movement (ἡ ἀρχὴ τῆς κινήσεως).

Both the Empedoclean theory of love and strife and Anaxagoras' *Nous* are mentioned as the first philosophical views that incorporated a notion of good as part of the principles that are supposed to explain nature (*Metaphysics* I 4, 985a 1-ff). Nonetheless, even when Aristotle believed that these accounts were better than the materialistic accounts presented above, he thought they failed at giving an adequate explanation of nature. Empedocles' principles (i.e., love and strife, which regulate the behaviour of the four elements) do not provide a systematic account of the cyclicity of nature

(*Metaphysics* I 4, 985a 23). Anaxagoras, in contrast, made certain progress in addressing some aspects of reality that Greek natural philosophers had ignored:

For surely it is not likely either that fire or earth or any such element should be the reason why things manifest goodness and beauty both in their being and in their coming to be, or that those thinkers should have supposed it was; nor again could it be right to ascribe so great a matter to spontaneity and luck. When one man said, then, that reason was present—as in animals, so throughout nature—as the cause of the world and of all its order, he seemed like a sober man in contrast with the random talk of his predecessors. We know that Anaxagoras certainly adopted these views (...). (*Metaphysics* I 3, 984b 10-22).

Goodness and beauty cannot be accounted for in merely materialistic terms. So, Anaxagoras postulated an immaterial principle, i.e., *Nous*, that was responsible for their existence. Aristotle remains dissatisfied with Anaxagoras' proposal. He thought that Anaxagoras used this new principle in a poor manner, as *deus ex machina*: when he cannot draw on another type of principle for explaining something, he refers to it (*Metaphysics* I 4, 985a 17-25). This line of criticism can be easily traced back to Plato's *Phaedo* (97c-ff). According to this passage, the world is disposed in a rational and optimal way, inasmuch as it is ordered in the best possible way and according to intelligence (i.e., *Nous*) (*Phaedo* 99b-d). For this reason, non-materialistic explanations acquire more importance than Anaxagoras might have thought. Following a similar thought, the theories advanced by the Atomists are also rejected by both Plato and Aristotle: randomness and chance barely constitute a cause. Moreover, they are unsuitable for explaining anything in terms of purpose and goodness.

Despite his agreement with Plato's assessment of these views, Aristotle is also very critical of his account of causes. A first group of objections is that Plato only considered two of the four causes, namely, the material and the formal (*Metaphysics* I 6, 988a 9-19). According to Aristotle, he failed at recognizing the notion of finality or purpose that should be in play. What this account is missing is a notion of finality understood as some good that is brought about by some state of affairs (*Metaphysics* I 7, 988b 5-7). We must notice, however, that a case could be made against Aristotle's reading of Plato in this regard, particularly considering the relevance granted to the teleological explanations found in the *Phaedo* and the *Timaeus*.

A second group of objections directed towards Plato's theory of causality can be found later in the *Metaphysics* I 9. Here, Aristotle argues that it is impossible for the Platonic species to actually be the cause of any individual member (*Metaphysics* I 9, 991a 17-30).

It is in this context that Aristotle advances his theory of the four causes. By contrast to the views of his predecessors, this theory is meant to include all the different types of causes. In this way, Aristotle makes up for the aspects he found defective in the views of Plato and of the early Greek philosophers.

1.3 The four causes

Aristotle states his theory of the four causes in *Physics* II and *Metaphysics* V 2. For him, a complete account of natural substance must include its material, formal, efficient, and teleological aspects (*Physics* II 3, 194b 17-ff). These are all the relevant ways in which we can ask a why-question regarding a natural substance. Aristotle illustrates the four causes with the case of the bronze statue. It is important to keep in mind that the statue in the analogy, is not, properly speaking, a substance. For something to be a substance it must have *φύσις*, an inner source of movement and rest. The paradigmatic substances are living beings. The main purpose of Aristotle's theory of the four causes, then, is to provide an account of natural substances. In light of this, it might be odd that Aristotle chose the statue. One reason that could explain this choice, however, is how useful this example turns out to be to illustrate how each of the causes works. In the case of a statue, it is straightforward which cause is which. Nonetheless, it can also obscure some features of the four causes. In the next section, I will discuss and clarify each of the four causes.

1.3.1 Material causes

When considering the case of the bronze statue, its material cause can be easily identified: the cause is bronze. Aristotle puts this in the following way: “[a]ccording to one way of speaking, that out of which as a constituent a thing comes to be is called a cause; for example, the bronze and the silver and the genera would be the causes respectively of a statue and a loving-cup” (*Physics* II 3, 194b 23-26).

Generally speaking, the material cause is the source out of which something is made (“bronze, silver and the genera”). It is important to notice that this notion of “material” has a very broad extension that can accommodate for both corporeal and incorporeal objects. So, just as it can refer to the bronze of the statue, it can also refer to the premises of an argument, to the part in relation to a whole, or to the syllables of a word (*Physics* II 3, 195a 15-20).

Material causes explain certain important features of natural substances. Non-essential processes, for instance, are due to a substance's matter. Examples of the latter are a statue heating up if it is left out in the sun, or the body of an animal becoming fatter or thinner. However, essential processes depend on matter too, insofar as the possibility of certain properties being instantiated in a substance depend on a specific material source. For instance, the statue must be made of something that is able to stand as a three-dimensional object. Aristotle presents, here, the example of an axe that must be made of a hard material like steel (*Physics* II 9, 200a 10-15).

1.3.2 Formal causes

Following the analogy of the statue, the formal cause would consist in the figure of whatever it is represented by the statue. This example points out that, broadly speaking, form consists in a certain imposition that shapes matter into something intelligible:

So there is another way of speaking, according to which nature is the shape and form of things which have in themselves a source of their changes, something which is not separable except in respect of its account. Things which consist of this and the matter together, such as men, are not themselves natures, but are due to nature. The form has a better claim than the matter to be called nature. For we call a thing something, when it is that thing in actuality, rather than just in possibility. (*Physics* II 1, 193b 3-8).

In the case of natural substances, this refers to the essence, i.e., an account of what it is to be X. This is part of the well-known Aristotelianhylomorphic theory. Recall that, for him, a materialist account is insufficient for explaining all the features of a natural substance. Matter by itself is highly undetermined and is insufficient to explain why an object is a member of some species. The concept that Aristotle devises to explain why some material basis constitutes a definite substance is the formal cause.

1.3.3 Efficient causes

The efficient cause, in turn, is the primary source of movement. In the case of the statue, the efficient cause is the sculptor: “there is the primary source of the change or the staying unchanged: for example, the man who has deliberated is a cause, the father is a cause of the child” (*Physics* II 3, 195a 21-22).

The “source of movement” includes many ways in which something is responsible for movement that not necessarily involves the transmission of movement via contact. Aristotle’s concept of efficient cause is very general. Hence the examples he uses. For instance, he illustrates this case by referring to a deliberating person who, in being responsible for an action, is the cause of it. In *Metaphysics* V 2 (1031b 23-24), he also presents the example of a person who gives advice to someone else. In the case of natural substances, however, he refers mainly to reproduction, e.g., the father is responsible for the existence of the child. Nonetheless, efficient causes can include some (more or less) environmental conditions that are required for the reproduction of living beings. For instance, the sun is an efficient cause in the generation of human beings insofar as life on Earth depends on yearly seasons, which in turn depend on the sun’s trajectory (see *Metaphysics* XII 5, 1071a 15-16).

1.3.4 Final causes

Aristotle defines final causes as an end or as that for the sake of which something is done. Consider the following passage:

And again, a thing may be a cause as the end. That is what something is for, as health might be what a walk is for. On account of what does he walk? We answer ‘To keep fit’ and think that, in saying that, we have given the cause. And anything which, the change being effected by something else, comes to be on the way to the end, as slimness, purging, drugs, and surgical instruments come to be as means to health: all these are for the end, but differ in that the former are works and the latter tools. (*Physics* II 3, 194b 30-195a 1).

Aristotle illustrates final causes, for instance, with the relation between health and walking: walking for the sake of one’s health. This concept includes both actions and instruments. A single final cause, like health, can include a process that involves more than one step or more than one item. For instance, in the case of health, Aristotle mentions a number of objects that are for the sake of health, among which are walking, drugs, and some instruments.

It is worth noting that final causes are not limited to agents capable of having mental states that deliberate about the good or benefit of something, as the previous example suggests. Instead, final causes are also relevant for understanding natural phenomena in which there is not a deliberating mind at play, regardless of whether this is a human or a divine mind, like Plato’s demiurge. In these cases, the nature of a substance explains why its parts are beneficial for the whole substance. For instance,

carnivorous birds have hooked shaped beaks that are explained by reference to the benefit they report to the bird: the beaks are good for tearing meat.

In the next section, I focus on these, the final causes that do not involve a deliberating mind. My aim is to discuss why Aristotle develops this concept of cause.

1.4 Teleological causation

Aristotle devises the concept of final causes to explain how it is that nature is arranged in patterns that are both regular and beneficial. Consider, for instance, the disposition of the teeth in the mouth of some animals (e.g., sharp teeth in the front for cutting food, flat teeth in the back for grinding) which is good or useful for those animals. According to Aristotle, the fact that they are good or beneficial explains why such an arrangement is the way it is. In other words, the good or beneficial disposition partly shapes living beings. Aristotle notes that these cases are pervasive: the natural world is filled with cases like these ones.

Aristotle argues for the view that the convenient and the good have causal powers. To understand this rather odd claim, it is helpful to bring to mind the similarity between art and nature. For Aristotle, there is a close relation between them insofar as they are both purposeful. So, just as art is a goal-oriented activity, so is nature, since the former imitates the latter (*Physics* II 8, 199a 8-20). The purposefulness of nature, however, is ontologically prior and more perfect than that of art (*Parts of Animals* I 4, 654a4-25). The close connection between natural teleology and that of art, however, is limited. Unlike the purposeful nature of art, natural teleology does not presuppose an agent capable of desiring or of conceiving a goal. Instead, it is a substance's *nature* that is responsible for teleological causation⁴. Good things become explanatory of events or states of affairs insofar as a natural substance operates towards those good things *as* goals. Moreover, good things or things that are beneficial are thus identified as causes.

For Aristotle, teleological causation is not completely unrestricted. Firstly, a formal principle, such as the soul of living beings, is required. This principle is immanent to a substance and sets out the

⁴ The craftsman is necessarily a rational agent, and so it can be replied that some craftsman, like a builder, is qua person an agent that might desire to build something. However, any desire or reason to build is not part of what defines the craft of the builder (see Sarah Broadie (2007, pp. 93–94)).

functions that are essential to it. Secondly, there are also some material conditions that are required. Aristotle introduces the concept of hypothetical necessity to explain this⁵. For a formal principle to cause a set of specific functions, an appropriate material is required. For instance, an axe must be made of a solid material; something similar applies to the bodies of living beings. Similarly, for a bird to perform an essential function (e.g., to fly) it requires the appropriate organic materials that can constitute a functional set of wings.

Considering, once more, the context in which Aristotle introduces his account of teleological causation becomes helpful at this point. He introduces it as part of a discussion with early philosophers aimed at explaining natural phenomena in terms of chance. Empedocles, for instance, supposedly argued that the convenient disposition of an animal's organs is due to chance. Accordingly, at some point, there was more than one arrangement of animal parts within a single kind of living beings. However, not all combinations were equally successful in surviving. Animals with successful arrangements survived, and the disposition of their parts endured over time and throughout different generations. Those animals with unsuccessful arrangements did not survive. Aristotle, by contrast, rejects this view and argues that chance, understood as an event that occurs neither always nor for the most part, cannot be the right concept for understanding regular phenomena (*Physics* II 5, 196b 10-17). Consider the following passage:

What, then, is to stop parts in nature too from being like this—the front teeth of necessity growing sharp and suitable for biting, and the back teeth broad and serviceable for chewing the food, not coming to be for this, but by coincidence? And similarly with the other parts in which the ‘for something’ seems to be present. So when all turned out just as if they had come to be for something, then the things, suitably constituted as an automatic outcome, survived; when not, they died, and die, as Empedocles says of the man-headed calves. This, or something like it, is the account which might give us pause. It is impossible, however, that this should be how things are. The things mentioned, and all things which are due to nature, come to be as they do always or for the most part, and nothing which is the outcome of luck or an automatic outcome does that (...) If, then, things seem to be either a coincidental outcome or for

⁵ For the concept of hypothetical necessity, see *Physics* II 9, 200a10-15; *Parts of Animals* I 1, 640a 33-35; IV 10, 689a 20-21; *Generation of Animals* V 1, 778b 15-19.

something, and the things we are discussing cannot be either a coincidental or an automatic outcome, they must be for something. (*Physics* II 8, 198b 24-ff).

The relevant premises of this argument are the following (Cooper, 2004, p. 116):

- (1) For a natural substance, if something is advantageous, it is either by chance or precisely because it is good for the substance.
- (2) Things by chance are exceptions.
- (3) Advantageous structures (e.g., organs) happen most of the time.
- (4) The disposition of teeth is something that happens for the sake of something.

According to (1), the functioning parts of a living being are either the result of some happy accident⁶ or the result of being beneficial for a substance (i.e., an Aristotelian final cause). Although Aristotle presents this as an exhaustive dilemma it is not in fact one. There is more than one available teleological explanation. For instance, one could refer to a Platonic Demiurge that chooses the right bodily or material arrangement for a substance. Nonetheless, Aristotle does not contemplate alternative models of teleological causation.

The second premise (2) expresses what seems to be a conceptual truth for Aristotle, namely, that regularity cannot be the outcome of chance. If this is correct and the organs of animals happen to be useful almost all the time⁷, animals' body arrangement cannot be due to chance. Furthermore, the only way to explain this disposition is in virtue of its usefulness.

In what concerns premise (3), it is worth noting that ancient natural philosophers, like Leucippus and Democritus, would probably have rejected this claim. If we suppose that there are innumerable worlds composed of infinite atoms, then we do not have to believe that there is only one way in which one

⁶ Aristotle presents another reconstruction of this argument in *Parts of Animals* where he explains that Empedocles thought that body parts have the shape they do out of material necessity, i.e., an object's shape is due to the properties of the matter of which it is composed (*Parts of Animals* I 6, 640a 17-26). For example, the backbone is sectioned in various vertebrae because, in virtue of being hard, it was severed during the foetal stage. The argument of *Physics* II should be read in similar terms: the notion of "chance" in the dilemma presented in (1) should be understood as something that occurred as a by-effect of material necessity. If "chance" was taken in accordance with the technical terms developed in *Physics* II 4-6 (i.e., accidental in relation to a goal-driven process), the argument would beg the question.

⁷ See *Generation of Animals* IV 4 for Aristotle's account of "monstrous" and "deformed" animals.

kind of organ, e.g., eyelids, must be arranged (Cooper, 2004, p. 117). By contrast, for Aristotle, natural species are eternal. So, animals and plants do not originate from any primigenial material source or previous species. This means that every natural process endured by a natural substance is directed towards the development of a single species. Accordingly, their only end is the conservation of said species.

In the following chapters, I turn to the wider context to Aristotelian teleology. I begin by discussing the explanatory reach of teleological explanations.

1.4.1 The reach of teleological explanations

Aristotelian final causes allow an account of at least two important features of the natural world, namely, (a) the convenient disposition of the organs of animals and (b) the continuous and eternal replication of species.

A process that has a beneficial and non-sporadic result calls for a teleological account. The appropriate conceptual tool, then, to explain the arrangement and disposition of a living being's body and its parts—whenever it is recurrent and useful—is that of a final cause. In *Parts of Animals*, we can find nice illustration of how an explanation of this kind would work. Here, Aristotle argues that it is because fish are essentially swimmers that they have fins (*Parts of Animals* IV 13, 695b 17-26)⁸. In this case, swimming, understood as the final cause, is responsible for the form or essence of the fish that causes the growth of fins in a body. The body of the fish is, in turn, composed of the appropriate material for swimming.

⁸ Aristotle provides many examples of this kind of teleological causation throughout *Parts of Animals* and in many places of the corpus in general. Besides, Aristotle also provides many detailed descriptions of how formal principles shape the material components of natural substances. See Mariska Leunissen (2010) for a thorough account of the latter. Note that, while hypothetical necessity explains the emergence and configuration of parts that are essential for surviving, material necessity explains the presence of parts that, although useful, are not essential for surviving. Examples of this would be the solid horns grown by the males of some species. The horns are good for fighting but not strictly required for survival, in virtue of the presence of an excessive amount of earth at an embryonic level.

Following a similar line, Aristotle claims in *On the Soul* that animal generation is a process that must be accounted for in teleological terms. It is worth considering, here, the complete passage:

The acts in which it manifests itself are reproduction and the use of food, because for any living thing that has reached its normal development and which is unmutated, and whose mode of generation is not spontaneous, the most natural act is the production of another like itself, an animal producing an animal, a plant a plant, in order that, as far as its nature allows, it may partake in the eternal and divine. That is the goal towards which all things strive, that for the sake of which they do whatsoever their nature renders possible. The phrase ‘for the sake of which’ is ambiguous; it may mean either the end to achieve which, or the being in whose interest, the act is done. Since then no living thing is able to partake in what is eternal and divine by uninterrupted continuance (for nothing perishable can for ever remain one and the same), it tries to achieve that end in the only way possible to it, and success is possible in varying degrees; so it remains not indeed as the self-same individual but continues its existence in something like itself—not numerically but specifically one. (*On the Soul* II 4, 415a 27-b 7).

Reproduction is, for Aristotle, one among the central biological functions that are the result of a substance’s final cause. In this case, the final cause is to exist in the most complete manner available to living beings, namely, by means of the eternity of their species. So, for all species, at any given time, there must be at least one living member. This unending reiteration of numerically different individuals is the only way Aristotle sees fit to understand the viability of living beings and biological species. If the success of any given living being (i.e., to live and to be able to reproduce) can neither depend on a series of happy accidents, nor can it be explained appealing only to material principles, nor as a result of some mind that deliberates, then it must be explained in reference to a final cause (i.e., the purpose of reproducing and generating a different individual of the same species)⁹. Aristotle’s theory of the eternity of species includes a detailed physiological account that explains the transmission of the formal principle via reproduction. Very roughly, the view is that while the male parent transmits the form via the sperm, the female parent gives the material principle via the menses (see *Generation of*

⁹ I am following here the view of John M. Cooper (2004, pp. 120–122). For him, the explicative possibilities of the concept of matter available to Aristotle are not good enough to account for the viability of animals and plants. Therefore, a teleological account of the possibilities of matter is the most reasonable explanation available to Aristotle. See also Broadie (2007, pp. 88–89).

Animals IV). This teleological model of causality involves a conception of species as eternal and unchanging.

Now, we might wonder whether Aristotelian final causes are meant to account for something other than these two phenomena (i.e., the arrangement of parts of animals and the perpetuation of species). In the natural world, cases that suggest that some form of teleological causation is at play are pervasive. Recurrent and convenient states of affairs can be found everywhere in nature, not just in living beings and their parts. For example, consider the good fit between plants and animals and their environments. Consider, too, the Aristotelian conception of the structure of the whole cosmos: i.e., the unmoved mover, the superlunary and the sublunary. These two cases are surely relevant for an Aristotelian natural scientist. In the case of the animal and its environment, the latter facilitates the success of the animal (e.g., a frog that lives in a marsh that is neither too cold nor too dry, and that also contains insects that the frog can catch). This good fit between the frog and its environment cannot be the result of chance. Even if the abiotic parts of the environment can be explained in terms of material necessity (e.g., the marsh is never extremely cold due to its geographical position, nor is it too dry due to the presence of water, etc.) the fact that it is convenient for the frog can only be due to either a happy accident or a final cause. It is possible to argue that this is just a brute fact of the cosmos—different species have always been distributed wherever they are distributed since eternity—and, therefore, that there is no need for an additional explanation. An answer of this kind would imply that the resulting good outcome, like facilitating the wellbeing of an animal, is a mere coincidence. This result is, however, unsatisfactory, since it seems that if something is convenient and non-sporadic, it must be explained. Furthermore, the best candidate to do this work is the final cause—in this case, the promotion of the good of the marsh dwelling creatures.

Similarly, the structure of the cosmos seems to call, too, for a teleological explanation. Consider that, under the Aristotelian view of the cosmos, all the conditions for life on Earth are set out by the architecture of the heavens. There is an unmoved mover, who exists out of necessity (*Metaphysics* XII 7, 1072b 10-14). The unmoved mover causes the movements of the celestial bodies all the way down to the sun, which in turn guarantees the yearly seasons. The latter enable the reproduction of creatures which depends on earthly cycles (see *Metaphysics* XII 6, 1071b 18-20; *Generation and Corruption* II 10, 336b 3-10). As in the previous case, this good state of affairs must be either the result of luck or, instead, part of a goal-driven process.

Perhaps unsurprisingly, there are some passages of the Aristotelian corpus that very explicitly present and discuss this kind of cases, namely, states of affairs the final cause of which explains either the good fit between more than one substance or the convenient result of an environmental condition for a substance. Here is a list of these passages and the phenomena discussed in each of them¹⁰:

- 1) *Metaphysics* XII 10, 1075a 11-25: the order and unity of all the parts of the cosmos are compared with that of an army and its general and with that of a household.
- 2) *Politics* I 2, 1252b 27-ff: the polis is described as a natural substance that develops throughout a goal-driven process and is said to be prior to individual living beings.
- 3) *Politics* I 8, 1256b 7-20: living beings are conceived as being for the sake of human beings insofar as humans can dispose of them as resources.
- 4) *Physics* II 8, 198b 16-199a 8: the occurrence of winter rain is understood as for the sake of crop production.
- 5) *Parts of the Animals* IV 13, 696b 25-30: the fact that some animals—i.e., dolphins and selachians—have their mouths pointing downwards is explained by referring to the benefits they bring to their preys. Dolphins and selachians need to eat by rotating backwards in such a way that the mouth looks upwards. During the rotation, the prey has the chance to escape and survive.

There are at least two reasons to consider that the reach of teleological explanation goes beyond individual living beings, their parts, and their reproduction. More precisely, there are at least two good reasons to consider that Aristotle might have been aware of the need to explain cosmic and environmental conditions by referring to final causes. The first reason is the textual evidence available to support this consideration, namely, the passages just mentioned. The second reason is that, in light of Aristotle's claim that convenient and non-sporadic good outcomes require this kind of explanation, the structure of the universe and the relation between living beings and their environments seem good candidates for this kind of explanation. Of course, it does not follow from this prospect that Aristotle had a complete account of how these phenomena were to be accounted for in teleological terms. I will discuss the latter in subsequent chapters.

¹⁰ I discuss these passages throughout the thesis.

1.4.2 The context of the debate about the reach of teleological explanations

In addition to the ones mentioned above, there is a third reason to consider this extended or more encompassing reach of teleological explanations. In the philosophical literature that is chronologically close to Aristotle, there are at least three arguments that present the possibility of explaining beneficial environmental conditions in teleological terms. Firstly, according to Xenophon, Socrates held a teleological worldview in which god arranged the whole cosmos in the best way possible (*Memorabilia* I 4; IV 3). Similarly, in the *Timaeus*, Plato explains that some plants were created for the sake of human beings, since plants could provide materials to create shelter, and they constitute a source of food:

Once the mortal creature had been equipped with its full complement of parts and limbs, its circumstances were such that it necessarily spent its time exposed to fire and air, and they were melting and eroding it away. The gods therefore came up with a scheme to help it. They engendered a compound with a constitution that was naturally akin to the human constitution, but which was so different in appearance and awareness that it was in fact a different living being. These living beings are now cultivated trees, plants, and seeds, which have been reclaimed by agriculture for our use from their original wild state, before they were ever cultivated (*Timaeus* 77a).

These two arguments presuppose a theistic model of teleological causation. Socrates' deity and Plato's demiurge articulate their notion of the good and carve out the world in accordance with that very idea. By opposition, for Aristotle, the kind of teleological causation relevant for natural philosophy is due to a mindless principle. However, Xenophon's and Plato's arguments can be taken as a teleological explanation of the interaction of more than one substance.

A third interlocutor in this debate is Theophrastus, Aristotle's younger contemporary and associate in the Lyceum. He discusses in his *Metaphysics* some issues about this kind of teleological causation. In this discussion, he questions the possibility of accounting for natural phenomena using Aristotelian final causes. According to Theophrastus, it seems that not everything in the natural world can be explained in reference to teleology. He presents some cases that are not easily explained with final causes. Some of these cases are related to animal parts. For instance, the presence of useless body parts (e.g., breasts in males and female ejaculation); parts that can be harmful for an organism (e.g., deer antlers); violent or unnatural bodily processes (e.g., herons' copulation and the short lifespan of some flies) (Theophrastus' *Metaphysics* 10b 8-10). Other cases are, in turn, related to meteorological phenomena. Theophrastus mentions the cases of ocean tides, of atmospheric changes, and of the

coming-to-being and passing-away cycles of living beings (Theophrastus' *Metaphysics* 10a 28-b7). The latter refers to the conditions appropriate for the growth and gestation of animals (i.e., the yearly seasons) (Theophrastus' *Metaphysics* 7b 2-ff; 10b 16-19).

Theophrastus' explicit concern about the reach of teleological explanations can be taken as a piece of textual evidence that suggests that such concern was already present in—and was relevant to—Aristotle's philosophy. If Theophrastus is aware of the issue of the reach of teleological explanations, and it is also the case that his works and Aristotle's were very close (at least during the time both were alive and productive in the Lyceum), then it is reasonable to suppose that the concern for the issue in question is shared by both philosophers. In the final section of this thesis (part IV), I will discuss both the chronological and the conceptual relationship between Aristotle's natural philosophy and Theophrastus criticisms of teleological explanations¹¹.

Given that Xenophon's and Plato's arguments provide a relevant context for thinking about extended teleology, and that Aristotle interacted with a philosopher who is concerned with the reach of teleological explanations, it is reasonable to suppose that Aristotle was concerned with extended teleological explanations. Before discussing at length the different passages that are relevant to the question of extended teleology, however, I turn to the different positions in the recent academic debate surrounding the reach of teleological explanations.

1.4.3 The academic debate

As mentioned, there is an important academic dispute about the reach of Aristotelian teleology¹². While some scholars claim that Aristotelian final causes are meant to explain solely the cases

¹¹ My view on this issue is that some arguments of Aristotle's natural philosophy works can be read as replies to the difficult cases mentioned by Theophrastus. If this reading is correct, then Aristotle shared the concern about the possibility of explaining some environmental phenomena in teleological terms.

¹² There is a previous dispute about the very nature of teleological explanations. According to some interpretations, Aristotle introduces the concept of final cause not because he thinks final causes are real, but to show the various ways in which something can be understood. This was a common interpretation until the 1980s (see David Furley (1999, p. 71). It was argued that teleology is just a heuristic element introduced by Aristotle because is very natural to think like this (see Wolfgang Wieland (1962, pp. 275–276). Given that some of our actions are purposive, we are inclined to conceive some biological processes in teleological terms (e.g.,

concerning the arrangement of living beings and their parts, as well as animal reproduction, there is another group who claims that final causes should be invoked, too, for states of affairs in which there is more than one natural substance. The latter include beneficial environmental conditions, the organization of the cosmos, and perhaps even some political institutions. The issue concerning the reach of teleological explanations can be broken down into at least three different questions: (1) is there enough textual evidence to claim that Aristotle was committed to some kind of extended teleology?, (2) what kind of concept is the Aristotelian final cause?, and (3) is there any passage in the corpus that contains an argument against extended teleology? In what follows, I discuss these questions.

1) Is there enough textual evidence to claim that Aristotle was committed to some kind of extended teleology?

Some interpreters do believe that Aristotle had an account of extended teleology. In other words, their view is that the model of final causes is meant to explain not only individual animals and their parts, but also states of affairs in which more than one substance is involved.¹³ According to this view, there is enough textual evidence in the corpus to show that Aristotle subscribed to the view that there is an overarching teleological principle that explains why all the parts of the cosmos constitute an ordered whole. For these scholars, the passages found throughout the corpus are sufficient to support this view.

the purpose of blood is to deliver oxygen to the organs and to remove metabolic waste from those very organs). It was also a common interpretation because it seemed to be a charitable reading of final causes insofar as this concept can be puzzling. Consider, for instance, that the good, understood as the cause of the body parts, would be chronologically posterior to its effect. There are, however, convincing ways of solving this puzzle. Some scholars claim that final causes are referred to species taken as a whole, rather than to individuals. For instance, when Aristotle argues with Anaxagoras in *Parts of Animals* IV 10 (687a 6-11) about the primacy in the relation of hands with intelligence, he has in mind a kind of causality that sums all the generation of human beings. Consider the claim that humankind has hands and intelligence for the sake of using tools. This should not be understood as the claim that the cause of an infant having hands is his future use of technology, rather it should be understood as the claim that intelligence is prior to tools if we consider the whole species (see Broadie (2007), Cooper (2004), Furley (1999, 2004)).

¹³ For representatives of this view, see Cooper (1982, 2004), Furley (1985, 1999), Sedley (1991, 2000, 2007), and Mohan Matthen (2001).

There is, however, another group of scholars that have remained sceptical about the possibility of final causes operating beyond natural substances.¹⁴ According to them, teleological causation is strictly limited to immanent formal principles, namely, the souls of living beings. Teleological causation is restricted to the configuration of living beings' body parts and their generation and behaviour such as food-seeking. In what concerns the controversial passages in question, the strategy preferred by these scholars consists in showing that these passages can be read in such a way that it does not involve any form of extended teleology. In short, the strategy—or part of it—is to show that the textual evidence for extended teleology is inconclusive. A good amount of the literature within this group orbits around *Physics* II 8, and to a lesser extent around *Politics* I, and *Metaphysics* XII 10.

2) *What kind of concept is the Aristotelian final cause?*

Let us turn now to the second question. Some of the philosophical concepts that Aristotle devises are made ex professo to solve a very specific issue. For example, in *Physics* VI 2 (200b 18-20), he introduces the concept of the “continuous” as that which is divisible in parts that are always further divisible. The purpose of this concept is to show that the infinite divisibility of an extended magnitude can be thought without any contradiction. With this account Aristotle wants to make a point against Parmenides and the Atomists (Sattler, 2020, p. 300). In this case, Aristotle advances the concept to deal with a specific problem within the debate on atoms. One alternative is to explain the concept of final causes in this way: as a conceptual tool developed to respond to a rival theory in a specific debate. In this case, it would be a response to Empedocles' account of the disposition of animals' parts as a result of chance.

Another alternative, however, is to take the concept of final cause to have a wider scope. Aristotle seems to be interested in the prospect of generalizing teleological explanations. By this, I mean that he seems interested in expanding the scope of domains in which the concept of final cause could fulfil an explanatory role. In that sense, teleological explanations are meant to explain an aspect of the natural world *in general*. If this is the right way to understand final causes, it makes sense to presume that Aristotle was interested in giving a teleological account of the good fit of the two parts of the cosmos (*Metaphysics* XII 10), and of beneficial winter rain (*Physics* II 8). States of affairs in which there

¹⁴ For representatives of this view, see Robert Wardy (1993), Monte R. Johnson (2005), Lindsay Judson (1991, 2005, 2019), and Leunissen (2010).

is a convenient and recurrent relationship between more than one object are everywhere in nature, for instance, animals and their parts, as well as animals and their environments.

3) *Is there any passage in the corpus that contains an argument against extended teleology?*

We might wonder whether Aristotle develops an argument in which he explicitly rejects the prospect of extended teleology. It seems that there is neither a direct nor an explicit argument that aims at this. There are some passages, however, in which Aristotle does seem to reject some of the consequences of extended final causes. Consider that one assumption that seems to be at play is what I will call the ousiological condition. According to this condition, final causes require an immanent formal principle and, thus, a substance to operate. If this is so, however, when it comes to extended final causes, we would need substances composed of substances for *extended* final causes to operate. This possibility is highly problematic.

The ousiological condition for teleological causation is presented in two passages of *Physics* II. Let us take a look at the first one, where Aristotle explains that, if art is purposeful, a fortiori nature is also purposeful: “Art too does not deliberate. If the art of shipbuilding were present in wood, it would act in the same way as nature; so if the ‘for something’ is present in art, it is present in nature too. The point is clearest when someone doctors himself: nature is like that.” (*Physics* II 8, 199b 28-32). The comparison between nature and a doctor who gives herself medical treatment would indicate that nature is an internal source of goal-driven change. The only difference between a doctor and nature is that, in the case of the doctor, it is accidental that she cures herself. By contrast, in the case of nature, nature is essentially both the agent and the patient. It seems, therefore, that nature and final causes are inherent to a substance insofar as they depend on a formal principle.

Consider, now, the second passage relevant to the discussion about the limits of final causes:

Since, then, nature is for something, this cause too should be known, and we should state on account of what in every way: that this out of this necessarily (i.e. out of this simply, or out of this for the most part); and if so and so is to be (as the conclusion out of the premisses); and that this would be what the being would be; and because better thus—better not simply (οὐχ ἀπλῶς), but in relation to the reality of the thing concerned (ἀλλὰ τὸ πρὸς τὴν ἐκάστου οὐσίαν). (*Physics* II 7, 198b 5-9).

Here, Aristotle mentions once more the four causes. However, this time he adds a prescriptive clause to teleological causation. According to this clause, the good responsible for some outcome cannot be the good simpliciter (οὐχ ἀπλῶς), instead, it is the good in relation to the substance of each thing (ἀλλὰ τὸ πρὸς τὴν ἐκάστου οὐσίαν). The exact meaning of this constraint has been the object of discussion. It could be the case that good which constitutes a final cause cannot be indefinite. Instead, a final cause must have some beneficiary. For example, winter rain can be explained in teleological terms as long as it is good *for some substance* (Furley, 1985, p. 182; Sedley, 1991, p. 190).

Another way of reading this prescriptive clause is the following: final causes happen not simpliciter, but with relation to that very thing of which it is a substance (i.e., final causes operate within an individual substance only). At that point of the argument presented in *Physics* II, however, Aristotle has only introduced immanent and focalized final causes. For this reason, it seems plausible that he addresses, here, the kind of teleological causation that refers to a substance and its formal principle. If Aristotle were to introduce at this point a more general prescription about final causes—namely, that they concern not only substances, but also natural phenomena that are recurrent and have some definite beneficiary—some clarification would be expected (Judson, 2005, p. 360).

Similarly, when he mentions the argument of the doctor-patient case, he does not introduce any quantification about the way “nature” is meant to work. So, he does not say that, *in at least some cases*, nature is like the doctor-patient. To this, of course, it could be replied that *Physics*’ II account of final causes does not only include the argument of the doctor-patient, but also the argument concerning winter rain. The latter is precisely a natural phenomenon that is recurrent and has at least one substance as the beneficiary.

Something that is important to notice is that in two of the central pieces of textual evidence for extended teleology, namely, *Metaphysics* XII 10 and *Politics* I 2, Aristotle presents arguments precisely in ousiological terms (i.e., arguments that concern the cosmos as a single object whose nature is ordered, and arguments that claim that the polis is by nature). These two cases could be taken as an indication of Aristotle’s commitment to the ousiological condition even when he seems to suggest the possibility of extended teleology. As was mentioned, given the ousiological condition, the operation of extended teleology requires a substance composed of substances. But Aristotle explicitly rejects this possibility in *Metaphysics* VII 13 (I discuss this argument in chapter 2). For Aristotle, substances are the most basic entity. An object composed of more than one substance cannot be, in turn, a substance. Conversely, the parts of an object cannot be substances if the object is a substance. If this is correct,

when Aristotle refers to objects composed of natural substances as substances—e.g., the cosmos and the city—it seems that something is off.

Alternatively, it could be the case that Aristotle’s commitment to the ousiological condition is not consistent throughout his works. In the passages where he accepts that there are some objects with some form of unity, this unity would have to be weaker than that of a substance. If this is correct, however, we would need an argument that explains how the unity of these objects would be sufficient for teleological causation. I will discuss this in parts II and III of this thesis.

1.5 The rainfall (*Physics* II 8)

The relevant passage in *Physics* II 8 is highly controversial. Consider that the second book of the *Physics* is the main source of the doctrine of Aristotelian final causes. At the very heart of this book, Aristotle claims that winter rain is the kind of natural phenomenon that is to be accounted for in teleological terms. In this section, I discuss Aristotle’s argument and the debate around it. In line with the two groups of scholars mentioned above, we can identify at least two views on this matter. On the one hand, some scholars are happy to accept that natural phenomena like rain are part of the things that Aristotle thought could be explained with final causes¹⁵. On the other hand, some scholars argue instead that it is better to read the passages that mention rainfall in such a way that does not imply Aristotle’s commitment to the view that rainfall is for the sake of something¹⁶.

Within the first group of scholars who argue that Aristotle did consider rainfall as a case of an object that is to be explained with final causes, there are at least three subgroups:

- i. For the first subgroup, rainfall is meant to be explained teleologically insofar as the craft of agriculture uses the material potential of rain and seeds to secure the production of crops (Leunissen, 2010, pp. 30–32). The explanation of rain is teleological in an instrumental sense because it aids a craft.
- ii. The second subgroup argues that rainfall is meant to be explained teleologically insofar as it is part of an elementary natural cycle which in turn is teleological (Matthen, 2001; Scharle, 2008).

¹⁵ For representatives of this view, see Sarah Waterlow (1982a), Cooper (1982, 2004), Furley (1985, 1999), Sedley (2000), Matthen (2001), Margaret Scharle (2008), and Leunissen (2010).

¹⁶ For representatives of this view, see Wardy (1993), Johnson (2005), and Judson (1991, 2005).

According to this view, the elements imitate the unmoved mover in the sense that being part of a cycle—like the condensation or evaporation of water—is metaphysically akin to the eternal activity of the unmoved mover (Scharle, 2008, pp. 170–171)¹⁷. In this case, the goal of rain is inherent to water, rather than having the goal of benefitting crops or some other living beings.

- iii. The third subgroup is composed of scholars who more clearly claim that Aristotle had an account of extended teleology, and that the arguments of *Physics* II 8 play an important role in such theory (Cooper, 1982, 2004; Furley, 1985, 1999; Sedley, 2000). Unlike the first subgroup, the explanation of rain is teleological but not in an instrumental sense.

Note that some of the scholars who pertain to the second subgroup are to some extent motivated to defend their own view to respond to the views presented, in turn, by scholars in the third subgroup. Note, too, that some of the consequences of final causes operating at macrolevel are problematic. While some of these problems are quite general (e.g., one may wonder whether Aristotle has the conceptual tools to accommodate a teleological account of this kind), there are some other consequences that are more problematic, and that result from the possibility of any goal-driven phenomenon like rainfall to be interpreted in this way (i.e., that any recurrent meteorological event that has some beneficiary is explained teleologically).

In what follows, I discuss in more detail Aristotle’s argument and the debate around it. I focus particularly on the possibility of reading *Physics* II 8 as evidence for an Aristotelian account of extended teleology.

1.5.1 Winter rain as purposeful

In *Physics* II 8, Aristotle introduces the aporia of whether final causes are real. He also provides some arguments to show that they do exist and are relevant for the natural philosopher. Let us take a look to this aporia:

The problem thus arises: why should we suppose that nature acts for something and because it is better? Why should not everything be like the rain? Zeus does not send the rain in order to make the corn grow: it comes of necessity. The stuff which has been drawn up is bound to

¹⁷ I discuss the possibility of the unmoved mover as an exemplar cause in chapter 4.

cool, and having cooled, turn to water and come down. It is merely concurrent that, this having happened, the corn grows (...) What, then, is to stop parts in nature too from being like this—the front teeth of necessity growing sharp and suitable for biting, and the back teeth broad and serviceable for chewing the food, not coming to *be for* this, but by coincidence? (*Physics* II 8, 198b 16-27).

According to this aporia, it could be the case that materialist theories are sufficient to explain the natural world, and, therefore, the inclusion of final causes would be redundant. The materialist view Aristotle has in mind, here, is that of Empedocles mentioned in section 1.2 of this chapter (*Physics* II 8, 198b 29-32). Natural phenomena are better explained by referring exclusively to the capacities of material properties. In the case of rain, for instance, simple material elements (e.g., water and air) and their interaction with a source of heat is enough to explain the physical or material changes that result in rain (i.e., evaporation and condensation). An explanation of this kind resorts only to material and efficient causes. Consequently, the good or bad results of rain in relation to the crops are merely an accident (συμβαίνω) of a physical process. In the final part of this aporetic argument, however, Aristotle wonders about the plausibility of expanding the reach of the materialistic hypothesis to cases such as animal parts. Consider, for instance, the case of teeth: they grow the way they do due to some material condition. The fact that they are useful for chewing food could be a by effect of a physical process, a by effect that merely happens to be good. Aristotle, though, prefers the teleological view. Here is one of the arguments he presents:

The things (ταῦτα) mentioned, and all things which are due to nature, come to be as they do always or for the most part, and nothing which is the outcome of luck or an automatic outcome does that: We do not think that it is the outcome of luck or coincidence that there is a lot of rain in winter, but only if there is a lot of rain in August; nor that there are heatwaves in August, but only if there is a heatwave in winter. If, then, things seem to be either a coincidental outcome or for something, and the things we are discussing cannot be either a coincidental or an automatic outcome, they must be for something. But all such things are due to nature, as the authors of the view under discussion themselves admit. The ‘for something’, then, is present in things which are and come to be due to nature. (*Physics* II 8, 198b 34-199a 8).

The argument can be reconstructed in the following way.

- (1) Anything that is due to nature happens by chance (i.e., accidental in relation to material necessity) or for the sake of something.

- (2) None of the things that are due to chance happen always or for the most part.
- (3) Some natural things happen always or for the most part (e.g., summer’s heat and winter rain).
- (4) Those very things are for the sake of something (1-3).

If the disjunction presented in (1) is exhaustive and concerns all the natural phenomena, then it does follow that winter rain and summer heat are for the sake of something. It seems that this is, precisely, what Aristotle is saying. At line 198b 34, when Aristotle says that “[t]he things (ταῦτα) mentioned, and all things which are due to nature”, the “ταῦτα” refers only to living beings, their parts, and their generation. These were mentioned in previous lines, 198b 29-32, when Aristotle reconstructs Empedocles’ argument about the fortuitous combination of animal parts resulting in the existing species. However, Aristotle also adds the phrase “and everything that is by nature” (καὶ πάντα τὰ φύσει). Given that the phrase does include this universal quantifier and that there is no other precision about its domain, it should be taken at face value (Furley, 1985, pp. 180–181; Sedley, 1991, pp. 183–184).

If this is the right way to read Aristotle’s argument, rain and summer heat are for the sake of something. Moreover, this claim is not inconsistent with the mechanical account of rain that Aristotle presents in *Meteorology* I 9 (346b 23-31). Even if an account of rain in mechanical terms is possible (i.e., referring only to efficient and material causes), final causes should also be invoked to give a complete account of it. Furthermore, it is not only that these are not incompatible accounts. Instead, it is precisely in virtue of being mechanical that a natural phenomenon like rain is also recurrent (Sedley, 1991, p. 184).

So, it seems plausible to support the reading according to which Aristotle does claim that rain is for the sake of something (Furley, 1985, p. 180; Waterlow, 1982a, p. 80 fn. 29). However, figuring out what exactly is the purpose of rain is not an easy task. One answer to this is what we might call teleological biocentrism (Cooper, 2004, pp. 125–126). The purpose of rain is, according to this account, the promotion of life of those that benefit from it, regardless of the species.

Alternatively, another answer is teleological anthropocentrism (Sedley, 1991). Human beings are the main beneficiary of nature, including both living beings and meteorological phenomena like winter rain¹⁸. Sedley’s argument, for instance, is based on historical considerations regarding the expression “Zeus’ rains” at 198b 16. It seems that this expression has a providential connotation in the sense that

¹⁸ There are some papers devoted almost exclusively to showing the problems of Sedley’s anthropocentric view. See Judson (2005), Wardy (1993), and to some extent also Scharle (2008).

Zeus is responsible for the rain and, thus, it can favour human beings. At some point in time someone reinterpreted this as a physical or mechanical phenomenon rather than as an act of God. Aristotle, then, would be using the expression to reappropriate its original providential and anthropocentric connotation (Sedley, 1991, p. 185). Nonetheless, this interpretation seems too far removed from what is said in lines 198b 16-21. This might make biocentrism a more plausible alternative.

1.5.2 The non-teleological reading

Besides the groups of scholars who defend a teleological reading of the rainfall case, there is another group of scholars who defend an explanation exclusively in terms of material and efficient causes. In support of this reading, it is worth noting that there is textual evidence where Aristotle presents an explanation of rain in terms of material necessity, namely, *Meteorology* I 9, 346b 23-31. If this is how Aristotle conceives of rain, then it is possible to argue that, when he introduces the rain example in *Physics* II 8, 198b 18, he aims at conveying the idea that it is plausible to generalize the reach of materialistic explanations whenever there are explanations of this kind that would be adequate to these cases (Leunissen, 2010, pp. 29–30; Rossi, 2010, pp. 100–110). So, given that a natural event like rain is sufficiently explained in terms of material and efficient causes alone, why not do the same for natural objects such as animals and their parts? Note that one assumption at play within this view is that the case of winter rain and the case of teeth disposition do not pertain to the same category. Unlike rain, the case of teeth disposition can be explained materially¹⁹, although, it can be better explained with the addition of final causes. Despite this, the strategy is to generalize the explanation advanced for cases such as rainfall to cases such as teeth disposition. An explanation that can be generalized (in this case, a materialistic explanation) is deemed preferable to an explanation that cannot be generalized (in this case, a teleological explanation). This is so, even when the latter explains some particular cases better (e.g., teeth disposition).

Even if this reading is correct and Aristotle is generalizing the case of an adequate materialistic explanation to cases in which it might be better to appeal to final causes, we still have the second reference to rainfall at *Physics* II 8, 199a 1. Here, Aristotle seems to identify the cases of winter rain and summer heat as members of the group of things that happen for the sake of something. Some

¹⁹ Aristotle does provide an account of the composition of teeth referring to material necessity (*Parts of Animals* III 2, 663b 22-35).

scholars, however, claim that this is not what Aristotle is really saying (Charlton, 1992, p. 123; Judson, 2005, p. 349). Instead, as mentioned, the “ταῦτα” of 198b 34 can be taken to refer only to living beings, their parts, and their generation. And, if this is so, the scope of the dilemma presented in premise (1) is not broad enough to include all the natural phenomena, like the winter rain or the summer heat. The reference to these two is just an illustration of how we would not refer to a non-sporadic event as something that happens out of randomness²⁰.

So, is there a compelling reason to prefer a reading of this kind? Perhaps the main incentive for choosing this kind of reading is that it is not easy to explain how extended teleology works. Indeed, the consequences of admitting that Aristotle does claim that rainfall is naturally purposeful are quite puzzling, and, so, it seems reasonable to suppose that he did not mean it that way. Defending the claim that rainfall is naturally purposeful requires the following:

- 1) Firstly, we would need an Aristotelian account of extended teleological causation. Such a theory, however, is never discussed as such. In other words, extended teleology does not constitute its own theme. By contrast, focalized teleology (i.e., a final cause operating within an individual living being) is explicitly thematized in *Physics* II. This makes the rainfall reference inadequate in the sense that it gets outweighed by focal teleology. Otherwise, if the teleology of the rain is to be understood in the focal sense, then two odd consequences follow: (i) that the object composed of the rain and the crops are a substance; and (ii) that the good of the crops, as the essence of said substance, causes the rain.
- 2) Secondly, defending that the rain is beneficial for many living beings also requires saying something about how it could also be detrimental for other living beings (e.g., it could be unpleasant or expose some animals to their predators).
- 3) Thirdly, the example of rainfall is anthropocentric insofar as the success of crops requires agricultural skills. Once we take human interests as part of the equation and argue that an event such as rain is teleological in virtue of being recurrent and useful, then many similar events would be equally teleological. For instance, if almost any year winter rain causes serious damage to the road that connects a village with a farmers’ market, and this results in an advantage to a neighbouring village that produces the same crops and sells them in the same

²⁰ This is Judson’s (2005, pp. 349–350) take on Aristotle’s argument.

marketplace, it would follow that this advantage is also part of the purposes of rain (Judson, 2005, p. 347).

Although both readings of *Physics* II 8 are plausible, the claim that rain is for the sake of something should be taken at face value. Consider that this is not the only passage where the existence of something like extended teleology is suggested. Furthermore, the rainfall passage is one among other teleological arguments that refer to environmental conditions²¹. Besides, it seems that Aristotle has good reasons to at least try to explain environmental conditions with final causes. There is, of course, a reply from the materialist interlocutor to Aristotle's argument about the insufficiency of material and efficient causes: if final causes are to be invoked whenever we see a recurrent good fit between a living being and its organs, why should we not argue that final causes are everywhere? It is not only meteorological conditions like rain that can be recurrent and good, but also the good fit of the two parts of the cosmos which is also recurrent and good. The unmoved mover moves the heavens, which in turn moves the spheres until we get to the movement of the sun. The latter causes, in turn, yearly seasons on which life on Earth depends. So, the materialist response would say, either we admit that teleology is everywhere, or we assume that the cosmos' structure just happens to be a very happy accident.

It is worth noting that it seems preposterous to attribute to Aristotle the acceptance of the second horn of the dilemma: the structure of the cosmos cannot just be a happy accident. So, there must be some sort of teleological explanation to account for it. It might be objected that even if this supposition is correct and Aristotle would have had to accept that teleology is everywhere, he does not strictly articulate an answer to this issue. If this is so, then it might be that *Physics* II 8 is not part of the answer to this Panglossian dilemma insofar as Aristotle has no answer. A response of this sort should be only partially accepted. By this I mean that it seems like Aristotle does not have a *fully articulated* answer to this issue. Nonetheless, if some form of global teleology seems to be required by his view, why should we downplay the passages that seem to offer some sort of response—or an attempt at responding—to this issue? It certainly seems reasonable to accept *Physics* II 8 as a piece of evidence for an account of extended teleology, insofar as it answers how to understand the good fit

²¹ See *Generation and Corruption* II 10 and *Metaphysics* XII 10. I will discuss these arguments in part III of this thesis.

between the environment and natural substances like plants, even when this view might not be fully articulated.

There is, additionally, the problem concerning the role of *Physics* II 8 in this partial answer to the issue of the extent or reach of final causes. According to the general argument of *Physics* II, final causes are effective insofar as there is a formal principle that is the efficient cause of a good result. The agency of the formal cause is goal-driven. If this is correct, then it is hard to say how the rain happens for the good result of the crops. It could be the case that this is not the only form of teleological causation available to Aristotle. For example, the unmoved mover could bring about a good state of affairs in virtue of being some sort of role model. Now, even if Aristotle did agree with that claim, it would be hard to explain why Aristotle introduces a new model of teleological causation precisely when he aims at scrutinizing the view he presented earlier (i.e., focalized teleology) vis-à-vis the materialist account of animals.

It is important to notice just how problematic the location of the rainfall passage is. All the accounts which argue that rain is purposeful, and that Aristotle is using a teleological model other than the strictly ousiological model²², would have to explain why Aristotle either shifts to or adds a new teleological model in the middle of the argument. As far as I can tell, this issue has not been addressed in the recent literature. Perhaps it is sensible to suppose that Aristotle's theory of final cause is a hypothesis that is devised to explain as many natural phenomena as possible. So, it should explain not only the parts and reproduction of animals, but also the good fit between animals and their environments, and, in general, as much of the natural world as possible. After all, if the rival theories

²² This is the case with Sedley's argument (1991, pp. 192, 195). Rain is caused by a cosmic nature and not by the nature of water. It is the case also of Scharle's (2008) elemental teleology because rain is teleological in the sense that only the elements are goal driven, rather than the object composed of rain and living beings.

Matthen does argue that the whole universe is some sort of substance. While the form is the unmoved mover, the matter are the four elements. According to this view, rain would be the result of an inherent formal principle, namely, the form of the universe (for this view, see Matthen (2001, p. 182). It is worth noting, however, that according to Matthen the cosmos cannot be a substance *stricto sensu*. Its cohesion is not as strong as that of living beings (Matthen, 2001, pp. 196–199). In any case, it would still be puzzling that, when Aristotle introduces his account of final causes as parts of natural substances, he is also introducing a new kind of substance to explain rain.

Aristotle has in mind can provide an account of many aspects of the cosmos in terms of efficient and material causes alone, Aristotelian teleology should aim at doing the same.

Let me briefly summarize what I have defended up to this point. I have claimed that it is plausible that, in *Physics* II 8, Aristotle means that environmental phenomena such as summer heat and winter rain are for the sake of something. I have noted, too, that it remains unclear how exactly teleological causation works. While it is likely that Aristotle thought that inherent formal causes could be a good explanation for these phenomena, he does not have a complete or fully articulated answer of how this is the case.

In subsequent chapters, I discuss each of the mentioned passages at length. In the following chapter, I turn to the passages in *Politics* I 2 where Aristotle claims that the polis exists by nature. While Aristotle advanced these arguments within the context of his political philosophy, they are presented from the perspective of a natural philosopher.

PART II. EXTENDED TELEOLOGY IN THE *POLITICS*

Chapter 2. The Naturalness of the Polis

If we follow the criteria previously established of *beneficial and recurrent dispositions* for referring to teleological explanations, we could be tempted to believe that Aristotelian teleology should be invoked to account for cases that involve more than one substance or a substance and the environment. As was mentioned earlier, there are two big groups of cases of external teleology. (1) One of these would be that of animals and their environments. The beneficial conditions of a particular environment, like a swamp for swamp-dwelling creatures, would be an instance of a teleological fit. (2) The other group includes the cosmos if we think about it from, let us say, a “big picture” perspective. In short, the unmoved mover that causes the movement of celestial bodies (i.e., stars, planets, and the sun). These, in turn, are the cause of the environmental conditions that enable life on Earth.

The truth of the matter is that, in Aristotle’s remaining works, there is nowhere to be found a fully developed account of these broad teleological relations, namely, an account of beneficial relations between different individuals, in opposition to the strictly focalized view of some animals and their parts. Aristotle never explains how exactly this extended model is supposed to operate. Furthermore, there is no discussion of the extended model that addresses it as such, i.e., as a model distinct from focalized teleology, that is required for explaining some particular kind of natural phenomena. Nonetheless, there are some passages that suggest a model of extended teleology. Aristotle does mention some cases that conform to what could be a model of extended teleology. Despite the existence of these passages, there is barely information in the corpus that would tell us about the metaphysical underpinnings of this new account; for instance, something that would tell us about the location of these final causes (e.g., some form or even God’s mind).

Given this picture, the best way to start reconstructing extended teleology consists in mapping out the different conceptual possibilities that Aristotle could have followed to solve this puzzle. My point of departure are the following presuppositions: (a) that final causes are real; (b) that Aristotle was always committed to some sort of substance metaphysics; and therefore (c) that any ad hoc concept must be consistent with this doctrine. With these in mind, it will become easier to see what Aristotle might have thought of these issues.

Perhaps, the most plausible concept for explaining these cases of extended teleology is something we could call *the grand-substance theory*. According to this theory, concrete-particulars are no longer

metaphysically basic, but could be parts of a whole, which in turn would be a substance in its own right. One first kind of grand substance theory would be an account of teleology in which there is a single substance—i.e., the universe—whose form's active aspect is God. The latter would be akin to Stoic monism. In this case, any goal-driven natural phenomena are due to God in the sense that God is the formal principle of the cosmos. Another kind of grand substance theory is totalitarian corporativism. Namely, a city conceived as a substance in which the citizens are the organs of that substance. In this case, societies are considered grand substances, and persons become parts of it.

Now, it is important to notice that the most sensible thing to say is that Aristotle was undecided, at best, about either of these last two possibilities. While there is not enough textual evidence for making a strong claim about which was Aristotle's final take in this matter, there is a way of putting together some passages to show that Aristotle might have been on the track of something akin to Stoic grand substance monism. These passages are found in the first book of the *Politics* and in the twelfth book of the *Metaphysics*.

In this chapter, I focus exclusively on the passages of *Politics* I that can be read in terms of extended teleology. I focus on two groups of arguments. The first group of arguments relates to Aristotle's claims that (i) cities exist by nature and (ii) that they develop from households in a process that is very similar to that of natural substances. After some points of clarification and the introduction of some caveats, I reconstruct the different interpretations of these claims. I then turn to classify and discuss the different readings of the teleological claims about extended teleology. The second group of arguments concerns Aristotle's claim that some complex objects, whose parts stand in a hierarchic relation, are purposeful. Households and a natural trophic chain in which human beings stand at the top are cases of this kind of objects. I argue that these cases can be explained in terms of axiarchic teleology. I also show that the case of the city being akin to a substance might be explained in these terms, too. After revising and discussing these two sets of arguments, I discuss the reasons why they are problematic within the context of Aristotle's general account of substances. At the end of the chapter, I discuss the limitations of an axiarchic reading.

In what follows, I begin by enlisting the passages of the *Politics* I that will be discussed. I briefly indicate the different interpretations they invite.

2.1 The passages in question

Aristotle's *Politics*, specially the first book, can be very useful for making sense of the puzzle of teleological causation in which more than one substance is involved. Here, Aristotle refers in some form to a case that resembles the case of totalitarian corporativism, namely his description of cities as teleologically driven objects. A word of warning here is necessary: that Aristotle makes this reference does not mean that we can find in this section of the *Politics* a fully developed account of extended teleology. However, there are some arguments that seem to fit with the abovementioned description of extended teleology. On the one hand, some of these arguments are teleological explanations that involve more than one substance. On the other hand, Aristotle explicitly mentions some metaphysical principles that, taken at face value, are also highly teleological. Moreover, unlike the final causes that are based on the inherent formal principle of a substance (i.e., on its formal cause), these principles operate in the context of a plurality of substances. Although, I will quote and discuss in detail the relevant passages throughout the rest of this chapter, it is useful to begin by listing them and by briefly summarizing the interpretations that surround them.

Firstly, passages concerned with *political institutions* are those where the following claims are expressed:

1. Cities exist by nature (*Politics* I 2, 1252b 27-1252a1).
2. Human beings are political by nature (*Politics* I 2, 1253a 7-18).
3. Cities are prior to individuals (*Politics* I 2, 1253a 18-29).

Secondly, passages where the following *general teleological principles* can be found are:

4. Hierarchical principle (*Politics* I 5, 1254a 28-1254b 2).
5. Anthropocentric principle (*Politics* I 8, 1256b 7-26).

It is also important to notice that the arguments that appear in these passages are not necessarily consistent with a single kind of final causality. Passages (4) and (5) are consistent with a model of teleology that is non-mentalistic and non-focalized, i.e., that does not depend on the soul of a natural substance. According to this model, what explains an actual state of affairs is the fact that it is *optimal*. In this context, “optimal” means in accordance with some general and rational principle that governs over objects that vary in dignity and/or capacities. Of the examples mentioned above, this kind of explanation would include passages (4) and (5). In (4), Aristotle claims that there is a natural hierarchy within both human societies and objects such as a musical mode (ἁρμονία), and that the best state of affairs is that in which the superior rules over the inferior (*Politics* I 5, 1254a 28-32). Developing a

similar argument in (5), Aristotle argues that non-human living beings are there for the benefit of human beings. Now, the principles that seem to be at play here are teleological in more than one sense. In the first place, both (4) and (5) involve human agency. Consider that, according to (4), the soul must rule over the body. This claim, in turn, refers to virtuous actions that presuppose an agent who makes some rational decision. Similarly, according to (5), human beings can *deliberately* dispose of some animals. However, (4) and (5) can also be understood in terms of a non-mentalistic teleology; for instance, (4) includes non-psychological objects, like a musical harmony. But more importantly, in both (4) and (5) the principles discussed are supposed to be real in virtue of being the best way in which these relations can exist²³. This is a different account of teleological causation that does not necessarily entail human agency (or divine or demiurgic agency, for that matter). It does not entail either a formal principle that operates within a single substance.

Arguments (1) and (3), in turn, could be read as extended teleology in the sense of a grand substance (i.e., an object whose parts might be more than what elsewhere is treated as one natural substance). At *Politics* I 2, 1252b 15-ff, for instance, Aristotle describes the polis as the result of a developmental process that starts off with primitive households from which more complex institutions branch out. This process is described in almost biological terms insofar as it is goal-driven. Households and villages exist for the sake of survival, but the ultimate goal, human happiness, can only be achieved in a city. Consequently, a city is the *terminus ad quem* of this whole process. In line with this, Aristotle says that the ultimate institution, the city, exists by nature (*Politics* I 1, 1253a 1-2; 1253a 18-29). There is a large academic discussion about what exactly Aristotle means by “cities exist by nature”. One alternative is to take this phrase at face value, as some do. According to this reading, then, when Aristotle claims that cities are composed of more than one substance, he is using the same terms as when describing natural substances.

However, not everyone agrees with the above reading of cities as substances. A second alternative to this is the account according to which some political institutions count as prime examples of non-focalized or non-substantial teleology. In this case, the good fit between an Aristotelian polis and rational human beings, as well as the convenience of the former to the latter, explains why an

²³ At *Politics* I 8, 1256b 20-26, Aristotle also claims that: “[i]f then nature makes nothing either incomplete or to no purpose, it must be that nature has made all of them for the sake of man (...).” Another relevant passage is *Politics* I 8, 1254b 2-16, where he claims that “[i]n these cases it is clear that it is both natural and beneficial for the body to be ruled by the soul (...).” I will come back to these arguments in section 2.5 of this chapter.

Aristotelian polis is both *natural* and *prior* to human beings. More precisely, Aristotle explains that cities are the optimal political institution for the flourishing of human beings and argues that they are so in virtue of the kind of rationality that we human beings have. Furthermore, Aristotle claims that for some relevant human needs, there is a social institution that would optimally cover that need. The optimal set-up of these institutions is given by nature, even if they are designed by some legislator or politician. Note that this does not count as a case of substantial teleology (i.e., it is not the result of an inherent formal cause). Although required by some natural properties of human beings, the optimal set-up of cities would, ultimately, be the result of human craft. In this case, substantial teleology and the crafts would not be natural in the same sense. The latter are natural insofar as they are the result of an inherent formal principle, the former only in the sense that it promotes human natural ends.

Throughout this chapter, I discuss the passages mentioned in more detail. In what follows, I turn to those that relate to political institutions.

2.2 Teleology in political institutions

The passages that relate to political institutions refer, more specifically, to the goal-oriented drive of these institutions and to the senses in which this drive can be said to be teleological. Note that the language Aristotle uses in these passages is highly metaphysical. At times it looks like a natural philosophy disquisition, insofar as the polis is described as a natural entity. For example, this kind of city is described in terms of being “self-sufficient” (αὐτάρκεια) (*Politics* I 2, 1252b 28-20) and “naturally prior to human individuals and to households” (καὶ πρότερον δὲ τῆ φύσει πόλις ἢ οἰκία καὶ ἕκαστος ἡμῶν ἐστίν) (*Politics* I 2, 1253a 18-19). Furthermore, the polis seems to be a goal-driven object; its telos is the good life of human beings (or of some human beings at least) (*Politics* I 2, 1252b 30). Importantly, what is suggested is that the polis—and its own goal—is given “by nature” (πᾶσα πόλις φύσει ἐστίν) (*Politics* I 2, 1252b 27-1252a 1).

These claims are, of course, puzzling. What is perhaps the main problem, though, is that Aristotle never specifies exactly what he means here by “nature”, let alone what he means by the phrase “by nature”. If he means “nature” in the sense of that of a living being, the teleology involved in the genesis of the city would be that of a biological process. And, consequently, the Aristotelian polis would be a natural substance. As I discuss later in this chapter, this possibility turns out to be very problematic. As mentioned before, Aristotelian substances cannot be composed of parts that are

substances. In any case, *if* we were to take the city as a natural substance, it would be consistent with the argument presented by Aristotle in relation to the evolution of households into cities, where he claims that “(...) in this as in other fields we shall get the best view of things if we look at their natural growth from their beginnings” (*Politics* I 1, 1252a 24-26). Now, the arguments Aristotle presents here are confusing (and perhaps even show that Aristotle himself was confused). For, while we have the above-mentioned claims about the naturalness of the city, we also encounter that Aristotle says that the polis is the result of the legislator’s craft. The latter would make cities an artificial object, rather than a natural substance.

If no natural substance is an artificial object and vice versa, how should we interpret Aristotle? It is not easy to say. Some scholars claim that the city is an artificial object and a product of practical reason (Keyt, 1987). Other interpreters, however, claim that the Aristotelian concept of “nature” can include the job of the law maker. The chief goal of human life is happiness, and this goal is only obtained under a particular political regime. In that way, the work of the legislator that makes that regime possible is a joint cause with nature (Miller, 2000, pp. 327–328; Saunders, 1996, pp. 59–63). According to this view, the city emerges from the political nature of humans, but it requires a legislator that creates a constitution in order to be complete. Additionally, there is a third group of scholars who claim that the account of “natural entities” provided in *Physics* II (i.e., substances with an intrinsic principle of movement and rest) can in fact accommodate an entity such as a political community (Reeve, 2009; Trott, 2013).

Roughly speaking, there are three positions about the notion of teleological causality at play here:

- (i) The first position points to the role of craftsmanship. Accordingly, an object has certain purpose because some rational agent built it that way in accordance with the rules of her craft. In the case of the city, it is produced by the legislator’s craft.
- (ii) The second position points to an axiarchic model. According to this model, the world is such that there is some sort of guarantee that any natural arrangement—and, therefore, natural human communities—will come to be in its optimal state. In the case of human beings, who are endowed with the capacity of holding and communicating moral beliefs, the optimal state (i.e., being virtuous and happy) requires a social environment such as an Aristotelian polis. In this sense, nature (i.e., an axiarchic principle) guarantees the existence of the city Aristotle has in mind.

- (iii) The third position is that the notion of teleological causality at play is that of a natural substance, as they are described throughout *Physics* II.

I discuss each of these positions throughout this chapter. In what follows, I turn to the passage where Aristotle claims that cities exist by nature.

2.2.1 The claim that cities exist by nature

In *Politics* I 2, Aristotle discusses several social institutions and their origins²⁴. For him, some social institutions, namely households and cities, are natural insofar as they fulfil a human need. Broadly speaking, whereas a city provides the moral and material goods required for happiness, households provide the goods required for human subsistence (i.e., a basic scheme of labour division and the basic conditions for the perpetuation of the human species). Consider the following passage where Aristotle describes the nature of the household:

Now in this as in other fields we shall get the best view of things if we look at their natural growth from their beginnings. First, those which are incapable of existing without each other must unite as a pair. For example (a) male and female, for breeding (and this not from choice; rather, as in the other animals too and in plants, the urge to leave behind another such as one is oneself is natural); (b) that which naturally rules and that which is ruled, for preservation. For that which can use its intellect to look ahead is by nature ruler and by nature master, while that which has the bodily strength to labour is ruled and is by nature a slave. Hence master and slave benefit from the same thing. (*Politics* I 2, 1252a 24-34).

²⁴ There is wide consensus that the passage where Aristotle justifies the idea that cities exist by nature comprises two arguments: the genetic argument (*Politics* I 2, 1252b 27-34) and the telic argument (*Politics* I 2, 1252b 34-1253a 7) (for discussion, see David Keyt (1987)). Given that Aristotle presents one argument after the other, consensus breaks over distinguishing where exactly one argument ends and the other begins. Note, too, that both arguments are elliptical, and not all the premises are properly spelled out, so interpreters need to speculate about the precise way these arguments are meant to work. Both arguments conclude that cities are by nature. Given that my focus is on this general claim, I concentrate here in a detailed account of the claims involved in both arguments. Regardless, throughout this discussion, I refer at times to the debate that concerns the genetic, and, at others, I refer to the telic argument.

Let us take a closer look at this passage. Aristotle starts with the institution of the household. For him, heterosexual couples and slaves are required for our species' "self-preservation and mutual advantage". Now, this claim is arguably false. On the one hand, a household—or any larger and more complex society—can thrive without slaves. On the other, nuclear families are not necessarily a couple composed of only one man and only one woman. There are many possible configurations in number of members and the gender thereof in the composition of nuclear families. In any case, Aristotle's certainty on the universality of this kind of household might be due, firstly, to his own observations and the information available to him. Slavery was a very extended institution in the ancient world (Pellegrin, 2012, pp. 561–563). Besides, even if slavery is not necessarily required (both for the rulers and the slaves), at least some kind of hierarchical relation between the members of a household might have been almost always present in what Aristotle acknowledged as primitive societies. His point might be taken instead to be that a household cannot thrive without labourers of some kind (who, in some contexts, might be slaves). Also, in the context that Aristotle has in mind, both a biological man and woman are required at least for reproduction. Moreover, Aristotle seems to refer here to what would be the minimal case of nuclear families.

In what concerns the claim about "mutual advantage", Aristotle refers here to a basic form of social cooperation in which the master takes care of the household. The arrangement benefits slaves and animals insofar as they are part of it. The master, in turn, benefits from their labour. There is the issue, naturally, of how exactly the household's arrangement is beneficial for both the masters and the slaves. Aristotle does not seem to be concerned about any particular set of autonomous interests proper to slaves²⁵, let alone animals. Rather, he is concerned with what is better for slaves insofar as they belong to a social order that is properly guided by the master (*Politics* I 6, 1255b 4-15).

According to this view, the household is considered a natural object. Aristotle does not spell out properly the reason why this is the case. However, it is reasonable to argue that insofar as there is a

²⁵ Some scholars claim that, according to Aristotle (*Politics* I 2, 1251a 31-32, 1260a), masters and slaves share the same interests, but given that slaves are not fully rational and thus cannot deliberate properly, the master must guide slaves in the pursuit of their interests. This in analogy to the case of parents and their children (see Malcolm Schofield (1990, pp. 14–15)). However, other interpreters claim that this is not the whole picture. Unlike the relationship between a father and his children, in which the benefit of the latter is always deliberately contemplated, in the master-slave relationship the benefit of the slave is accidental to the interest of the master. This can be seen in *Politics* III 6, 1278b 32 (see Pierre Pellegrin (2012, p. 568)).

natural human tendency or instinct both to preserve life and to procreate, the household is natural. It is not up to us to have such instincts and, therefore, the parts and functions of the household as an institution are not up to us.

Before cities come into existence, there is another institution that branches out from the household, namely the village. According to Aristotle, villages are the sum of several households, which are ruled by a king, who normally is the eldest patriarch of an extended family (*Politics* I 2, 1252b 5-10). The purpose of the village is “satisfying need[s] other than everyday ones” (*Politics* I 2, 1252b 13-14). Aristotle does not mention which needs are supposed to be covered by the village, he does not mention either what are the exact relationships between the members of it or the number of the latter. In any case, Aristotle has in mind a colonial settlement (*ἀποικία*) of several associated households where there is some degree of consanguinity among the individuals that are part of it, and where there is also some sort of patriarchal ruler who tends to be one of the older members of the community (*Politics* I 2, 1252b 17-27). Like the case of the household, the village is also an object by nature (*Politics* I 2, 1252b b16-17). Once again, Aristotle does not explain what exactly this means. It is possible to argue that the village is natural insofar as there are some more complex human needs that are satisfied by the village and not by the household. The fulfilment of those makes it more self-sufficient and therefore more valuable (i.e., more choice worthy). In virtue of being more self-sufficient it is prior in nature (Keyt, 1987, pp. 66–67).

In addition to the previous argument, it could also be argued that it is natural insofar as it is the non-deliberate result of the existence of households: whenever there is a household there are children, who will have their own children and, because there is some need for rulership, a patriarchal leader is naturally necessitated. In this case, the *need* for a transition from household to village does not presuppose any choice (e.g., a deliberated or imposed social contract), but is instead a spontaneous consequence (i.e., non-deliberative, but guided by *a* nature).

The final stage of this *social* process is, as Aristotle describes it, the emergence of the polis. Cities are supposed to be goal-driven, too. Material goods and self-preservation, which are provided by villages, are not the only relevant human needs in Aristotle’s list. Complete self-sufficiency, instead, includes

happiness²⁶, which is a more important good, and can only be achieved in a city (*Politics* VII 4, 1326b 4-ff; III 9, 1280b 34). We can take this to mean that human beings can only be happy as part of a political community such as a city. Consider the following passage:

The complete association, from several villages, is the city-state, which at once reaches the limit of total self-sufficiency, so to say. Whereas it comes into existence for the sake of life, it exists for the sake of the good life. Therefore, every city-state exists by nature, since the first associations did too. For this association is their end, and nature is an end; for whatever each thing is in character when its coming into existence has been completed, that is what we call the nature of each thing—of a man, for instance, a horse or a house. Moreover, the aim, i.e. the end, is best; and self-sufficiency is both end and best. (*Politics* I 2, 1252b 27-1253a 1).

We are faced here with the question of what Aristotle means by “by nature” in these passages. However, other questions arise as well. For example, how can the naturalness of basic institutions be responsible for the naturalness of the polis? There are many ways to answer these questions.

We could say that the genetic account of social institutions is diachronic: i.e., at T1, there is an object composed of a set of households and the relationships between their members; at T2, the same object becomes a city (i.e., it has laws, citizens and other inhabitants, and territory). We can also think that the qualitative change brought at T2 refers to different kinds of institutions or communities, in the sense that their goals are different. While the goal of one would be reproduction and survival, the goal of the other would be the good life. If this qualitative change is brought about mainly by some sort of human deliberation or human craft (e.g., creating a constitution), then it cannot be the case that “by nature” here means an internal source of movement and rest, as it would be in the case of a natural *substance* (Keyt, 1987, p. 68; Miller, 1995, pp. 34–36).

If the argument, instead, is that cities are both (a) natural insofar as they stem out of natural components and (b) a product of craft, we have a fallacy of composition. Think of a salad which is not natural, although its components are natural or were natural at some point. Similarly, the household could be natural, but not necessarily the city. In line with this, Aristotle presents in *Parts of Animals* the case of a house—an artificial object—which is prior in substance to its components, which

²⁶ Aristotle defines self-sufficiency in *Nicomachean Ethics* in the following way: “Let us examine this question, however, on another occasion; the self-sufficient we now define as that which when isolated makes life desirable and lacking in nothing (...)” (I 5, 1097b 14).

are—or were— natural objects (e.g., lumber, clay) (II 1, 646a 24-29). The city might be one of these cases, regardless of Aristotle’s phrasing.

There is yet another way of reading this argument. Some scholars claim that Aristotle’s story of the evolution of households to polis does not presuppose a qualitative change in the members’ community, only in the *kind* of institutions (Trott, 2013). The latter are defined by their ends (i.e., survival, reproduction, or both, and the good life) but human beings are political at all times. The human drive responsible for the search of self-sufficiency is the same in the household and in the city. This means that a community within a household is “nascently political”, although it is not yet capable of being self-sufficient (Trott, 2013, p. 49). In this view, the goals of the members of the basic community (i.e., the satisfaction of basic needs) tend to become more like the sophisticated goals of the fully political life (i.e., the need of a good life). If this is the case, what makes basic institutions natural also makes cities natural, namely “the drive to join together” into “self-sufficiency” (Trott, 2013, p. 48).

This reading might be useful to understand the so-called *telic argument*:

Moreover, the aim, i.e. the end, is best; and self-sufficiency is both end and best. These considerations make it clear, then, that the state is one of those things which exist by nature, and that man is by nature an animal fit for a state. Anyone who by his nature and not by ill-luck has no state is either a wretch or superhuman; he is also like the man condemned by Homer as having ‘no brotherhood, no law, no hearth’; for he is at once such by nature and keen to go to war, being isolated like a piece in a game of *pettoi*. (*Politics* I 2, 1252b 34-1253a 7).

Self-sufficiency is the good responsible for the polis’ status as the more perfect social institution. It is also the cause of its evolution. Additionally, the good of the polis is good for human beings, and thus a fully human life is only possible as part of a city.

If this kind of reading is correct, it might be reasonable to claim that the naturalness of the polis is that of the inner source of movement and rest, akin to a natural substance. Political institutions develop in a goal-oriented fashion (i.e., toward complete self-sufficiency) and from an inner source (i.e., either an incipient or fully developed political community). It is important to notice that it is not very clear in the passage abovementioned how exactly the relationship between the human good and the good of the polis is supposed to be conceptualized. On the one hand, the good of the city (i.e., self-sufficiency) brings about the city from the household. On the other hand, the good of human

beings is defined in terms of a self-sufficient life. If both human beings and the polis are explained by the same final cause, either the same good causes two different substances or the good brings about only one substance. In this second case, the self-sufficiency is good for both, but in different senses: for the city, it is the good of the whole substance; for human beings, it is just the good of the parts of a substance. This would be akin to saying that nutrition is good for an animal as an individual, but it is also good for any organ, insofar as they depend on the individual as a whole. Of course, this consequence is extremely puzzling. Nonetheless, Aristotle would seem to suggest that this very possibility is the case. He says that the city is ontologically prior to human beings.²⁷

2.2.2 Human beings as political animals by nature

So far, we have seen that Aristotle provides an account of the emergence of the city in teleological terms. The city naturally branches out from villages that, in turn, originate in the household. Now, there is another important claim Aristotle makes in *Politics* I 2, namely, that human beings are by nature and more than any other gregarious animal a political animal (διότι δὲ πολιτικὸν ὁ ἄνθρωπος ζῶον πάσης μελίττης καὶ παντὸς ἀγελαίου ζῴου μᾶλλον, δῆλον) (1253a7-9). Aristotle claims that the rationality required to express moral beliefs (e.g., communicating what is fair or unfair, what is just and unjust) makes human beings the kind of creature for which living in a city is convenient. I will turn to these arguments in what follows. Consider the following passage:

The reason why man is an animal fit for a city; to a fuller extent than any bee or any herding animal is obvious. Nature, as we say, does nothing pointlessly, and man alone among the animals possesses speech. Now the voice is an indication of pleasure and pain; which is possessed by the other animals also; for their nature does extend this far, to having the sensations of pleasure and pain, and to indicating them to each other. Speech, on the other hand, serves to make clear what is beneficial and what is harmful, and so also what is just and what is unjust. For by contrast with the other animals man has this peculiarity: he alone has sense of good and evil, just and unjust, etc. An association in these matters makes a household and a state. (*Politics* I 2, 1253a 7-18).

²⁷ I further discuss this issue in section 2.2.3 of this chapter.

Here, Aristotle claims that some gregarious non-human animals are social insofar as they can communicate the objects of their perception, such as pleasure and pain. Having these capacities, however, is necessary but not sufficient for being part of a community such as an Aristotelian polis. In the case of human beings, there is an extra capacity of rational speech which is responsible for having a complex form of morality, for it enables the communication of what is harmful or beneficial future consequences of some action, as well as the communication of what is just and unjust. This capacity, along with the possibility of communicating the objects of perception, is necessary and sufficient for being fit for life in a city.

It is noticeable that Aristotle says that it is evident that human beings are more political than other animals in virtue of the “nature does nothing in vain” principle. The argument seems to work like this. Given that human beings are capable of rational speech, we also are capable of the highest form of sociability, i.e., political life. It would be preposterous if human beings were rational but not naturally fit for political life. For example, if the capacity of rational speech were not matched with the capacity for political life, insofar as the latter were only possible through coercion. Such a state of affairs would be comparable to an animal capable of digesting vast amounts of plants but without the appropriate molars to chew vegetation. These cases are incompatible with the ordered and intelligible way natural objects are disposed, hence the introduction of the “nature does nothing in vain” principle.

Some scholars have noticed that the meaning of “πολιτικόν” varies throughout the argument of *Politics* I 2, 1253a 6-18 (R. G. Mulgan, 1974, p. 444). Aristotle claims that both humans and bees are political, but not to the same extent. Here “political” cannot be understood in the sense of belonging to a polis, because only human beings live in poleis. Instead, it seems that it should be understood as the property of being a social or gregarious creature. Nonetheless, he also says that only human beings are fit to live in a polis, since he claims that an association based on human’s peculiar sense of good and evil “makes a household and a state” (*Politics* I 2, 1253a 15-17). These two definitions of political (i.e., gregarious, on the one hand, and those who pertain to a polis, on the other) are present in different parts of the Aristotelian corpus. On the one hand, in *History of Animals* I (487b 33-488a 13), Aristotle presents a classification of animals according to which, from the class of animals that are gregarious (ἀγελᾶτος), a subclass of animals is political. Human beings are not the only members of this subclass as it includes bees, wasps, ants, and cranes. In this sense, “political” is not defined in terms of being a member of a city but as having some objective in common (κοινόν ἔργον), namely, each member has a function oriented towards a common goal and the members spend time together. On the other

hand, Aristotle sometimes talks of political animals in the sense of being capable of taking part in some governing activity (*Eudemian Ethics* VII 10, 1242a 22-24; *Nicomachean Ethics* VIII 12, 1162a 16-19). Other times, he defines the “political animal” as a member of a household insofar as it is one of the institutions encompassed in the polis (see *Nicomachean Ethics* I 7, 1097b 8-11; IX 9, 1169b 16-22; *Politics* III 6, 1278b 15-30).

However, there is no true opposition between human beings (as if we were the only truly political animal, properly speaking) and the rest of gregarious creatures²⁸. Both groups are political but human beings are so in a fuller or more intensified way. Aristotle’s primary goal in the biological works is not to make a classification of the different kinds of animals. Rather, the methodological stance in these works is both to create a list of the relevant traits found across living beings and to divide these traits into four classes (both generic and specific: parts, dispositions, actions and ways of life) (Depew, 1995, p. 171). The aim of this classification is to examine how the presence of these traits varies across different kinds of animals²⁹. This method makes way for a scale or graduality of a trait. For instance, of all the social animals, some are more social insofar as they communicate, and some are deemed even more social because they communicate *verbally*. The quality of being political, therefore, admits of degrees. And the most complete and sophisticated example of this is that of human beings³⁰. The political trait of human beings escalates from a group that has a common goal, to social cooperation based on rationality capable of making and expressing moral judgements.

²⁸ Not everyone agrees with this view. Some scholars claim that these two senses of political are mutually exclusive. For this view, see R. G. Mulgan (1974, pp. 444–445) and Bernard Yack (1993, p. 51). So, when Aristotle says that non-human animals are also political, he must refer either to one and only one of the two meanings of “political” or express himself metaphorically. Moreover, some scholars think that “political” *stricto sensu* is exclusive of human beings (Irwin, 1981; Keyt, 1987; R. G. Mulgan, 1974). This last claim, however, does not necessarily entail that the property of being political names the human essence, as some philosophers claim, (e.g., Mulgan (1977, pp. 17–26) and more famously Hannah Arendt (1958).

²⁹ I am following David J. Depew in this reading (1995, p. 162), who in turn follows David M. Balme (1987) and Pellegrin (1987).

³⁰ A similar take can be found in Wolfgang Kullmann (1991, pp. 94–17), Cooper (1993), and Fred D. Miller (1995, p. 31).

2.2.3 Cities as prior to human beings

The final passage concerned with political institutions relates to Aristotle's claim that cities are prior to individuals:

Furthermore, the city-state is by nature a thing prior to the household and to each of us individually. For the whole must be prior to the part. If the body is put to death as a whole, there will no longer be hand or foot except in name, as one might speak of a 'hand' made of stone. The killed hand will be like that; for everything is defined by its capacity and function. So-when they are no longer in that condition, we must not say they are the same things, but that they have the same names. It is clear then that the state is both natural and prior to the individual. For if an individual is not self-sufficient after separation, he will stand in the same relationship to the whole as the parts in the other cases do. (*Politics* I 2, 1253a 18-25).

This argument is puzzling. Aristotle is saying that the polis is by nature prior both to individual human beings and to basic institutions. He illustrates his argument with the case of an organ separated from a body, which is no longer an organ properly speaking. If organs are defined by its function, and that function is only possible when integrated to an organism, detached from the latter they become an object essentially different. Similarly, a human being without a city is supposed to be a different object than, let us say, her political counterpart, insofar as its goal (i.e., self-sufficiency) is in this case impossible to attain. According to the list of the different senses in which something can be prior or posterior to something else³¹, the city could be either prior in nature, in substance, or in both.

If, on the one hand, we take "priority in nature" to mean priority in separation, i.e., X is prior to Y if X can exist without Y, but Y cannot exist without X (*Metaphysics* V 11, 1019a 2-4), the claim about the priority of the polis is an untruism. It seems obvious that it is perfectly possible to live outside society, for people do not cease to exist whenever they get ostracized or accidentally separated from their natural community. Think of Sophocles' character Philoctetes³². On the other hand, "priority in substance" can be understood as "priority in perfection", namely, X is prior to Y if X is developed

³¹ For Aristotle's list of the different senses of 'prior to' and 'posterior to', see *Metaphysics* V 11 and *Categories* XII.

³² Keyt (1987) notices that Aristotle is acquainted with Philoctetes' story as it is mentioned in *Nicomachean Ethics* VII 2, 1146a 19-20.

fully in comparison to Y³³. For instance, an oak tree is prior in perfection to the acorn, regardless of the temporal priority of the latter.

Some interpreters claim that “being prior” here means (or should mean) “priority in perfection” (Key, 1987, pp. 63–65). A human being can live without a society, but her life would be suboptimal. Aristotle believes that happiness consists in being virtuous, and virtues can only be developed under the tutelage of other virtuous persons. The latter is only possible in the context of an Aristotelian polis. Perhaps this example is useful for understanding how this kind of explanation would work. Suppose that, whenever there is some form of human society, people will ask philosophical questions. So, there is a human need for doing philosophy. Now, the best way to do philosophy consists in having some interlocutors that stand in a relation of teacher-student (let us call this the Socratic institution). Additionally, suppose that the best way to instantiate this Socratic institution is in a university where there are professors, lecturers and students. In the face of this example, we can speculate that Aristotle would claim that the university is natural in the sense that it is the best institution for satisfying the natural human need of discussing philosophy. Furthermore, he could also maintain that universities are prior to asking philosophical questions, in the sense that academic philosophy is the best philosophy, vis-à-vis its non-academic counterparts, even though philosophy could persist without universities.

This kind of reading makes the passage more digestible. Furthermore, we can see, too, that it would be consistent with some of Aristotle’s own concepts, e.g., that of priority in perfection. If this reading is correct, it is possible to take this analogy as a hyperbolic illustration of how a city is required for the good life. Accordingly, if the goal of human life is to be a virtuous member of a city, without a city a person becomes morally suboptimal, akin to the dead organ that can no longer fulfil its natural purpose.

Additionally, this interpretation of the argument in question would also be consistent with a non-ousiological reading of *Politics* I 2, namely, a reading according to which cities are not ontologically prior to human beings. This is useful for avoiding the abovementioned issue of a case like Philoctetes’, who remains both alive and a human being (and, hence, a substance), even when he is isolated. Nonetheless, note that Aristotle is not exactly saying that cities are more complete in the sense that only there can one fulfil all the moral requirements for a good life. Taken literally, the argument takes

³³ For this notion of priority, see *Physics* VIII 7, 261a 13-14; *Metaphysics* VIII 8, 1050a 4-7.

the issue of the city's ontology a step further. Anyone that is not part of a city is a human being only homonymously, just like the hand of a dead body that is a hand only homonymously. The example of the homonymous hand vis-à-vis the proper hand (i.e., as part of a living person) is not infrequent in Aristotle³⁴. Proper organs are defined by their function within a natural substance. In this case, Aristotle would mean that the city is a natural substance³⁵, and not a hyperbolic illustration of how cities are necessary for human happiness. The latter would be in line with the ousiological reading of *Politics* I 2, according to which cities *are* prior to human beings, lending it thus support over the non-ousiological reading.

Now, if someone were to commit to the ousiological reading and take the argument literally, there is a way of solving the issue of the priority in separation³⁶. According to Aristotle's account of body parts, detached limbs do not cease to exist simpliciter, instead they are just something other than the integrated limb. More precisely, detached limbs share the name but not the definition with integrated limbs. So, could it be the case that Aristotle means something similar, namely that a human being without a polis is an object essentially different to a political human being? This could, perhaps, make sense if we suppose that it is almost impossible for a human being to be entirely non-political. If someone, like Philoctetes, was at some point a member of a polis, there is a sense in which he would be a member of the polis all his life, even when isolated. For instance, he could still wish for his polis to thrive. Sharing interests with members of a community along with being, at some point, part of the latter might be sufficient to be a political animal. Besides, isolated Philoctetes is definitely both a moral subject and a moral agent. In short, belonging to any social institution, provided that there is some kind of genuine political activity throughout all the stages of the household-city process, might be sufficient to be considered political. Now, if this is the case, to be separated from a political community (i.e., a household-polis continuum) should be understood as being completely isolated from it at birth. A horrifying example would be that of exposed new-borns. A person in this situation either is adopted and becomes part of a political community or faces premature death, and therefore it is impossible to

³⁴ For other examples of this, see *Meteorology* IV, 12, 389b 35-390a; *Parts of Animals* I 1, 640b 30-641a 6; *Generation of Animals* II 6, 734b 25-27; *Metaphysics* VI 2, 1026b 30-32; VII 10, 1035b 23-25.

³⁵ I will discuss this possibility in section 2.4.3 of this chapter.

³⁶ Adriel Trott argues that Aristotle does not mean that human beings qua entity become a homonymous object without a polis, but only the political part of human beings (i.e., the actualised capacity of being member of a community). Isolated Philoctetes is only potentially political which makes him political only in name (Trott, 2013, pp. 62–65).

become a fully developed human being. We could stretch this argument a bit more and argue that the exposed infant might be adopted by some non-human animal and become a feral child. In this case a person might not die, but she would not develop verbal language. Now, if we commit additionally to the claim that verbal language is a necessary condition for being a human being—a conception we can recognize now as ableist—the feral child would not be properly a human being. We could presume that Aristotle might endorse a conception of this kind.

If all these assumptions are correct, namely, that Aristotle subscribes to this definition of human being and that all social institutions are to some extent political, we can take the claim about the ontological priority of the city at face value. However, it is worth noting that if we take this argument to its last consequences, we get some odd metaphysical and political results. It would follow that cities are natural substances and that individual citizens are their parts. Furthermore, the city, qua substance, would organize or shape its parts and not the other way around (*On the Soul* II 1, 412b 1-ff). The city would be akin to a living being. Besides, the political regime proper of the political social community would be totalitarian³⁷. Individual human beings' goals and interests, akin to those of the organs, are set out by a centralized authority—regardless of whether this is a ruler, a constitution or both—which would constitute, in this case, the formal principle. Another odd consequence would be that of feral animals. If domestic animals are also part of a household and of a city, whenever they are domesticated (i.e., whenever they are the property of someone who cares for them), they are part of a substance. However, if one of these animals gets back into the wild and manages to survive on its own, it would become an independent substance. Conversely, if a wild animal is domesticated (e.g., a peacock bird,

³⁷ For this interpretation, see Karl Popper (2013, Chapter 1) and Jonathan Barnes (2005). Barnes says that the argument of the priority of the polis does imply a totalitarian view of the city-state (2005, pp. 200–201). The part-whole relation between citizens and the city is that of possession (κτηῖμα), as described in *Politics* I 4, 1254a 8-17. In this passage, the citizen is a possession of the city, like the slave is a possession of the master. However, Barnes claims that even if Aristotle argues that the goals of individuals are to be heavily constrained by the legislator (e.g., that the education of young people is entirely up to the legislator (*Politics* VIII 1, 1137a 11-12) or that cities should ban foul language (*Politics* VII 17, 1336b 13-14)), he should reject the totalitarian argument for the following reasons. Firstly, the only explicit argument for totalitarianism is bad, since it rests on the untruth of people being the property of a state. Secondly, his highly intrusive policies about education, personal morals, and even reproduction are not the result of a theory of political liberty (i.e., an account of what is rightfully a state's prerogative and of which policies, if any, are *ultra vires*), but of his illiberal and naive notion of what is a state-service (Barnes, 2005, p. 198).

perhaps), then it would become a different object, it no longer be a substance on its own, but part of a substance.

2.2.4 Aristotle's political theory

In the previous subsections, I have presented an overview of Aristotle's arguments in book I of the *Politics*, particularly those related to the teleological underpinnings of these arguments. Note that, by means of these arguments, Aristotle aims at building, let us say, the more theoretical side of his political theory. This consists mainly of three groups of arguments. First, a justification of why the polis is the best political institution for human beings. Secondly, a philosophical account of what a city is and what a human being is. And finally, a philosophical account of social hierarchies, that perhaps borderlines on an ideological spiel on the master-slave relation.

Regardless of how this choice of topics compares to what we now consider the most relevant philosophical underpinnings of a political theory, it is fairly reasonable to say that he is arguing against two kinds of political theories: on the one hand, a spontaneous account of political institutions; and, on the other hand, a constructivist account of the foundations of political institutions. By "constructivism" I mean a theory according to which the design of the purposes of all political arrangements is *entirely* up to us. According to Aristotle, we are the kind of animal that can easily be part of a civil society, and, therefore, this is not an acquired disposition but rather a natural consequence of our rational capacities. Many commentators of Aristotle's *Politics* mention Thomas Hobbes' *Leviathan* (1996) as an example of a constructivist theory³⁸. In the opening lines, it is explained that the State is an artificial object³⁹. Furthermore, according to Hobbes, given that there is no natural inclination for being a cooperative member of a civil society, the main incentive for social cooperation is the fear of being a victim of violence (*On the Citizen* I, 2)(Tuck & Silverthorne, 1998)⁴⁰. Aristotle

³⁸ Perhaps Glaucon's account of justice presented in the second book of *The Republic* might be read in these terms, too. Laws are the result of a social convention the goal of which is to avoid suffering the harm of injustice (359a-ff).

³⁹ Hobbes claims that "[n]ature (the art whereby God hath made and governess the world) is by art of main, as in many other things, so in this also imitated, that it can make and Artificial Animal" (*Leviathan*, Introduction, p. 1). I am following Richard Tuck's (1996) edition of *Leviathan*.

⁴⁰ I am following Tuck's and Michael Silverthorne's (1998) translation and edition of Hobbes' *On the Citizen*.

would reject these psychological underpinnings. We are the most political animal, so being a cooperative member of some sort of community would be only natural. He also rejects the idea of an entirely artificial city, hence all the arguments we have discussed. In light of this, it seems that Aristotle's theory of *Politics* I 2 is at the antipodes of Hobbes' own political philosophy.

A much earlier version of a political theory of this kind can be found in Plato's *Laws* X. At 888d-ff, Plato discusses an argument in which nature and chance are older than art and craft. All the natural world is the result of chance, which does not include political institutions and law because these are an entirely human-made object (*Laws* X, 888d 6-ff). A similar antecedent is that of the proponents of arguments for slavery as a social convention mentioned at *Politics* I 2, 1253b 27-30, whom Aristotle unfortunately does not mention by name.

A "spontaneous theory" of social institutions might also be on the background of *Politics* I. According to this view, there are at least some objects and events that are not the result of any planning (neither human nor divine) but are nonetheless conducive to some form of social cooperation. Think, for example, of "spontaneous order" theories like that of Friedrich Hayek (1960), in which economic agents communicate their needs through a price mechanism. An antecedent of this general kind of view can also be found underdeveloped in Plato's *Laws* (Keyt, 1987, p. 58). In book IV (709a 1-b2), the Athenian guest mentions the possibility that chance and random catastrophic events overrule any law that pretends to legislate over human affairs (τύχαι δὲ καὶ συμφοραὶ παντοῖαι πίπτουσαι παντοίως νομοθετοῦσι τὰ πάντα ἡμῖν) (*Laws* IV, 709a 2-3). For example, a given legislation can be amended as a response to war or poverty. The Athenian interlocutor does not elaborate much on the argument because he quickly modifies his view. In the modified version, it is not chance but God who is responsible for the events in question. Nonetheless, this argument remains an antecedent of an indeterministic account of political institutions. Aristotle would reject, however, a view like this, since political institutions are not the result of luck or chance, as they are defined in *Physics* II.

2.3 The term 'by nature' in other works

In opposition to the claim that political institutions are the result of luck or chance, Aristotle claims that cities are by nature. These are the claims that we have reviewed throughout this section. Given that in the *Politics* he does not specify what he means by this phrase, we can turn to some of the ways in which Aristotle uses the term "by nature" in other of his works. Both the concepts of "φύσει" and "φύσις" are used as distinctions that stand in the opposition to different terms (Chappell, 2009, p. 386). Here is a list of these conceptual oppositions, although this list might not be exhaustive.

Events that happen normally or most of the time are called “natural”, as opposed to things that are the result of luck (τύχη), an accident (κατὰ συμβεβηκός), or what Aristotle calls a “spontaneous result” (αὐτόματον). For example, many humans are born with a pair of hands, in opposition to a spontaneous result, like a person being born with only one hand (*Parts of Animals* II 10, 656a7–1, IV 10 686b2–5; *Generation of Animals* IV 3, 767b5). Aristotle does not say explicitly that the polis is not the result of chance, but it follows from the claims that cities are a natural object. In any case, we have mentioned how the conceptual possibility of a political institution that results from chance might be present in Aristotle’s arguments of *Politics* I. However, it seems that Aristotle would reject this view.

Aristotle also draws a distinction between things that are by nature, and the products of social norms or conventions (*Politics* I 3; III 6)⁴¹. This distinction is relevant for understanding Aristotle’s account of political institutions. It is natural that some kind of hierarchy exists in an object such as a community. In a similar line of thought, Aristotle argues that some human beings are naturally fit either to rule or to be ruled.

Another contrast that becomes relevant here is that between “natural virtues” and “complete virtues”. Fully rational human beings can develop moral virtues because everyone, including children, has a natural disposition that enables further moral perfection (*Nicomachean Ethics* I 6, 1143b 7-15; 1144b 1-12). Now, this restricted sense of naturalness seems to be somehow relevant to the arguments of *Politics* I, since the virtues that can only be developed as a citizen might have a proto version in the household and the village. This could entail that when Aristotle says that cities are “by nature” he means that they are ontologically just as any other natural substance, i.e., a hylomorphic compound whose form is promoted by a craftsman, but not sourced from her soul. Instead, it would be just the sophistication of the thing that is given by nature, in this case, the household virtues.⁴²

Another contrast that could be relevant is Aristotle’s distinction between natural substances and manmade objects. The latter would include the results of the application of a given craft. This is the meaning of “φύσις” that is central to his philosophy of nature and that is that of individual living beings. The technical account of this term is developed by Aristotle in several parts of the corpus, the most famous, perhaps, is *Physics* II. Luckily for us, in *Metaphysics* V 4 (1014b 15-ff) there is a list that summarizes six different senses for the term *nature*:

⁴¹ See also Plato’s *Laws* 890a2–9 and *Gorgias* 483c.

⁴² I will further discuss this argument in section 2.4.3. of this chapter.

- (1) The coming-to-be of things that grow.
- (2) An immanent principle responsible of the growth of things described in (1).
- (3) An internal and non-accidental source of movement for natural things.
- (4) The primary matter of non-natural objects.
- (5) A substance in the sense of form and configuration.
- (6) In general, any substance, because any nature is a substance.

The first of these options is a non-technical use of “nature”. According to (1), the root of φύσις is φύω, in the particular sense of growing. Perhaps this would be one of the first connotations that would have come to mind to the native speaker of ancient Greek. The sense indicated in (2) moves from the vernacular sphere to a more technical meaning, in this case to some internal principle that is responsible for the growth (φύεται) of the growing thing (τὸ φύομενον). The rest of the list relates to the famous four causes: (4) alludes to the material cause, (3) to efficient causes, and (5-6) to formal and final causes, and substances in general.

For Aristotle, the paradigmatic instances of natural things are living creatures and the four elements. More precisely, Aristotle defines natural things as that which “has in itself a source of change and staying unchanged, whether in respect of place, or growth and decay, or alteration” (*Physics* II 1, 192b 13-14). It could be further specified that formal causes have an ontological and explanatory priority over the rest of them. Final and formal causes are closely related, since some of the movements and processes experienced by natural substances are regulated by their form and they aim toward the good of the individual and of the species⁴³. For instance, a carnivorous bird has a particular form that configures its parts in a way that it is beneficial for the animal. According to Aristotle, this happy concurrence of body parts that are adequate for performing some beneficial function can only be explained by a formal principle.

Natural substances are opposed to artificial objects produced by craft. The main difference between these two kinds of objects is that the latter do not have an intrinsic and non-accidental principle that

⁴³ The association between formal and efficient causes is not completely consistent throughout the whole corpus. In some passages, Aristotle connects relates causes to the material cause. He claims, for instance, that “[a]n eye is for some end, but a blue one is not (...) we must take it that these things [viz., eye color and other such features that serve no end] come about of necessity, and refer to the matter and the source of the movement as their causes” (*Generation of Animals* V 1, 778a32– b1).

accounts for self-motion (or for any purposive function, generally speaking). Aristotle explains this with a couple of examples. On the one hand, an artisan is responsible for the process in which some pieces of wood *become* a bed and for the artefact to *function* as a bed, so in this case the source of movement is not intrinsic to the bed. On the other hand, when a doctor heals herself, the cause of the healing (i.e., the art of the doctor), and the result of this art (the healed patient) just happens to be in the same individual as the result of that art, and so the principle of movement is accidental in this case. More precisely, the principle of movement is accidentally internal.

Although the telos of natural substances is non-intentional or non-psychological, whereas the telos of artefacts comes from a purposive mind, it is important to notice that natural causes and artificial causes share some important attributes. Firstly, they are goal-driven. Secondly, they both replicate a similar causal structure (e.g., if X is good for A, and if X is the result of a process that necessitates Y, then Y is for the sake of A and of X). Thirdly, natural and artificial causes replicate similar outcomes. The latter should not be overlooked: according to Aristotle, if nature were to be the cause of some objects that are actually artificial, they would be as they are now. And vice versa, in a possible world in which natural objects are produced by art, the result would be the same as they are now (*Physics* II 8, 199a 8-17)⁴⁴.

The previous argument suggests that cities could have been structured in the same way, regardless of being natural or artificial. Nonetheless, Aristotle claims—as we have been discussing—that cities are “by nature.” Recall that the problem of concern here is whether Aristotle’s polis is natural in the sense of a natural substance. If it is so, then it cannot be an object produced by craft. Although, some passages clearly indicate that the latter is the case. Consider, for instance, the following: “(...) although the impulse towards this kind of association [cities] exists by nature in all men, the first person to have set one up is responsible for very great benefits” (*Politics* I 2, 1253a 29-31). And also: “As the weaver or shipbuilder or any other artisan must have the material proper for his work (and in proportion as this is better prepared, so will the result of his art be nobler), so the statesman or legislator must also have the materials suited to him.” (*Politics* VII 4 1326 a1-5)⁴⁵.

⁴⁴ See also *Physics* II 8, 199b 27-28.

⁴⁵ Similarly, in *Politics* II 12 (1273b 32-33; 1274b 18-19), Aristotle refers to lawgivers in terms of craftsmen. Relevant passages are, also, *Politics* I 2, 1253a 30–31; II 8, 1268b 34–38; II 12, 1273b 32–33; II 12, 1274b 18–

One final point that is worth mentioning is that in *Physics* II 8, Aristotle mentions that things like spiderwebs and nests are “by nature”, in opposition to things that are “παρὰ φύσιν” (against nature) (*Physics* II 8, 199a 28-30). This point will become important for the next section, where I turn to the debate that concentrates on these issues. More specifically, I discuss more thoroughly the claim that cities and households are a natural entity. As was mentioned before, this seems to be a very problematic issue, given that no Aristotelian substance can have parts which in turn are also substances.

2.4 Interpretations on Aristotle’s teleological political concepts

Let us turn now to the academic discussion surrounding the issue of what Aristotle means when he claims that cities are “by nature”, and, furthermore, that they are “by nature” prior to individuals. Broadly speaking, regarding this exegetical issue there are three groups of interpreters:

- (1) those who claim that this teleological jargon is a blunder on Aristotle’s part;
- (2) those who claim that the polis is natural in an extended sense;
- (3) those who claim that cities have a “standard” nature, similar to those of natural substances.

2.4.1 Teleological jargon as a blunder

Perhaps the more extended group is that of people who claim that the use of metaphysical, and, more precisely, teleological jargon results from a big blunder on Aristotle’s part. The most influential scholar in this group is Keyt (1987). Consider that none of the abovementioned contrasts of ‘natural’ with ‘non-natural’ is really consistent with what Aristotle says in *Politics* I, especially the distinction between natural substances and artificial objects. When Aristotle lays out his doctrine of natural entities and objects which are the result of a craft in *Physics* II and *Metaphysics* V 4, he clearly states that the two categories are mutually exclusive. No natural substance is artificial, and no artificial object is a natural substance. The latter is especially problematic for Aristotle’s political philosophy. Aristotle actually says that cities are by nature, and also that we are naturally political creatures. As was mentioned earlier, this kind of theory is opposed to some contractual views of society, in which political institutions are

19; III 3, 1276b 1–11; III 12 1282b 14–16; VII 4 1325b 40–6a 5; VII 4 1326a 35–38; *Nicomachean Ethics* III 3, 1112b 14; X 9, 1181a 23; *Eudemian Ethics* I 5, 1216b 16–19.

the result of human ingenuity. The purpose of political institutions is to curb some of the violence that reigns in a pre-civic state of nature. Nonetheless, Aristotle also claims that cities are the result of a craft. The passages mentioned in the previous page (namely, *Politics* I 2, 1253a 29-31 and *Politics* VII 4 1326 a1-5) are a clear example of this.

Insofar as cities are the result of at least one lawmaker or a legislator, they are the product of some craftsman that imposes a form over some materials that are adequate to the task at hand. The legislator imposes a constitution (i.e., the form) upon a set of citizens that live within a delimited territory (i.e., the matter) (*Politics* III 3, 1276b 1-11). It seems that a “polis is an artefact of practical reason just as a ship or a cloak is an artefact of productive reason” (Keyt, 1987, p. 55). It is in light of this that the claim that the polis is natural appears to be a “big blunder” (Keyt, 1987, p. 55).

2.4.2 Polis as natural in an extended sense

The second group of interpreters is composed of those who argue that the polis is natural in an extended sense. Given that the Aristotelian city promotes natural human goals (i.e., the good life) (see *Nicomachean Ethics* I 7) in a way that is better than any other institution, there is a sense in which the legislator collaborates with nature. The reason for this is that the legislator creates the conditions for the kind of institution that enables the fulfilment of human goals. In other words, the city is an instrument for achieving human goals that is facilitated by the legislator. Miller (1995, 2000) is perhaps the most influential author in this category. According to him, cities exist “by nature”, because they have “as its function the promotion of an organism’s natural ends and it results, in whole or in part, from the organism’s natural capacities and impulses. On this interpretation nature and the lawgiver might function as joint causes of the completed polis” (Miller, 2000, p. 328).

According to this view, cities do not have a nature of their own, at least not in the sense of having an internal source of motion and rest. By contrast, human beings do have an internal nature, and so a proper telos (Miller, 1995, p. 41). Now, given that cities are required for the completion of the goal of human beings and that they promote the nature of human beings, cities are *κατὰ φύσιν*. Evidence in support of this argument can be found in *Physics* II 8 (199a 6-8, 29-30), where Aristotle says that spiderwebs and birds’ nests are *κατὰ φύσιν*. Both spiderwebs and nests promote a natural end insofar as they provide an immediate environment that enables the survival of spiders and birds. Aristotelian

cities would constitute the optimal environment for human beings (i.e., they guarantee both material and moral goods), which would make them *κατὰ φύσιν*.

The main virtue of this interpretation is that it seems to explain the odd use of “nature” in *Politics* I in a simple and charitable way. Nonetheless, it is possible to point out a few problems. First, Aristotle does not say in *Politics* I that the polis is *κατὰ φύσιν* but “by nature” (φύσει). Second, if cities are in the same ontological category as spiderwebs, and cities are the result of the legislator’s craft, it would follow that spiderwebs are the result of some sort of craft that pertains to spiders. The problem with this is that the crafts are, in the Aristotelian picture, a rational activity and therefore exclusive to human beings. I will return to these problems in the next section.

2.4.3 Polis as similar to paradigmatic substances

The third group of interpreters⁴⁶ consists of those who argue that Aristotelian cities have a “standard” nature, similar to those of paradigmatic natural substances, i.e., living beings. An important example of this group is C. D. C. Reeve’s (2009) arguments. Reeve points to the evidence in favour of this thesis in *Politics* 1252a 24–26 (Reeve, 2009, p. 513). Recall that in this passage, Aristotle claims that cities are the result of a process in which households evolve into villages which, in turn, become a polis. Note that this is the kind of language that Aristotle uses for describing biological processes⁴⁷. However, Aristotle also refers to the job of the legislator as a craft. Furthermore, natural substances cannot be the result of some craft. This apparent impasse is not the end of the story. Aristotle claims that craft sometimes is required by nature to “perfect or complete the task that nature is unable to perfect or complete” (*Physics* II 8, 199a 15–16). For example, human beings perfect their nature through moral and intellectual virtues, which are the result of rational choice but also of the craft of education (Reeve, 2009, p. 513)⁴⁸. According to this view, things whose nature requires the assistance of some craft to fully develop, are not strictly speaking the product of craft, even if they came about with its aid. For example, medicine exists not to produce something that does not exist in nature at all, but in

⁴⁶ In this part, I focus on Reeve’s (2009). For similar arguments, see Kevin Cherry & E. A. Goerner (2006).

⁴⁷ For instance, at *Politics* I 2, 1252a 24–25, Aristotle makes the following remark: “Now in this as in other fields we shall get the best view of things if we look at their natural growth from their beginnings” (Εἰ δὴ τις ἐξ ἀρχῆς τὰ πράγματα φυόμενα βλέψειεν, ὥσπερ ἐν τοῖς ἄλλοις, καὶ ἐν τούτοις κάλλιστ' ἂν οὕτω θεωρήσειεν).

⁴⁸ See also *Politics* VII 13, 1332a 39–b 11; VII 17, 1336b 40–1337a 3; *Nicomachean Ethics* II 1, 1103a 17–26.

order to improve our natural wellbeing. Similarly, the legislator's craft has some input in the creation of a political regime, but actions such as legislating or seeking out for some legislation, are a natural development.

Consider, at this point, that artificial objects have their form imposed by something external. Their form comes from the soul of the craftsman, which she somehow applies into a material substrate (see *Metaphysics* VII 7, 1032b 1-10). Objects with a standard nature, on the other hand, are hylomorphic compounds with an intrinsic form.

So, how exactly would a social institution like a polis have a *nature*? Living beings are the paradigmatic case of a natural substance, and they acquire their form—or nature—through the male parent (see *Generation of Animals* IV 3). One way to answer the question, then, is the following. Aristotle claims literally that substances are both “by nature” and “prior to human beings” (*Politics* I 2, 1252b 27-1253a 4). While higher moral needs can only be met in a city (i.e., receiving the right education, having the right moral role models, etc.), *material* and *biological* basic needs, at least in a first moment, are satisfied in households and villages. This is the result of a progressive process of Aristotelian institutions to satisfy different human needs. The polis stands as the final and most complete stage of this process (Reeve, 2009, p. 516). But where is the nature of the polis located? According to Reeve (2009), this is located in the soul of its members. Each member of a community indexes the virtues that belong to that kind of political institution. In the case of a democratic constitution, democratic values are indexed into the souls of the citizens through education, which is contemplated and stipulated in such a constitution (Reeve, 2009, p. 516). Furthermore, there would be something like a generic “democratic soul”, insofar as there is a group of virtues specific to democracy (see *Politics* V 9, 1310a 12-16; VII 1, 1337a 10-18).

Now, if those constitutions—which determine the moral character of their citizens whose soul is the locus of the city's nature—are a product of craft, it is not clear that the argument succeeds in proving that cities have a standard nature, in opposition to an artificial form. There might be, however, an answer to this question: human beings are always part of a community, since we are at least members of a household, which is the most basic social institution. There are, according to Aristotle, a set of household virtues (*Eudemian Ethics* VII 10, 1242a 40-b 1). Household virtues are connatural to human beings, insofar as they pertain to an institution which is not the result of a convention nor of any kind of institutional design. Cities, although a more sophisticated social institution, are part of a social process that stems out from households. If this is so, the virtues that are proper to, e.g., an oligarchic

polis, are a more refined and sophisticated version of the household virtues. In consequence, any constitution X that procures the virtues proper to X through a particular educational model, is not entirely artificial. It is, instead, a variation of the household virtues, which are part of an institution that arises out of biological necessity.

It is important to notice that this account takes Aristotelian cities as substances (Reeve, 2009, pp. 517–518). This means that cities have the following characteristics. Firstly, they have an internal nature, as we just have explained. Secondly, they are a hylomorphic compound. The form is the constitution, and the matter is the sum of the individual citizens. Finally, the form of the polis works as a source of stability and change, i.e., individual citizens might change over time, but the kind of political regime that defines a particular polis will stay the same as long as the constitution remains unchanged. Conversely, a polis would lose its identity only when the constitution changes.

In a similar line, Trott also argues that the Aristotelian polis is not an artificial object. The latter is not possible because the beneficiary of a produced object, like a house, could be anyone, either the architect or someone else. In the case of the polis, however, it is not possible to separate the beneficiary or the user and the activity of making a polis (Trott, 2013, p. 54). According to this view, there is a structural parallel between natural substances and the polis in what concerns their source of movement. In the case of the latter, rather than a proper formal cause (i.e., a soul), what causes movement is rational activity, more precisely, deliberation about what constitutes a good life (Trott, 2013, pp. 169–170). The source of activity of the polis is, thus, similar to that of a natural non-rational substance in that it is internal. This in opposition to an artifice, the cause of which is external. According to this view, the deliberative reasoning of individuals is a political activity. If the purpose of the polis is the good life and it is by means of deliberation that we evaluate the actions that might lead to a good life, deliberation is essential to the polis (*Politics* III 9, 1280a 31–ff). In this way, deliberating is the most basic form of ruling, which involves all the citizens (Trott, 2013, p. 152). The deliberative community establishes a particular constitution as the goal of their deliberation. Therefore, this constitution expresses the view of the community’s—composed only of proper citizens—of what constitutes the good life. Trott infers from the foundational nature of deliberation that the constitution is both a formal and a final cause. Not only does it give order to the parts, but it is also a formal cause insofar as it is the activity “that indicates what a polis is, and also the end toward which the polis aims” (Trott, 2013, p. 160). According to this view, the constitution cannot be reduced to the institutions

that compose a particular form of government, rather it is the activity of the citizen-rulers that seeks to achieve their ultimate goals⁴⁹.

Now, if we were to decide if any of these interpretations is correct, we would need to make explicit what exactly we are trying to do. For example, let us suppose that the objective here is mainly to provide an exegesis of the first book of the *Politics*. This exegesis would aim at providing an account of what Aristotle means, how the argument works and how it fits with other arguments or with other accepted doctrines of Aristotle's philosophy. If this is the case, then Keyt's blunder view and Reeves' and Trott's grand substance view would have an advantage over Miller's reading of the instrumental polis. For the former views take Aristotle's argument at face value and, to put it bluntly, tend to put fewer words in Aristotle's mouth. Aristotle does not say that cities are natural insofar as they are *κατὰ φύσιν*, rather he says many times that they are *by nature*. This expression, along with the claim that cities are ontologically prior to individual human beings, at the very least suggest that cities are natural in a different sense than the way in which a spiderweb or a bird nest are said to be natural.

It is important to notice that if we were after an exegesis of this kind, it would be reasonable to point out that Keyt's view is insufficient insofar as there is no explanation of why Aristotle is so confused when he says that the city is a natural substance. Even if an argument supposes some confusion, it is desirable to understand what led to those mistakes. Put differently, it would be desirable to know what led to the wrong use or application of a conceptual toolkit. Furthermore, it would be good to exhaust the possible ways in which a city can be understood as a substance before rejecting this possibility completely. Similarly, Reeve and Trott take the claims about the naturalness of the polis at face value, but they also explore the conceptual possibility of the city as a natural substance. Nonetheless, an account of this kind would still have to deal with some exegetical issues. For example, can Aristotle's ontological metaphysics include an object such as a city-substance?

In the next section, I will engage with this issue. On the one hand, it is hard to conceive an Aristotelian substance whose parts are in turn substances. In this case, this would be a substance—the city—that

⁴⁹ According to Trott (2013, pp. 162–164), the governing class (πολίτευμα) Aristotle has in mind is not an elite alienated from the ordinary citizens. Instead, the relationship between citizens and ruling class is closer than what it might seem. So, when Aristotle says at *Politics* III 6 1278b 11 that the “the government class is the constitution” (πολίτευμα δ' ἐστὶν ἡ πολιτεία), he does not mean that the politeia is that far away from the citizens.

is, in turn, composed of substances—human beings and animals. On the other hand, the naturalness of a constitution as an internal and self-regulating principle might not be consistent with Aristotle's own view of the inherent character of the nature of a substance. In the next section, I will also discuss why Aristotle uses his natural philosophy concepts for explaining why an object such as a city is to be described in teleological terms.

2.5 Can the polis be a substance?

As mentioned, despite their exegetical advantages, an account like that of Reeve's and Trott's has some problems as well. The most relevant are those that relate to the possibility of an object such as an Aristotelian polis being a natural substance. On the one hand, when Aristotle says that substances "have a nature", he means it both as an intrinsic and not-accidental principle of movement. This claim is illustrated with the example of the doctor that is the cause of her own health. In this case, the relation between the craft and the subject remains accidental although intrinsic. In the case of the polis, the formal principle is intrinsic and essential. The legislators, insofar as they must work with the specific ethos of their own political community, can only create a politeia within their political community. This is different from the case of the doctor that can cure herself or be cured by another doctor.

However, although the legislator's task is intrinsic in the abovementioned sense, her activity is accidental insofar as both the deliberation and the moral formation of souls could come in many possible configurations and are, therefore, contingent. For example, there could be a political process that results in either a democratic or an oligarchic constitution. If this is the case, any particular instance of political deliberation or of the moral frameset of the souls of some citizens, would not be essential to the Aristotelian polis. This is not the case for natural substances: the form of human being can only cause another human being.

A more serious difficulty with the Reeve-Trott's reading is that it can be hard to think of an Aristotelian substance whose parts are also substances. As mentioned before, along with focalized teleology, Aristotle sometimes suggests the existence of cases of what we have called extended teleology. These are either cases of global teleology or cases of living beings in a particular environment which seems beneficial to them. If we suppose that non-theistic teleological explanations require a concrete nature that guides any goal-driven process (as in the case of an individual animal, whose form shapes the way

its organs are disposed), we can, then, think in terms of grand substances. More precisely, these could be substances whose parts are other substances (i.e., the city as a substance, the members of which are humans and animals that are also substances), or a single substance whose parts are no longer traditional Aristotelian substances (i.e., a monism in which the only substance is the cosmos or a city⁵⁰). Reeve-Trott's reading seems to be a case of a substance whose parts are in turn substances. This concept, however, seems highly un-Aristotelian. The possibility of a substance composed of different substances seems to be discarded by Aristotle himself. Consider, for instance, the following passage from *Metaphysics* VII:

It is impossible for a substance to consist of substances present in it in complete reality; for things that are thus in complete reality two are never in complete reality one, though if they are potentially two, they can be one (e.g. the double line consists of two halves-potentially; for the complete realization of the halves divides them from one another); therefore if the substance is one, it will not consist of substances present in it and present in this way, which Democritus describes rightly; he says one thing cannot be made out of two nor two out of one; for he identifies substances with his indivisible magnitudes. (*Metaphysics* VII 13, 1039a 4-10).

Aristotle clearly states that substances cannot be composed of parts which are also substances. An object composed of more than one fully actualised substance cannot be, in turn, a single substance. Although Aristotle does not say much about the reason for this impossibility, it seems that it is because substances are the most basic entity. By definition, there cannot be a substance whose existence is grounded on something more basic.

If the prospect of a substance composed of substances is that puzzling, we could just argue that the city is an object whose unity is weaker than that of a natural substance, but greater than that of an artificial object⁵¹. The unity of the polis consists in a constitution that is caused not only by the choice of the legislators, but by the naturally given moral and rational character of human beings. As it has been explained, this is different than the external imposition of an artificial form by a craftsman.

⁵⁰ For views that explore this possibility, see Barnes (2005), Cooper (1993, pp. 303–325), Popper (2013, vol. I, p. 11), and (Reeve, 2009, pp. 518–519).

⁵¹ I am following Matthen (2001, pp. 197–199) in this claim about natural object whose unity is weaker than a natural substance.

An account of this kind would be met with two challenges. First, is that of what to do with the passages in which Aristotle seems to imply that a city is a natural substance. Namely, *Politics* I 2, 1252a 24 where Aristotle says that the city should be studied since the beginning of its natural growth, like living beings; and *Politics* I 2, 1253a 18-19, where it is said that cities are ontologically prior to human beings. The second challenge consists in explaining how teleological causation would work within an object like a city.

An answer to the first of these two issues could be posed in the following terms. Firstly, Aristotle compares the study of the development of a city with that of a natural substance because these two objects are similar in a relevant sense. Neither the city nor the substance is the result of craft, therefore their origin must be in nature, even when they are not the exact same kind of object. Secondly, the priority argument could be read as a hyperbolic illustration of how human life without a city is suboptimal. This might give us reasons not to take it at face value. This reading could be supported with an argument found in *Politics* II 2, where Aristotle criticises Plato's views concerning a strong social unity akin to that of a household:

But obviously a state which becomes progressively more and more one will not be a state at all. For a state is by nature a plurality of some sort, and the more it becomes one, it will turn from a state into a household, and from a household into an individual person. For we would say that the household is more one than the state, and the single individual than the household. (*Politics* II 2, 1261a 16-21).

Aristotle argues that the unity of a city is weaker than that of a household, which in turn is weaker than that of a human being. If Aristotle acknowledges in the *Politics* that a natural substance such as a human being is more unified than a polis, and this position is consistent with his account of substances of the *Physics* and the *Metaphysics*, we should not take the argument about the ontological priority of cities at face value.

Answering to the second issue could be a bit more complicated. In the case of substances, teleological causation depends on the inherent formal principle that brings about the arrangement of a living being's parts (i.e., on its form). In the case of the city, there cannot be a formal principle like that of a substance, so, more needs to be said to explain how it is a goal-driven object. As was mentioned in the previous section, some interpreters have explored how cities could have a non-artificial nature. It could be argued that the formal cause is composed of both a constitution and the set of virtues it

promotes (Reeve, 2009). It could also be said that the political deliberation is the formal principle of a polis (Trott, 2013).

An account of this kind should be complemented with a more thorough explanation of how the naturalness of the polis is rooted in the naturalness of the household (Cherry & Goerner, 2006, p. 571). Unlike cities, for which the legislator's craft is a necessary condition, Aristotelian households are completely unplanned. According to Aristotle, households come about by biological necessity. Breeding is a natural necessity, and the birth of a human being requires a household. This means that they must be by nature. If households are not artificial, and not the result of chance, then they must be natural. There is a passage in the *Nicomachean Ethics* that points in this direction:

Between a man and a woman, friendship seems to hold by nature, since a human being seems to be by nature more couple forming than political to the extent that household is prior to and more necessary than city, and reproduction is a characteristic more common to animals. (*Nicomachean Ethics*, VIII 12, 1162a 16-19).

This argument echoes *Politics* I 2 (1252a 24-34), where Aristotle argues that households exist for “the self-preservation and mutual advantage” of its members (i.e., heterosexual couples, slaves and/or domestic animals). The purpose of this argument is to show that some good brings about a social structure. In this case, the human good of reproduction is responsible for the way basic societies are shaped.

There is a very important feature of this teleological account of the household that should not be overlooked. Namely, that this would be one of the few teleological descriptions that involve more than one animal in the Aristotelian corpus. First, we have human couples and their children, but the only way they can survive is with the assistance of other individuals. These can be either slaves and domestic animals, or just the latter (*Politics* I 2, 1252b 9-15). Note that Aristotle justifies the expansion of the members of the household with a new teleological principle. Note, too, that there is an interesting contrast between the way Aristotle discusses the teleological underpinnings of the city and those of the household. In the case of the former, Aristotle introduces some of his ontological concepts. In the case of the latter, Aristotle uses another kind of teleological concepts. More precisely, he uses what we might call the hierarchical principle. Let us take a look at the relevant passage:

For wherever there is a combination of elements, continuous or discontinuous, and something in common results (*γίνεται ἔν τι κοινόν*), in all cases the ruler and the ruled appear (*τὸ ἄρχον*

καὶ τὸ ἀρχόμενον); and living creatures acquire this feature from nature as a whole. (Some rule exists also in things that do not share in life, for instance over a musical mode; but an investigation of these topics would perhaps take us somewhat far afield.) First, the living creature consists of soul and body; and of these the former is ruler by nature, the latter ruled. (*Politics* I 5, 1254a 28-35).

According to the hierarchical principle, for complex objects whose parts present variations in value, the superior will rule over the inferior because this is the best setting for an object as a whole. The hierarchical principle is supposed to have a very extended reach. It explains why the vertical relationship of the household members is natural, or why the soul should rule over the body: because that is how nature distributes objects in which there is some common purpose. Nature is supposed to guarantee the best state of affairs.

If this is correct, it could be argued that the underpinnings of the teleological account of the household are axiarchic. As was explained in the introduction of this thesis, axiarchism is a metaphysical proposal according to which there is a direct link between value and existence. Accordingly, the goodness of X explains why X is actual. For instance, this world is actual because it is good that this possibility is actualised. The theory is at times presented as a non-materialistic alternative to theistic accounts of the origin of the universe or of the emergence of consciousness. It differs from theism in that there is no need for a God that causes or designs any state of affairs. Instead, there is an ethical necessity for good things to exist (Leslie, 2016; T. Mulgan, 2015, 2017). In other words, the view would be that we do not need a provident God that chooses to bring this world to actuality out of all possible worlds and in virtue of this being the best possibility. Instead, it is the goodness of this possible world itself that makes it actual (T. Mulgan, 2017, p. 2).

According to the axiarchic reading of the household, the reason for the existence of both a complex arrangement of a set of parts and of their hierarchical relationship is that it is a good state of affairs. The same thing can be said of all the objects in which their parts stand in a ruler-ruled position. If order is good, then the fact that is good is sufficient for explaining why order exists. The quality of being ordered is defined in the previous passage in terms of the more valuable having ontological priority over the less valuable. For example, the body over the soul, or the tonic over a musical scale (*On the Soul* I 5, 410b 10-15). This principle would also explain why in the household the master rules over the slaves or the domestic animals. Notice that this principle seems to work both for natural substances and for objects with a weaker unity.

If this is right, it is possible to argue that there is room for teleological causation that does not require a formal principle that is inherent to a substance, namely, that does not require a formal cause. This kind of teleology seems to be desirable for understanding this part of the *Politics*. Aristotle is actually providing an account of the foundations of social order in teleological terms. He uses some of his ousiological concepts for this purpose (i.e., cities are substances). This, of course, is puzzling because substances cannot be composed of substances. Nonetheless, Aristotle seems to mention an alternative model of teleological causation in the first book of the *Politics*. Moreover, this new model seems to work both for substances and for objects which possess some kind of unity, even when their unity or order is not as cohesive as that of a natural substance.

This argument faces two challenges. Firstly, an explanation is needed to account for the fact that Aristotle uses his ousiological concepts but not this axiarchic concept when he wants to explain that the city is not an artificial object. Aristotle says that the city is by nature prior to human beings. He does not say, however, that ‘given that nature makes way for order, the city branches out from households because it is more worthy’, or something along those lines. Although this is certainly puzzling, perhaps it could be replied that axiarchism includes many teleological explanations, among which are ousiological accounts. Not all the teleological views that fall under axiarchism, however, are ousiological. Given that substances have a stronger unity than that of non-substantial ordered objects, they are used as a paradigmatic case of the application of an axiarchic principle. An answer of this kind might explain why Aristotle sometimes uses ousiological concepts in a confusing way. This confusion, nonetheless, is not always present. Consider, for instance, the passage mentioned above where Aristotle recognizes degrees of unity amongst political institutions.

The second challenge is the following. It could be replied that the teleological arguments of the *Politics* could be read in a reductive way. We could say that the household order is not caused by a general hierarchical principle, but rather by the individual souls of its members. According to a view of this kind, it would be coessential to human beings to live in households. For example, maternity would be coessential to women, or the specific kind of ruling over domestic animals would be coessential to some human beings. We could say that ruling over dogs in the “household way of ruling” is coessential of human beings naturally fit for being dog owners. If this were the case, all the relationships between the members of the households would be explained with the respective formal principles of the individual substances involved. The formal principle is defined by the essential capacities of an animal,

and so if household functions are coessential to human beings, then the domestic roles are due to the inherent natures of its members⁵².

I think that there are at least two reasons for rejecting the reductive reading in question. The first reason is the following. Even if coessential household-capacities alone would explain the household order, they would not be sufficient for explaining all of the teleological claims Aristotle makes about the polis. It is not only the case that being political is coessential to human beings, but also, as Aristotle says, that the polis is prior and that it exists on its own right.

The second reason to reject the reductive view is that Aristotle uses axiarchic arguments for explaining the favourable environmental conditions that enable the life of human and non-human animals alike. At *Politics* I 8, Aristotle introduces the subject of chrematistics or the acquisition of material goods. Regarding the acquisition of food, Aristotle says that there is a good fit between the way of life of animals and the kind of food that can be sourced from the environment: “for no life is possible without food, so the differences of food have produced among animals different ways of life” (*Politics* I 8, 1256a 21-23). In the case of humans, nature provides resources according to the chrematistic culture of different social organizations (e.g., people who depend on fish for their subsistence live close to a body of water) (*Politics* I 8, 1256a 36-37).

Aristotle explains this good fit between the environmental conditions that provide an adequate source of food for both different kinds of animals and different kinds of cultures with an anthropocentric variation of the hierarchical principle:

Such acquisition is clearly given by nature herself to all, both straight away at the first moment of birth, and so too when they are fully grown. For some animals produce at the start, to accompany the birth, sufficient food to last until such time as the offspring is able to get it for itself, for example those which produce grubs or eggs. The viviparous carry for some time

⁵² This argument is based on Jessica Gelber’s account of the environment as a coessential feature of an animal’s vital capacities (Gelber, 2015, pp. 283–285). The soul of living beings is a set of capacities required for engaging in vital activities. The habitat, nonetheless, gives shape to the mentioned activities, e.g., looking for food in a muddy marsh is different than looking for food in another environment. The environment is, then, part of the essence and enables, e.g., some birds to search for food in the ‘the marsh-dweller way’. This is how Aristotle would conceive of the way some animals are well “adapted” to their environments. I will also discuss this view in more detail in the appendix of part III.

within themselves food for the offspring being born—the natural substance we call milk. So similarly it is clear we have to suppose that, for developed things also, plants exist for the sake of animals, and that the other animals exist for the sake of man, tame ones both for use and for food, and most but not all wild animals for food and other support—in order that we may obtain clothing and other instruments from them. If then nature makes nothing either incomplete or to no purpose, it must be that nature has made all of them for the sake of man. (*Politics* I 8, 1256b 7-23).

This kind of argument seems to be inconsistent with a reductive view of the teleological underpinnings of the household. Aristotle uses a general teleological principle to explain a natural process such as the acquisition of food, a process that would be an instance of good fit between animals and their environment. But, if this general principle is applied here, it is reasonable to suppose that Aristotle would use this general teleological principle to explain the relationship between the members of the household. In other words, it is plausible that he would use it to explain the teleology of the order of a complex whole. Both the hierarchical and the anthropocentric principles can be taken as cases of axiarchic teleology. The best state of affairs is actual because it is good. In the case of the household, this is the hierarchical relationship between its members. In the case of the relationship between natural sources of food and living beings, there is a trophic chain that involves both plants and animals, and that has human beings as the ultimate beneficiary. This trophic chain is similar to the household insofar as both are ordered structures that have an ultimate beneficiary: in the household, the masters and the free people in general (*Metaphysics* XII 10, 20-21); in the trophic chain, the human species in general.

This would be an answer to the issues related to the concept of the city whose parts are substances. If we are going to take seriously Aristotle's claims about the naturalness of the polis, then a non-mentalistic teleological explanation is required. The model of substantial teleology in which there is a soul that brings about the specific activities of an object does not seem to be the right conceptual tool. This is so because substances cannot be composed of substances. An alternative reading of the naturalness claims seems to be required. To understand this, we can look into the teleological underpinnings of the household, which is also a natural object. Aristotle introduces the hierarchical principle: all the objects required for the good of human reproduction are there in an optimal way because this is how nature distributes objects: with order (i.e., the superior rules over the inferior). This claim seems to be consistent with what Aristotle says about the environment as a source of

nutrition: food is required, and so it is disposed orderly, namely, there is a hierarchical trophic chain. Both the household and the trophic chain are natural objects that display some unity, but the unity is not necessarily caused by a soul. What about the claim about the ontological priority of the city vis-à-vis human beings? We can make the exegetical decision of reading it as a hyperbolic claim about how poleis are extremely important to human happiness. Given that there is evidence that Aristotle is willing to accept that the city is not as cohesive as a substance, it is plausible to take this position as the view we should attribute to Aristotle.

PART III. EXTENDED TELEOLOGY IN ARISTOTLE'S COSMOLOGY

Introduction

In part III, I reconstruct the two core Aristotelian arguments concerning extended teleology. These arguments are presented by Aristotle in parallel passages located in *Physics* VIII and *Metaphysics* XII. In these passages, Aristotle provides, firstly, an account of the unmoved mover and of the motion of the superlunary structure; and secondly, an account of the cosmos' arrangement, as well as the properties that make it an ordered object. According to Aristotle, this order is guaranteed by necessary entities and processes. These passages are central to the question of extended teleology, since it is here that Aristotle seems to more clearly suggest that there is a kind of causation that is goal-driven and involves more than one substance. My aim in this section is to provide an alternative teleological reading of the cosmic arrangement that is articulated in terms of an axiarchic principle. This axiarchic principle allows a teleological explanation of a state of affairs in which there is more than one substance involved.

Now, by 'extended teleology' I mean the relations between different substances, or substances and the environment, in which, as a result of that relation, at least one of the substances involved is benefited. This benefit, however, is neither the result of chance nor of necessity (according to the Aristotelian sense of those terms), so it must be non-sporadic. Something important to note about extended teleology is that Aristotle never uses the concept. Nonetheless, it is hard to believe he never contemplated the scenario addressed by it. Consider that, if convenient and non-sporadic relations between different substances cannot be accounted for by chance or necessity, they must be explained in teleological terms. If the latter is correct, it would seem that Aristotle should have been ready to accept that teleology is everywhere. This view, however, is never held explicitly by Aristotle. Instead, there are some passages that suggest the idea that there is some kind of order between the different parts of the cosmos. These are the passages I reconstruct and discuss in this section. I argue that these passages can be taken as arguments about extended teleology. Although there is a way to reconstruct them in the terms I have mentioned, I argue, too, that it is still possible to conclude that Aristotle remains undecided about the precise way in which to deal with extended teleological relations. In the next chapter, I discuss the reception of this undeveloped view of Aristotle in the thought of Theophrastus.

In the first chapter of this section, I focus on the arguments concerning extended teleology as they appear in *Physics* VIII. I discuss the arrangement of the universe as it is presented in this book and the relation between the eternity of movement and of biological species. The arguments Aristotle gives in

this regard point in the direction of the existence of an unmoved mover. In what concerns the causal relation between the unmoved mover, the superlunary, and the sublunary, I consider, too, the plausibility of an axiarchic teleological reading.

In the second chapter of this section, I discuss *Metaphysics* XII. I focus, here, on the arguments concerning the unmoved mover and the causal relation between the latter and the first heaven. I favour a reading according to which the unmoved mover is both a final and an efficient cause. As in the previous chapter, I present a reading of the causal model presented by Aristotle in terms of an axiarchic principle.

Finally, in the appendix, I discuss a recently developed view according to which the essence of living beings includes a reference to their environment. The idea is that being fit or adapted to a certain environment is co-essential to living beings. I argue that this view does not sufficiently account for the relation between living beings and their environments.

Chapter 3. Extended Teleology in *Physics VIII*

3.1 The cosmic arrangement

When considering the big picture of Aristotle's cosmology, there are some aspects that give rise to a question about the scope or reach of what I have called extended teleology. One way to pose this question is the following. Let us consider the case of celestial revolutions. Celestial revolutions are a result of the activity of the unmoved mover. They guarantee both that, in the sublunary world: (i) there exist the environmental conditions that enable the life of natural substances; and (ii) that for any given animal or plant species, there is a potentially infinite series of ancestors and descendants. It seems pertinent to ask whether the relation between those cosmological conditions and the ordered nature of the world, along with the infinite chain of animal and plant specimens, is to be considered a case of teleological fitness or a teleological relation.

One way to articulate what counts as a teleological relation is the following. The relation between X and Y is teleological if X and Y stand in a relation, R, such that X is always the beneficiary of Y, and R explains the configuration of X in terms of Y being for the sake of X. So, going back to the case of the relation between the superlunary and the sublunary. The superlunary seems to be arranged in such a way that is extremely beneficial for all sublunary substances. Moreover, the arrangement of the superlunary and these beneficial fit relations seem to require a teleological explanation; otherwise they would be the result of chance. If this is right, the claim that the superlunary is good for the sublunary would entail that the former happens for the sake of the latter.

Note that acknowledging these as possible teleological relations involves acknowledging, too, the presence of non-sporadic and good results for the element of the relation that is benefited by the relevant natural process. Furthermore, these kinds of natural phenomena are precisely what, according to Aristotle, materialist accounts of nature—which rely on necessity or chance—fail to explain (see *Physics* II 8, 199b 26-31; *Metaphysics* I 3, 984b11–15). Now, if the criterion mentioned above for acknowledging teleological fitness is correct, it seems that Aristotle should be ready to accept that teleology is everywhere throughout nature, in the same way some Stoic philosophers were perfectly happy to hold. Moreover, teleology should be present in the Aristotelian cosmic big picture precisely in virtue of the hierarchical disposition of the unmoved mover, the fixed spheres, the sun, and the sublunary world. The latter might look like a bold claim. However, given the purpose of Aristotle's

teleological theory, this seems like a very natural step to take: the entirety of the cosmic disposition cannot be the result of chance nor be caused by some sort of natural necessity (i.e., as a mechanistic cosmology would have it). Unfortunately, Aristotle's own position on this issue (or the position to which we have access based on his available work) is at best undeveloped.

As was mentioned, there are some traces of an extended teleology in some parts of the corpus. My goal has been to follow those traces and reconstruct them as arguments for extended teleology. In this chapter, I discuss the arguments concerning extended teleology as they appear in *Physics* VIII. I begin by briefly presenting the cosmic arrangement as presented in this book. Next, I discuss the arguments advanced by Aristotle to show that both species of living beings and movement are eternal. These arguments point in the direction of the existence of a first unmoved mover. Then, I discuss the features of the unmoved mover, according to the arguments presented in *Physics* VIII. Finally, I discuss the kind of causal relation between the unmoved mover, the superlunary, and the sublunary. In what concerns these passages, I discuss the possibility of reading this model of teleology in terms of an axiarchic principle, i.e., that the good and ordered state of affairs of the cosmos is due to it being good. I make this reading plausible by discussing other passages that can be read in similar terms.

In the next two subsections I provide a reconstruction of the arguments Aristotle presents to explain the eternity of movement and the need of an unmoved mover. This will be useful for understanding the kind of causality that could be at play in the Aristotelian cosmos: on the one hand, efficient causes; on the other hand, axiarchic teleology. It could be argued that the structure of the cosmos is necessary insofar as it is ordered and good. I will discuss this issue in 3.4.

3.2 The eternity of species and of movement

The purpose of *Physics* VIII is twofold. On the one hand, it aims at showing that movement has always existed and will always exist; on the other, it aims at showing that it is the nature of the cause—namely, the unmoved mover—that explains the eternity of movement and change (Waterlow, 1982a, p. 204)⁵³.

⁵³ Some scholars discuss whether this really exhausts Aristotle's strategy in *Physics* VIII (i.e., first to show the eternity of movement and from there to prove the existence of an unmoved mover). At the beginning of *On the Motion of Animals* (I 698a 8-11), Aristotle refers to the last book of *Physics* but describes the argumentative strategy in the terms of the scientific methodology of *Posterior Analytics*: to search what a thing is (τί ἐστί) and

Now, to address the issue of extended teleology in *Physics* VIII, it could be useful to make a distinction between (i) the Aristotelian account of the eternity of movement, and (ii) what we can identify as Aristotle's account of the eternity of species. The two accounts are very closely related: the arguments for the eternity of movement often imply the eternity of species too. However, the former group of arguments is not exhaustive in what there is to say about the eternity of species. Consider also that these two kinds of eternity are deeply integrated. Firstly, the cosmic picture in question has it that there are three basic realms in the world: the unmoved mover, the heavens, and the sublunary. All three realms are required for explaining why some natural entities are sometimes in movement and sometimes at rest: "some things are moved by an unmoved mover that is everlasting, and that is why they are always in motion; and some things are moved by a moved and changeable mover, so that these things must change too" (*Physics* VIII 6, 260a 15-17). Secondly, the cycle of coming-to-be and perishing of the different generations of living beings requires certain cosmological conditions (i.e., an unmoved mover and the celestial spheres).

One of the reasons why Aristotle introduces these cosmological conditions seems to be related to a certain synonymy between the cause (i.e., the eternity of the cosmos) and that which is caused (i.e., the eternity of the species) regarding modality and duration. Now, while both are said to be eternal, they are eternal in different senses. The different species of living beings are eternal in the sense that, for any given individual animal, there is a potentially infinite number of both ancestors and descendants (e.g., this human had a father, who in turn had a human father and so on, *ad infinitum*). However, these chains of movers are contingent (i.e., they could have not existed) and are only potentially infinite in time (i.e., the members cannot all exist at once). So, if this is the case, as Aristotle believes it to be, natural substances alone cannot be the cause of the eternity and necessity of movement. To solve this problem, he introduces an unmoved mover which is characterised as eternal and as being pure actuality, and which is responsible for the eternal movement of the spheres and of celestial bodies, including the sun. According to this description of the universe, it seems that the unmoved mover is the cause of the environmental conditions that enable the life of natural substances. For Aristotle, species are said to be eternal in virtue of the way their existence is caused, namely, that a living being's existence is caused by another individual of the same species. What explains this causal chain and the eternity thereof is neither chance nor the involvement of a demiurge who created the

why it is (διὰ τὸ ἔσθιν) (II 10, 93b 29-35). According to this view, the main goal of *Physics* VIII is to establish a scientific definition of eternal movement (see Andrea Falcon (2014, pp. 258–259)).

world. Instead, these conditions are only possible in virtue of the unmoved mover's activity. The latter results in an eternal world in which the potentially infinite ancestry of any given animal is guaranteed. But how about the eternity of movement? Let me now turn to the arguments in favour of this presented in *Physics VIII*. I begin by making some general remarks about movement, and then I introduce the arguments Aristotle advances to show the eternity of movement.

It is worth considering, first, Aristotle's claim that local movement or locomotion is prior to other kinds of movement, including substantial changes. The priority in question is to be understood in two ways. Firstly, in the sense that locomotion is a *necessary condition* for other kinds of movement. So, any change—even when not in itself an instance of locomotion—involves some kind of proximity and even direct contact with another object that actualises its movement. Secondly, locomotion is prior in the sense that it has *chronological primacy*. There are some instances of locomotion (i.e., the eternal and uniform movement of the heavens) that do not involve any kind of generation and corruption nor any other qualitative change.

With this in mind, we can move on to the arguments presented by Aristotle to prove the eternity of movement. The latter is, for Aristotle, a matter that deserves to be addressed explicitly, even when the existence of movement is a given for the natural philosopher (*Physics* I 2, 185a 13; 184b 25-185a 13; VIII 3, 253a 32-b6). Aristotle asks whether it is the case that any given movement is both preceded and succeeded by another set of movements. He introduces this question with a dilemma:

Did motion come into being at some time, without having existed before, and does it perish again in such a way that nothing is in motion? Or is it instead the case that it neither came into being nor perishes, but instead always existed and always will exist; and being deathless and unceasing, is it present in things as if it were a kind of life belonging to everything composed by nature? (*Physics* VIII 1, 250b 11-14).

So, either movement is both created and is perishable or, rather, it has always existed and will always exist. Aristotle will claim that the first of these conjunctions is false and the second true. The part about movement being “deathless and unceasing” as akin to “life belonging to everything composed by nature” is already introducing the circular movement of the heavens into the argument⁵⁴. Note, firstly, that the term “immortal” (ἀθάνατος) is used by Aristotle to describe celestial bodies (*On the*

⁵⁴ I follow here Marcelo D. Boeri's (2003, pp. 177–178) interpretation.

Heavens I 3, 270b 9; I 10, 279b 1), the intellect (*On the Soul* III 5, 430a 23), and God's activity (*On the Heavens* II 6, 289a 9-ff). "Unceasing", in turn, is used by Aristotle to describe the circular movement of the celestial bodies (*Physics* VIII 6, 259b 25-26; *Metaphysics* XII 7, 1072a 21-22), which are also immortal⁵⁵. Both terms are used to describe superlunary objects and their activities. Thus, it seems that what Aristotle has in mind here is the cosmological aspect of his account of the unmoved mover, rather than just the aspect that deals with sublunary natural substances.

The everlasting chain of finite movements, generally speaking, goes backwards in time, because, whenever there is change, a previous process of change is required to account for it. Thus, there have been countless previous processes of change. Additionally, Aristotle argues that the chain of movement cannot stop at some given point in the future, for there is no instance in which something that has the capacity of producing certain change X and receiving certain change X loses that capacity at the same time. For instance, an object cannot actually be burning and lose the possibility of being burned, at the same time. It is important to mention that this infinite chain of movement might be understood in two ways: (i) as a diachronic series of potentially infinite generations of living beings; and also, (ii) as a synchronic infinite chain of movers (A moves B, and B moves C...). The latter (ii) is an aspect of something that is not part of Aristotle's conception of the cosmos (Graham, 1999, pp. 90–91). For Aristotle there cannot be an infinite motion in a finite time; besides, a member of the series of members must be identified as the central or prime mover. I will come back to this in the next section. The former (i), however, is a key part of Aristotelian cosmology.

Let us turn, now, to the arguments related to the eternity of movement. These can be divided into five groups: (a) those based on the definition of movement, (b) those based on the conditions of movement, (c) those based on the nature of time, (d) those based on the incorruptibility of movement; and, finally, (e) an argument based on the order of nature. Let me turn, next, to the first of these arguments. The last argument (e) will become particularly relevant for my purposes. Here, Aristotle discusses critically Anaxagoras' and Empedocles' arguments that movement is not eternal. When discussing these views, however, Aristotle's remarks on the order of the universe might suggest that he has in mind a teleological cosmic principle. Before discussing argument (e), I will briefly introduce arguments (a) to (d).

⁵⁵ See also *Metaphysics* 1072a 21-22; *On the Heavens*, II 3, 286a 10-11

a) The argument from the definition of movement (*Physics* VIII 1, 251a 9-ff)

Aristotle thinks that the possibility of an original first movement that is not caused by a previous movement is to be rejected a priori. Any movement presupposes a causal factor. More precisely, there must be something in *actuality* that is capable of producing change. Now, if we take into account that movement is defined as the actuality of the movable qua movable (*Physics* III 1, 201a 9-11), any movement will require an agent capable of producing that movement and a patient capable of being actualised. This includes any case of a supposedly first movement. Furthermore, Aristotle not only claims that there must be a causal factor in actuality to account for movement, but that it must be encompassed within some of the species of movement and/or change he identifies, e.g., locomotion. Aristotle illustrates this with the case of something burning: if something is to be burned, it must be capable of suffering combustion; additionally, what causes the fire must be capable of producing combustion, too.

b) The argument based on the conditions of movement (*Physics* VIII 1, 251b 1-7)

The second argument concerns the idea that movement is caused when certain conditions obtain. According to the previous argument, movement requires that there be both an agent capable of moving and a patient capable of being moved. According to this second argument, however, there are other conditions that need to obtain for movement to be caused. Aristotle exemplifies these conditions with the case of a doctor who is capable of both healing and hurting patients (*Metaphysics* IX 1, 1046b 2-9)⁵⁶. The right conditions for movement are akin to a doctor that wishes to help a patient and does not err accidentally. Now, if there ever was a state of affairs in which there was no movement, then this would indicate that neither the right conditions nor the proximity required for movement were present. But if there is movement now, then something changed to cause the right conditions to exist, and so there was some previous movement that cause the right conditions when, *ex hypothesi*, there was no movement.

⁵⁶ Insofar as the knowledge required for a craft is based on a definition that can show what its object is and also its privation, a doctor can harm the health of a patient.

c) The argument from the nature of time (*Physics* VIII 251b 10-ff)

In his third argument, Aristotle turns to his account of time⁵⁷. In *Physics* IV, Aristotle claims that movement is required for the existence of time. If this is so, and the argument in question (i.e., the argument that claims that there is a point before which there was no movement) presupposes the existence of time (i.e., at T1 there is no movement but at T2 there is), then that very argument presupposes the existence of movement.

d) The argument from the incorruptibility of movement (*Physics* VIII 251b 28-253a 3)

The fourth argument concerns the incorruptibility of movement. Aristotle argues that there must be a new motion after any motion, and so there cannot be a final motion. If A causes the destruction of B, A will survive B, and so it would have to be destroyed afterwards by C. If movement were to stop, all the moving objects would have to lose both the ability to move and of being moved. A scenario like this is impossible. On the one hand, a mover does not cease to be a mover even once it has caused some movement. On the other hand, if movement is destroyed, then the moved and the mover must be destroyed at the same time. However, being moved and being capable of being moved cannot occur simultaneously. Consequently, movement cannot be destroyed.

e) The order of nature (*Physics* VIII 1, 252a 5-11)

The final argument for the eternity of movement concerns the order of nature. In relation to this argument, consider that Aristotle discusses, first, two rival theories to his account of eternal movement. Both Anaxagoras and Empedocles supposedly claimed that movement is not eternal. Instead, they argued that there are some periods in which there is no movement anywhere in the universe and that, therefore, movement can have a starting point. A view along these lines is described in *Physics* VIII as something fictitious or delusional (*πλάσμα*). According to this argument, Empedocles believes that there are alternate periods in which there is movement and periods in which everything is at rest. The phase in which there is movement is ruled by either Love or Strife. While the former is responsible for cosmic unity (i.e., the coming together of the different natural objects), the latter is responsible for multiplicity (i.e., things being dispersed). However, there are some intermediate time

⁵⁷ See *Physics* IV 10-14 for Aristotle's account of time.

periods in which there is no movement (*Physics* VIII 1, 252a 5-10)⁵⁸. Anaxagoras' view, in turn, has it that everything was together and at rest for an infinite amount of time until the *Nous* gave shape to the order of the cosmos and started movement (*Physics* VIII 1, 250b 24-25)⁵⁹. I come back to these views in section 3.4. At this point, though, consider that, although Aristotle would reject both views, he finds Anaxagoras' argument particularly preposterous. Let us take a look at this passage:

But surely there is nothing disorderly in things which happen by or according to nature, for nature is a cause of order in everything. But there is no ratio between one infinite and another, yet all order is ratio. Hence, to suppose that things were at rest for an infinite time, then moved at some moment, without there being any distinguishing feature to account for why the change should happen now rather than earlier, and without there being any order, is inconsistent with the action of nature. For what is natural is either uniform and invariable, e.g., fire invariably travels upwards by nature; or if it is not uniform, it varies according to some ratio. In this case it is better to say with Empedocles and those who share his view that the universe is in turn at rest and again in motion. For such a system has at least some kind of order present in it (*Physics* VIII 1, 252a 11-22).

Aristotle claims that natural things are either uniform and invariable or at least they vary according to some ratio. This claim echoes some of the general remarks about final causes that Aristotle makes elsewhere, particularly the claim that natural events happen always or for the most part (*Physics* II 8, 199b 32-33). So, the event mentioned by Anaxagoras—the isolated episode in which the universe, a single amorphous object, transits between a stationary phase and another phase in which there is movement—is at odds with the regularity expected in nature. Empedocles' view would at least, by contrast, have the advantage of attributing some regularity to the stationary-moving cycle, insofar as the Love-Strife phases are part of a natural cycle. Regardless of this advantage vis-à-vis Anaxagoras' view, Aristotle will also reject Empedocles' own account because the causes of the Love-Strife cycles are not fully developed (*Physics* VIII 1, 257a 23-25).

It is worth noticing that Aristotle rejects Anaxagoras' theory with a teleological argument. There seems to be a close relationship between the concepts of order and final causes. If something happens all the

⁵⁸ The reference here seems to be Anaxagoras B1 and B13 (Graham, 1999, p. 40).

⁵⁹ The reference here seems to be Anaxagoras B17. 9-13 = b26- 8-12 (Graham, 1999, p. 40).

time or most of the times according to some reason, it is ordered. What is ordered in this sense is precisely the kind of thing or event that Aristotle believes is better accounted for by final causes.

In this particular discussion with Anaxagoras, the teleological underpinnings can be understood in at least two ways. Firstly, that good cosmological theories assume that the universe is as intelligible as possible. “Order”, in this case, is more of a heuristic principle. If a theory proposes a random or inexplicable event, like the *Nous* that puts things in motion at some random point in time during an infinite period of rest, such a theory would be, as a result, less elegant and less intelligible than a theory in which any event—like movement—is regular and expectable. In this case order does not entail that there is a real final cause at work. Secondly, he could also suggest that there must be some sort of teleological causation at play. The fact that the structure of reality (e.g., the eternity of species, the impossibility of a beginning or an end in movement, or the spatial finitude of the cosmos) is guaranteed by an unmoved mover is something that can be accounted for in teleological terms. I will discuss this issue further in the subsequent parts of this chapter.

In the following section, I discuss the arguments Aristotle advances to account for the necessity of a first and unmoved mover that guarantees the eternity of movement.

3.3 The first mover and the eternity of movement

According to Aristotle, the only way to account for the eternity of movement is by postulating an unmoved mover. Aristotle’s cosmological picture is one in which there is an entity that is always at rest, a group of objects that are always moving, and a third class of objects which can be at rest or in movement at different times. Before addressing the matter of which objects Aristotle has in mind, and the puzzling issue of how exactly this unmoved mover is effective in causing movement, I briefly discuss the arguments advanced to justify the existence of the first mover. Additionally, I discuss the main properties of this first mover (i.e., unmoved, without magnitude, and with infinite power).

Aristotle considers three possible scenarios concerning the movement of the unmoved mover, the superlunary, and the sublunary objects (*Physics* VIII 3, 253a 24-25). Either (1) all things are always at rest; (2) all things are always in motion; or (3) some things are in motion and some at rest. The third scenario can be, in turn, understood in three different ways (*Physics* VIII 3, 253a 25-30):

- (3.1) Things moved are always in motion and the things at rest are always at rest.

(3.2) All things naturally move and rest, alike.

(3.3) Some things are either always in motion or always at rest, and some things partake of both states.

Aristotle will consider (3.3) as the right position, “[f]or it holds the solution to all our problems, and is the conclusion of our investigation” (*Physics* VIII 3, 253a 30-32). According to this view, the unmoved mover is that which is always at rest, the superlunary objects are always in motion, and the sublunary realm is both at rest and in movement, for both states are possible for any object in this realm at different times.

Let us turn, briefly, to the existence of the first mover. The arguments regarding this can be found in *Physics* VII 1 and *Physics* VIII 5. More precisely, in these passages, Aristotle wants to show that there is an object that is the central cause of movement, and whose own movement is not the result of being moved by something else. At this point, it is important to recall that Aristotle has in mind two different kinds of infinite causal series. On the one hand, we have that of the members of biological species: for instance, at any given time, either there has been or there will be one horse who was generated by another horse in a previous point in time. This kind of process is not problematic for Aristotle because the totality of the members of a species do not exist all at once. In other words, this kind of causal series is only *potentially infinite*. On the other hand, there is another hypothetical kind of causal chain, composed of infinite movements existing all at once. The unmoved mover becomes relevant to reject this second notion of infinite causal series. According to Aristotle, there is a mover that is at the beginning of the causal chain and is the main cause of movement. Let us take a look at the arguments related to the unmoved mover.

The argument presented by Aristotle to prove the existence of the first mover is negative⁶⁰:

- (1) If everything that moves is moved by something else, the mover-moved series must be infinite or finite.
- (2) Everything that moves is moved by something else.
- (3) The mover-moved series cannot be infinite.
- (4) The mover-moved series is finite (1-3).

⁶⁰ I am following José Alberto Ross Hernández's (2007, p. 124) in the reconstruction of this argument.

Aristotle justifies premise (2) with an argument based on the distinction between two different kinds of movement, those that are natural and those that are violent or against nature (*Physics* VIII 4, 255b 31-256a 2). Given that this twofold classification is exhaustive, in the case of the latter, an object other than the one that is moved is responsible for the movement and, thus, the object moved is moved by something else. In the case of natural movement (i.e., all the cases in which nothing external interferes with an object that has a nature), there are two possible ways in which (2) is supposed to be true. For living beings, the soul is the mover and the whole substance—soul and body—is the object being moved⁶¹.

In what concerns premise (3), Aristotle presents two different versions. Both versions point to the impossible results of an infinite causal chain. In the first one, it is argued that if there is an infinite causal chain, the result would be an infinite movement in a finite time. The kind of causality that Aristotle seems to have in mind here is efficient causality. Accordingly, we would have an infinite group of movers that, insofar as they move through contact, are contiguous and constitute a single object (*Physics* VII 1, 242b 59-70). It is not entirely clear why a movement like this is impossible in Aristotle's eyes⁶². Perhaps we can make sense of this claim if we look at *Physics* VI, where it is argued that it is impossible for an infinitely large body to traverse a finite magnitude in a finite time (*Physics* VI 7, 238b 10-17). If all the parts of the infinite body must go from A to B successively (i.e., first part 1 goes from A to B, then part 2 goes from A to B, and so on ad infinitum), then any finite amount of time would not be enough for all of the series of parts to move—provided that the object moves at a finite speed. It is plausible that this way of conceptualizing the movement of an infinite causal chain is at the core of the *reductio* in question.

⁶¹ In the case of inanimate objects (i.e., the elements and inanimate compounds), movement cannot be caused by an intrinsic principle like a soul. Aristotle gives a number of reasons for this: the capacity for self-motion is proper of living beings, having a soul includes the capacity of being at rest, and also admits a plurality of movements, among others. Nonetheless, they have an innate tendency or disposition to move in a certain way. To explain how they move naturally, Aristotle introduces a distinction between two senses of “being potentially”, which was later known as *potentia prima* and *potentia secunda*. On the one hand, it could mean that S potentially knows P when she is learning P; on the other hand, S potentially knows P when she has already learnt P but is not exercising this knowledge at some given moment. In a similar manner, there are two ways in which an element can move towards its natural place. An element like water is by nature heavy and moves down, although it can turn into a light object like air and, thus, move upwards. The capacity of moving upwards of air is a first potentiality. However, if something hinders the movement of air, the capacity of going upwards once the obstacle is removed is a case of second potentiality. In this very sense, the inanimate elements are also moved by something else.

⁶² For discussion, see David W. Ross (1936, p. 670); Daniel Graham (1999, pp. 90–91).

Now, consider the second version of premise (3), namely, that “it is impossible for a series of movers which are themselves moved by another to go on to infinity, for there is no first (πρῶτον) member of an infinite series” (*Physics* VIII 5, 256a 18-19). It is not entirely clear what Aristotle means by a “first” member of the series. If we understand the term in question as the individual member of a set which appears before the rest of the members, the argument seems to beg the question: there must be a first mover because otherwise the series would be infinite, but it cannot be infinite because there must be a first mover (Ross Hernández, 2007, pp. 135–136). Instead, “first” could be taken to mean a principal mover, i.e., a mover that does not pertain to the same set as that of things that are being moved, because none of these would answer the question of who or what started the chain of movements. Aristotle exemplifies this with the rock that is moved by a stick, which in turn is moved by a hand that is moved by a person. The latter in this case is the first mover in the sense of being the cause of a series of movement whose own movement is not accounted for in the same way by a previous mover. This passage seems to echo *Metaphysics* II 2, 994a 12-13, where Aristotle claims that, *stricto sensu*, only the first member of a causal chain can properly be called “cause”⁶³.

The next step of the argument is to show that the first mover is unmoved and that it guarantees the eternity of movement. The first mover must be unmoved because, if it were to experience movement, including accidental movement (like the souls of substances when they move (*Physics* VIII 6, 256b 9-10)), then it could not account for everlasting and uninterrupted movement. The reason is that, for it to be moved, it would need to possess potentiality, and any kind of potentiality admits the possibility of more than one outcome which would be inconsistent with a necessarily eternal cosmos.

Let us take stock of this subsection (3.1-3.3). Once Aristotle shows that there must be a first mover, he proceeds to show how this mover is also unmoved and eternal. As can be seen from the previous section, the first mover is meant to account for the eternity of movement. The architecture of the Aristotelian cosmos is such that the movement of the heavens and the continuation of biological species are eternal. According to the argument presented in *Physics* VIII 6, only an unmoved object

⁶³ Graham (1999, pp. 90–91) notices that this last argument concerning the absurdity of the lack of a principal mover becomes especially important if we consider that the argument of *Physics* VII 1 (i.e., the impossibility of an infinite series of efficient changes) does not seem to hold water in an eternal world. If the universe is everlasting, it is perfectly possible to consider an infinite series of efficient movers that move during an infinite time. However, an account of any kind of movement that appeals to an infinite number of causes is not a good explanation.

can guarantee the eternity of the rotation of the superlunary which, in turn, provides the conditions for the eternity of the generation and corruption series. The “eternity of movement”, here, refers to two different things. Firstly, to the eternity of the continuous movement of the heavens; and, secondly, to the eternity of the succession of members of biological species. Both kinds of everlasting movements can only be guaranteed by a first and unmoved mover (*Physics* VIII 6, 258b 10-16), because only an object that is pure actuality is necessary.

In the next section, I discuss how this account of the architecture of the cosmos is important for an account of Aristotelian extended teleology.

3.4 The causation at play and the plausibility of an axiarchic interpretation

As was mentioned before, Aristotle’s goal in *Physics* VIII is to provide an account of a universe as both eternal and regular. However, the sublunary and the superlunary parts of the cosmos do not have these attributes in the same way. In what concerns the latter, on the one hand, the unmoved mover causes the movement of the first sphere, which in turn is responsible for the movement of the planetary system including both the moon and the sun (*Physics* VIII 7, 260a 5-7). In the sublunary part of the cosmos, on the other hand, the movement of the sun makes way for the yearly seasons in which the birth and death cycles of living beings occur. Consider the following passage:

But what is moved by something moved, which in turn is moved by something unmoved, because it occupies variable relations to things, will not be the cause of a uniform motion, but because of being in contrary places or forms it will produce contrary motions in each of the other things moved and cause them to be at one time at rest and at another time in motion. (*Physics* VIII 7, 260a 6-7).

For Aristotle, the perfect continuous movement of the first heaven cannot account for the coming-to-be and passing-away of the members of biological species. The succession of the latter is uninterrupted, but it is not a perfectly uniform and continuous movement as that of the heavenly bodies. Instead, it is the annual trajectory of the sun that which causes the meteorological conditions that in turn have an effect on the cycle of generation and corruption.

Aristotle is emphatic about the affinity between the explanans and the explanandum, what I have called before the synonymy of properties between cause and that which is caused. For instance, the unmoved mover, insofar as it is supposed to be simple and perfectly immutable, is the cause of a single and simple movement (i.e., the circular motion of the heavens) (*Physics* VIII 7, 260a 17-19; 10, 267a

21-24). According to Aristotle, this movement must be circular, given that it is the only kind of movement capable of being invariable, infinite, and continuous (*Physics* VIII 7, 260a 23-25). As for the successive chain of movements of the sublunary world, the unmoved mover is only indirectly responsible.

We might wonder about the kind of causality involved here. There are two causal relations that are relevant: (a) firstly, the causality involved in the relation between the unmoved mover and the first heaven; (b) secondly, the relation between the superlunary (i.e., unmoved mover, heavens, planets, the moon, and the sun) and the sublunary yearly seasons. Unfortunately, Aristotle does not provide an explicit account of these two causal relations. In any case, it is less challenging to provide an answer to the issue of how the unmoved mover moves the heavens (a). Not only because in book XII of the *Metaphysics* Aristotle proposes an account of the issue in question. But, also, because some passages suggest that in *Physics* VIII the kind of cause that Aristotle had in mind is efficient causality. The examples used by Aristotle to illustrate some of the arguments about chains of movement concern efficient causes (e.g., a human, whose hand moves a stick, which in turn moves a rock).

What about (b) the causal relation between the superlunary and the sublunary? Here, it would seem that efficient causation is the right candidate, too. The movement of the first heaven causes the movement of the sun, which in turn approaches or moves away from the earth. These two movements (i.e., approaching and receding in relation to the earth) cause yearly seasons. So, according to this view, there is a certain movement that is responsible for another movement and, thus, it seems to fit the description of an Aristotelian efficient cause (i.e., the main source of change and rest). Nonetheless, we might ask whether efficient causes alone are enough to explain the input of the sun into the sublunary world. Let us turn to this next.

There are some aspects of the cosmic arrangement described earlier that suggest that there is some kind of extended, broader teleology. According to the criteria for acknowledging possible teleological relations (i.e., that there is (i) some non-sporadic (ii) beneficial result)⁶⁴ the relation between the superlunary revolutions and the species might be an instance of teleological causation. More precisely, the integration of the unmoved mover, the heavens, and the series of generations of living beings could be understood as having the sublunary natural substances as beneficiaries of this whole cosmic disposition. Inasmuch as what enables the perpetuation of any species is the endless circular motion

⁶⁴ For these criteria, see *Physics* II 8, 199b 26-31; *Metaphysics* I 3, 984b 11-15.

of the heavens, and it is precisely in the process of perpetuation that final causes operate, the mentioned motion should be taken as an instance of a relation that should be accounted for in terms of final causes. Alternatively, the claim would be that the whole disposition of the cosmos is accidental, which seems highly un-Aristotelian. Consider, for instance, that during the summer solstice, the sun is at the most northward position in relation to the tropic of Cancer, and during the winter solstice it is to the most southward position on the tropic of Capricorn. So, the sense in which the sun's movement is not perfectly uniform is that it is near to or far from different regions of the earth at different times of year⁶⁵. These differences must be understood by Aristotle as intrinsic to the sun's movement (not just recurring happenstance).

As was mentioned before, there is no textual evidence where Aristotle explicitly defines his own position on whether superlunary benefits happen for the sake of earthly species or not. Regardless, there are good reasons to suppose that this issue is relevant for his theory. Firstly, this becomes an explicit question in the last chapter of book XII of the *Metaphysics*, where Aristotle enquires about the order of the whole universe and clearly favours an account of the universe in which there is cohesion between its parts. Secondly, Theophrastus, in his short work that we know as *Metaphysics*, explicitly asks about the difficulty of accounting for the yearly seasons in terms of final causes (Theophrastus' *Metaphysics* 10b 10-ff). I discuss Theophrastus' arguments in the final part of this thesis. The third reason is Aristotle's tendency to favour theories in which cosmic order, rather than random events, prevail.

In connection with the latter, consider that the account of the cosmos and its different kinds of movements provided in *Physics* VIII rivals Empedocles' and Anaxagoras' views. The problem with these theories is that the universe they portray is insufficiently ordered. In that sense, accounting for the continuity and perfect predictability in the workings of the universe would be a comparative advantage of a cosmological theory. This is why Empedocles' view (i.e., that there is a cosmic cycle set by love and strife) is preferable over Anaxagoras' view of the *Nous*, which starts movement at some random point in time. Order is preferable because it is the way natural things are supposed to work. Does this entail that *some kind* of final cause is at play here, namely, that the two parts of the cosmos

⁶⁵ Aristotle also mentions this argument in *Generation and Corruption* II 10, 336b 3-10; *Metaphysics* XII 5, 1071a 15-17; 1072a 10-18.

work together for some benefit? It seems to be so. Nonetheless, the problem remains about a lack of clarity concerning the precise kind of teleological causation at play.

The two candidates that would seem best to explain this world order are natural substances and/or a creator or deity. The latter possibility is discarded, since theistic accounts are not part of Aristotle's philosophy. The other alternative, however, does not fare any better. In the Aristotelian picture, we have standard final causes. These are focalized in the sense that they must be inherent to a substance, since they are the formal principle that guides the developmental process of a living being. However, an Aristotelian substance cannot be composed of parts that are also substances (e.g., a substance composed of animals and their environment, or a single substance whose parts are all the parts of the universe).

If we cannot resort neither to natural focalized final causes nor to a theistic god in order to account for the good fit of the sublunary and the superlunary, teleological axiarchism might be the right conceptual tool. By "axiarchism" I mean a teleological principle according to which the goodness of X explains why X is actual. For instance, this world is actual because it is good that this possibility is actualised.

It is in line with this view that we can read some passages of the Aristotelian corpus. These passages can be read as axiarchic arguments according to which there is an ethical necessity in virtue of which the cosmos has some features. An example of this is *Metaphysics* XII 7, where Aristotle explains that both the unmoved mover and its main properties (e.g., being unmoved, intelligent, and eternal) exist out of necessity. Consider the following passage:

It exists, then, of necessity; and inasmuch as it exists of necessity, it does so well, and in this way it is a principle. (For the necessary is spoken of in this number of ways: that which is by force, because it is contrary to impulse; that without which things are not good; that which cannot be otherwise, but is necessary without qualification.) On such a principle, then, depend the heavens and nature. (*Metaphysics* XII 7, 1072b 10-14).

The properties in question are necessary in that they cannot be otherwise. If both the unmoved mover and its properties are eternal, immutable, and causally independent, then they cannot be otherwise, and they exist out of necessity. In virtue of being necessary, the unmoved mover is good and, thus, a principle (καὶ ἡ ἀνάγκη, καλῶς, καὶ οὕτως ἀρχή). The argument here presented is, unfortunately, very condensed, but it seems to suggest the idea that, in virtue of being good, the unmoved mover is also

a principle⁶⁶. Now, if this reading is correct, Aristotle seems to convey the idea that something can be a cause in virtue of being good. Furthermore, it would also follow that this very object, the unmoved mover, exists in virtue of being good, in case that “being necessary” and “being good” are the same property or are necessarily correlated properties (i.e., if X exists out of necessity, X is also good).

At the end of the first chapter of *Physics* VIII, we can find another example of this kind of reasoning. Aristotle mentions an argument supposedly advanced by Democritus according to which there is no need to look for a principle to account for an eternal object or event (e.g., movement), because if something is always the same, then it is self-explanatory (*Physics* VIII 1, 252a 30-252b 5). Aristotle’s reply to this claim is that some eternal things (e.g., mathematical truths) are explained by some other eternal things, namely principles. This shows that not all eternal things are self-explanatory. However, if this is the case, we must now explain why only some eternal things are explanatory in relation to others. In other words, what makes some eternal things principles. Aristotle does not answer the question in this passage. However, it is possible to argue that only principles exist on their own and are self-explanatory because, insofar as they are causally independent and immutable, they are necessarily real. This could be a case in which an object exists out of necessity in virtue of being valuable. The fact that principles are ontologically prior to mathematical truths makes them a valuable object, which would explain why they are real.

Now, in both accounts of *Physics* VIII and *Metaphysics* XII, the unmoved mover(s) exists out of necessity and is causally independent but is somehow also responsible for a causal chain that goes all the way down to the sublunary world⁶⁷. The consequence of this is that the kind of teleological axiarchic causation just described (i.e., a principle that exists and has causal powers in virtue of being good) would work only for the unmoved mover. However, it is also plausible to think that many other things can be explained according to this teleological axiarchic theory. An instance of this would be the Aristotelian architecture of the cosmos: i.e., the universe as a spatially finite single object, with eternal movement, with natural places and natural kinds of movements, with fixed eternal species whose members succeed diachronically for all of eternity. If such a state of affairs is necessary and ordered, and so is good, then it follows that it is actual in virtue of being good. The result of this would be a teleological explanation that can accommodate many substances, as well as the relation between

⁶⁶ I am drawing on Judson (2019, p. 228).

⁶⁷ See also *Metaphysics* XII 7, 1072b14; *On the Heavens* I 9, 279a 28-30.

the two parts of the universe. Such an account would accomplish encompassing all the relevant elements of Aristotle's cosmological picture and, thus, would be the ultimate account of extended teleology, to put it somehow.

While the reach of this view makes it particularly appealing, there is no textual evidence to ascribe such a theory about the *whole* of the cosmic architecture in axiarchic terms to Aristotle. Instead, there are some other passages that could be read as axiarchic arguments, although with a more limited scope. Consider, for instance, a passage in *Generation and Corruption* II 10 where Aristotle claims that the endless continuity of the coming-to-being and passing-away of living beings in the sublunary world is explained in terms of this being the best possible state of affairs:

Coming-to-be and passing-away will, as we have said, always be continuous, and will never fail owing to the cause we stated. And this continuity has a sufficient reason. For in all things, as we affirm, nature always strikes after the better. Now being (we have explained elsewhere the variety of meanings we recognize in this term) is better than not-being; but not all things can possess being, since they are too far removed from the principle. God therefore adopted the remaining alternative, and fulfilled the perfection of the universe by making coming-to-be uninterrupted; for the greatest possible coherence would thus be secured to existence, because that coming-to-be should itself come-to-be perpetually is the closest approximation to eternal being. (*Generation and Corruption* II 10, 336b 25-336b 34).

It is noticeable how Platonic this argument is. In the *Timaeus*, Plato argues that the world should include all the species of living beings in order to be as perfect as possible (*Timaeus* 41b-d). Aristotle seems to share with Plato the idea that the existence of mortal living beings cannot be an externality of the way things work in the higher tier of the cosmos. They seem to exist on their own right⁶⁸. However, Plato can resort to a demiurge that makes the decision of creating species based on a “perfect as possible” principle. The existence of mortal living beings is not an accident insofar as they are a rationally intended consequence of the demiurge. In contrast, Aristotle must explain the existence of life on Earth as both an unintended and non-accidental state of affairs. Aristotle solves this puzzle with the use of an axiarchic argument. To begin with, consider that Aristotle claims that there is a general principle according to which being is better than not being. Moreover, this principle admits grades of perfection. For example, there is a perfect mode of existence (i.e., full actuality with no

⁶⁸ In *Parts of Animals* I 4 (645a 15-24), Aristotle argues that living beings are worthy of study on their own right.

potentiality whatsoever), and a less perfect mode of existence (i.e., the uninterrupted but eternal coming-to-be of mortal living beings). This less perfect mode of existence is good enough to guarantee the existence of the uninterrupted cycle of generation. Now, if this reading is correct, the claim about the cosmic architecture connected to the eternity of species can be, in turn, accounted for in teleological terms. All the parts of the universe are real because they are as good as they can be. This last claim could be taken a step further. The perfection of the cosmos is a benefit for the cosmos itself. This would entail that the universe is either a substance or at least an object with some robust unity. If this is correct, the superlunary-sublunary arrangement would be beneficial for living beings, but the cosmos would also be the beneficiary of the overall goodness of the arrangement that includes living beings.

A similar axiarchic argument about the existence of some cosmological state of affairs can be found in *On the Heavens* II 3. Aristotle claims that the sun's trajectory is required to guarantee the cycles of generation and corruption of the sublunary elements. This claim is the conclusion of the following argument. The first heaven, insofar as it is alive, must move, and the only movement fit for an eternal object is in circles, since circular movement has no opposites. If the first heaven rotates circularly, thus forming a sphere, it follows, according to the argument, that the centre of the sphere is immobile. If the centre is immobile, it must be made out of a different material than that of the first heaven, in this case earth. And if there is earth there must be fire, for necessarily there is an opposite to any element. But if there is earth and fire, then there must be some intermediate elements, namely, air and water. These sublunary elements cannot exist eternally, and thus a process of generation is required. From all this, Aristotle concludes that the conditions for the generation of the elements must exist as well:

Thus, we see that generation is necessarily involved. But if so, there must be at least one other motion; for a single movement of the whole heaven would necessitate an identical relation of the elements of bodies to one another. This matter also will be cleared up in what follows; but for the present so much is clear, that the reason why there is more than one circular body is the necessity of generation (...). (*On the Heavens* II 3, 286b 2-6).

The "other motion" mentioned in this passage is that of the sun, responsible for the yearly seasons which, in turn, are the condition for the transformation of the elements. Aristotle seems to be inferring the existence of the sun's trajectory from the fact that it is necessary for a sublunary process. A

teleological explanation of this kind can be taken as an axiarchic one. The sun and the yearly seasons must exist because they are good for the transformation of the elements⁶⁹.

An interesting feature of axiarchic teleological explanations is that they are consistent both with efficient causes and focalized final causes. On the one hand, any source of movement and rest—ruled, in turn, by whichever mechanical principle—can be part of a general state of affairs that is good and, therefore, actual (e.g., spheres that move other spheres which, in turn, move the sun and affect the earthly weather). On the other hand, natural substances with an inherent formal principle can also be actual in virtue of being good. For example, there could be an inherent formal principle that explains why a certain bird has a beak that is pointy (i.e., it is good for the bird's feeding). This principle (i.e., the soul), however, stands in a ruling position in relation to the body. Given that this is a good state of affairs, it is actual. Furthermore, it could also be argued that the fact that such bird exists (and that the existence of its species is guaranteed by a formal principle) is good for the whole cosmos and, therefore, actual.

This claim about the compatibility of axiarchic teleology and ousiological teleological explanations can be illustrated with an argument from *On the Heavens* II 2. In this passage, Aristotle argues that there are absolute positions in the universe: i.e., right and left, up and down, and back and front. Likewise, in the case of living beings, there are natural positions which are determined by biological functions. For instance, plants grow towards their superior part; or, in the case of some animals, locomotion begins from the right side and sight determines the front side (*On the Heavens* II 2, 284b 15-20)⁷⁰. Now, in the case of the universe, positions are meant to work in this same way, for the heavens are described as an animated object (*On the Heavens* II 2, 284b 31-34). In line with this, Aristotle claims that “above is the region from which movement originates⁷¹, right the region in which it starts, front the region to which it is directed, then on this ground too above has the character of a principle as compared with the other forms of position” (*On the Heavens* II 2, 285a1 20-25).

⁶⁹ See also *Metaphysics* XII 6, 1072a 15-18, where Aristotle presents a parallel argument.

⁷⁰ See also *Progression of Animals* 705b 15-ff.

⁷¹ Although the first heaven's movement is eternal, Aristotle has in mind that “it must possess a principle from which it would have begun to move if it had begun, and from which it would begin if it came to a stand” (*On the Heavens* II 2, 285b 6-7).

It is important to notice that the heaven is described as an object with a soul. However, the disposition of its parts (i.e., right, left, up, and down) is not explained by being useful for survival or reproduction. There is no benefit for the heaven and the universe in having natural positions other than perfection: in this case, the perfection of the heavens and the universe. The ordered disposition of the positions of the universe could be accounted for with an axiarchic argument. In other words, the view would be that the positions of the universe are good and, therefore, real.

An axiarchic account of the structure of the cosmos comes with some important advantages. For starters, by following this interpretation, we might be able to provide teleological explanations that are consistent with some of the central claims of Aristotle's natural philosophy. Moreover, this interpretation provides a non-theistic but teleological account of some instances of natural phenomena in which there is more than one natural substance involved. Additionally, this reading does not need to appeal to a substance whose parts are also substances.

Despite its benefits, this interpretation comes too with several challenges. Perhaps the most important is that Aristotle does not seem to make the most out of axiarchism. When Aristotle introduces axiarchic arguments, sometimes he also introduces arguments based on some of the central concepts of his substance metaphysics, which do not seem to be the best conceptual tool for explaining extended teleology. For instance, in *Politics* I, Aristotle offers an axiarchic argument about the natural hierarchical relation between wholes and parts, as well as the anthropocentric argument of *Politics* I 8. However, he also argues that the development of households into cities is akin to that of a natural object (*Politics* I 1, 1252a 24-26). Had Aristotle developed more fully an account of axiarchic teleology, it is plausible that he would have used it for these purposes. The exception to this is, precisely, the passage of *Generation and Corruption* II 10 discussed above, since it is plausible that this argument is a more refined answer to the problem of extended teleology. In the final chapter of the thesis, I discuss the possibility of this axiarchic argument being a response to one of Theophrastus' Aporias. For now, let us turn to the arguments presented in *Metaphysics* XII.

Chapter 4. Extended teleology in *Metaphysics* XII

4.1 The general argument of *Metaphysics* XII

In this chapter, I discuss the arguments presented in *Metaphysics* XII that concern extended teleology. As mentioned, these passages are parallel to those presented in *Physics* VIII. My aim, here, is not to present a complete exegesis of book XII of the *Metaphysics* as a whole. Instead, I want to focus mainly on the argument presented in the tenth chapter, since it is one of the few passages of the remaining corpus where Aristotle explicitly discusses how to account for the relation between more than one substance in teleological terms. More specifically, he explicitly asks how to account for the good of the whole universe, referring both to the unmoved mover and to the sublunary realm.

The structure of the chapter is the following. I begin by presenting the general argument concerning the unmoved mover as it is presented in book XII. Then, I present the causal model that underlies the relation between the unmoved mover and the first heaven. Next, I discuss the different views and interpretations concerning this causal model and the relations in question. More specifically, I discuss whether the unmoved mover is a final cause, an efficient one, or both. I favour the latter interpretation. Finally, I discuss the two analogies introduced by Aristotle in the last chapter of *Metaphysics* XII to describe the universe as a well-organized object. Aristotle compares, firstly, the well-ordered nature of the universe to the order of an army; and, secondly, he compares the relation between the different parts of the cosmos—i.e., the superlunary and the sublunary—with that of the members of a household. I argue that these analogies can be interpreted in minimalistic and non-minimalistic ways⁷². I advance, here, a new argument for the non-minimalistic interpretation. As in the previous chapter, this interpretation follows an axiarchic principle. Let us take a look at the general structure of the argument presented in the book XII of the *Metaphysics*.

Now, there are some similarities between the argument presented here and that of *Physics* VIII. In both arguments, Aristotle starts off from the conceptual need of a first mover and, at a later stage, moves to the attribution of the properties of being unmoved and eternal to this first mover. However, in *Metaphysics* XII, the unmoved mover has properties that are not mentioned in the *Physics*. For

⁷² For minimalistic readings, see, e.g., Judson (2019) and Leunissen (2010). For non-minimalistic readings, see, e.g., Sedley (2000) and Christoph Horn (2016).

instance, the unmoved mover is defined in terms of being pure actuality or *energeia*. Given that time and movement are eternal, Aristotle claims that there must be a substance whose being is complete actuality, vis-à-vis a substance that has any possibility of potentiality:

But if there is something which is capable of moving things or acting on them, but is not actually doing so, there will not be movement; for that which has a capacity need not exercise it. Nothing, then, is gained even if we suppose eternal substances, as the believers in the Forms do, unless there is to be in them some principle which can cause movement; and even this is not enough, nor is another substance besides the Forms enough; for if it does not *act*, there will be no movement. Further, even if it acts, this will not be enough, if its substance is potentiality; for there will not be *eternal* movement; for that which is potentially may possibly not be. There must, then, be such a principle, whose very substance is actuality. (*Metaphysics* XII 6, 1071b 12-20).

Aristotle's starting point in this argument is that there must be an eternal substance. He seems to presuppose that anything that exists is either a substance or an object ontologically dependent on a substance. If both time and movement are eternal, then at least the substances on which these depend are eternal.

The next step of the argument presented in this passage, however, becomes slightly confusing. Aristotle says that being an everlasting substance is not sufficient to account for eternal movement. He mentions here Platonic forms which, despite being eternal substances, are unfit to account for the architecture of the cosmos. In addition to being an everlasting substance, there are two more conditions. Firstly, the first substance must be actuality (εἰ γὰρ μὴ ἐνεργήσῃ, οὐκ ἔσται κίνησις); and secondly, it must have no potentiality. The second condition is at times read in terms of the action of a universal plenitude principle. During an infinite time, any potentiality would be actualised, and so if the unmoved mover has the capacity of changing, it will change at some time (Hintikka, 1973; Waterlow, 1982b). Some interpreters argue that there is no need to postulate such a universal principle of plenitude. Instead, they claim that it is only in some cases that all possibilities must be actualised. Nonetheless, it is uneconomical to suppose that there are some natural functions that can go without actualizing. This kind of redundancies make the world less intelligible and should, therefore, be rejected (Judson, 2019, p. 204).

In what concerns the first condition, the claim is that the unmoved mover must be able to work as an efficient cause. We can find evidence that supports this claim in the abovementioned passage, but also

in the analogy that compares the unmoved mover to a general that is partly responsible for the order of the cosmos. Once Aristotle introduces this condition, he claims that the way the unmoved mover moves should be explained in terms of a final cause: “this is how the objects of desire and of intellect cause motion; they cause motion without being moved” (*Metaphysics* XII 7, 1072a 26-27). These two claims taken together are puzzling. As a result, a discussion has arisen about how to make sense of the unmoved mover as both a final cause and an efficient cause. This discussion is part of a more complex debate about the kind of teleological causation that Aristotle has in mind. Below I present the central positions surrounding this debate.

Generally speaking, the first of these positions—what is sometimes referred to as the traditional reading—could be summarized in the following way⁷³. The unmoved mover, whose *sole activity* is to contemplate its own intellectual activity (*Metaphysics* XII 9), is the object of desire of the first heaven. This kind of desire⁷⁴, according to this view, results in the first heaven’s imitation of the unmoved mover. More precisely, this imitation takes the form of an eternal circular motion, namely, the rotation of the first heaven. This rotation, in turn, is responsible for the movements that go all the way down to the sun⁷⁵.

⁷³ Enrico Berti (1997, pp. 66–75) presents a thorough history of this interpretation that goes from Theophrastus to the 1990’s.

⁷⁴ As was mentioned in the previous section, the first heaven is an ensouled substance (*On the Heavens* II 2, 285a 27-31), a feature that enables its intellectual activity. The unmoved mover, on the other hand, is maximally intelligible and maximally desirable.

⁷⁵ Some scholars reject the claim that the main activity of the unmoved mover is contemplative. When Aristotle mentions teleological causation in Lambda, he does not mention the concept of a final cause via imitation. In Lambda 7 (1071b 1-4), Aristotle makes a distinction between two kinds of final causes. On the one hand, the *finis cui* which is the beneficiary of an action; and the *finis qui* or the objective of an action or an intrinsic goal. Neither of these two senses can accommodate the traditional view, according to which it seems to be more of an “exemplary cause” (S. Broadie & Brunschwig, 1993, p. 382). Furthermore, there is no mention of the first heaven’s desire to move in circles in virtue of its desire toward the unmoved mover (Bradshaw, 2001, p. 7). The latter would multiply the number of actions ascribed to the first heaven mover: to desire the unmoved mover and to move in circles (S. Broadie & Brunschwig, 1993, p. 386). Moreover, Aristotle does not say much about the mental states of the first heaven. This lack of information makes it difficult to ascribe any particular course of action to the first heaven. It could be that contemplating the unmoved mover causes its circular movement,

There is another group of interpreters for whom the unmoved mover is capable of being both a final and an efficient cause. Some scholars within this group argue that there are some cases in which *a desired object* is both final and efficient cause. For example, if S has a desire for some final cause and the goodness of the latter explains why S desires it, the very object of desire (i.e., the final cause) is also the source of movement (Judson, 1994, pp. 164–165). It is worth noting here that Aristotle distinguishes between proximate and remote efficient causes in Lambda 5 (*Metaphysics* XII 5, 1071a 15-16)⁷⁶. The latter do not involve the direct transmission of movement and so they can accommodate for cases such as, e.g., the input of the sun in the generation of a human being. So, while desire might be a direct cause of movement, the *object* of desire is a remote cause of movement. The unmoved mover would be a remote efficient cause with respect to the movement of the heaven (Laks, 2000, p. 241).

An alternative explanation of this kind has it that the unmoved mover is essentially a kinetic agent, instead of a contemplating agent (S. W. Broadie, 1994, p. 186). If the noetic activity of the unmoved mover involves motion, and this noetic activity is the object of desire of the first heaven, then the object of desire is motion. In this case, there is no need for an efficient cause different from the first heaven (S. Broadie & Brunschwig, 1993, pp. 386–387)⁷⁷.

These different accounts about the functioning of the unmoved mover tend to focus primarily on two things: firstly, on the prospect of exemplary causes, and, secondly, on how to accommodate the final and efficient causal powers of the unmoved mover. Now, within this discussion, there is a sub argument that concerns, specifically, the last chapter of Lambda. More precisely, this debate aims at making sense of the account of cosmic order that is described when Aristotle presents the analogy of the general and the army. By making this analogy, the teleological relation that is at play seems to be more complex than the one involved in the case of the unmoved mover as a final cause. In this case, the unmoved mover's field of action or reach is the first heaven, which in turn is responsible for the rotation of the superlunary spheres. However, in *Metaphysics* Lambda 10, there is a shift in what concerns the reach of the unmoved mover. In this chapter, the reach concerns the whole universe,

but it could also result in the first heaven deciding to rest in order to emulate the immutability of the unmoved mover. This idea was first suggested by Theophrastus (*Metaphysics* 5a 23-25).

⁷⁶ Aristotle mentions the father and the sun's trajectory as parts of the causes of a human being.

⁷⁷ An account that shares this premise of the unmoved mover as a kinetic object can be found in Aryeh Kosman (1994, pp. 139–140). The unmoved mover is the soul of the first heaven.

namely, the unmoved mover, the superlunary, and the sublunary. In the next section, I present the arguments of Lambda 10. I also discuss the different theories advanced to make sense of this argument.

4.2 The analogies of the unmoved mover. The argument of *Metaphysics* XII 10

The importance of the last chapter of book XII of Aristotle's *Metaphysics* goes beyond the particular role it plays in the general argument of that same book. This chapter is one of the few parts of the corpus that depicts how an Aristotelian cosmic "big picture" would look like. More precisely, this "big picture" includes a plausible view of how different parts of the cosmos are interrelated, as well as a view of the interplay of the different causal relations that obtain between different kinds of substances, both perishable and non-perishable. Now, if this reading is correct, this chapter becomes a key passage for understanding Aristotelian extended teleology, given that the order of the world should be accounted for in teleological terms.

Now, there is a debate concerning the possibility of finding a coherent outline of the cosmos' big picture in this chapter of book Lambda. Broadly speaking, there are at least two ways to read this part of the *Metaphysics*. On the one hand, the minimalistic view; on the other hand, the non-minimalistic view. According to the former, the only instance of a working final cause is that of the unmoved mover and the heavens. The unmoved mover qua final cause is responsible for the movement of the first heaven and of nothing more. Sublunary teleology is accounted for by the form of each individual, and so it is not the case that there is a global good (i.e., a good that involves the good of more than one substance) that explains some macrocosmic state of affairs, like the relation between the unmoved mover and the sublunary world⁷⁸. In contrast, the non-minimalistic view has it that, according to Lambda 10, there is such thing as a state of affairs involving more than one substance which is to be accounted for in terms of a teleological explanation. The latter could be an Aristotelian final cause or some other concept⁷⁹. Before discussing these views, it might be useful to take a look at the central arguments of Lambda 10.

⁷⁸ Some representatives of the minimalistic view are Wardy (1993), David Charles (2012), Leunissen (2010), and Judson (2019).

⁷⁹ Some representatives of the non-minimalistic view are Charles Kahn (1985), Sedley (2000), and Horn (2016).

4.2.1 The Argument of Lambda 10

Metaphysics Lambda 10 is divided in at least three parts. In the first part (*Metaphysics* XII 10, 1075a 11-35), Aristotle presents a very rough sketch of the way the first mover accounts for cosmic unity. In the second part (*Metaphysics* XII 10, 1075a 25-34), Aristotle criticises previous theories about the unity of cosmic principles. Finally, in the third part (*Metaphysics* XII 10, 1075b 34-1076a 4), he presents theories in which it is not possible to give an account of the unity of the universe. In this part, he mainly focuses on that of Speusippus.

The first part of Lambda 10 provides the more positive account of cosmic order and unity. Let us consider the passage in full⁸⁰:

A (1075a 11-13) We must consider also in which of two ways the nature of the universe contains the good or the highest good, whether as something separate and by itself, or as the order of the parts. (Επισκεπτέον δὲ καὶ ποτέρως ἔχει ἢ τοῦ ὅλου φύσις τὸ ἀγαθὸν καὶ τὸ ἄριστον, πότερον κεχωρισμένον τι καὶ αὐτὸ καθ' αὐτό, ἢ τὴν τάξιν).

B (13-15) Probably in both ways, as an army does. For the good is found both in the order and in the leader, and more in the latter; for he does not depend on the order but it depends on him. (ἢ ἀμφοτέρως ὡσπερ στρατεύμα; καὶ γὰρ ἐν τῇ τάξει τὸ εὖ καὶ ὁ στρατηγός, καὶ μᾶλλον οὗτος· οὐ γὰρ οὗτος διὰ τὴν τάξιν ἀλλ' ἐκείνη διὰ τοῦτόν ἐστιν).

C (16-18) And all things are ordered together somehow, but not all alike,—both fishes and fowls and plants; and the world is not such that one thing has nothing to do with another, but they are connected. For all are ordered together to one end. (πάντα δὲ συντέτακται πως, ἀλλ' οὐχ ὁμοίως, καὶ πλωτὰ καὶ πτηνὰ καὶ φυτὰ· καὶ οὐχ οὕτως ἔχει ὥστε μὴ εἶναι θατέρῳ πρὸς θάτερον μηδέν, ἀλλ' ἔστι τι. πρὸς μὲν γὰρ ἐν ἅπαντα συντέτακται.).

⁸⁰ In this section, I introduce the Greek text, since there are some important remarks about the phrasing to be made. Here, I use Ross' text. My aim in this section is to examine the plausibility of two different readings of 1075a 22-23. For my purposes, Ross' text is more neutral in what concerns these readings. Texts that come afterwards (specifically, Jaeger's and Zeller's) change the manuscript's phrasing in a way that might tend to preclude one of these readings (what I will call the non-minimalistic reading) (Sedley, 2000, pp. 330–331). For discussion, see István Bodnár (2005) and Horn (2016).

D (18-22) (But it is as in a house, where the freemen are least at liberty to act as they will, but all things or most things are already ordained for them, while the slaves and the beasts do little for the common good, and for the most part live at random; (ἀλλ' ὡσπερ ἐν οἰκίᾳ τοῖς ἐλευθέροις ἥκιστα ἔξεστιν ὅ τι ἔτυχε ποιεῖν, ἀλλὰ πάντα ἢ τὰ πλεῖστα τέτακται, τοῖς δὲ ἀνδραπόδοις καὶ τοῖς θηρίοις μικρὸν τὸ εἰς τὸ κοινόν, τὸ δὲ πολὺ ὅ τι ἔτυχεν).

E (22-23) for this is the sort of principle that constitutes the nature of each.) (τοιαύτη γὰρ ἐκάστου ἀρχὴ αὐτῶν ἢ φύσις ἐστίν).

F (23-25) I mean, for instance, that all must at least come to be dissolved into their elements, and there are other functions similarly in which all share for the good of the whole. (λέγω δ' οἷον εἰς γε τὸ διακριθῆναι ἀνάγκη ἅπασιν ἐλθεῖν, καὶ ἄλλα οὕτως ἔστιν ὧν κοινωνεῖ ἅπαντα εἰς τὸ ὅλον).

Aristotle introduces the question concerning the way the good of the universe is to be explained. He offers, here, two possible explanations: as something separate or as the order of the parts. The answer to this issue is presented in the form of two analogies. According to the first analogy, the good of the cosmos is akin to the good of an army, the good of which is in part explained by the general and in part explained by its own order. In this case, the unmoved mover stands to the cosmos in a relationship akin to that of a general vis-à-vis an army. The general is the cause of the good to a greater extent, insofar as the order depends on her.

The argument continues with the introduction of a new claim according to which all parts of the cosmos are (i) organized; while (ii) they are not organized in exactly in the same way, they all (iii) tend towards a same goal. Aristotle illustrates these three features with the analogy of a household composed of two groups: the free people, and the slaves and domestic animals. The former—which are akin to the superlunary—behave in such a way that there is a straightforward relation between their interests and the good of the household. Furthermore, in some way, their interests are defined in terms of the good of the household. For Aristotle, it is implausible that the interests of the free and whatever is convenient for a household match accidentally, unlike those of the slaves, whose interest are more likely to match with those of the household accidentally. In the analogy, the good of the household corresponds to the unmoved mover qua object of desire or final cause. The unmoved mover has direct causation over the superlunary and, thus, there is no room for chance in this realm of the cosmos (i.e., both the eternity of movement and the uninterrupted perpetuation of species are

necessary). The sublunary, on the other hand, depends directly on the movement of the sun and its trajectory. This realm depends, however, only indirectly on the unmoved mover.

Taken at face value, these passages provide clear and direct support for a teleological account that concerns a relation between more than one substance. In the first sentence, where Aristotle asks about the way the “nature of the universe” contains what is good and best and whether this is the prime mover or the order of the parts, he actually says “ἡ τοῦ ὅλου φύσις”. Later on, at line 18, Aristotle adds that all things in the universe are in a conjoint arrangement in relation to one thing, which seems to be the unmoved mover. Finally, in the last lines (23-25), Aristotle says that the cycle of generation and corruption of living beings contributes to the good of the whole. If this reading is correct, then this must be a case of extended teleology. The core claims of the argument are the following:

- A. There is such a thing as the nature of the Universe. For this nature, goodness and perfection consist both in the activity of the unmoved mover and in the eternity of movement and uninterrupted perpetuation of biological species.
- B. The unmoved mover’s activity has some kind of causal priority in what concerns the perfection of the cosmos.
- C. All things in the universe are in a conjoint arrangement in relation to one thing (i.e., the unmoved mover).
- D. The universe is analogous to a household in that all of its members work towards the good of the household.
- E. The nature of the universe works as a general principle for each natural substance.
- F. The dissolution of natural entities into their basic components makes way for the generation of new living beings.

4.2.2 The two readings of Lambda 10

Not everyone agrees with the non-minimalistic reading presented above. For instance, when Aristotle says: “the nature of the universe”, the term “universe” does not necessarily refer to a single object. Instead, the term could be taken as a periphrasis of the “space in which all the existing things are confined”. In support of this reading, there is a parallel expression in *On the Heavens* I 2. Here, Aristotle enquires about the extension of the universe, whether it is finite or infinite (*On the Heavens* I 2, 268b 11-12). In those lines, “περὶ μὲν οὖν τῆς τοῦ παντὸς φύσεως” should be taken as a periphrasis of the

space in which all the existing things are confined (Bodnár, 2005, p. 21; Judson, 2019, p. 347; Leunissen, 2010, p. 47).

As for claim C, it can also be read in a minimalistic way. Accordingly, it is not necessarily the case that the unmoved mover is the principle that causes the cosmic order. Instead, each individual natural object aims at achieving its own goal. This is what can be taken to be, to some degree, similar to the goal of the unmoved mover (Leunissen, 2010, p. 46). The goal of the unmoved mover is full actuality; for the first heaven, eternal rotation; and for the rest of the spheres, multiple movements (see *On the Heavens* II 12, 292b 20-25). According to this view, there is no such thing as the nature of a single cosmic substance which is responsible for the order of all the parts of the universe.

In this minimalistic view, some passages that are usually taken as parallel to Lambda 10 are read in a deflationary way (Judson, 2019, p. 336). These are the passages in which Aristotle says that some objects imitate the heavenly objects⁸¹. Among these passages, *Generation and Corruption* II 10 and *On the Soul* II 4 (both discussed in previous chapters) are especially relevant, insofar as they mention a desire on the part of the sublunary realm. In these passages, Aristotle refers to the existence of a desire that explains an ordered state of affairs. More specifically, in *On the Soul*, the desire in question is that of animals to perpetuate their species in order to partake of the everlasting and divine. In *Generation and Corruption*, in turn, god's desire of the best possible outcome for sublunary substances (i.e., the everlasting perpetuation of species) is responsible for such outcome. In both arguments, the "desire" in question is a figurative way of referring to the level of perfection that is possible for focalized final causes. In the sublunary world, goal-driven processes are less perfect than in the superlunary realm, and both are, in turn, less perfect than the unmoved mover. Goal-driven processes, however, occur on an individual level and are accounted for by an individual's particular soul (Judson, 2019, pp. 339–340).

In contrast, according to the non-minimalistic view, the sections of Lambda 10 and the passages mentioned above concerning the imitation of the unmoved mover can (and should) be read in terms of a global final cause (Sedley, 2000, pp. 330–331). The unmoved mover is what directly or indirectly causes natural substances to achieve their maximum potentiality (Kahn, 1985, pp. 186–187; Sedley, 2000, p. 297). Some interpreters suggest that "ἡ τοῦ ὅλου φύσις" could be read as the inner source of

⁸¹ These passages are *Meteorology* I 9, 346b 36-374a6; *Metaphysics* VIII 8, 1050b 22-30; *Metaphysics* L 8 1074b 2-3, and *On the Movement of Animals* 700b 7-9.

movement (“φύσις” as defined in *Physics* II 1) of a single entity, i.e., the universe (Sedley, 2000, pp. 329–331). A reading of this kind would be different from those readings that would be adequate for similar expressions used elsewhere in the corpus, for example, the abovementioned passage in *On the Heavens* I 2 268b 11–12. In Lambda 10, nature is equivalent to a final cause (1252b 34). The first mover stands to the universe as its nature, in the sense of being a source of movement (Sedley, 2000, p. 331). According to this view, the unmoved mover is something like the ousia of the whole universe.

According to Sedley, the kind of teleological causation proper of the universe as a single entity works by means of the sublunary imitating the unmoved mover (Sedley, 2000, pp. 333–334). Both the arguments of *Generation and Corruption* II 10 and *On the Soul* II 4, become relevant at this point. Aristotle talks about the desire either of god or of individual living beings to reproduce and, thus, to guarantee the eternal cycle of generation and corruption. In the case of spheres and planets, this movement would be the result of a deliberate imitation, insofar as the higher part of the cosmos is supposed to be intelligent. Meanwhile, in the sublunary region, the appropriate form of imitation seems to be non-psychological. Consider that plants, if not all non-human animals, are surely for Aristotle incapable of the mental states which would explain the action of desiring to be like the unmoved mover (Sedley, 2000, p. 334). However, the claims of *Generation and Corruption* II 10 and *On the Soul* II 4, namely, the claim concerning living beings’ desire of partaking in the eternal or divine and the claim about the god that chose the best state of affairs at hand, must be cashed out in non-metaphorical terms (Judson, 2019, p. 338). According to Sedley, one possible way to do this is to say that the desire of the superlunary substances has a counterpart in plants and non-human animals that can be conceptualized as some sort of natural tendency (Sedley, 2000, pp. 334–335)⁸². Another alternative is to claim that, within non-human living beings, there is an “unconscious” striving that is part of the species’ “deeper interest” to continue existing (Kahn, 1985, p. 194).

4.3 Axiarchic teleology

The minimalistic reading of Lambda 10 is appealing insofar as there is no need to ascribe to Aristotle an account of extended teleology. It is more economical in what concerns both the kind of substances

⁸² The counterpart of this desire is illustrated with the case of a living being’s body parts, which are mindless and do not need their own soul to work orderly but only the soul of the creature as a whole (*On the Motion of Animals* 10, 703a 34–703b 1).

and the kind of teleological causation that we assume are accepted by him. This minimalistic reading is compatible with two claims that Aristotle arguably holds. Firstly, the claim that substances are the most basic entities and, therefore, that it is not possible for there to be a substance whose parts are also substances. And, secondly, the claim that non-mentalistic final causes are accounted for by an individual form. Under this minimalistic reading of XII 10, there is no need to devise concepts such as “global teleology” or “extended teleology”, and to find textual evidence that makes plausible to ascribe the use of those concepts to Aristotle. If this is correct, the minimalistic view stands as the more economical exegetical account. This surely has some interpretive merit.

The preference of this methodological principle, however, comes at a cost, since it can make it hard to appreciate what Aristotle attempts to do in some parts of the corpus. It seems that the passages of Lambda 10, where Aristotle uses the language of global teleology, are an attempt at explaining the good fit between the different parts of the universe. Note that this issue is not exactly the same as the question concerning the unmoved mover as both an efficient and final cause. The possibility of an unmoved mover that is both an efficient and final cause of the first heavens (which in turn cause the movement of the planets and of the sun, and consequently, of the yearly seasons) does not explain that the *overall cosmic disposition* is convenient for life on Earth. The fact that the Aristotelian cosmic disposition is good for everybody must be accounted for. Moreover, it must be accounted for in terms of final causes. Otherwise, it would be the result of chance.

Now, if Aristotle had in mind the problem concerning the relationship between the different parts of the cosmos when he wrote Lambda 10⁸³, the non-minimalistic account becomes much more appealing. A teleological account of the good fit of all the parts of the world is surely needed if the issue in question was the disposition of the cosmos. An overarching single universe with a nature that explains why the architecture of the cosmos is such that everything exists as perfect as it is possible fulfils this job. Moreover, if this kind of reading is correct, the arguments about global teleology found in the

⁸³ In the next and final chapter, I argue how some arguments of Theophrastus’ *Metaphysics* can be taken as evidence for the claim that accounting for all of the parts of the universe in teleological terms is a problem that Aristotle was aware of and interested in. The analogy of the army suggests that there is some coordination between the parts. Moreover, Aristotle criticizes Speusippus for dividing the cosmos into two different tiers, that of mathematical objects and of sensible objects (*Metaphysics* XII 10, 1076a 1-3).

discussed parallel passages are consistent with Lambda 10 when taken at face value. This has some exegetical merit, too⁸⁴.

Of course, it is still the case that the non-minimalistic view faces many challenges. The most serious are those about the plausibility of the conditions required for global teleology. If the universe is a single substance, we would face the problem of accepting that there is a substance whose parts are also substances, or instead claim that there is only one substance. Within the conceptual possibilities of grand substances (i.e., substances whose parts are substances), the prospect of cosmic monism seems to be less problematic than the concept of a “city-substance”, discussed in part II of this thesis. In the latter case, we have the problem of a person whose polis ceases to exist for whichever reason. Such a human being would have a different ontological condition than someone who is part of an actual polis. The person without polis is different insofar as she is not part of a city-substance. We could interpret this in two different ways. On the one hand, those living outside the city could be a substance in a more proper sense insofar as they do not depend on a bigger and more perfect grand-substance. On the other hand, they could be a diminished object vis-à-vis their counterparts who inhabit a city in virtue of not being parts of a bigger substance. The former would be like a detached limb, and the latter like the incorporated limb. Now, if the only substance in the world is the single cosmic substance, we do not have to deal with this problem, because everything other than the single substance shares the same status, namely, being part of that single substance.

In any case, it seems unlikely that Aristotle took the argument to such a strong position as cosmic monism. Aristotelian substances par excellence are individual living beings. Besides, Aristotelian substances are the most basic objects and, by definition, they cannot be part of a substance. Furthermore, throughout the corpus, there are many references to individual substances, as well as an account of substances in which the issue of what exactly they are is thematized and discussed. So, taken as textual evidence, the references to substances throughout the corpus, the theory of substances of *Physics* II, *Categories*, and the central books of the *Metaphysics* clearly outweigh the passages concerning extended teleology. Nonetheless, the problem of the good fit of all the parts of the cosmos, as well as the claims about grand substances that are advanced to solve this very problem are also present in the

⁸⁴ It is important to keep in mind that none of the parallel passages—neither taken together nor individually—are sufficient to decide the debate about the non-minimalistic and the minimalistic readings of Lambda 10. The passages in question are usually taken as a whole and remain contested according to any of the positions.

corpus. The mentioned problem and these claims should be considered, even if Aristotle does not have the full account of how teleological explanations work in the case of complex objects in which there is more than one substance involved.

Given the difficulties associated with grand substances, an alternative reading that can encompass extended teleology without committing us to the existence of grand substances becomes desirable. Axiarchism is a useful conceptual tool for this task. Recall that axiarchism is the view according to which a property or state of affairs is actual in virtue of being good⁸⁵. According to this view, we do not need to conceive of the cosmos as a unitary substance with one nature, in which all the parts work for the good of this whole being. Rather, the universe has some form of unity, which includes a certain arrangement of various things, even various distinct substances, and these exist precisely because that arrangement is good.

The concept of axiarchism is useful to understand the arguments about the world order presented in Lambda 10. The universe is an object that has order-like properties such as its hierarchical structure, regularity, everlastingness, and so on. These properties are distributed to different degrees in the different realms of the universe. For instance, the unmoved mover is complete and eternal actuality, the first heaven rotates eternally and uniformly, and living beings reproduce in order to secure the good of the species. What explains both the existence of those properties and its distribution is the fact that they are a good—actually, an optimal—state of affairs.

The concept of axiarchism also allows us to cash out, in a different way, the metaphors of *Generation and Corruption* II 10 and *On the Soul* II 4 (i.e., a living being's desire of partaking in eternity and a deity choosing an endless cycle of generation and corruption to guarantee the existence of species and living beings). Living beings exist in the most complete way they can, because it is good for species to exist in this way. We do not need to attribute to plants and animals neither any desire to imitate the unmoved mover, nor any non-conscious deep interest to keep existing.

⁸⁵ Horn proposes a similar account which he calls the “perfectionist account of teleology” (2016, pp. 284–285). According to this view, the teleological character of nature consists in the distribution of optimal configurations to all living beings. Nature somehow strives for perfection and so there is no need of a beneficiary in goal driven process (Horn, 2016, p. 291).

Appendix. Axiarchism and the Environment

In part II, I have discussed extended teleology from a vertical point of view. From this perspective, the main beneficiary of the good and ordered disposition of the superlunar is the sublunary. The question about the reach of final causes can also be discussed, however, from a horizontal point of view. The natural environment or habitat of earthly species seems to be one of those cases in which a recurrent state of affairs is beneficial for natural substances. In this appendix, I provide a general map of the academic discussion and mention some of the limitations of the positions presented in the most recent literature.

Both Aristotelian biocentrism and anthropocentrism tackle the issue of the environment. As mentioned in the first chapter of this thesis, some scholars claim that final causes are biocentric, insofar as some environmental phenomena (like rain) happen for the sake of life in general (Cooper, 1982, 2004; Furley, 1985). There is also an anthropocentric view according to which there is a cosmic nature that regulates both the nature of particular substances and meteorological phenomena (Sedley, 1991, p. 180). Furthermore, the main beneficiary of the cosmic goal-driven arrangement is humankind (Sedley, 1991, p. 183). For adherents of both of these views, an account of the causal role of the environment is somehow subsumed by the universal final cause that controls natural phenomena.

Some scholars approach the issue of Aristotle's account of the environment based on focalized final causes. An approach of this kind is presented by Gelber (2015). According to this view, the environment is a coessential feature of an animal's vital capacities⁸⁶. Aristotle not only thought about parts of animals being well adjusted to their natural function (e.g., locomotion, perception, or reproduction), but also *well fit* to their habitat⁸⁷. In the biological works, there are numerous references to the coordination between the organs of an animal that exercises some vital function, and certain features of the habitat (Gelber, 2015, p. 268). For instance, the beak of certain marsh dwelling birds is

⁸⁶ The Aristotelian environment could also be thought as a background, or as the "stage" in which natural substances act according to their natures (Waterlow, 1982a, p. 38). The input of the environment consists in two possibilities: either an expected result is not obtained because some necessary element required by a natural process is absent, or expected result is not completed in virtue of the direct intromission of something else.

⁸⁷ Gelber takes habitat to mean "an ecological environment characterized both by abiotic features (...) and by biotic ones" (2015, pp. 267–268).

flat in order to be serviceable for digging roots out of the mud (*Parts of Animals* IV 12, 693a 11-ff). Or, another case mentioned by Gelber, the tough interior of a camel's mouth allows it to eat thorny plants readily available for it (*Parts of Animals* III 14, 674a 22-b 5). Fitness between an animal and its habitat is explained by the idea that the habitat is a part of its essence. In Gelber's words: "Aristotle considers habitat to be partially constitutive of the capacities that comprise a kind's essence, and not merely an external or enabling condition under which an organism can exercise its essential capacities" (2015, p. 279).

A problem with an interpretation of this kind relates to Aristotle's claim that the essence of living beings is identical to the soul (*On the Soul* II 4, 415b 8-15). The challenge, then, would be to make sense of an extended view of the essence that includes both psychic and habitat-fitness properties. Gelber's strategy to address this consists in taking the soul as a set of capacities required for engaging in vital activities. The habitat, however, gives shape to the mentioned activities, e.g., looking for food in the muddy marsh is different than looking for food in another environment. Gelber puts this in the following way:

Habitat, according to this proposal, gets into the essence by serving as a determinant of the precise way in which organisms have their vital capacities. Marsh-dweller birds, for instance, are not just birds with certain capacities that happen to be exercised best in marshes. Marsh-dweller birds are birds that have those capacities in the marsh-dweller way. That is, 'the marsh-dweller way' is a specification of the way the organism has its vital capacities. (Gelber, 2015, p. 284).

As a last step in her argument, Gelber refers to Aristotle's account of perception, which is an example of how some organs have external essential qualities. Perceptual capacities have a coessential external element, insofar as they are essentially defined by their objects: sight is defined by colour, hearing by sound, etc. (Gelber, 2015, pp. 284–285).

Although this view certainly sheds some light on the issue of Aristotle's take on the environment, the concept of an essence that includes the habitat does not explain all there is to natural habitats. For example, it does not account for the fact that frogs happen to live in marshes that provide the appropriate conditions for them. Even if it is coessential to a frog to feed in the marsh-appropriate way, we could ask if there is something that explains the happy distribution of frogs in marshes, as well as the very existence of marshes which happen to be good for frogs.

Notice that it could be the case that the macrocosmic conditions that facilitate the existence of marshes can be coessential to an animal. For example, it is part of the essence of a frog to be marsh-dwelling, which in turn means being tropical, the latter being defined as positioned in some particular part of the earth which is in some specific spatial relation with the sun throughout the year. However, the fact that animals happen to live where their essence can accommodate for, cannot be explained by being coessential to animals. Unless we claim that environments exist for the sake of animals, this state of affairs would just seem like an accident. If the essence of some rodent includes the taiga, then the taiga is for the sake of the rodent. Similarly, if the taiga is a good habitat because its temperature is modulated by the yearly seasons, then the latter are for the sake of the rodent, and so all the way to the sun and the unmoved mover. If this is correct, it would also be a feature of some parts of the environment to be useful for life on Earth. All the living beings who benefit by the yearly season are essentially solar creatures. If this is so, however, the sun's essence is partly defined by being the source of life of solar-based living beings. If this consequence follows, then we need an account of extended teleology.

Perhaps this kind of questioning is inappropriate. Aristotelian teleological biology is limited qua scientific theory. Precisely the difficulties Aristotle faces when explaining events like predation or the way some animals adapt to a particular environment is what explains why natural selection is now the best available scientific theory. In this sense, asking about the deeper metaphysical underpinnings of the happy distribution of frogs and marshes might not be the most correct approach when doing history of philosophical biology. The problem with this objection, however, is that it is Aristotle who introduces metaphysical arguments everywhere, including in his works on natural philosophy⁸⁸.

It seems that it is hard to find a clear-cut distinction between Aristotle the natural philosopher and Aristotle the metaphysician or theologian. The conceptual relation between teleology in the natural world and in the broader cosmological realm can also be found in Theophrastus' *Metaphysics*. In the next chapter I will discuss Theophrastus' objections to Aristotelian teleology and some other metaphysical/cosmological arguments.

⁸⁸ See, for instance, *Generation and Corruption* II 10, *On the Soul* II 4, and *Politics* I 2.

PART IV. THEOPHRASTUS ON ARISTOTELIAN TELEOLOGY

Chapter 5. Teleology in Theophrastus' *Metaphysics*

5.1 An overview of Theophrastus' *Metaphysics*

In this chapter, I argue that Theophrastus' *Metaphysics* presents and discusses the conceptual possibility of a teleological world view that fits with what I have called extended teleology. In this sense, Theophrastus' *Metaphysics* is part of the family of texts, within the Peripatetic tradition, that introduces such a conceptual possibility. The other members of this group are *Physics* II 8, *Politics* I, and Lambda 10. Unlike these parts of the corpus, in his *Metaphysics*, Theophrastus explicitly enquires about the interconnectedness of first principles and the natural world. Moreover, he even mentions the possibility of conceiving the universe as a single substance, which would explain in teleological terms the good fit of the two parts of the world. If this interpretation is correct, Theophrastus would be inaugurating a new concept, that of non-demiurgic organicism. The universe is to be accounted for in terms of a self-regulated single substance, akin to an Aristotelian natural substance.

Before discussing the latter concept and, more generally, its relationship with what we have described as extended teleology, I will present a summary of the discussion about the chronological relation between Aristotle's corpus and Theophrastus' *Metaphysics*. The conceptual relation between Aristotle's natural philosophy and Theophrastus' views on teleology has been discussed many times in the academic literature as part of the broader question of the chronological relation between the two. Moreover, the historical relation between these arguments might shed some light on the dialectic between the philosophers' views on teleological explanations.

Given that there is no external source for dating Theophrastus' *Metaphysics* (this work is not mentioned by Diogenes Laertius, or by anyone else for that matter), a strategy followed by some scholars has been to calculate its date of composition in relation to some parts of Aristotle's corpus. This approach entails some further complications since it is extremely hard, in turn, to establish a timeline of Aristotle's works. Theophrastus' *Metaphysics* is, more specifically, closely connected to book Lambda of Aristotle's *Metaphysics*, a book which is difficult to date accurately. In any case, some scholars claim that Theophrastus' *Metaphysics* must be as old as Lambda, given that both books are close thematically (Reale, 1980, pp. 365–391). On the one hand, the thematical closeness between the two works becomes evident after taking a close look at some of the questions posed by Theophrastus in his *Metaphysics*. His questions are directed towards the arguments about the unmoved mover as they are

presented in Lambda⁸⁹. Additionally, Theophrastus' conception of the highest science is the one Aristotle presents in Lambda 1: i.e., while physics deals with objects that are perceptible and movable, metaphysics or the highest science, focuses on objects that are immobile and imperceptible⁹⁰. On the other hand, it is taken as evidence for the chronological connection the fact that there are no direct or indirect references to the rest of Aristotle's *Metaphysics*. For instance, there is no mention of neither first philosophy as the study of being qua being, nor of the universality of first philosophy, nor of substance as focal meaning or as a category (Devereux, 1988, pp. 181–182). The absence of these topics is taken by many scholars as something relevant for dating Theophrastus' *Metaphysics*.

While I am neutral with respect to the exact chronological position of Lambda, both in the context of the whole Aristotelian *Metaphysics* and in the context of Aristotle's corpus, I do favour the hypothesis that Theophrastus' *Metaphysics* might not be very late in relation to both Theophrastus' and Aristotle's works. There seems to be a discussion between some of the puzzles or aporias Theophrastus develops in his *Metaphysics* and some parts of Aristotle's corpus. In any case, to properly understand the arguments advanced by Theophrastus connected to the question of extended teleology, it becomes crucial to briefly discuss some of the hypotheses mentioned above about the composition date of both Theophrastus' *Metaphysics* and Lambda.

5.1.1 Theophrastus' *Metaphysics* in relation to Aristotle's works

Some scholars argue that Theophrastus' *Metaphysics* is late in relation to Aristotle's works. The most influential views within this group are those of Giovanni Reale (1980) and Marlein Van Raalte (1988; 1993). Reale's take on Theophrastus' *Metaphysics* is part of a broader discussion about the role of book Lambda in the context of Aristotle's *Metaphysics*. According to this view, Lambda is not only a late work, but is also Aristotle's definitive version of first philosophy. One of the arguments Reale introduces to prove this claim is the content of Theophrastus' *Metaphysics*. Theophrastus refers only to Lambda in his *Metaphysics* because this is the most authoritative metaphysical work Aristotle produced. Had the central books of the *Metaphysics* been a more mature or refined version of first philosophy, Theophrastus would have discussed some of their arguments as well.

⁸⁹ In *Metaphysics*, 5b 7-10, Theophrastus' refers to Aristotle's *Metaphysics* XII 7, 1072a 26-ff.

⁹⁰ In *Metaphysics* 4a1-8, Theophrastus' refers to Aristotle's *Metaphysics* XII 1, 1069a31-ff.

It is important to notice that the fact that Theophrastus' *Metaphysics* seems to refer only to the main claims of Lambda, and not to the central books of Aristotle's *Metaphysics*, can also be taken as evidence to support the idea that Lambda is an early work (Devereux, 1988, pp. 181–184; Gutas, 2010, pp. 3–5). If we were to suppose that Theophrastus was well acquainted with all of Aristotle's important theories, the fact that Theophrastus makes no mention of the arguments of books III–X of Aristotle's *Metaphysics*, could be explained by the fact that they were not written when Theophrastus wrote his own *Metaphysics*. If no plausible explanation for the absence of such references is provided, then it is hard to use Theophrastus' *Metaphysics* as evidence for Reale's take on Aristotelian metaphysics (i.e., that the study of the divine substance is the culmen of first philosophy, and so book Lambda is the conclusion of books III to X). Without some piece of evidence within Theophrastus' works that explains this absence of references to the central books, the argument could become circular: Theophrastus follows Lambda because it is Aristotle's mature take on first philosophy, and proof of this is the fact that Theophrastus only discusses the central claims of Lambda.

Van Raalte also favours a late date of composition for Theophrastus' *Metaphysics*. Her hypothesis is that the latter work are Theophrastus' notes for his "first course of Metaphysics shortly after taking over the leadership of the Peripatetic school" (van Raalte, 1988, p. 198). The fact that the style of the text is extremely terse suggests that these are Theophrastus' annotations. Van Raalte also argues that this work presupposes some familiarization with some of the arguments of *On the Motion of Animals*, presumably a late work (van Raalte, 1988, pp. 198–199). On at least three different occasions, it is possible to associate Theophrastus' arguments to some of the arguments of *On the Motion of Animals*.

Firstly, Theophrastus alludes to a couple of verses of Homer's *Iliad*, where it is said that: "I could pull you up, earth, sea, and all" (Theophrastus' *Metaphysics* 5b 17)⁹¹. The story is that Zeus, while challenging the other gods to pull him down from heaven in some sort of tug of war contest, brags that the contest would result in him pulling up the gods along with the earth, ocean, and everything else. Theophrastus quotes this verse in the context of a puzzle about the causal power of the unmoved mover: if it cannot cause movement in the sublunary world by being an object of desire, either the sublunary objects are unreceptive of this desire, or the unmoved mover is weak (*Metaphysics* 5b 10–15). Given that the unmoved mover is more capable than Homer's Zeus, surely the former is the case. Here, Theophrastus

⁹¹ Theophrastus refers here to *Iliad* VIII 20–22.

might be referring to *On the Motion of Animals* (699b 37-700a 2), where Aristotle argues that the source of movement of the universe must be itself immovable and quotes the same verses from Homer⁹².

Secondly, in *On the Motion of Animals* (703a 29-ff), Aristotle makes an analogy between cities and animals to explain the organization and functioning of the latter. According to Aristotle, the parts of an animal behave “as a city well-governed by laws” (ὡσπερ πόλιν εὐνομουμένην). In other words, all parts do their assigned role without a monarch giving orders constantly. Theophrastus echoes this idea in *Metaphysics* 8a 5, where he suggests that the unity of the cosmos should be conceived as that of a polis or an animal (van Raalte, 1988, p. 201).

The third argument offered by Van Raalte to support the claim that Theophrastus’ *Metaphysics* is part of a discussion contemporary to the supposedly late work *On the Motion of Animals* is the following (van Raalte, 1988, pp. 201–203). At *Metaphysics* 5b 7-10, Theophrastus argues that if the heavenly bodies have some sort of desire towards the best—and have, consequently, a soul—the mental activity of these objects would be a distinct kind of movement from the trajectory of those bodies. This movement would be of a superior quality, given that it is a mental and not a physical motion. The unmoved mover would not be its cause, but instead the cause would be the soul of the first bodies. Theophrastus entertains a possible solution to this problem in *Metaphysics* 6a 10, where he claims that desire is connatural (σύμφυτον) to the first heaven. This new concept of “connatural desire” is related to *On the Motion of Animals* (703a 5-ff). Aristotle, according to van Raalte, deals with the general issue of desire and movement of the soul at the end of his productive years, with the concept of “material substrate” (i.e., connate pneuma) which he introduces in *On the Motion of Animals* (703a 14-16). In living beings, desire is an embodied function in the sense that there is an organ or a corporeal part that is in charge of processing perceptual stimuli and of turning them, then, into bodily responses⁹³. Theophrastus has in mind this latter account of a connate pneuma when he introduces the puzzle in question. The connate pneuma would explain how some stimuli causes an action. Although, he also

⁹² According to Martha Nussbaum (1978, p. 321), Aristotle could have had in mind *Theaetetus* 153c6-d5 in this part of *On the Motion of Animals*. Also relevant is that Plato makes a reference to those verses while explaining that the rope used in this context is akin to the movement of the sun, which is necessary for the functioning of the universe.

⁹³ van Raalte (1988) follows Nussbaum (1978, p. 158, fn. 54) in this interpretation of connate pneuma.

echoes this Aristotelian notion when he considers the possibility of desire being innate to the first heavens.

It is important to notice that even if Theophrastus' essay is terse and it includes some references to *On the Motion of Animals*, it could be the case that we are not dealing with his notes for some sort of post 322 BCE lectures, after Aristotle has died. Perhaps these are his notes for some academic activity that Aristotle witnessed or even collaborated with. We have no reason to assume that Aristotle was unwilling to discuss Theophrastus' arguments, as challenging as they might have been for some of Aristotle's claims⁹⁴.

There are some passages in Aristotle's corpus that suggest another picture of the Theophrastus-Aristotle discussion. Some arguments within Aristotle's works on natural philosophy can be read as answers to some of the puzzles Theophrastus lays out in his *Metaphysics*. If these passages are replies to some of Theophrastus' puzzles, then there is no reason to suppose that Theophrastus' *Metaphysics* is older than Aristotle himself. Furthermore, let us suppose that Theophrastus is a perfectly well-informed Aristotelian reader. This would mean that, if an Aristotelian argument is missing in Theophrastus' *Metaphysics*, that argument should be older than the latter work because, otherwise, the argument would be included in it. If this is correct, it could be argued that the Aristotelian works in which we find the replies to the puzzles are older than Theophrastus' *Metaphysics*.

Some scholars have noticed that Theophrastus' essay might be previous both to *Generation of Animals* and to *History of Animals* V-VI (Devereux, 1988; Gutas, 2010). This view has it that Theophrastus is discussing with some theories that at some point Aristotle revised, so it would seem that his work was written before Aristotle revised such arguments. In the final section of his *Metaphysics* (10a 22-ff), Theophrastus presents some cases that cannot be easily explained in terms of final causes. Nevertheless, Aristotle does present a teleological account for some of these cases. If we suppose that Theophrastus is a perfectly well-informed Aristotelian, it is hard to believe that he was not acquainted with the teleological accounts of these cases, and so the alternative explanation for this issue is that Aristotle is replying to Theophrastus' objections in the natural philosophy works in question. One

⁹⁴ An argument like van Raalte's (1988) might presuppose that Aristotle was a dogmatic scholar zealous of his own work to the point that he was not open to any critical engagement with his students. It is impossible to actually know what kind of academic environment Aristotle and his students created, whether collegial and dialogical or something more vertical and doctrinaire, but there is no reason to suppose the latter.

consequence of this would be that Theophrastus' *Metaphysics* was written before *Generation of Animals* and *History of Animals* V-VI. This is Glenn W. Most's argument (Laks et al., 1988, pp. 232–233), who presents a list of some passages of Aristotle's biological works that could perfectly be read as answers to the contentious cases that cannot be easily explained in teleological terms. In short, it would be puzzling that, while reading very deeply into the arguments of *Metaphysics* Lambda, Theophrastus is at the same time ignorant or dismissive of some arguments of *Generation of Animals* and *History of Animals*.⁹⁵

At this point, it is worth considering the passage in which Theophrastus presents the cases that are not easily explained in teleological terms:

Again, in animals themselves some things are practically useless, as for instance in males the breasts and in females the emission peculiar to them, unless indeed this makes some contribution, and in some animals too the growth of a beard or, generally speaking, of hair in certain places; and again the size of the horns, as in deer, for those that are not benefited by them (while some have even been injured by the rubbing of their horns against obstacles or by being suspended by them or by their horns covering up their eyes); and the way in which some phenomena are even violent or unnatural, like the copulation of the heron and the life of the day-fly; and one might find not a few other things of the same kind. (*Metaphysics* 10b 8-16).

Let us consider each of these problematic cases in more detail, as well as what might be Aristotle's considerations around them:

1. Firstly, Theophrastus mentions that “breasts in males are useless (μάταιος)” (*Metaphysics* 10b 8). Aristotle, however, discusses this issue in *Parts of Animals* IV 10, 688a 19-ff. He claims that the reason for males having breasts is to protect parts near the heart. In the case of females, breasts are useful for storing nourishment and for feeding offspring.
2. The next problematic case he mentions is that of emission (πρόεσις) in females, which appear to be pointless as well (*Metaphysics* 10b 9). It is not very clear which object or biological process Theophrastus has in mind when he says “emission”, but Aristotle discusses some physiological phenomena that might address Theophrastus' concern. For instance, if we take “emission” to be female production of

⁹⁵ See also Daniel T. Devereux (1988, p. 233).

semen during intercourse, Aristotle plainly rejects the existence of such an object (see *Generation of Animals* I 19, 727a 26-727a 30). On the other hand, if we take the meaning of *proesis* as a vaginal discharge that some women produce during intercourse, Aristotle discusses this in *Generation of Animals* I 20 (727b 36-ff) and II 4 (739a 37-ff). Now, he does not give a teleological account of this phenomenon, but it could be argued that there is no need for an explanation of this kind, given that this is not a frequent occurrence, it only happens to some women and not all of the times (Laks et al., 1988, p. 226). If this is the case, it would not be part of the class of things that happen “most of the time and are beneficial” that, according to Aristotle, require a teleological explanation. If, however, Theophrastus’ “*proesis*” refers to menstrual fluid, Aristotle does give a teleological explanation in *Generation of Animals* I 19 (727b 6-727b 30). For him, menstrual fluid provides the matter (in the hylomorphic sense) of an embryo, of which the male would provide the form. Similarly, if “*proesis*” is taken here as the whole process of menstruation, we can find a biological explanation in *Generation of Animals* II 4 (738a 11-ff). For Aristotle, given that in some species female bodies do not produce enough heat to fully concoct their own blood, this semi-processed blood travels to the uterus through some blood vessels. An excessive accumulation of this fluid is unhealthy, so the excessive residues are discarded, which in turn favours the health of women⁹⁶.

3. Theophrastus also mentions “the growth of hair in certain places” as a challenging case for teleological explanations (*Metaphysics* 10b 10-11). Aristotle discusses this case in *Parts of Animals* II 14 (658a 18-ff). Hair, in general, has the purpose of protecting the body, and the particular physiognomy of some animals requires a particular kind of hair growth. Nature tends to protect the most dignified parts (τοῖς τιμιωτέροις), because nature always brings about the best possible arrangement (ἀεὶ γὰρ ἐκ τῶν ἐνδεχομένων αἰτία τοῦ βελτιονός ἐστίν). Additionally, Aristotle also makes a mention of deer antlers (*Metaphysics* 10b 11-14), which seem to be useless and even detrimental to the survival of these animals. Here Aristotle agrees with Theophrastus: Antlers seem to be useless and potentially harmful. What seems to protect deer, in any case, is their speed. Similarly, with the case of the day-fly. Aristotle agrees that these insects live for only one day, but he makes no comment about their short lifespan. A third point of agreement in a case that has no teleological explanation of this kind is that of the copulation of the heron that seems to be characterized by a difficult intercourse (see Theophrastus’ *Metaphysics* 10b 14-15 and *History of Animals* IX 1, 609b 23-25; IX 18, 616b 33-ff).

⁹⁶ See also *Generation of Animals* II 4, 738a 28-ff; IV 6, 775b 8-9

In addition to the cases just mentioned, Theophrastus adds a second pair of physiological facts that are not satisfactorily explained in teleological terms:

(...) for we are told that where the better is possible, there it is never lacking; and this is illustrated by the facts that the windpipe is in front of the gullet (for this is the more honourable position), and that the mixture of the blood is best in the middle ventricle of the heart because the middle is the most honourable part (*Metaphysics* 11a 8-12).

The first of these cases is that of the position of the windpipe in relation to the oesophagus (i.e., the former in front of the latter) in virtue of being a more noble position. The second case is “the mixture [of the blood] being the best in the central ventricle of the heart—because the centre is the noblest”. Theophrastus has in mind an explanation of the latter based on the unrestricted application of a universal principle according to which “nature desires the best in all cases and when it is possible gives things a share in the eternal and orderly” (ἀπλῶς μὲν ὅτι τὴν φύσιν <εικὸς> ἐν ἅπασιν ὀρέγεσθαι τοῦ ἀρίστου καὶ ἐφ’ ὧν ἐνδέχεται μεταδιδόναι τοῦ ἀεὶ καὶ τοῦ τεταγμένου) (*Metaphysics* 11a 5-7).

Aristotle also discusses the position of the windpipe in relation to the gullet in *Parts of Animals* III 3 (665a 7-26). The position of the windpipe is such out of necessity (ἐξ ἀνάγκης) because it must be connected to the lungs and to the heart which are in front of the body. There is, however, a teleological side to Aristotle’s argument here. Consider that he claims that, *whenever possible*, the more honourable tends to be located “in the front, above, and of the right” (*Parts of Animals* III 3, 665a 22-26). As for the second case—namely, that of the blood-mix taking place in the central chamber of the heart—Aristotle’s explanation is not, in contrast, based in an unrestricted general teleological principle (*Parts of Animals* II 4, 650b 29; IV 10, 689a 9) 97.

These replies to Theophrastus’ arguments make way for an account according to which Theophrastus’ *Metaphysics* is not late in relation to the timeline of Aristotle’s works. One might wonder, however, what to make of van Raalte’s (1988) arguments based on the discussion between Theophrastus’ work and *On the Motion of Animals*. van Raalte argues that the fact that Theophrastus is discussing some arguments of *On the Motion of Animals*, presumably a late work, is an indication that Theophrastus’ *Metaphysics* is late. However, some of the arguments of *On the Motion of Animals* address a concern that

⁹⁷ See also André Laks & Most (1993, pp. 82–83, nn. 37–38).

Aristotle shows in many works. This could indicate that Theophrastus is aware of a concern that is relevant for Aristotle in many of his works.

For instance, the claim that Theophrastus' suggestion that the unity of a cosmos should be conceived as that of a city or an animal echoes the analogy between animals and cities of *On the Motion of Animals* (703a 29-ff). It is important to notice that the concern about an account of the unity of the cosmos is present also in Aristotle's *Metaphysics* Lambda 10. Aristotle wonders whether the parts of the universe are organized in a way that is analogous to the organization of a household. The parts are all organized towards a single goal, the good of the household. Aristotle's use of the analogy of a household to illustrate the unity of the cosmos is not that far away from the analogy used by Theophrastus, i.e., a polis or an animal.

Another passage that is relevant here is that discussed of the first book of the *Politics* I 2. Here Aristotle mentions that cities are a natural entity, which arguably implies that the unity and order of a city is, if not the same of a natural substance, like that of a natural substance (*Politics* I 2, 1252b 27-ff). As was discussed in part II, this claim about cities being natural is problematic and there are many interpretations, but it is the case that Aristotle resorts to the example of a natural substance when he needs to explain the unity of organized objects composed of more than one substance (i.e., objects such as Theophrastus' cosmos and Aristotle's polis). It would seem that both Aristotle and Theophrastus can be, so to say, bold with the use of substantial unity when they need to account for an object with these characteristics. I will discuss this issue at the end of this chapter. But at this point it is important to notice that explaining complex objects in terms of natural substances is not something unheard of in the Aristotelian corpus.

van Raalte (1988) also mentions that the arguments of Theophrastus' *Metaphysics* 5b 7-10 and 6a 10 are part of a discussion that starts at *On the Motion of Animals* 703a 18-19. However what Aristotle says at *On the Soul* III 10, 433b 13-28 could be read as an answer to the problem posed by Theophrastus at *Metaphysics* 5b 7-10, which, in turn, could be read as an objection to the argument of Lambda 7, 1072a 26-35. According to this last argument, the object of desire (τὸ ὀρεκτὸν) causes *directly* the movement of the heavenly bodies. Nonetheless, recall that Theophrastus objects that, if the heavenly bodies have some sort of desire towards the best, then they must have a soul. The mental activity of these objects would be a different kind of movement than that of their trajectory. As was mentioned, given that this would be a mental movement, it would be of superior quality. Moreover, the direct cause would be the soul of the first bodies, rather than the unmoved mover.

It is worth recalling here that Aristotle distinguishes, in *On the Soul* III 10 (433b 12-28), three parts of the causal process of an action:

1. What initiates the motion, which in turn can be something (1a) unmoved while causing movement (i.e., the good that an action looks out for); or (1b) both causing movement while being itself in movement (i.e., the capacity or faculty of desire).
2. That with which it is moved (i.e., a corporeal organ responsible for perception).
3. That which is moved (e.g., an animal).

This account of desire as source of action can be taken as a revised version of what Aristotle says in *Lambda* about desire causing movement directly. According to these new distinctions, the unmoved mover is the cause of the movement of the heavens in the sense of being the object of desire. What the unmoved mover originates is the desire that, in turn, makes the souls of objects of the first heaven generate their circular motion (Gutas, 2010, pp. 6, 285–286). Now, if we take *Metaphysics* *Lambda* as a not so late work and suppose that Theophrastus was, at any given point in time, well acquainted with the works already produced by Aristotle up to that moment, it is possible to claim that these arguments are part of a philosophical dialogue within the Peripatetic school. This discussion would progress chronologically in this way: at T1, we have the argument of *Lambda* 7; at T2, Theophrastus' objections of *Metaphysics* 5b 7-10 and 6a 10; and at T3, *On the Soul's* new account of desire as the cause of movement.

Something similar could be said of the arguments of *Parts of Animals*, *Generation of Animals* and *History of Animals* discussed above, in which Aristotle might be answering some of Theophrastus' concerns about teleological explanations. If this kind of reading is correct, we could say that there is a long-term discussion, as well as some shared concerns about some philosophical problems between Aristotle and Theophrastus.

The problem of extended teleology might be part of these concerns. More precisely, this would be a concern about the need to explain some macro cosmological phenomena in teleological terms, like the beneficial input that the sun or the seasons have in earthly creatures. Theophrastus explicitly calls into question an over-all global teleology⁹⁸ view that explains in teleological terms some climatological phenomena (i.e., the yearly seasonal variation) that could be understood as external conditions for the development of some species (*Metaphysics* 7b 2-5; 10b 16-20). The mere mention of the conceptual

⁹⁸ I am following van Raalte in the use of this concept (1993, p. 21).

possibility of the seasons happening for the sake of life on Earth is very noteworthy in the context of Peripatetic natural philosophy. In a similar line, some passages of Lambda, as was discussed in a previous section, could be read as part of a similar concern, that of giving a holistic account of the different parts of the cosmos. At *Metaphysics* XII 5, 1071a 10-17, Aristotle mentions that the sun's yearly path around the earth is one of the multiple efficient causes (i.e., sources of change) that figures in the generation of a single individual (Judson, 2019, p. 165). Although there is no mention of final causes here, at the end of Lambda (*Metaphysics* XII 10, 1075a 11-25) Aristotle does wonder both about the unity of the universe and a unitarian account of it. Like Theophrastus, he also seems to claim that there must be some account of the relation between the two main parts of the cosmos.

Aristotle also explores the possibility of a teleological macro explanation at *Generation and Corruption* II 10, 336a 32-b4, where he mentions that the natural solar cycles that enable the unending perpetuation of species are due to the fact that it is the best state of affairs. This argument can be used as a piece of textual evidence for an early date of Theophrastus' *Metaphysics*⁹⁹. If Aristotle is replying to the puzzle set by Theophrastus about the difficulty of explaining environmental conditions in teleological terms, then *Generation and Corruption* II is older than Theophrastus' *Metaphysics*. Furthermore, Aristotle might also be exploring in passages like *Generation and Corruption* II 10 another kind of explanation for cases of extended teleology. As it was discussed in chapter 3, he might be committed to a form of axiarchism, according to which the actual world is actualised in virtue of being good. In this case, a world in which species are eternal insofar as both the cycle of coming-to-be and passing-away and the external conditions required for this cycle are eternal.

5.2 Theophrastus' criticisms of Aristotelian teleology

In this subsection, I reconstruct the main arguments of Theophrastus' *Metaphysics*. Although in this short work he discusses many philosophical and methodological problems related to natural philosophy and to what we might call first philosophy, it is possible to identify a central theme that is developed throughout the whole of his *Metaphysics*. This theme could be more precisely described as an aporia about the interrelation or the interconnectedness between the first entities and the natural world. This work is a collection of brief disquisitions on both Platonic and Aristotelian accounts of

⁹⁹ Dimitri Gutas (2010, p. 6) notices that this passage of *Generation and Corruption* could be a reply to Theophrastus.

the kind of causation that is adequate to the heavens and the natural world, respectively. Additionally, Theophrastus' *Metaphysics* is also a series of disquisitions on the reach of teleological explanations. The discussion of these problems is closely related to the problem of extended teleology. Before addressing the latter in detail, I will begin by presenting a reconstruction of the central arguments of this work. Having these arguments on the table is important for understanding how Theophrastus' criticisms of Aristotelian final causes are relevant to understand extended teleology.

5.2.1 The general structure of Theophrastus' *Metaphysics*

Theophrastus introduces the central aporia we have mentioned, namely the question about the causal relation between the first principles and both heavens and the natural world, by posing the more general question about the scope of the study of the first principles. This kind of study is different from the study of nature insofar as the latter deals with the objects of the senses and the study of the first principles with the objects of reason. Given that the first principles are superior in the sense that they are unchanging and stable, it seems that metaphysics is a more dignified and important discipline¹⁰⁰. However, even if this is the case any theory of the first principles that does not bridge the gap with the natural world, and that fails to provide a good account of the interconnectedness of reality and of the unity of the cosmos should be rejected.

The next step in Theophrastus' argument is to engage directly with the main problem he is concerned with. He presents it as a dilemma. On the one hand, there might be a connection between the objects of reason and natural entities, in this case these two classes of objects work in "mutual partnership" (*κοινωνία πρὸς ἄλληλα*) (Theophrastus' *Metaphysics* 4a10). On the other hand, it might be the case, instead, that these two realms are independent of each other. In which case, the apparent cohesive and organized structure of the two parts of the universe (i.e., first entities and the natural world) would not be real. Rather, there would be two separated realms that have nothing to do with each other, and any seeming good fit between them would be the result of chance. Consider the following passage:

¹⁰⁰ Theophrastus' argument is a bit messy. He claims that some of the properties of these two disciplines are somehow transferred to their respective subject matters: "the study of the first principles is definite and unchanging, which is the reason also why men describe it as concerned with objects of reason" (Theophrastus' *Metaphysics* 4a 2-4). In any case, it seems that Theophrastus is trying to show that the study of the first principles should account not only for the nature of the first principles but also for how these principles and the natural world work together as a unity.

Our starting-point is the question whether there is a connexion (συναφή) and as it were mutual partnership between objects of reason and the things of nature, or there is none, but the two are, so to speak, separated, though they co-operate somehow to make the whole of reality (Theophrastus' *Metaphysics* 4a 8-13).

The key concept here is συναφή. Although this word is not part of Aristotle's own metaphysical or cosmological jargon (Laks & Most, 1993, p. xxv), Theophrastus refers by it to the relationship of parts that constitute a single and continuous whole. This kind of unity is opposed to a group or collection of parts that are merely contiguous (Van Raalte, 1993, p. 86). According to the first horn of the dilemma, intelligible entities stand in a relation of "mutual association" (οἷον κοινωνία) with the natural world. Meanwhile, according to the second horn, these two realms are separated and are in a less cohesive relation to each other that somehow makes up the universe. Theophrastus rejects the latter:

It is, at all events, more reasonable to suppose that there is a connexion and that the universe is not a mere series of episodes, but some things are, so to speak, prior and others posterior—some, ruling principles, and others, subordinate to them—as eternal things are prior to and ruling principles of those that are perishable (*Metaphysics* 4a 13-16).

The most reasonable approach to this issue, according to Theophrastus, is that there is some continuity between the two main parts of the universe. The parallel with this passage and Aristotle's *Metaphysics* Lambda 10 is noticeable. In these passages, Aristotle explicitly favours an account of the universe in which its two parts are integrated in an ordered whole. It is important to note that neither Theophrastus nor Aristotle say much more about this very basic methodological stance. Both seem to suppose that the prospect of a universe that is akin to a faulty tragedy, in which the succession of episodes is unlikely and/or incoherent (see *Poetics* 9, 1451b 34-35), is neither a good starting point nor a heuristic device for an *optimal* scientific theory. Quite the opposite, both philosophers share the supposition that an ideal account of the world should include the causal relation that the superlunary has with the sublunary. This is the only way to get an economical and elegant cosmological theory. Now, given this basic methodological starting point, according to which we should favour the possibility of a universe in which there is an actual macrocosmic good fit between the superlunary and the sublunary, first philosophy must account for this possibility.

In any case, it remains unclear what the precise relation is between these two parts of the universe. In the rest of the *Metaphysics*, Theophrastus gives some indications about different ways of conceptualizing this relation, some of these are negative (i.e., theories that should be rejected), and

some of them seem to be positive indications. Nonetheless, it seems that Theophrastus does not offer a fully developed account on the relationship between the two parts of the cosmos¹⁰¹.

The next step in Theophrastus' argument is to consider a few objects that might work as first principles that are able to account for all the universe. He starts with the remark about the priority of the first principles over the natural world (Theophrastus' *Metaphysics* 4a 13-17). It seems that this priority is ontological in at least two senses. On the one hand, first principles are just entities of a higher quality or dignity¹⁰². On the other hand, they have causal priority over natural objects insofar as the movements of the heavenly bodies are part of a unidirectional chain of causality whose repercussions go all the way into the sublunary world.

Theophrastus moves on to examine the kind of entity that the first principles could be. The first candidate he examines are mathematical objects (Theophrastus' *Metaphysics* 4a 17-4 b6). These, however, cannot be the first principles given that they do not exist on their own (i.e., they are derivative from physical objects through some mental operation). Also, even if they had a separate existence, it seems that it is hardly the case that they can be the cause of life and motion in the natural world. So, if mathematical objects are neither capable of a separate existence nor of having any influence on the natural world, they cannot be the kind of first principle that Theophrastus is looking for, one that fits the bill of being a superior principle and that also explains how all the parts of the universe are connected.

It is then that Theophrastus elaborates on some desirable properties of the first principles (*Metaphysics* 4b 7-17). Unlike some mathematical objects, these principles are numerically scarce and should be found only in a few things. Furthermore, they are superior in relation to natural entities insofar as they are "primary and in the first of all things" (πρώτοις καὶ ἐν τῷ πρώτῳ). This means that all the objects of the natural world exist and endure on account of these principles (ἅπαντα καὶ ἔστιν καὶ διαμένει). In

¹⁰¹ Broadly speaking, there are three different views on this matter. Scholars in the first group claim that, in his *Metaphysics*, Theophrastus is highly critical of Aristotle's account of teleological causation (Lennox, 1985); the second group has it that the criticisms of Theophrastus are consistent with Aristotle's view of teleological causation (Gourinat, 2015; Repici, 1990); and a third group claims that Theophrastus is presenting here not only a very different account of teleology but a different cosmological theory in general (van Raalte, 1988). I discuss these arguments in the section 5.3.2. of this chapter.

¹⁰² Aristotle introduces this kind of priority in *Metaphysics* IX 8 (1050b 8-9).

short, these principles are divine, and so the next candidate Theophrastus examines is the Aristotelian unmoved mover.

Here (*Metaphysics* 5b 18-5a 4), Theophrastus follows closely Aristotle's argument of *Metaphysics* Lambda 7 (1072 b2-4). If there is a first principle, given that the central property of natural entities is movement, this principle must account for their movement. This moving cause, however, cannot be itself in movement. We are left, then, with the alternative of moving as an object of desire, which nicely solves the puzzle of being the cause of movement without being a regular part of a series of movements (i.e., being an object, whose movement is somehow caused by another object or event).

At this point, however, Theophrastus introduces his critical analysis of these arguments, which in turn results in some very interesting puzzles. This examination includes the Aristotelian account of the first principle as an object of desire, as well as some Platonic and Pre-Socratic rival theories. The first set of problems he introduces concern Aristotle's unmoved mover. More precisely, the way in which an object of desire can be the source of celestial movement and, more importantly, what kind of desire this can be. Theophrastus notes that the heavenly bodies are more than one, and the directions of their movements are—or at least appear to be—opposed to one another.

The first aporia works as a dilemma (Theophrastus' *Metaphysics* 5a 14-25). If there is a single source of movement, why is there not a single kind of motion for the heavenly bodies? The unmoved mover leaves this plurality of movements unaccounted for. However, if there is not a single source of movement, but a different source for each moving body, then the "harmony as they move in the direction of the best" is left unexplained. There is no clear indication in the development of this second horn of the dilemma about how to understand the plurality of movers, i.e., whether we should understand it in terms of being numerically different but of the same kind or multiple in both senses. In any case, there seems to be a reference to *Metaphysics* Lambda 8 about the number of spheres and what Theophrastus considers to be the inadequacy of the astronomers' accounts of this multiplicity of movements.

In the next puzzle, Theophrastus wonders if it is the case that the heavenly bodies have a natural desire for the unmoved mover (*Metaphysics* 5a 23-27). If the latter is necessarily at rest, why do the heavenly bodies have a tendency (ἔφεσις) towards movement instead of a tendency to being at rest? Theophrastus attributes the same problem to the Platonic view of natural bodies that imitate the One and numbers, which are also at rest (Theophrastus' *Metaphysics* 5a 27-29).

The next aporia is related to the probable mental activity of the heavenly bodies (*Metaphysics* 5b 1-16). As was mentioned, it might be presumed that the heavenly bodies are animated because their impulse or desire toward the best presupposes a soul (*Metaphysics* 5b 1-7). But if this is the case, the mental states that compose the dianoetic movement of the heavenly bodies (i.e., their desire toward the unmoved mover), would be a different kind of motion from circular trajectories. The former kind of movement is, according to Theophrastus, better than the circular trajectory, because it is “first” and mental. In consequence, the unmoved mover is not the direct cause of the best motion, i.e., that of the souls of the heavenly bodies.

In this section, Theophrastus discusses some of the consequences of the limited reach of the unmoved mover as an object of desire (i.e., that it is an object of desire for the heavens, but not for the rest of the natural world). That objects in the sublunary world lack this impulse towards the unmoved mover could be accounted for by either a fault on the unmoved mover’s part, or by a fault in the sublunary entities. The first option is rejected, since the first principle is meant to be perfect and, so, to possess an adequate causal power (Theophrastus’ *Metaphysics* 5b 13-17). The second option, in turn, seems to be more likely. The objects of the natural world are just incapable of this kind of desire towards the unmoved mover insofar as they are not receptive of its desirable qualities (Theophrastus’ *Metaphysics* 5b 18). Based on the second possibility, Theophrastus poses a fascinating puzzle. If the sublunary world is incapable of partaking in the causal chain of the heavens—a causal chain comprised of at least one unmoved mover which is the object of desire and constitutes the impulse of an intelligent entity—it might be the case that the sublunary is not part of the cosmos. If this is correct, an explanation of how exactly the sublunary is part of the same system is required. Consider the following passage:

Perhaps, however, one might first inquire what manner of being the things at the centre have, whether they are or are not parts of the celestial system, and if they are parts, how they are so; for in this account they are as it were thrust apart from the things of highest worth not only in spatial position but also in their activity, *if* the rotatory movement is the highest activity; for they acquire as it were by accident under the influence of the rotation their changes both into their own places and into one another. (Theophrastus’ *Metaphysics* 5b 19-26).

Theophrastus notices that the differences between these two parts are not only a mere difference in what concerns their position. Instead, there is a more subtle qualitative variation of “activity”

(ἐνέργεια)¹⁰³. This can be read as a contrast between the kind of movements of both regions of the cosmos, namely, circular for the superlunary, and rectilinear for the earthly elements (see *On the Heavens* I 2, 286b 15-ff). Furthermore, there is also a contrast between the kind of cycles that correspond to each of these two parts of the universe. The sublunary life cycles are different from their superlunary counterparts in at least three ways. First, they do not occur in the same way all the time. Second, they are derivative from the superlunary movements. Third, the sublunary cycles are not individually eternal. In consequence, sublunary movements seem to be an accidental by-product of the eternal motions.

A few lines ahead, Theophrastus discusses a more general criticism of some Platonic metaphysical arguments (*Metaphysics* 6a 15-6b 16). First principles should account for all levels of being. This general demand should be understood in the terms Theophrastus states at the beginning of the *Metaphysics*: a good metaphysical theory should account for both the superlunary and for the natural world. A successful instance of a theory that is consistent with this methodological principle is that of the Pythagorean Eurytus. Theophrastus praises, perhaps ironically¹⁰⁴, his claims that numbers are the first principles, and that there is a specific number that accounts for the essence of each animal species (Theophrastus' *Metaphysics* 6a 21-22). An unsuccessful case of the application of this principle is that of some Platonists and of the Pythagoreans¹⁰⁵. Theophrastus notices that this shortcoming of Platonists and Pythagoreans might be explained by some general methodological feature. Unlike other sciences, whose starting point are some basic principles, the subject matter of first philosophy is the basic principles themselves. Perhaps Theophrastus is introducing a contrast here between philosophy and mathematics, which seems to fit this description of deducing a theorem or some mathematical proposition from a general axiom.

¹⁰³ I am following Laks & Most in the reconstruction of this argument (1993, p. 40), as well as Ross & Francis H. Fobes (1929, p. 47).

¹⁰⁴ It is possible that Theophrastus has in mind an argument attributed to Eurytus according to which a geometrical figure that represents the figure of an animal could be marked with some pebbles. The number of each species was the same as the number of pebbles in the figure. Theophrastus is noticing the naivete of this theory (D. W. Ross & Fobes, 1929, p. 49). In contrast to this view, Laks & Most claim that Theophrastus' praise of Eurytus is genuine (1993, p. 43).

¹⁰⁵ These philosophers posit two main principles, the One and the Dyad, and deduce from them the existence of some mathematical objects like numbers, planes, and solids.

Let us, now, turn to the arguments that directly address focalized final causes.

5.2.2 Theophrastus on the reach of teleological explanations

In connection with focalized final causes, Theophrastus introduces two arguments that are part of a single strategy. In the first part, he explains why a worldview in which everything can be explained with a formal principle is problematic. In the second part, he presents the list of cases that resist a teleological explanation, and that were mentioned in the first part of this chapter. In what follows, I examine these arguments in more detail.

Argument 1 (Theophrastus' Metaphysics 7a 15-7b5)

In the following section of his *Metaphysics* (6b 23-7b5), Theophrastus enquires whether the first principles are something definite (i.e., endowed with shape) or indefinite and potential (i.e., merely material). This discussion makes way for two extreme positions. On the one hand, there is a materialistic position according to which nothing can be accounted for in terms of a formal principle, not even the apparent order of the cosmos. On the other hand, we have a Panglossian position in which every natural phenomenon can be referred to a formal principle and explained in teleological terms. Although Theophrastus rejects both claims, this discussion is central to the problem of the interconnectedness of the different parts of the cosmos. In some way, each of these two positions would show both a possible way in which first principles can begin to explain every entity and a way in which the two parts of the cosmos relate. Furthermore, they do so either by reducing all explanation to some materialistic principle or by appealing to some single formal principle that can explain how all the parts of the cosmos are goal-oriented. Theophrastus will ultimately reject these two options. I will discuss his own position in the next subsection of this chapter. Note here that he seems to suggest two possible solutions to the problem of the interconnectedness of the two parts of the cosmos. On the one hand, he suggests a non-theistic organicist world view (i.e., the view that the universe is a natural substance). On the other hand, he suggests a view according to which only some natural phenomena are the result of final causes. The latter leaves room for teleological indeterminism (i.e., the view that some things are the result of chance or by-effects of material processes).

This same section of Theophrastus' *Metaphysics* (6b 23-7b5) can be read as a discussion of extended teleology insofar as it examines how widespread teleological explanations can be. It is important to notice that Theophrastus not only wonders how some particular natural substances and their parts

can be explained in terms of final causes (e.g., some parts of an animal that seem to be useless or even detrimental to their survival, like a deer and its antlers). Instead, he considers both the issue of what a general universal formal principle would look like, as well as how complex natural phenomena might involve more than one substance (e.g., the beneficial effect of the superlunary for the sublunary). Another important aspect of this section, which is often overlooked, is that it can be read as textual evidence of a Peripatetic discussion on extended teleology. I will return to the implications of this reading in the last section of this chapter.

Theophrastus presents a list of three different positions that could be held about the nature of the principles:

- (1) Some people claim that all these principles are endowed with shape or form (οἱ μὲν οὖν ἐμμόρφους πάσας).
- (2) Another group claims that all the principles are material (οἱ δὲ μόνον τὰς ὑλικάς).
- (3) Finally, there is a third group of people who claim that some principles are material, and some are formal (οἱ δ' ἄμφω, τὰς τ' ἐμμόρφους καὶ τὰς τῆς ὕλης).

It is not entirely clear who are the precise referents of this doxographical catalogue. The first group, which is not Theophrastus' main focus, could include some Platonic doctrines¹⁰⁶. The second group includes some physiologists (Van Raalte, 1993, p. 296). As for the third position, although perhaps the most obvious candidate is Aristotle and his hylomorphic theory¹⁰⁷, a discussion remains open about the possible members of this group. For instance, we could read this as a reference *mainly* to the doctrine of the One and the indefinite Dyad as formal and material principles respectively, attributed to Plato, the Academy, and the Pythagoreans (Laks & Most, 1993, pp. 50–51, n. 13). Although in this part of the *Metaphysics* (7a 8-9), Theophrastus does not make a direct allusion to this doctrine, he explicitly refers to it afterwards:

(...) yet since [Plato and the Pythagoreans] make a sort of opposition between the One and the indefinite dyad, on which essentially depends what is indefinite and disordered and, so to speak, all shapelessness, it is absolutely impossible that for them the nature of the whole should exist without the indefinite dyad; they say that it has an equal share in things with, or even

¹⁰⁶ Theophrastus refers directly to Plato's *Timaeus* (6b 27). It is not entirely clear to which section of this dialogue he is referring to. According to (Laks & Most, 1993, p. 46, n. 87) the reference could be *Timaeus* 29c 3.

¹⁰⁷ This is Ross & Fobes' reading (1929, p. 61). See also, van Raalte (1993, p. 296).

predominates over, the other principle; whereby they make even the first principles contrary to one another. (*Metaphysics* 11b 2-7)

If it is the case that the third view is an allusion to the One and the Dyad in the terms posed by this passage, then the view in question would claim that there is a universal formal principle that works for all the entities in the universe. This general formal principle explains not only the balance between the indefiniteness and definiteness, so to speak, of individuals, but also of the cosmos as a whole. These two principles are different from the Aristotelian concepts of “matter” and “form”, since the latter is not a universal principle, but rather an inherent formal principle (i.e., the soul of living beings). It also remains unclear how the cosmic struggle between indefiniteness and definiteness is a problem for Aristotle. In any case, it could be argued that Theophrastus could have conceived of these two accounts (i.e., One-Dyad and Hylomorphism) as part of the same family of theories, namely, those in which there is a formal principle that explains at least some natural phenomena in teleological terms.

Position (2), in turn, is almost preposterous for Theophrastus:

But even those who make the ruling principles material would think it unreasonable if the whole universe and each of its parts all involve order and plan in respect both of shapes and of powers and of periods of time, but in the ruling principles there is nothing of this sort, but ‘the most fair universe’, as Heraclitus says, ‘is like a rubbish-heap of things thrown anyhow.’ Yet they make the assumption we have named, even (one may say) in the smallest detail, alike among inanimate and animate things; for the natures of each set of things, so to speak, are definite—even when the things come into being spontaneously—but the ruling principles, they say, are indefinite. (*Metaphysics* 7a 10-19).

If, as Theophrastus seems to imply, the material is defined in terms of being indeterminate (ἀόριστος) in the sense of not having a definite shape, capacity, and/or function, then it would be irrational to claim that material principles alone can account for the orderly movements and cycles of the superlunary, which seem to be ordered and purposeful. The same argument applies to earthly natural substances and their determinate natures: if these seem to be definite or informed, a fortiori, the principles that cause them are also definite.

While Theophrastus rejects (2), he also rejects the possibility of a theory in which everything in the natural world can be referred to a final cause. In other words, while materialistic theories cannot

explain adequately the order of the universe, formal principles cannot directly explain all of the cosmos in terms of final causes:

On the other hand, it is difficult to assign plans to each class of things, linking them up with their final causes in all cases, both in animals and in plants and in the very bubble; unless it happens by reason of the order and change of other things that all manner of shapes and varieties arise of things in the air and on the earth; of which some make the greatest example to be the facts about the season of the year on which depends the generation both of animals and of plants and fruits, the sun being, as it were, the begetter. (Theophrastus' *Metaphysics* 7a 19-7b 5)

Not only the *aporia* that Theophrastus presents here about the extent of teleological causation in the natural world is puzzling, but also the way he shifts from the concept of “formal principle” of (3) to that of “for the sake of which”. Here, for the first time in his *Metaphysics*, Theophrastus uses the expression “for the sake of” (Χαλεπὸν δὲ πάλιν αὖ τὸ τοῦς λόγους ἐκάστοις περιθεῖναι πρὸς τὸ ἔνεκά του συνάγοντας ἐν ἅπασιν) (*Metaphysics* 7a 19-20). This seems to be the account of teleological causation of Aristotle's *Physics* II, according to which a formal principle is responsible for the physical constitution of animals and plants¹⁰⁸.

It is worth recalling here that, a few lines back (*Metaphysics* 4b 18-5a 13), Theophrastus reconstructed an argument very similar to that of *Metaphysics* Lambda 7, 1072b 2-4, in which the unmoved mover causes movement as an object of desire. This kind of final cause is different from that of *Physics* II. The main difference is that the latter is a form of non-mentalistic causation insofar as it is based on the nature of living beings, while the former is the result of the mental activity of both the spheres and the unmoved movers. Theophrastus, however, makes no observation about the two different senses of final cause. Also, for Aristotle, though not necessarily for Theophrastus, the existence of final cause is taken for granted.

It seems that the formal principle of substances responsible for teleological causation is part of the family of principles described in (3). This general approach to formal principles explains something remarkable in this passage. Theophrastus is questioning the possibility of ascribing a formal principle—and thus a teleological explanation—to the relation between the environmental conditions

¹⁰⁸ As it will be discussed in the next subsection, some of the examples provided by him of controversial instances of teleological causation make it obvious that he is referring to this model.

provided by the yearly seasons and the sun's trajectory around the earth. The latter would be a case of extended teleology (i.e., namely, a relation between more than one substance or at least one substance and the environment that is frequent and beneficial for the individuals involved). If this is correct, Theophrastus would be explicitly posing the issue of the possibility of extended teleology.

Argument 2 (Theophrastus' Metaphysics 10a 22-b7)

As was mentioned in the first part of this chapter, Theophrastus mentions some instances of the natural world that are not easily explained by a final cause. This discussion starts at Theophrastus' *Metaphysics* 10a 22-ff., where he wonders about the "boundary" (ἀφορισμός) of non-mentalistic teleological explanations. More precisely, he has in mind biological explanations based on principles such as "being for the sake of" and "nothing is in vain". Theophrastus does not make any comment about what exactly he means by these principles, nor how they relate to each other. However, based on the problematic cases he mentions, it seems that Theophrastus has in mind at least two different forms of teleology: the traditional focalized final causes that operate within a single substance, and some kind of teleology that would operate in cases in which there is more than one substance. We have on the one hand, the cases in which Theophrastus refers to single animals or single species (*Metaphysics* 10b 7-16). Here is a list of these cases:

- i. Useless body parts and processes (e.g., breasts in males and female ejaculation).
- ii. Parts that can be harmful for an organism (e.g., deer antlers).
- iii. Violent or unnatural bodily processes¹⁰⁹ (e.g., the herons' copulation and the short lifespan of some flies).

On the other hand, Theophrastus mentions some cases which involve more than one substance (or a substance and the environment) that cannot be easily explained in teleological terms. At *Metaphysics* 10a27-10b 27, Theophrastus suggest that some natural phenomena seem to happen by chance or necessity (οὐθενὸς γὰρ ταῦθ' ἔνεκα, ἀλλὰ συμπτώματα καὶ δι' ἑτέρας ἀνάγκας) rather than for some

¹⁰⁹ van Raalte (1993, pp. 508–509) claims that the cases mentioned by Theophrastus here are both unnatural and violent.

purpose. These events include some cyclical natural events like tides¹¹⁰, atmospheric changes, and the coming-to-being and passing-away cycles of living beings¹¹¹.

With regard to the view that all things are for the sake of an end and nothing is in vain, the assignation of ends is in general not easy, as it is usually stated to be (where should we begin and with what sort of things should we finish?), and in particular some things are difficult because they do not seem to be for the sake of an end but to occur, some of them, by coincidence, and others, by some necessity, as in the case both of celestial and of most terrestrial phenomena. For what end are the incursions and reflexes of the sea, or droughts and humidities, and, in general, changes, now in this direction and now in that, and ceasings-to-be and comings-to-be, and not a few other things, too, that are all like these? (Theophrastus' *Metaphysics* 10a 22-10b 7).

Additionally, Theophrastus mentions another set of cases that seem to involve more than one substance or a substance and the environment:

The greatest and most obvious example is in connexion with the nutrition and birth of animals; for there are facts about these which are not for any end, but are coincidences and due to external necessities. For if they were for the sake of the animals, they should have been always uniform and unvaried. (Theophrastus' *Metaphysics* 10b 16-19).

Although he does not give any concrete example, it seems that here he has in mind the dependence of the gestation¹¹² and birth of some animals on environmental conditions such as the movement of the sun and the yearly seasons. The dependence on these environmental conditions was described in Theophrastus' *Metaphysics* 7b 2-5, where he introduces the issue about assigning a final cause to any natural phenomena (Laks & Most, 1993, p. 79, n. 20). The reason he gives for considering a teleological

¹¹⁰ For discussion, see Laks & Most (1993, p. 76 n.7); van Raalte (1993, p. 493).

¹¹¹ It is important to notice that Aristotle does not try to give a teleological account of the tides nor of atmosphere changes (Repici, 1990, p. 205). For instance, in *Meteorology* II 1, 354a 12-ff., oceans' flows and ebbs are explained by river discharges. However, this is not the case for the succession of the different generations of living beings, in *Generation and Corruption* II 10 336b 26-34, where Aristotle does provide a teleological explanation.

¹¹² The term τροφή, in Theophrastus' *Metaphysics* 10b 17, refers to the gestation of the foetus (Laks & Most, 1993, p. 79, n. 20). See also *Generation of Animals* IV 10, 778a 10-11.

explanation of the dependence of living beings and the environment as unlikely, is that natural cycles are not always uniform and invariable. It is not exactly clear why Theophrastus expects such a level of uniformity of natural cycles, and whether the irregularity is present in the yearly seasons, or in the animals' breeding and gestation periods, or in both.

It is important to notice that Theophrastus' strong requirement of regularity is at odds with Aristotle's criteria for teleological causation of *Physics* II (i.e., natural things that happen always or for the most part are not due to chance nor necessity). It would seem that both the natural events of the season and breeding periods are regular enough to invoke an Aristotelian teleological explanation. Although it is true that Aristotle's quantification ("always or most of times") is not entirely precise, these cases could be accommodated within the "most of the times" condition. As for Aristotle's second condition (i.e., a good outcome), the benefit that these external conditions bring to life on Earth seems to be acknowledged by Theophrastus. Otherwise, this relation between the environment and living beings would not even be a candidate to be explained by means of a final cause. If this reading is correct, it would follow that the possibility of an extended teleological account is, at the very least, considered by Theophrastus in this section of the *Metaphysics*.

5.3 Theophrastus' position vis-à-vis Aristotle

In this section, I discuss the conceptual relation between Theophrastus' and Aristotle's views on final causes. Broadly speaking, there are two positions on this issue. According to the first one, these two philosophers agree on the reach of application of final causes (i.e., individual animals, their parts, and their reproduction). According to the second view, Theophrastus is presenting a radically new account of teleology, a view which is closer to Stoic cosmic monism than to Aristotelian final causes. In what follows, I discuss these positions along with some of the problems they have, before introducing my own view on this issue.

5.3.1 Are Theophrastus' and Aristotle on the same page?

As was mentioned at the beginning of this chapter, it is not entirely clear what the precise chronological relation is between Theophrastus' *Metaphysics* and Aristotle's works. There is another similar problem about the conceptual relation between Theophrastus' criticism of teleological explanations and Aristotle's account of final causes. It seems that Theophrastus is criticizing a position in which the

reach of teleological explanations is very broad. It is important to notice that Theophrastus is questioning the claim “everything happens for the sake of something, and nothing is in vain” (*Metaphysics*, 10a 21-22). This proposition is not the same as Aristotle’s “nature does everything for a purpose and nothing in vain”¹¹³. One way to understand this discrepancy is to understand Theophrastus’ strategy in the following way. He wants to question the reach of final causes, and so he introduces the concept of unrestricted teleology (i.e., everything is for the sake of something), but then finds some cases that are not easily accounted for in terms of final causes.

This raises the question about whether Theophrastus is pro or contra Aristotle in the question of the extent of objects/events that can be explained by final causes. Some scholars claim that both philosophers are on the same page¹¹⁴. Both Theophrastus and Aristotle accept that final causes are not omnipresent and that some things are better explained by some sort of concomitance to a teleological process¹¹⁵. They also accept that some things are just the result of chance. According to this view, both Aristotle’s hypothetic and simple necessity, and the notion of “*symptomata*” presented in *On the Soul* III 12, are consistent with some of Theophrastus’ claims about the limits of the teleological principles in nature. These limits are mentioned in the following passage: “(...) and in particular some things are difficult because they do not seem for the sake of an end but to occur, some of them, by coincidence, and others, by some necessity” (τὰ μὲν συμπτωματικῶς τὰ δ' ἀνάγκη τινί)” (Theophrastus’ *Metaphysics* 10a 25-28).

These two kinds of non-teleological explanations (τὰ μὲν συμπτωματικῶς τὰ δ' ἀνάγκη) are present in some parts of Aristotle’s corpus, and so it seems that Theophrastus is following Aristotle in his own argument. The first of Theophrastus’ alternatives echoes a passage in *On the Soul* III 12¹¹⁶. Aristotle says here that “For all things that exist by Nature are means to an end, or will be concomitants of means to an end” (ἔνεκά του γὰρ πάντα ὑπάρχει τὰ φύσει, ἢ συμπτώματα ἔσται τῶν ἔνεκά του) (*On the Soul* III 12, 434a 31-32).

¹¹³ For discussion, see Jean-Baptiste Gourinat (2015, p. 159), Luciana Repici (1990, p. 201), van Raalte (1993, p. 487).

¹¹⁴ Repici claims that Theophrastus’s criticisms are not directed toward Aristotle (1990, p. 201). See also Gourinat (2015, p. 164).

¹¹⁵ See also *On the Soul* III 12, 271a 33-ff; *Parts of Animals* I 1m 642a 1-2; *Nicomachean Ethics* III 5, 112a 31-34.

¹¹⁶ See, for discussion, Gourinat (2015, pp. 161–162) and Repici (1990, pp. 200–201).

Aristotle does not illustrate the notion of “σύμπτωμα” with any example. It seems to have, however, a different sense than the one of *Physics* II 8 (199a4)¹¹⁷, where Aristotle has in mind the result of mere chance, as the creatures attributed to Empedocles’ proto-natural selection theory. In this passage of *On the Soul*, the “σύμπτωματα” refers to something that results from a process of teleological causation but is not *per se* explained by a final cause. More precisely, the functional disposition of an organ requires a particular material set-up, and this material set-up, in turn, accidentally influences the shape of some other part of an individual (Gourinat, 2015, p. 162). Although this is not Aristotle’s own example, we can illustrate this with a teleological account of male breasts in which they are a by-product of the formation of female’s breasts in embryos. The former would be symptomatic of a teleological process such as the development of a useful organ.

The second conceptual alternative to unrestricted teleology that Theophrastus mentions (i.e., some things are the result of necessity) has as its Aristotelian counterpart the concept of simple necessity. In *Physics* II 9 (199b 33-34), Aristotle makes a distinction between hypothetical necessity and necessity simpliciter. The former refers to some material conditions required by some particular goal (e.g., a serviceable knife has to be made out of an adequate solid material). In these cases, the final cause has ontological priority (i.e., the purpose defines the material properties, and not the other way around) (*Physics* II 9, 200a 31-ff). Simple necessity, on the other hand, does not depend on final causes, but is rather a by-effect of material properties.

It would seem to be the case that both Theophrastus and Aristotle accept the existence of final causes, but also admit the existence of a great deal of things that escape the reach of teleological accounts. In other words, both philosophers admit that final causes operate on the realm of individual animals and in the desire of the heavens toward the unmoved mover. Nonetheless, they are also happy with the fact that many events and objects in the natural world are either symptomatic or the result of some of the two kinds of Aristotelian necessity (Gourinat, 2015, pp. 176–177)¹¹⁸.

¹¹⁷ More specifically, Aristotle says that: “[i]f, then, things seem to be either a coincidental outcome or for something, and the things we are discussing cannot be either a coincidental or an automatic outcome, they must be for something.” (εἰ οὖν ἢ ἀπὸ συμπτώματος δοκεῖ ἢ ἔνεκά του εἶναι, εἰ μὴ οἷόν τε ταῦτ' εἶναι μήτε ἀπὸ συμπτώματος μήτ' ἀπὸ ταῦτομάτου, ἔνεκά του ἂν εἴη) (*Physics* 199a 3-5).

¹¹⁸ Additionally, according to this reading, the real target of Theophrastus’ criticism is Plato’s demiurgic worldview and Xenophon’s *Memorabilia* providentialism.

This compatibilist account of Aristotle's and Theophrastus' views on final causes has some problems. Firstly, it is not entirely clear that Aristotle and Theophrastus really agree on the impossibility of explaining with final causes the difficult cases mentioned by Theophrastus. It is therefore hard to tell the extent of the agreement on the reach of final causes between these two philosophers. As was mentioned earlier, in some of his biological works, Aristotle has a teleological explanation for some of the difficult cases mentioned by Theophrastus. At least in what concerns these cases, there seems to be some discrepancy in a non-teleological explanation of such natural phenomena.

Furthermore, it is not clear how much of teleological indeterminism they are each willing to accept in the context of a cosmological theory. In the case of Aristotle, we have the last chapter of *Metaphysics* Lambda, where he considers explicitly the prospect of an ordered universe in which all parts are integrated to a single goal. We also have the axiarchic argument of *Generation and Corruption* II 10 about the cyclicity of the cosmos as the result of the best possible configuration of the world. Additionally, we have the argument of *On the Heavens* II 3 where Aristotle claims that the trajectory of the sun exists out of necessity because it is required for the cyclicity of the natural elements. These three arguments can be read as a reply to Theophrastus' argument in which the natural cycles cannot be accounted for with final causes.

With respect to Theophrastus, it is not entirely clear if he was really sceptical about the possibility of final causes being relevant in cases other than those of natural substances. He advances an argument in which he suggests that the interconnectedness of all the parts of the universe is similar to that of an animal or a city. If this is correct, then Theophrastus would seem to believe that it is only rational to suppose that the universe has some form of cohesion, rather than accepting a cosmology in which the cosmic structure happens by chance (*Metaphysics* 4a 8-ff). The question, then, is how strong the cohesion of the universe is supposed to be. The following passage is useful to answer this question:

Only, perhaps, we should not understand the matter as if we were reducing the universe to something that has no parts; we should only aim at securing that the whole universe (ὁ ὅλος οὐρανός), which they do maintain to be most perfect, shall be as far as possible harmonious with itself, and well fitted together as though it were a city or an animal or something else that *has* parts. (Theophrastus' *Metaphysics* 8a 3-7).

In this passage, Theophrastus examines the issue of the causal power of the unmoved mover. If it is not necessary that the heavenly bodies actually imitate the unmoved mover (*Metaphysics* 5a 23-25), there is a fortiori no guarantee that in the sublunary world such mimetic process would work. The

solution that he proposes to this issue is to conceive the cohesion of the cosmos¹¹⁹ as an object with parts, like a city or an animal.

If we suppose that Theophrastus has in mind an Aristotelian animal (i.e., a natural substance), the mention of cities becomes puzzling. The unity of cities does not seem to be the same as that of living beings, unless we take at face value Aristotle's claims in the *Politics* I 2 (1253a 18-29) that cities are ontologically prior to individuals. In any case, if we suppose that he is comparing the unity of the cosmos to that of an Aristotelian natural substance, then we might suppose as well that Theophrastus favours a strong threshold for the unity of the cosmos: the cosmos is either a natural substance or at least something that exists by nature. It would follow that there is a formal principle that rules all of its parts. If this is correct, Theophrastus would be explaining the cohesion of the universe in teleological terms. I will return to this argument at the end of the next subsection.

5.3.2 Organicism

There is another take on Theophrastus' position, according to which he develops in the *Metaphysics* an organicist account of the cosmos (van Raalte, 1988). According to this view, the universe is a self-regulated whole whose parts are both set in a hierarchical way and connected to each other. For instance, the rotation of the heavens gives rise to the motion of the sun, which in turn provides the climatological conditions for the existence of sublunary living beings (van Raalte, 1988, p. 193). This chain of causation, however, is not to be conceived as a primary process (e.g., like that of the rotation of the heavens) of which a side-effect results, in this case, the conditions favourable to living beings. Rather, the chain of causation is a single process, not ruled by the top of the "chain of being" (i.e., the heavens), but by the cosmos as a whole (van Raalte, 1988, pp. 192–194).

The rationale of this argument and the textual evidence for it are the following. Theophrastus holds that there is some continuity between the parts of the universe (*Metaphysics* 4a 13). The relation between these parts cannot be a case of teleological causation (*Metaphysics* 10b 19-20). If there is no final cause here, then the relation between the sublunary (X) and the superlunary (Y) is that of (1) X is a side

¹¹⁹ In this passage, "ὁ ὅλος οὐρανός" should be understood as the whole universe, as in the extended sense of "οὐρανός" presented in *On the Heavens* I 9, 278b 9-21. This argument is Theophrastus' answer to the problem he presented in *Metaphysics* 5b 26-6a 2, namely, whether the centre of the universe is really part of the heavens. If this is correct, then in both passages "οὐρανός" means the whole universe. I am following here Ross & Fobes (1929, p. 64) and Laks & Most (1993, pp. 56–57, n. 37).

effect of Y¹²⁰; or (2) X is produced by the higher-level entities of Y (see *Metaphysics* 10b 18; 10a 26-27). According to this interpretation, Theophrastus seems to favour (2) (van Raalte, 1988, p. 194). This means that the highest tier of the universe has the capacity to give shape to the lesser realms. The latter because the highest tier has a more definite nature and because the objects of this group have the properties of being more uniform and unvaried (*Metaphysics* 10a 9).

Laks & Most (1993, p. xxvi) call this view *proto-stoic*. However, this label can be misleading. On the one hand, van Raalte claims that Theophrastus is anticipating the idea of Stoic pneuma that acts through “*to thermon*” (van Raalte, 1988, p. 207). On the other hand, she seems to suggest that organicism and finalism are mutually exclusive (van Raalte, 1988, p. 194). According to this view, in order for there to be teleological causation, at least two objects are required: a final cause X and a substance Y for which X is a final cause. However, if the cosmos comprehends everything that exists (*Metaphysics* 8a 5-8a 7), and has a strong form of unity akin to that of an animal or a city, then there cannot be any numerically different object that works as a final cause of the movement of the heavens (i.e., an unmoved mover) (van Raalte, 1988, p. 194)¹²¹. Furthermore, if the world-organism is all there is, there cannot be a good outside of it, like food in the case of animals.

This supposed opposition between organicism, and finalism is problematic. Teleological causation is possible for a single organicist cosmic-substance. For example, the way in which the higher parts of the cosmos give shape to the lesser parts can be a goal-driven process insofar as they complete the whole cosmic substance. In other words, the form of the pneuma of the substance shaping the parts of the substance can be a case of axiarchic teleological causation. The good in this case would be intrinsic to the world-substance. Now, if this is correct, we would amend her organicist view in the sense that it can be teleologically friendly. Is there any evidence to support the argument that Theophrastus holds (or at least would agree) with the new revised organicist theory? At the very end of his *Metaphysics*, Theophrastus insists, once again¹²², on the non-teleological character of some natural phenomena.

¹²⁰ This is van Raalte (1988) reading of τὰ μὲν συμπτωματικῶς in *Metaphysics* 10a 26.

¹²¹ For van Raalte, the unity of the cosmos is akin to that of an animal, but as some Stoics conceive the unity of animals: “a soma henomenon is characterized by its being subject to a single holding or binding force (*hexis*), such as plants and animals” (1988, p. 206).

¹²² He first makes this point in *Metaphysics* 10b 20.

Even among first things we evidently observe many events that happen at random, e.g. the facts that have been named, connected with the changes of the earth; for we see here neither the better nor that which is for the sake of an end, but such things seem to follow, if anything, some necessary law; and there are many things of this sort in the air too, and elsewhere. (*Metaphysics* 11b 12-17).

An organicist theory that makes way for non-mentalistic teleological explanation would not accept that these events (i.e., the yearly seasons) happen at random. The comparative advantage, so to say, of organicism vis-à-vis focalized and pluralistic teleology is precisely the possibility of explaining complex natural events with reference to some final cause (e.g., the world's soul). This suggests that Theophrastus is not really committed to an organicist view in the amended sense. Were he committed to a teleological organicism, he would have no problem explaining in teleological terms any meteorological phenomenon. An organicist theory would excel at explaining, in ontological terms, complex events that involve more than one living being or the relation between the living beings and the environment. For example, the form of the universe causes the rainfall or the seasons of the year, just as the form of an animal is responsible for some organic function.

Perhaps a better way of understanding Theophrastus' argument is the following. He is pointing in the direction of some of the crucial issues of Aristotelean natural philosophy that we have discussed here (i.e., the need to explain complex objects in teleological terms). In doing so, he is also considering some of the closest conceptual alternatives that seem to branch out from such puzzles. More precisely, Theophrastus notices that standard teleological explanations cannot easily explain the relations between more than one natural substance or between these and their environments. He refers to the cyclicity of the process of coming-to-be and ceasing-to-be that depends on the yearly seasons (Theophrastus' *Metaphysics* 10b 12-ff). The reason why this case is resistant to a teleological explanation is not that final causes supposedly operate only within a singular substance, a problem discussed throughout this thesis. Rather, he seems to think that threshold of uniformity and regularity for something to be explained by a formal principle is very high. If something is for the sake of something else, it "should have been always uniform and unvaried" (Theophrastus' *Metaphysics* 10b 19-20).

However, what is interesting about Theophrastus' argument on teleological explanations is that he mentions explicitly the relations between more than one substance and their environments and the possibility of explaining them in teleological terms. This is relevant for an analysis of both Aristotelian and Aristotle's own natural philosophy. Specially for the discussion of extended teleology. But there

is another relevant part of Theophrastus' argument for this kind of inquiry. When he argues for the need for an account of the world that includes the relationship between both the higher tier of the universe and the sublunary, which is challenging given that the universe is not perfectly uniform, he mentions the possibility of accounting for the world as an animal or a city. If the cosmos is some sort of animal, the relation between its two parts is such that they must be explained with the principles of a natural substance, arguably a formal principle. In this way, Theophrastus inaugurates a concept, namely, that of a world-animal that needs no separated demiurge.

CONCLUSION

The central aim of this thesis was to reconstruct an account of Aristotelian extended teleology. This concept is as necessary for understanding Aristotle's natural philosophy as it is puzzling. There is a lot of the natural world that cannot be the result of chance, but that cannot be accounted for with traditional Aristotelian final causes either. To make things even more complicated, there is not a single section of the Aristotelian corpus devoted to the task of introducing and explaining a concept that is at least similar to extended teleology. There are, however, some passages in which Aristotle introduces arguments that can be read as extended teleological explanations. The presence of these passages, along with the conceptual need of some account of extended teleology are, jointly considered, a very compelling reason for approaching the issue of extended teleology with an open mind.

My view is that extended teleology can be articulated as a form of axiarchism. Some objects, composed of more than one natural substance, are actual because they are arranged in the best possible way. In other words, they are sufficiently good to exist and, therefore, exist. This explanation is consistent with Aristotle's theory of focalized final causes. In line with axiarchism, natural substances exist because it is good that they exist. And, similarly, species exist in the most complete way they can, namely, throughout the infinite diachronic succession of individuals. Furthermore, the fact that a substance is an organized object can also be explained axiarchically. As organized objects, substances exist in the best possible way: each with a soul that determines its essential capacities which, in turn, enable it to survive and reproduce. Accordingly, final causes that are due to a formal principle are indeed restricted to living beings. However, this kind of focalized teleological causation does not exhaust the teleological causation that is accepted by Aristotle. Note that the price to pay for accepting only focalized final causes is too high: except for living beings, everything that exists—including the structure of the cosmos—would be the result of chance.

The strategy followed throughout the four parts of this thesis has been the following. In the first chapter, I began by discussing the need for an account of extended teleology. My next step was to discuss the second book of Aristotle's *Physics*. A lot of the discussion regarding the reach of final causes orbits around this book and, especially, around the rainfall argument in the eighth chapter. My view is that Aristotle does mean that final causes should explain meteorological phenomena like the rainfall. However, the conceptual tools for understanding how final causes operate in the domain of something

other than natural substances are not laid out in *Physics* II. Nonetheless, it seems reasonable to suppose that Aristotle is at least open to explaining phenomena, such as the useful winter rain, in teleological terms. If theories rival to Aristotle's tetra-causal account aim to explain in materialistic terms a lot of the natural world, and there is no clear indication of the scope of final causes being limited to living beings, it makes sense to suppose that Aristotle also aims at explaining as much of the natural world as possible with his teleological theory.

In the second chapter, I discussed the teleological arguments that can be found in the first book of Aristotle's *Politics*. In this work, Aristotle presents a detailed account of the metaphysical underpinnings of his political philosophy. I argued that some of these underpinnings can be read as arguments for extended teleology. Firstly, he explains that cities are "by nature" and prior to human beings. Although these two claims are highly controversial, I argued that they can be read as parts of a political theory according to which the structure and origins of some political institutions are natural. The latter means that the structure or relationship of the members of households and cities exist according to a hierarchical principle that can be articulated as an axiarchic principle. Whenever there is a human need, the social institution that best covers that need will exist. The reason for this is that the existence and wellbeing of the more valuable things is enabled and secured by "nature". This is what I claim can be recognized as an axiarchic principle. Aristotle presents a similar argument about natural food chains. Some living beings are useful as sources of food for other living beings. The ultimate beneficiaries of this chain are humans. The fact that the trophic chain is good qua state of affairs—namely that the more worthy is ruling over the less worthy—explains that it is actual.

In the third chapter, I argued that not only the unity and order of social institutions can be understood in axiarchic terms, but also the general structure of the Aristotelian cosmos. For Aristotle, the sublunary is not a random result of the superlunary, and, so, there is some form of order in all the parts of the universe. In *Physics* VIII, Aristotle argues that there must be an unmoved mover that guarantees the infinite series of successive generations of living beings. This general argument can be complemented with the arguments presented in *Generation and Corruption* II 10, according to which everything exists in the best way it can. The superlunary objects are perfectly regular and eternal, while the sublunary exists throughout the successive cycles of generations and corruptions. There is, in this argument, a direct link between value and existence: things exist the way they do because it is the best way they can exist.

In the fourth chapter, I discussed *Metaphysics* XII. I defended the view that the tenth chapter of book Lambda can be read as an explicit question about the order and unity of all the parts of the world. This is certainly a different issue from that of the kind of causality involved in the chain of movements started by the unmoved mover. The language Aristotle uses in this argument is highly teleological. Both the analogies of the universe's order as akin to that of an army and as akin to that of a household can be read in axiarchic terms. The universe is a single object the unity and order of which result from the good of this disposition. This does not mean that the universe is a single substance, whose form is the unmoved mover. Instead, it is an object with weaker unity than that of a substance, but a unity strong enough to guarantee an ordered cosmic disposition. This disposition is actual because it is good.

In the final chapter, I discussed Theophrastus' *Metaphysics*. I argued that Theophrastus is pointing towards the need for an account of extended teleology. He claims that not everything can be the result of a final cause, because some natural phenomena (e.g., the rotation of the sun that causes the yearly seasons) cannot be explained in teleological terms. In questioning the possibility of explaining these phenomena in teleological terms, however, Theophrastus is already thinking in terms of extended teleology. Put differently, he already needs a conception of extended teleology in order to reject it. Furthermore, according to Theophrastus, the universe must be an object with enough unity to integrate all of its parts in a single system. A two-tier cosmos whose parts are not causally connected is problematic. So, rather than dividing the cosmos in this way, he suggests the possibility of explaining the whole cosmos as if it were a city or an animal. I claim that his proposed solution is an alternative articulated in terms of extended teleology. If substances cannot be composed of substances, there are two alternatives: one could either argue that there is a teleological account that does not depend on the formal principle of a substance, or one could defend a monist solution in which there is only one substance. In his *Metaphysics*, Theophrastus does not manifest a commitment to either of these alternatives. Nonetheless, in his objections, he very explicitly conceives of extended teleology as a conceptual possibility.

In this thesis, I have discussed the main sources to reconstruct an account of Aristotelian extended teleology. Articulating this account opens the possibility of exploring other related questions. One of these, is the relationship between teleology and the environment. Although I briefly introduced this debate in part's III Appendix, there are many issues left to analyse. Among these issues are a thorough revision of Aristotle's remarks on nature operating in the best possible way. These remarks appear often in the biological works. This revision might open a question concerning the methodological

discrepancies and agreements between, let us say, Aristotle the biologist and Aristotle the cosmologist. Similar questions need to be addressed concerning Aristotle's arguments about the natural environment in his *Meteorology* that might invite a teleological reading.

Finally, a future step of this research concerns the historical ramifications of the problems related to extended teleology. The fact that Aristotle does not have an explicit and systematic account of extended teleology, and that Theophrastus is at least suggesting the possibility of a monist account of the universe, must be part of the historical development of Stoic monism. For instance, while there is no textual evidence of any relation between Theophrastus and the Stoa, more needs to be said about the conceptual relation between the two (Long, 1998; van Raalte, 1988).

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