

THE JUSTIFICATION OF THE EXISTENCE OF HIGHER NATURES IN
THE PHYSICS OF ARISTOTLE

A Dissertation

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For my family, especially my mother and father, who have supported me unconditionally from the very beginning of my philosophical studies.

Contents

Abstract	v
Introduction	2
1 The Search for the <i>Ἄρχαι</i>	15
1.1 The evolution of the term ‘ <i>φύσις</i> ’	16
1.1.1 <i>Φύσις</i> as <i>ἀρχή</i>	18
1.1.2 <i>Φύσις</i> as ‘source of operations’	20
1.1.3 The <i>περὶ φύσεως</i> accounts	22
1.1.4 Conclusions about the senses of <i>φύσις</i>	24
1.2 The theories of Empedocles, Anaxagoras and the Atomists	25
1.2.1 Empedocles	26
1.2.2 Anaxagoras	30
1.2.3 The Atomists: Leucippus and Democritus	33
1.3 Aristotle’s derivation of the <i>ἀρχαί</i> in the <i>Physics</i> , Book I	43
1.3.1 Parmenides and the doctrine of the One	45
1.3.2 The <i>φυσιολόγοι</i> and the <i>ἐναντία</i>	48
1.4 The <i>ἀρχαί</i> as formal and material principles, and their relation to <i>φύσις</i>	54
1.4.1 The <i>ὑποκειμένον</i> and <i>ὑλη</i>	54
1.4.2 <i>φύσις</i> as formal principle	56
1.5 <i>Φύσις</i> in the broader context of Aristotle’s other works	60
1.5.1 <i>Φύσις</i> as <i>οὐσία</i>	61
1.6 Conclusions: the doctrine of the <i>ἀρχαί</i> and its implications .	63
2 <i>Φύσις</i> and Ways of Being	68
2.1 The development of the term <i>τὸ ὄν</i> in the Pre-Socratics	69
2.2 Being and the categories	73
2.2.1 The categorial analysis of being in Aristotle	73
2.2.2 The multivocality of ‘being’ and the <i>φυσιολόγοι</i>	76
2.2.3 Conclusions concerning categorial being	81
2.3 Real vs. noetic being	86
2.3.1 The characteristics of noetic being	87
2.3.2 The Parmenidean error and the <i>φυσιολόγοι</i>	91

2.3.3	Conclusions on noetic and real being	96
2.4	The doctrine of potency and act	97
2.4.1	Potency and act as ‘ways of being’	99
2.4.2	The Megarians: Aristotle’s argument for potency in addition to actuality	101
2.4.3	Aristotle’s dilucidation of the notions of potency and act	104
2.4.4	Form as act and form as potency	114
2.5	Conclusion: <i>φύσις</i> and the ‘ways of being’	133
3	<i>Φύσις</i> as Principle of Motion	142
3.1	The Aristotelian analysis of motion and change	143
3.1.1	A brief look at Aristotle’s theory	143
3.1.2	The definition of motion	144
3.2	Self movers and things that move themselves	148
3.2.1	Are self-movers possible?	149
3.2.2	A proof for the existence of self-movers	156
3.2.3	How self-motion occurs	161
3.2.4	Tensions concerning the notion of self-movement . .	165
3.2.5	Conclusions on sublunar self-movers	178
3.3	Communication of form in motion and change	182
3.3.1	The difficulty of the ‘communication of form’	182
3.3.2	The conditions for communication of form	185
3.3.3	Kinds of motions and changes resulting from communication of form	187
3.3.4	A possible solution to the difficulty	190
3.3.5	Waterlow’s unitary subject theory	192
3.4	Conclusions regarding motion and change	196
4	The Arguments for Natural Finality	198
4.1	Empedocles’s ‘evolutionary’ theory	200
4.2	Accident, chance and luck	204
4.2.1	<i>τὸ δὲ κατὰ συμβεβηκός</i> : Accidental being	204
4.2.2	Aristotle’s analysis of chance and luck	212
4.3	Aristotle’s responses to Empedocles	218
4.3.1	<i>Φύσις</i> as acting ‘always or for the most part’	219
4.3.2	End-directedness as requiring reason	228
4.4	An issue concerning biological finality	238
4.5	Finality and Reductionism	239
4.6	Conclusions: <i>φύσις</i> and finality	247

5 Aristotle's Comprehensive Argument for Higher <i>Φύσις</i>	252
5.1 The elimination of the obstacles produced by erroneous theories of nature	252
5.1.1 The multiplicity of being	253
5.1.2 The <i>ἀρχαί</i> of mobile being	258
5.1.3 The characteristics of <i>φύσις</i>	261
5.2 The case for the existence of higher <i>φύσις</i>	267
5.2.1 Demonstrating the existence of <i>φύσις</i> as ‘ <i>γελοῖον</i> ’	268
5.2.2 Arguments for the existence of higher <i>φύσεις</i>	271
5.2.3 Non-reducible powers and potencies	279
5.3 Conclusions	288
Conclusion	291
A Translations of Greek Texts	303
A.1 Aristotle	303
A.1.1 Categories	303
A.1.2 On Sophistical Refutations	303
A.1.3 Physics, or Natural Hearing	303
A.1.4 On the Heavens	326
A.1.5 On Generation and Corruption	328
A.1.6 Meteorologia	334
A.1.7 On Dreams	334
A.1.8 On Sense and the Sensible	334
A.1.9 De Anima	336
A.1.10 On the Parts of Animals	340
A.1.11 Motion of Animals	342
A.1.12 On the Generation of Animals	342
A.1.13 Metaphysics	344
A.1.14 Nicomachean Ethics	363
A.1.15 Rhetoric	363
A.2 Diels, H.	363
A.2.1 Die Fragmente der Vorsokratiker	363
A.3 Empedocles	367
A.3.1 “On Nature,” translated by W. E. Leonard	367
A.4 Parmenides	371
A.4.1 “On Nature,” translation by J. Burnet	371
A.5 Plato	373
A.5.1 Laws	373
A.5.2 Meno	374
A.5.3 Theatetus	374

A.6 Simplicius	374
A.6.1 On Aristotle's Physics	374
A.6.2 On Aristotle's Physics	375

Bibliography **377**

Abstract

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In his own era, just as today, Aristotle's doctrine of *φύσις* was controversial. Against the materialist philosophers of his day, Aristotle sustained the existence of real actualities of a higher order than the 'elements' or 'atoms' postulated by these philosophers. This type of higher actuality or 'higher' *φύσις* is the form of a natural substance, which gives it a genuine unity beyond that of an aggregate of elements, and which acts as the source of the substance's characteristic operations. How does the Stagirite justify postulating such higher actualities? In this dissertation, I will examine the justifications that Aristotle gives, both explicitly and indirectly, in the *Physics*, the *Metaphysics*, *On the Soul*, *On Generation and Corruption* and *On the Heavens*, among other texts. I show that Aristotle's justification for asserting the reality of 'higher' *φύσις* derives from two sources. In the first place, his overall physical and metaphysical doctrines undermine the arguments adduced by the ancient Greek materialists in favor of reductionism, and make plausible the existence of higher *φύσις* of the sort he proposes. Secondly, Aristotle provides a number of positive arguments in favor of the necessity of postulating higher actualities or *φύσις* in order to explain the existence and activity of organisms. These arguments acquire substantially greater weight and cogency than is commonly acknowledged when viewed in the light of his metaphysical and physical doctrines.

Introduction

It is through an unfortunate quirk of history that we lack today an extended work by Aristotle dedicated to a study of his predecessors in natural philosophy, the *φυσιολόγοι*. Simplicius, the neo-Platonic Byzantine philosopher and commentator on Aristotle, quotes from a work tantalizingly entitled “On Democritus,” which was attributed to the Stagirite. Unfortunately, this work has been lost, and we have today no more than the fragments preserved in Simplicius’s commentary on *On the Heavens*.¹ The Stagirite, however, was a careful student of his predecessors, and his works on natural philosophy and metaphysics are replete with extensive citations of the works of the *φυσιολόγοι*, along with paraphrases of their doctrines and detailed critiques of their positions. While Aristotle maintained an interest in dialogue with the Platonists, with whom he studied and worked for so many years, the majority of his mentions of other philosophers concern the Presocratic natural philosophers, in particular Democritus, Empedocles and Anaxagoras. While he frequently disagreed with their basic assumptions, the founder of the Peripatetic school had a profound respect for these philosophers, and developed a broad physical theory—based firmly

¹The catalogue of Aristotle’s works found in Diogenes Laërtius’s *Lives of the Philosophers* (cited in Barnes 1995, 7–9) lists a work entitled ‘Problems from Democritus,’ which may or may not be the same work; Diogenes’s list lacks any reference to works dedicated to the doctrines of Anaxagoras, Empedocles or Leucippus.

Aristotle on Higher Natures

on his metaphysics—in order to respond to what we might call their ‘reductive materialism.’

This dissertation will focus on Aristotle’s response to the *φυσιολόγοι*, taking as its central topic the notion of ‘nature’ or *φύσις*² as developed by Aristotle. In particular, I will investigate the ways in which Aristotle defends the necessity of postulating what I term ‘complex’ or ‘higher’ *φύσις* against the reductionism of these Pre-Socratic philosophers.³ While this dissertation is specifically about *φύσις*, I will also include discussion of other aspects of Aristotle’s philosophy which underlie and support his description and defense of higher *φύσις* and *φύσεις*. My investigation will therefore range beyond the *Physics* itself, and will include the exploration of doctrines introduced in the *Metaphysics*, *On the Heavens*, *On the Soul* and *On Generation and Corruption*, among other works.

The strengths and weaknesses of Aristotle’s arguments are of interest to me, in light of my plans for future research. Therefore I have noted, where possible, those of his arguments that seem particularly strong, especially when viewed in the light of his metaphysical doctrines, which are frequently overlooked by modern commentators. Nevertheless, the primary

²In order to avoid confusion, in this work I will normally refer to this notion by the Greek word *φύσις*, instead of the English correlate ‘nature,’ whose modern usage involves many shades of meaning which are only remotely related to the notion which Aristotle developed and defends.

³In using the terms ‘complex’ or ‘higher’ *φύσις*, I am indicating those *φύσεις* which are the principles of being—in Aristotle’s natural philosophy—for complex natural substances, in particular living things, as opposed to the ‘simple’ or elemental natures. The term ‘higher *φύσις*’ is not commonly used in Aristotle, but it does occur once in the corpus: ἄμα γὰρ ἀνάγκη καὶ ψυχῆς τετυχηκέναι τιμιώτερα· τιμιώτερα γὰρ ταῦτα τῆς φύσεως τῆς τῶν ψυχρῶν, “On Breathing”, 477a16-17. The notion of a scale of natural beings, ranging from the lowest—the simple bodies—to the highest—rational beings—is quite common in Aristotle’s writings, so I feel justified in using the locution ‘higher *φύσις*’ to express this notion.

purpose of the study is descriptive. That is, I first wish to discern *how*, in as broad a sense as possible, Aristotle justified his doctrine of higher *φύσις*. As a secondary consideration, I seek to explore the degree to which Aristotle's arguments are genuinely probative against his *φυσιολόγοι* interlocutors.

Φύσις in Aristotle's works

Aristotle, at the beginning of Book II of the *Physics*, gives his famous definition of 'nature' as a principle of motion and rest: “*ώς οὖσης τῆς φύσεως ἀρχῆς τινὸς καὶ αἰτίας τοῦ κινεῖσθαι καὶ ἡρεμεῖ, ἐν ᾧ ὑπάρχει πρώτως καθ' αὐτὸ καὶ μὴ κατὰ συμβεβηκός.*”⁴ What does this definition mean, and why is it important (to Aristotle and to us)?

To someone not well-acquainted with Aristotle's overall philosophy, this definition would be quite obscure, since it is stated in terms of the technical vocabulary that Aristotle developed as an apparatus for investigating the natural world. Nevertheless, in the preceding paragraph, he gives an explanation in terms of examples, illustrating in this way what he means by the technical term 'φύσις.' He states,

Τῶν ὄντων τὰ μέν ἔστι φύσει, τὰ δὲ δι' ἄλλας αἰτίας, φύσει μὲν τά τε ζῷα καὶ τὰ μέρη αὐτῶν καὶ τὰ φυτὰ καὶ τὰ ἄπλα τῶν σωμάτων, οἷον γῆ καὶ πῦρ καὶ ἀήρ καὶ ὕδωρ (ταῦτα γὰρ εἶναι καὶ τὰ τοιαῦτα φύσει φαμέν), πάντα δὲ ταῦτα φαίνεται διαφέροντα πρὸς τὰ μὴ φύσει συνεστῶτα. τούτων μὲν γὰρ ἔκαστον ἐν ἑαυτῷ ἀρχὴν ἔχει κινήσεως καὶ στάσεως, τὰ μὲν κατὰ τόπον, τὰ δὲ κατ' αὐξησιν καὶ φθίσιν, τὰ δὲ κατ' ἀλλοίωσιν.⁵

⁴*Physics*, 192b20-23.

⁵*Physics*, 192b08-16.

Aristotle on Higher Natures

This list includes a number of very different kinds of beings, which we might not normally associate: living organisms (plants, non-rational animals and human beings), their parts (the homoeomerous bodies, such as flesh, and the more complex organs), and (interestingly for a modern reader) the ‘simple bodies,’ or the traditional four elements of Greek cosmology. These beings have a number of characteristics in common: they form genuine unities (in Aristotle’s view, at least), they demonstrate characteristic operations which they always exercise (in the absence of external impediments), and they have a permanence that other beings do not share (both in the sense of lasting through time and resisting degradation, and in some cases, of reproducing their essences).

‘*Φύσις*’ is Aristotle’s word for the principle (*ἀρχή*) that underlies all of these characteristics, and which makes a single ‘family’ out of the disparate kinds of beings he has listed. In the *Physics*, Aristotle is asserting that such a principle exists, that it can be described scientifically, and that by using it he can solve a number of extremely difficult problems that preceding philosophers were unable to solve. *Φύσις* is Aristotle’s answer to the thorny problem of explaining how there could be a multiplicity of changing beings that truly are (in all of the ways that ‘be’ can be said), and his claim is that those who deny *φύσις* destroy the ability to explain the world as it actually is: “ὅλως δ’ ἀναιρεῖται οὕτως λέγων τὰ φύσει τε καὶ φύσιν.”⁶

Aristotle’s doctrine of *φύσις* is thus intimately linked with the entirety of his philosophical project. However, the question of whether *φύσεις* exist is of interest far beyond Aristotle’s own age and the circle of Greek philoso-

⁶*Physics*, 199b15-b16.

Introduction

phers with whom he was in dialogue. It is also of great importance today, given the contemporary interest in producing fully materialist explanations for life and the mind, and theories of ethics which make no reference to a normative human nature. For this reason I have chosen to focus on the arguments that Aristotle makes for the validity of his doctrine. Nevertheless, in this study, I will not enter into the issue of modern critics of Aristotelian natural philosophy, but will focus on the issues as Aristotle encountered them.

Aristotle was the heir to, and participant in, the extraordinarily fecund era of Classical Greek philosophy, beginning with the Ionian natural philosophers, and continuing in Aristotle's day with the mature Platonic Academy, Cynics, Atomists and Sophists, among others. Aristotle himself was intimately familiar with the work of these philosophers; indeed, in several cases,⁷ the information we have about their doctrines comes in large part from citations in the Stagirite's works. He developed his own doctrines in dialogue with these philosophers, and generally summarizes their positions prior to demonstrating why his own position is superior.

In his various works of physical science and metaphysics, Aristotle developed a complete doctrine that provides a far superior explanation of the world than those offered by the various *φυσιολόγοι* that were his predecessors and contemporaries. In addition, at various points throughout his works, Aristotle offers direct refutations of the theories of the *φυσιολόγοι*, and provides a justification of why his own position is superior. Neverthe-

⁷In the case of Democritus, for instance, nearly half of the 'Lehre' fragments that Diels cites are from Aristotle.

Aristotle on Higher Natures

less, the development of his physical and metaphysical doctrines, and his refutations of his opponents, are spread widely throughout his works, and the critiques that have been made of his arguments in particular cases frequently fail to take into consideration other aspects of his philosophy that strengthen the arguments he makes.

While Aristotle is known to have written a text dedicated to an examination—and possible criticism—of Democritus (the work *On Democritus*, mentioned above), only a few fragments of this work survive. Further, to the best of my knowledge, there is no contemporary work in English which unites Aristotle's basic philosophical teachings with his explicit argumentation against the *φυσιολόγοι* in order to provide a complete vision of the response that he makes to materialism. This study, then, will provide an initial sketch of a holistic view on Aristotle's alternative to Greek materialism, with an emphasis on how he justifies his doctrine of 'higher' *φύσις* (i.e. the *φύσεις* of the 'homoeomerous bodies' and of living organisms, such as plants, animals and human beings). I will focus on the theories of Anaxagoras, Empedocles and the ancient Atomists, Leucippus and Democritus, with some mention of the Eleatics; for reasons of space, I will leave for future study his defense of his doctrine against Platonic idealism and the Platonic philosophy of nature.

Summary of chapter contents

The doctrine of *φύσις* is at the center of Aristotle's response to the challenge of developing a complete *περὶ φύσεως* account which not only explained

Introduction

the same phenomena as did the theories of his materialist rivals, but which explained a substantially larger range of phenomena via a unified theory at the metaphysical, physical and psychological levels of reality. In my research, I have identified four key areas where Aristotle developed arguments in order to sustain the existence of *φύσεις*, such that he might claim to an unconvinced third party that the theory he develops on the basis of the notion of *φύσις* is not merely better at explaining the explananda, but that it is a necessary development, given the phenomena to be explained. I develop these arguments in the following chapters:

- In Chapter 1, I begin my study with a brief overview of the search undertaken by the *φυσιολόγοι* for the *ἀρχαί* (or basic building blocks) of the physical universe, in the context of tracing the development of the term *φύσις* up to the time of Aristotle. I trace how the term *φύσις* came to be linked to these *ἀρχαί*, and I give a sketch of the theories of Aristotle's most important interlocutors. Next, I provide a reading of Book I of the *Physics*, tracing how Aristotle demonstrates what the ultimate 'principles' or *ἀρχαί* of natural beings must in fact be, and how the various proposals of earlier philosophers fail to reach the true irreducible principles *περὶ φύσεως*. The chapter concludes by examining the various ways in which the term *φύσις* is used by Aristotle, in order to distinguish the sense which will be of central importance to my study.
- In Chapter 2, I introduce Aristotle's analysis of the ways in which 'being' is said, and how this analysis impacts the ability of the *φυσιολόγοι*

Aristotle on Higher Natures

to defend a purely materialist view of the universe. I begin with categorial being, showing how his analysis necessitates that ‘being’ be used in multiple ways according to the figures of predication, even within the theories proposed by the *φυσιολόγοι*. Next, I examine ‘being as truth,’ or noetic being, in order to show how the error of Parmenides derives from the application of the character of conceptual being to real being; the resulting failure of the Parmenidean argument will also severely impact the ability of the majority of the *φυσιολόγοι* to defend eternal ‘atoms’ or ‘roots’. Finally, I pay particular attention to being *qua* potency and act, and show how *φύσις* is primarily said to be formal act, and how in this way it can be an *ἀρχή* that can host potentialities for the operations characteristic of a given type of natural being, making it possible for Aristotle to postulate higher *φύσεις* that ‘virtually’ contain the potencies of lesser natures.

- In Chapter 3, I discuss Aristotle’s theory of motion and change. In particular, I show how this theory resolves the problems of motion that remained unexplained (and indeed unexplainable) for the *φυσιολόγοι*, how his doctrine both explains and makes necessary the existence of ‘sublunar’ self-movers with complex natures, and finally how Aristotle’s theory explains how one being can affect another (i.e. be a genuine mover of other beings).
- In Chapter 4, I discuss the arguments that Aristotle puts forth to support his view that there is finality or end-directedness in organisms, both in their development and their activity. I examine Empedocles’s

Introduction

‘evolutionary’ theory, and Aristotle’s response, which he develops after an extensive analysis of luck and chance. I also look at an issue relating to biological finality, showing how it can be that parts of organisms can both demonstrate a distinct finality of their own, while nevertheless acting as part of the whole organism in the achievement of its higher finalities. Finally, I look at the issue of finality and reductionism, examining various contemporary arguments in favor of and against the idea that Aristotle’s defense of final causes in natural coming to be vitiates any possibility of reducing the functionality of higher natural beings to that of their constituent parts.

- In Chapter 5, I will unite the various strands of Aristotle’s argumentation that I have presented in earlier chapters, in order to present a holistic view of his comprehensive argument for the existence of ‘higher *φύσεις*,’ i.e. the kinds of *φύσις* which are the source of being for natural substances of greater complexity than the ‘simple natures’ or elements. The chapter is divided into two overall sections, the first of which presents the theoretical background by which Aristotle ‘prepares the ground’ for his positive argumentation in favor of higher *φύσις*; this argumentation is found both in the criticisms of the theories proposed by the *φυσιολόγοι*, as well as his exposition of his physical and metaphysical positions. The second section explores the various positive arguments that Aristotle adduces in favor of the necessity to posit higher *φύσις* of this kind. From these two distinct aspects of his argumentation, we can show that the Stagirite has developed a

Aristotle on Higher Natures

solid foundation for asserting the doctrine of ‘higher’ $\phi\acute{u}σις$ against the various contemporary philosophers who argued against him. In this chapter I also explore the issue of why Aristotle stated that it is unnecessary (or even ridiculous, ‘γελοῖον’⁸) to demonstrate the existence of $\phi\acute{u}σις$, and how this affects the possibility of a systematic account of the sort I develop here.

Notes on method

In this dissertation I follow what E. Alarcón calls a ‘hermeneutic of consistency.’⁹ This interpretative methodology assumes as its default position that a philosopher is consistent with himself across his various works and across time, unless there is clear evidence to the contrary. This hermeneutic is not merely a personal interpretative choice, but derives from a deeper requirement, namely that it be possible to come to a defensible global interpretation of the philosopher in question. If we do not assume consistency as a default position, any incoherent interpretation of the philosopher becomes valid, even when the texts do not support it. Furthermore, there is no longer any justification for preferring one interpretation over another when one encounters texts that clash with one another. The hermeneutic of consistency gives preference to that interpretation which provides the most consistent interpretation of the texts, while taking into consideration what is known about the author’s doctrinal development over time.

Based on this principle, when it is unclear how one argument or doc-

⁸Aristotle, *Physics*, 193a3.

⁹Personal conversation with Enrique Alarcón, 08/03/2010.

Introduction

trine fits with another, I give Aristotle ‘the benefit of the doubt,’ assuming that he is fundamentally coherent over the course of his philosophical career, and that the later Aristotle did not deny critical doctrines that he originally formulated in his earliest period.¹⁰ It is clear that Aristotle maintained a substantial intellectual flexibility and a dedication to continual revision of his own theories, and we see that in later works he introduced concepts and proposals that fit poorly, if at all, with his earlier positions. For example, in *On the Motion of Animals*, we encounter the concept of *πνεῦμα*, which is entirely absent from *On the Soul*, and is hard to make compatible with the earlier theory. Other examples of this kind of reworking of his theories are found throughout Aristotle’s works, but unless there is clear textual evidence suggesting that he has abandoned a major earlier doctrine, the Principle of Consistency justifies the according of the benefit of the doubt to Aristotle, and assuming that he himself believed himself to be developing or extending his overall doctrine, and not breaking radically with his ‘younger self.’

I have chosen, following the advice of my doctoral advisor, to use citations in Greek, rather than citing English translations. While this has the effect of making the presentation less easily accessible, except to scholars with excellent reading knowledge of Greek (my own Greek is sufficient to read Aristotle *after* an initial reading in English), it has the advantage of avoiding errors of interpretation caused by the unavoidable distortions present in any translation. I include, in an appendix at the end of this study,

¹⁰In particular, the period that Jaeger assigns as being Aristotle’s period of greatest dedication to the development of his ‘physics,’ up to and around 347 B.C., just after he left the Platonic Academy; cf. Jaeger, *Aristoteles: Grundlegung*, pp. 325-6.

Aristotle on Higher Natures

translations for all the citations I have used (in English, where possible; in the case of citations from Diels, I include the German if no good English translation is available). I cite Greek texts using the Greek alphabet, following the practice which has been traditional in classical and philosophical studies until very recently. While some philosophers have begun to cite Greek using a latinized spelling, I have refrained from doing so, except when the need to preserve textual citations has made it unavoidable.

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Finally, in concluding this Introduction, I would like to take the opportunity to thank those who have been especially important in making it possible for me to complete this dissertation. In the first place, I would like to acknowledge the debt of gratitude that I owe to Dr. Enrique Alarcón, my dissertation director, whose help and guidance have been invaluable in the development of this research project. Secondly, I would like to thank the Association of Friends of the University of Navarra, which graciously provided me with the scholarship that made my doctoral studies possible. In addition, thanks go to the Department of Philosophy for providing me with a position as research assistant, and for providing an outstanding atmosphere in which to pursue the ‘love of wisdom.’ I wish to especially acknowledge Drs. Alessandro Ghisalberti and Leo Elders, who graciously evaluated my dissertation in accordance with the guidelines for obtaining the European Doctorate mention for my diploma. Thanks also go to Dr. Jaime Nubiola, also of the Dept. of Philosophy, whose guidance was enor-

Introduction

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1. The Search for the *Ἄρχαι*

“...ώς οὖσης τῆς φύσεως ἀρχῆς τινὸς καὶ αἰτίας τοῦ κινεῖσθαι καὶ ἡρεμεῖ,
ἐν ᾧ ὑπάρχει πρώτως καθ’ αὐτὸν καὶ μὴ κατὰ συμβεβηκός.” (*Physics*,
192b20-23)

Aristotle’s famous definition of *φύσις* as an *ἀρχή* of motion and rest in substances is the culmination of more than a century and a half of Greek effort to come to an understanding of the underlying makeup of the physical world. This chapter will investigate the historical background to Aristotle’s own theory of *φύσις*, prior to proceeding to a study of *φύσις* in the works of Aristotle himself, especially the *Physics*.

In section 1.1, I provide a brief overview of the evolution of the term *φύσις* as a result of the efforts of the *φυσιολόγοι*, or ancient Greek materialist philosophers, to come to a unified and non-mythical understanding of the cosmos. In particular, I describe how the notion of *φύσις* came to be used as a technical term by the natural philosophers of the period preceding Aristotle. In section 1.2, I provide a more detailed overview of the *ἀρχαι*¹ of the physical world proposed by those later *φυσιολόγοι* whose theo-

¹I use the term ‘*ἀρχή*’ in Aristotle’s sense of an irreducible first component of things: “δεῖ γὰρ τὰς ἀρχὰς μήτε ἐξ ἀλλήλων εἶναι μήτε ἐξ ἄλλων, καὶ ἐκ τούτων πάντα” (*Physics*, 188a28). According to A. Vigo (personal conversation, June 6, 2010) ‘*ἀρχή*’ in this sense is a Peripatetic term, not a Presocratic one, and that supposed earlier appearances of the term used in Aristotle’s sense are either misinterpretations (as in the case of Anaximander: cf. *Early Greek Philosophy*, 57 n. 1, where Burnet points out that *ἀρχή* is being used as a technical

ries figure most prominently in Aristotle's works: Empedocles, Democritus and Anaxagoras. In section 1.3, I look at Aristotle's own theory about the *ἀρχαῖ*, and how the *ἀρχαῖ* are related to the notion of *φύσις*, highlighting how Aristotle's solution provides the necessary framework within which any adequate theory of nature must work. Finally, in section 1.5, I examine the use of the term *φύσις* in the broader context of Aristotle's complete corpus, focusing in particular on the sense of *φύσις* as *οὐσία*.

1.1 The evolution of the term ‘*φύσις*’

The term *φύσις* has a complex history in Greek thought. It is derived from the Indo-European root **bhū*.² This root has the base meaning ‘to be, exist, grow,’³ and manifests in Ancient Greek in several base forms, including *φύω* (‘to bring forth, produce, put forth’), *φυή* (‘form, [noble] stature’), and *φυλή* (‘race or tribe of men’), as well as *φύσις*.⁴ The meaning of *φύσις*, however, has not proved easy to pin down. Earlier in the 20th century, the complexity of the term was not always recognized, and it was common to find writers on the subject attempting to give a single meaning to the term

term by Theophrastus, from whom the citation ultimately comes, and that Anaximander was not calling *το ἀπειρον* an *ἀρχή*; cf. also Leszl, “Aristotle on the Unity of Presocratic Philosophy”, 363, n. 7), or else are found in citations of Presocratic authors found in Aristotle's works, as in the case of Heraclitus (Diels and Kranz, *DK*, 22A5; I will henceforth cite Diels and Kranz as *DK*). Nevertheless, the fact that the Presocratics *were* in search of one or more irreducible first component(s) of things means that it is legitimate, with Aristotle, to use the term *ἀρχή* when referring to the doctrines of the Presocratics, provided one recognizes that their own terminology is likely to have been different.

²Naddaf, *The Greek Concept of Nature*, p. 12.

³Pickett, *The American Heritage® Dictionary of the English Language*, Appendix 1, Indo-European Roots, entry ‘*bheuə-*’.

⁴Liddell and Scott, *An Intermediate Greek-English Lexicon*, entries for *φύω*, *φυή*, *φυλή* and *φύσις*, respectively.

Aristotle on Higher Natures

that would apply to all its usages amongst the Pre-Socratics. An example of this tendency is found in Burnet, *Greek Philosophy: Thales to Plato*, p. 27, where he asserts that among Pre-Socratic authors *φύσις* meant “the particular stuff of which a given thing is made”, and that this original sense of the term excluded the notion of ‘growth’ (cf. *ibid*, n. 1). Similarly, and in opposition to Burnet, Collingwood asserts that

in our earlier documents of Greek literature, *φύσις* ... always means something within, or intimately belonging to, a thing, which is the source of its behaviour. This is the only sense it ever bears in the earlier Greek authors, and remains throughout the history of Greek literature its normal sense.⁵

More recent studies, by Gerard Naddaf and Tomás Calvo Martínez, while not denying the contributions of Burnet and Collingwood, have integrated their claims into an overarching theory about the complex set of interrelated meanings that *φύσις* acquired amongst the Pre-Socratics, all deriving from an ancient ‘focal meaning’ of ‘growth’ or ‘birth’.⁶ In broad strokes, we can identify two general types of usages: in the first place, a particularized use, where the investigation resolves around the *φύσις of some particular thing*, and in the second place, a universalized use, where there is an attempt to develop a program of study *περὶ φύσεως*, which extends to the totality of existing things.

⁵Collingwood, *The Idea of Nature*, p. 44

⁶Cf. Calvo Martínez, “La noción de *physis*”, p. 36 and Naddaf, *The Greek Concept of Nature*, p. 12.

The first manner of using the term predates philosophical inquiry *per se*, occurring as it does in *Odyssey* X, 303, where Hermes aids Odysseus by offering him an herb (moly) that would counteract the effects of Circe's potion, which had turned the rest of his men into pigs. Hermes shows him the *φύσις* of the moly plant, explaining how it will work to protect him from Circe's wiles. Calvo Martínez asks what it is that Hermes has shown Odysseus in showing him its *φύσις*, and answers that “hemos de entender que le mostraría o explicaría su composición, su *constitución*, pero también, sin duda, sus virtudes o *propiedades activas*, puesto que de un fármaco se trata.”⁷ In contrast to its appearance, the *φύσις* of the moly plant is what the thing is really, *qua* the source of its active properties.⁸

1.1.1 *Φύσις* as *ἀρχή*

Over the course of the development of Pre-Socratic philosophy, there is additionally a clear development of the notion of *φύσις* towards the sense of ‘principle’ or ‘fundamental building block’ (*φύσις* as *ἀρχή* of currently existing things), in terms of which the surface appearance and activities of an object can be explained.⁹ A notable characteristic of the Pre-Socratics is their interest in identifying one or several *ἀρχαί* of this sort, including the

⁷Calvo Martínez, “La noción de *physis*”, p. 32.

⁸In contrast, Naddaf interprets this occurrence of *φύσις* in Homer as an action noun, with the meaning of ‘growth, birth’; see Naddaf, p. 12, citing Burger (1925). In this case, I side with Calvo Martínez; I see no grounds for interpreting *φύσις* in this passage as signifying ‘growth’ or ‘birth’.

⁹This sense of *φύσις* is closely related to Aristotle’s sense of the term as indicating a ‘part’ of a natural substance, since *φύσις* is no longer indicating the totality of the thing, but rather its deeper, and presumably truer, components. I discuss Aristotle’s use of this sense of *φύσις* in section 1.4.2.

Aristotle on Higher Natures

water of Thales, the *ἀπειρον* of Anaximander, the four elements of Empedocles and the ‘*ἄτομοι*’ of Democritus. Since the world and the things existing in it are constructed of one or several material elements, these thinkers could derive the conclusion “that the diversity of the present order is not from eternity, but has evolved from something radically simpler at a particular point in time.”¹⁰

We see this sense of *φύσις* in such writers as Heraclitus, where he speaks of the power of his *λόγος* to strip things down to their deepest natures,¹¹ in Philolaus, who speaks of the ‘genuine nature’ of the ‘unlimited,’ ‘soulless’ and ‘mindless’ as being ‘the false’ and ‘envy,’¹² and in Democritus, where he contrasts the conventionality of qualities with their ‘true nature’ as atoms and void: “*ποιότητας δὲ νόμῳ εἶναι, φύσει δ’ ἄτομα καὶ κενόν.*”¹³ In these citations, *φύσις* is taken as what is ‘truly existent’ in the being, i.e. its genuine components, as opposed to its composite ‘appearance’ to the senses or intelligence. Here, *φύσις* is clearly an *ἀρχή*, in the sense of identifying the stable root component(s) of the thing.

By knowing the characteristics of this *ἀρχή* (or *ἀρχαι*) the physicist may penetrate past the surface appearance of diversity and attain to a single, universal explanation of observed phenomena based on the ways in which the *ἀρχή* (or *ἀρχαι*) manifests its inner dynamism. Knowing what a thing really is involves knowing this *ἀρχή*, which is *φύσις* identified not now pri-

¹⁰Guthrie, *A History of Greek Philosophy*, vol. I, p. 83.

¹¹“*γινομένων γὰρ πάντων κατὰ τὸν λόγον τόνδε ἀπείρουσιν ἐόίκασι, πειρώμενοι καὶ ἐπέων καὶ ἔργων τοιούτων, ὁκοίων ἐγὼ διηγεῦμαι κατὰ φύσιν διαιρέων ἔκαστον καὶ φράζων ὅκως ἔχει,*” DK22B1, 6-8.

¹²“*τὰς τῶν ἀπείρων καὶ ἀνοήτων καὶ ἀλόγων φύσιος τὸ ψεῦδος καὶ ὁ φθόνος ἔστι,*” DK44B11, 10.

¹³As cited by Simplicius in his Commentary on Aristotle’s *De caelo*, quoted in DK68A1, 47.

marily as growth, but rather as how the ‘building blocks’ make up a compound being at its current moment of existence (although growth remains implicit in the notion, as Aristotle notes at *Physics* 193b12).¹⁴ This is the basis for the senses of *φύσις* as *ἀρχή* which we encounter in the works of Aristotle.

1.1.2 *Φύσις* as ‘source of operations’

A second identifiable sense of *φύσις* in the Pre-Socratics is as ‘source of motion,’ a sense which is extremely close to Aristotle’s fully precise definition in the *Physics*. This sense of the term is built upon the senses just described, insofar as *φύσις* as source of motion is precisely the motion which is characteristic of that being *qua* its kind, i.e. that motion which proceeds from its real character or root. This is clearly a sense which derives from the primordial sense of *φύσις* as process of growth, mentioned above; it is, furthermore, a natural development from the sense of *φύσις* as *ἀρχή* as well, since it is precisely the root or real character of a thing that determines how it will develop and act.

This sense of the term *φύσις* is quite common in the Pre-Socratics and later natural philosophers. Diels and Kranz lists 68 occurrences of *φύσις* in the sense of ‘*Naturkraft*’ or ‘*Naturanlage*'; of these, 62 are from philosophers or writers contemporary with or earlier than Aristotle. For instance, Democritus compares *φύσις* with teaching, because they have similar effects in action: “ἡ φύσις καὶ ἡ διδαχὴ παρα·πλήσιόν ἔστι. καὶ γὰρ ἡ διδαχὴ μεταρυσμοῖ

¹⁴Naddaf, p. 15.

Aristotle on Higher Natures

τὸν ἄνθρωπον, μεταρυσμοῦσα δὲ φυσιο-ποιεῖ.”¹⁵ Gorgias, in a similar manner, characterizes *φύσις* as the absolutely inescapable cause of death and decay present in all things: “*Ἡ μὲν κατηγορία καὶ ἡ ἀπολογία κρίσις οὐ περὶ θανάτου λιγίνεσθαι θάνατον μὲν γὰρ ἡ φύσις φανερᾶ τῇ ψήφῳ πάντων κατεψηφίσατο τῶν θυητῶν...*”¹⁶ Finally, Heraclitus characterizes *φύσις* as the guide or source of activity that leads to health: “*σωφρονεῖν ἀρετὴ μεγίστη, καὶ σοφίη ἀληθέα λέγειν καὶ ποιεῖν κατὰ φύσιν ἐπαίοντας.*”¹⁷

Thus, by the time of Aristotle, a sense of *φύσις* had developed which is very close to that which he defines explicitly at *Physics*, 192b20-23. When Aristotle takes up the challenge of developing a complete theory of the principles of mobile being, he is able to make use of a terminology that has already been in development since the time of Homer, and which had widespread acceptance among the philosophers with whom he was in dialogue (although the use of the term *φύσις* is not attested in all of the *φυσιολόγοι*). This sense is that of *φύσις* as an *ἀρχή* determining a thing’s ‘real constitution,’ and which is the source of the characteristic activities of the being (or class of beings) in question; in some cases this ‘real constitution’ was interpreted in a reductionist sense, whereas in other cases no reductionism seems to be implied.

¹⁵DK55B33.

¹⁶DK82B11a, 1-2.

¹⁷DK22B112. The sense of *φύσις* as ‘root’ or ‘real character’ is also notable here, showing the deep connection between the two senses.

1.1.3 The *περὶ φύσεως* accounts

A final sense of *φύσις* begins to appear with the emergence of Greek natural philosophy in Ionia: this is the sense already identified above which uses *φύσις* as a synonym for “the totality of reality as a whole.”¹⁸ Ionia is the birthplace of the so-called *περὶ φύσεως* account, whose structure would be followed by numerous natural philosophers up through the time of Socrates, who attended the lectures of Archelaos, one of the last of the *φυσιολόγοι*.¹⁹ These accounts attempted to provide a naturalistic explanation for the genesis, material composition, development and final state of the world as we know it: as Calvo Martínez puts it, “el programa de la investigación *περὶ φύσεως* incluía, sin duda, todos estos elementos por lo que se refiere a la totalidad de lo existente.”²⁰

The first work of this type that we know of is the lost *Περὶ φύσεως* of Anaximander. We have only a single preserved fragment of this work, but enough doxographic mentions exist to enable us to get a sense of the structure and content of the work, and to see how the term *φύσις* has acquired a triple meaning by the time of the early Ionians. Anaximander’s *Περὶ φύσεως* established a durable model for subsequent works of the same type, insofar as it was a wide-ranging attempt to provide an explanation of the *φύσις* of ‘all things’ (*τὰ πάντα*), in terms of its origin (*φύσις* as absolute *ἀρχή*), the stages of its evolution (*φύσις* as process of growth) and the resulting *κόσμος* as we know it (*φύσις* as result).²¹

¹⁸Cf. Calvo Martínez, “La noción de *physis*”, p. 37.

¹⁹Burnet, *Greek Philosophy: Thales to Plato*, pp. 124-25.

²⁰Calvo Martínez, “La noción de *physis*”, p. 36.

²¹Naddaf, *The Greek Concept of Nature*, p. 64.

Aristotle on Higher Natures

Following on the model of Anaximander, early accounts of the *Περὶ φύσεως* type tended to provide three major kinds of information about the cosmos, corresponding to these three aspects of *φύσις* taken universally: a cosmogony or account of the origin of the universe, an explanation of how the universe could develop (or grow) from this starting point, and a description of how the current state of things is the necessary result of this growth process (including, in some cases, an account of the formation of human society).²² According to Naddaf, other Pre-Socratics who followed this pattern included Xenophanes,²³ the Pythagoreans,²⁴ Heraclitus,²⁵ Empedocles,²⁶ and the Atomists.²⁷ In a departure from traditional interpretations, Naddaf also sees the second part of Parmenides' poem as a genuine *Περὶ φύσεως* account, presumably representing a realistic account of the world of mortals, despite this account having an epistemic status which is that of opinion and not truth.²⁸ Naddaf thus sees the tripartite concept of *φύσις* as underlying and structuring the ambitious systems of universal explanation developed by the Pre-Socratics: the senses of *φύσις* as origin, growth and final result remain strongly present, maintaining a clear linkage to the primordial meaning of *φύσις* as 'growth' or 'birth.'

²²Naddaf, 64; cf. also p. 20.

²³Naddaf, p. 115.

²⁴Naddaf, p. 123.

²⁵Naddaf, 128ff.

²⁶Naddaf, 142ff.

²⁷Naddaf, pp. 155-6.

²⁸Naddaf, p. 136.

1.1.4 Conclusions about the senses of *φύσις*

Prior to proceeding to a discussion of the concrete theories of the *φυσιολόγοι*, it is worth taking a moment to look at the conclusions we can draw from this discussion of the evolution of the senses of *φύσις*. The first sense we looked at is that of which we see present already in Homer: *φύσις* as the ‘nature of a thing, with all its properties,’ which corresponds roughly to Aristotle’s sense of *φύσις* as *τὸ τί ἦν εἶναι*, i.e. as the totality of the ‘whatness’ of a mobile being as expressed in its definition. A second sense which we encounter in the Pre-Socratics is *φύσις* as *ἀρχή*, highlighting the ‘hidden components’ behind our sensible experience of natural substances. This sense corresponds, again roughly, to the sense of *φύσις* as the material part of a mobile being which is analyzed in the first two books of the *Physics*, as we shall soon see. A third identifiable sense is that which highlights the way in which the ‘real constitution’ (either in terms of its component parts, or in terms of its essence) produces the characteristic activity of the beings of our world; this sense is clearly related to Aristotle’s definition of *φύσις* as a principle of motion and rest. The final sense that we have looked at is that which accounts for the content and orientation of *Περὶ φύσεως* accounts, as the ‘origin, growth and final result’ of cosmic processes and their constituent elements. Description in these terms is the focus of the new ‘science’ of speculation about the natural world.

Thus, we can draw the conclusion that the various senses of *φύσις* that exist in the Aristotelian corpus in fact precede Aristotle himself, and that Aristotle’s achievement was precisely to relate all these senses of the term

within a single, overarching theory of ‘physics’ built upon the base of his metaphysical discoveries. Upon beginning our closer study of Aristotle’s own theories, beginning in section 1.3, we will see in detail how he integrates these senses of *φύσις* into his system, and in the process refining them and giving them scientific definitions.

1.2 The theories of Empedocles, Anaxagoras and the Atomists

Aristotle was highly knowledgeable about his predecessors, the *φυσιολόγοι*, and quoted them extensively in his various works on natural philosophy and in the *Metaphysics*. Indeed, many of the extant fragments of their otherwise lost works are from extensive quotations or paraphrases in Aristotle’s writings. While critical of their errors, he nevertheless was able to develop his own theories by ‘standing on the shoulders of giants.’ In this section, I will provide a brief background to those of the *φυσιολόγοι* whose rival theories of the natural world were of greatest importance to Aristotle.²⁹ The philosophers I will discuss are Anaxagoras, Empedocles and the Atomists (primarily focusing on Democritus, since we retain so little concerning Leucippus).³⁰ This study is not intended as an exhaustive investigation of these philosophers. Rather, in this section I will highlight both

²⁹Although Naddaf interprets Parmenides as a *φυσιολόγος*, insofar as the second part of his famous poem contains a substantial *Περὶ φύσεως* account (cf. Naddaf, pp. 134-40), Aristotle does not normally argue against the theory of nature of Parmenides, but rather against his denial of the possibility of change due to the absolute unity and immobility of being (cf. *Physics*, 185a1-20); thus, I will primarily discuss Parmenides in the context of Aristotle’s refutation of the former’s monistic theory of being.

³⁰These philosophers have been termed by Wardy (who is followed by Graham and others) ‘Eleatic pluralists,’ insofar as they accept the basic terms of the Eleatic argument, in particular that “*in truth* nothing comes into or goes out of existence,” Wardy, “Eleatic Pluralism”, p. 125.

their proposals for the *ἀρχαι* of the physical world, as well as those aspects of their teachings which Aristotle discusses as having been serious rivals to the doctrines proposed in his own ‘physics.’ In this way, my later discussion of Aristotle’s arguments will have the necessary background for an understanding of how he differs from his predecessors, and how his own proposals constitute an important leap forward in the understanding of the physical world.

1.2.1 Empedocles

Empedocles is the most frequently cited Pre-Socratic philosopher in the Aristotelian corpus, being directly referred to over 160 times. While his doctrines do not garner the praise that Democritus is given,³¹ Aristotle obviously considers him to be a worthy opponent, and takes his teachings very seriously. Empedocles appears to have been the first major natural philosopher to attempt to integrate the apparently irrefutable arguments of Parmenides on the impossibility of change.³² He also attempted to develop a complete account of all aspects of the world, from the traditional topics of *Περὶ φύσεως* accounts (i.e. a cosmogony, a history of the universe and an explanation of the current structure of the world³³), to an account of the life processes of animals, human sensation and cognition, and ethical and spiritual issues. Thus, Empedocles is the provider of an integrated account of the world which is nearly as wide-ranging and ambitious as that

³¹On *Generation and Corruption*, 324b32-33.

³²Cf. Guthrie, *A History of Greek Philosophy*, vol. II, pp. 138-9.

³³Cf. Naddaf, p. 64.

Aristotle on Higher Natures

of Aristotle.

There are a number of major topics within Empedocles's system to which Aristotle pays special attention, each of which I will describe briefly in turn. The most influential doctrine of Empedocles is perhaps his theory of the four 'roots' or basic principles of all things in the cosmos, a theory which Aristotle both praises (for its elegance, explanatory power and simplicity³⁴) and builds upon, in his own theory of the four *στοιχεῖα* or 'simple bodies.' Empedocles states the theory of the four elements in Fragment 6, "τέσσαρα γὰρ πάντων ῥίζώματα πρῶτον ἄκουε· Ζεὺς ἀργῆς 'Ηρη τε φερέσβιος ἡδ' Αἰδωνεύς Νῆστος θ', ἦ δακρύοις τέγγει κρούνωμα βρότειον,"³⁵ claiming that *all* things are made up of these 'roots' alone: "ἐκ τούτων γὰρ πάνθ' ὅσα τ' ἦν ὅσα τ' ἔστι καὶ ἔσται."³⁶ This doctrine, according to Guthrie, is Empedocles's attempt to retain Parmenides's basic insight that that which is, cannot cease to be³⁷; these four 'roots' are eternal, each of them retaining its particular character or 'office' for all time.³⁸ The four 'roots' play the role of *ἀρχαί* in Empedocles's system, since there is nothing more basic, and all else is built from them.

³⁴Cf. *On the Heavens*, 302b20-30.

³⁵DK31B6. I will cite all fragments of Empedocles using the numbering found in Diels and Kranz (1964 edition).

³⁶DK31B21.

³⁷"More commonly however the language of Parmenides is recalled to show how far Empedocles is prepared to go with him. He accepts the statements that nothing can come out of nothing, and that what exists cannot perish; the sum of being is constant," Guthrie, *A History of Greek Philosophy*, vol. II, p. 139. Cf. also Naddaf, *The Greek Concept of Nature*, p. 141, "When examining Empedocles' poem *Peri phuseos*, the first thing of note is that he clearly wants to accommodate the consequences of Parmenides' way of truth. In fact, Empedocles actually castigates his contemporaries and predecessors for failing to recognize the new *sine qua non* of any *peri phuseos* account: that nothing can come into existence from what did not previously exist."

³⁸DK31B17, 27-35.

Empedocles, however, was not a man to deny the phenomena; indeed, he was intensely immersed in the world and a close observer, especially in the realm of medicine.³⁹ The fact of change, then, cannot be denied, but must be explained. Empedocles's solution was to propose that change could be explained without denying the changelessness of what truly is, by postulating 'separation' and 'aggregation'⁴⁰ as processes that produce mixtures⁴¹ according to 'ratios' which account for the peculiar character of each resulting aggregate.⁴² In order to account for the observed motion and (apparent) generation of physical beings, and given that the four 'roots' have no proper motion of their own,⁴³ Empedocles proposes his two famous universal forces, 'Love' and 'Strife,' which are coeternal with the four 'roots' and cause aggregation and separation, respectively:

τοῦτο μὲν ἀν βροτέων μελέων ἀριδείκετον ὅγκον·
ἄλλοτε μὲν Φιλότητι συνερχόμεν' εἰς ἐν ἄπαντα
γνῖα, τὰ σῶμα λέλογχε, βίου θαλέθοντος ἐν ἀκμῇ·
ἄλλοτε δ' αὖτε κακῆισι διατμηθέντ' Ερίδεσσι
πλάζεται ἄνδιχ' ἔκαστα περὶρρηγμῖνι βίοιο.⁴⁴

A major implication of Empedocles's theory is that there are no true 'higher' beings or substances; there is no true 'coming-to-be,' or *φύσις* in Empedocles's own terminology (*γένεσις* in Aristotle's terminology): "ἄλλο

³⁹Cf. Guthrie, *A History of Greek Philosophy*, vol. II, p. 132-33.

⁴⁰DK31B20.

⁴¹DK31B8.

⁴²As interpreted by Aristotle, in *On the Parts of Animals*, 642a17ff.

⁴³This idea seems to be contradicted by Fragment 62, DK31B62, but Aristotle appears to assume that Love and Strife are the only sources of motion in Empedocles's theory; cf. *Physics*, 250b26-251a5.

⁴⁴DK31B20.

Aristotle on Higher Natures

δέ τοι ἐρέω· φύσις οὐδενός ἔστιν ἀπάντων θνητῶν... ἀλλὰ μόνον μίξις τε διάλλαξίς τε μιγέντων ἔστι, φύσις δ' ἐπὶ τοῖς ὀνομάζεται ἀνθρώποισιν.”⁴⁵ In particular, supposed higher-level phenomena, such as ‘natures’ or goal-oriented behavior, can be explained in terms of the necessary behavior of the elements⁴⁶ and random arrangements produced by chance.⁴⁷ This radical reductionism seems to imply the impossibility of the coming-to-be of the highly complex beings we see around us, especially organisms; in order to account for the development of beings such as cows and humans, he postulated an ingenious theory of ‘natural selection,’ whereby ‘oxen-faced men’ and other random jumbles of organs arose⁴⁸ due to the long process of the separation of the elements from the One.⁴⁹ Aristotle is our source for Empedocles’s idea of the ‘survival of the fittest,’ which is not attested directly in any fragment. According to this theory, only those agglomerated beings which were ‘fit’ for surviving did so, whereas the ‘unfit’ died off, leaving us with the range of animals we know today: “ὅσα δὲ μὴ οὔτως, ἀπώλετο καὶ ἀπόλλυται, καθάπερ Ἐμπεδοκλῆς λέγει τὰ βουγενῆ ἀνδρόπρωρα.”⁵⁰

A final aspect of Empedocles’s physical theory is his assertion that while the elements or ‘roots’ embody the *έναντια* or opposite qualities that are at the base of the observed characteristics of natural beings,⁵¹ it is precisely *like* that affects like, and not that which is different or opposite: “ὡς

⁴⁵DK31B8.

⁴⁶Guthrie, *A History of Greek Philosophy*, vol. II, p. 163ff.

⁴⁷Empedocles explains the coming to be of the eye as being by *τύχη* (DK31B85), and Aristotle takes this argument up extensively in Book II of the *Physics*.

⁴⁸DK31B61.

⁴⁹Cf. DK31B17.

⁵⁰*Physics*, 198b17-b34.

⁵¹Cf. DK31B65, “ἐν δ' ἐχύθη καθαροῖσι· τὰ μὲν τελέθουσι γυναικες, ψύχεος ἀντιάσαντα, | τὰ δ' ἔμπαλιν ἄρρενα θερμοῦ.”

γλυκὺ μὲν γλυκὺ μάρπτε, πικρὸν δ' ἐπὶ πικρὸν ὅρουσεν, ὀξὺ δ' ἐπ' ὀξὺ ἔβη, δαερὸν δ' ἐποχεῖτο δαηρῶι.”⁵² This mutual influence of like upon like accounts for such phenomena such as vision, whereby light emanates from the eye, and meets with ‘effluence’-emitting objects in the world, thus causing the sensation of ‘seeing’ in the mind.⁵³ In the same fragment (84) Empedocles also introduces an important ‘adjustment’ to his theory: since there is no void⁵⁴ the light must leave the eye through pores in its surface. The theory of pores is also one that Aristotle takes up, but with important modifications, as we shall see later, in the discussion of contact and communication of form (p. 125).

1.2.2 Anaxagoras

Anaxagoras of Clazomenae is a philosopher for whom we have substantially less direct textual evidence; in *Die Fragmente der Vorsokratiker* of Diels and Kranz, only some 22 fragments of his writings are attested, as against 161 for Empedocles. Nevertheless, he was an important thinker in the eyes of Aristotle, who refers to him more than a hundred times throughout his works. Aristotle does not always show as much respect for Anaxagoras’s philosophical contributions as for those of Empedocles, and on several occasions uses him as an example of a thinker who, while creative, was nonetheless unwilling or unable to think through the implications of

⁵²DK31B90.

⁵³DK31B84.

⁵⁴Cf. DK31B13.

Aristotle on Higher Natures

his own doctrines.⁵⁵ Despite this sometimes critical attitude, a number of the ideas of Anaxagoras feature prominently in the Stagirite's discussions of earlier theories, and on several occasions Aristotle takes the time to refute the positions of Anaxagoras directly. I will touch briefly, therefore, on those aspects of Anaxagoras's doctrine which will help to put Aristotle's discussions in context.

The first Anaxagorian doctrine of interest is his theory of 'coming to be' and 'passing away' as separation and aggregation, much like the theory of Empedocles: “οὐδεν γὰρ χρῆμα γίγνεται οὐδὲ ἀπόλλυται, ἀλλ᾽ ἀπὸ ἐόντων χρημάτων συμμίσγεται τε καὶ διακρίνεται. καὶ οὗτως ἂν ὁρθῶς καλοῦεν τό τε γίνεσθαι συμμίσγεσθαι καὶ τὸ ἀπόλλυσθαι διακρίνεσθαι.”⁵⁶ Again, like Empedocles, “Anaxagoras accepted the Parmenidean canons that there is no empty space, and that coming-into-being and perishing into not-being are strictly impossible, and in general terms he accepted the same alternative.”⁵⁷ Where Anaxagoras differs from Empedocles is in the number of *ἀρχαί* that he proposes. As Guthrie explains it,

On the Empedoclean theory, if it were possible to divide a piece of (say) flesh into small enough fragments, the elements would come to light, and it would be flesh no longer. But Anaxagoras held that even if this were theoretically possible, then a defi-

⁵⁵See, for instance, Aristotle's sarcastic comments on Anaxagoras's use of *νοῦς* as a *Deus ex machina* at *Metaphysics*, 985a19ff. Similarly, at Aristotle, *On the Heavens*, 302b13ff, he criticizes Anaxagoras for not understanding what 'στοιχεῖον' means, even though he uses the term in his theory. Numerous other examples of this sort of criticism could be cited. On the other hand, elsewhere Aristotle praises him for arriving at the necessity of a moving or efficient cause, in addition to the material cause: he is said to be as a 'sober man' in comparison with his predecessors; *Metaphysics*, 984b15.

⁵⁶Diels and Kranz, *DK*, 59B17.

⁵⁷Guthrie, *A History of Greek Philosophy*, vol. II, p. 271.

Chapter 1. The Search for the ἀρχαί

nite substance, flesh, could perish. There was no reason for singling out certain forms of matter like earth or water as primary... All the infinite number of natural substances, flesh, bone, hair, sinew, wood, iron, stone, etc. must be equally real.⁵⁸

In addition, it appears that Anaxagoras included ‘qualities’ in amongst the infinite ἀρχαί that are present in everything.⁵⁹ Anaxagoras’s postulating of infinite ἀρχαί will be important in Aristotle’s discussion of the derivation of the first principles of nature in Book I of the *Physics*, and in his discussion of coming to be and passing in away in *On Generation and Corruption*.

A second important aspect of Anaxagoras’s teachings involves the role of *νοῦς* or ‘mind’ as a first moving cause in the cosmos. This doctrine was considered by later thinkers to be a major step forward, “by clearly separating, for the first time, the moving cause from the matter moved, and by characterizing this separate cause as Mind or Intellection.”⁶⁰ However, as Aristotle points out, Anaxagoras appears to assert that *νοῦς* was only active at the beginning of the cosmos, putting the whole into motion, and then ‘gradually withdrawing’: “καὶ ἐπεὶ ἤρξατο ὁ νοῦς κινεῖν, ἀπὸ τοῦ κινουμένου παντὸς ἀπεκρίνετο...”⁶¹ In place of *νοῦς*, the later development of the universe proceeded by ‘natural necessity’ and ‘chance’: “Ἀναξαγόρας... ἄδηλον αἰτίαν ἀνθρωπίνωι λογισμῶι· ἂ μὲν γὰρ εἶναι κατ’ ἀνάγκην, ἂ δὲ καθ’ εἰμαρμένην, ἂ δὲ

⁵⁸Guthrie, *A History of Greek Philosophy*, vol. II, p. 272.

⁵⁹I follow here the opinion of Guthrie (vol. II, p. 272), which is supported by the statement of Aristotle that “οὗτω μὲν γὰρ ἀνίσως αἴτια δόξειεν εἶναι ὡς τὸ λευκὸν μεμιγμένον τῷ λευκῷ, ἀλλ’ οὐτος μὲν δὲ λόγος λίαν εὐκίνητος, διὸ Ἀναξαγόρας μὲν πρῶτος Εὔδοξος δὲ ὑστερον καὶ ἄλλοι τινὲς ἔλεγον ῥάδιον γὰρ συναγαγεῖν πολλὰ καὶ ἀδύνατα πρὸς τὴν τοιαύτην δόξαν,” *Metaphysics*, 991a15-20.

⁶⁰Guthrie, vol. II, p. 272.

⁶¹DK59B13.

κατὰ προαιρεσιν, ἀ δὲ κατὰ τύχην, ἀ δὲ κατὰ τὸ αὐτόματον.”⁶²

It is not clear whether Anaxagoras viewed *νοῦς* as something ‘spiritual’ or non-material, but he described it as radically different from the material ‘seeds’ which make up the physical world: “τὰ μὲν ἄλλα παντὸς μοῖραν μετέχει, νοῦς δέ ἔστιν ἄπειρον καὶ αὐτοκρατὲς καὶ μέμεικται οὐδενὶ χρήματι...”⁶³ By postulating *νοῦς*, Anaxagoras was not only able to explain the beginning of motion in the cosmos, but also to explain the presence of *λόγος* in all things, since “ὅ δὲ νοῦς, ὃς ἀεί ἔστι, τὸ κάρτα καὶ νῦν ἔστιν ἵνα καὶ τὰ ἄλλα πάντα, ἐν τῷ πολλῷ περιέχοντι καὶ ἐν τοῖς προσκριθεῖσι καὶ ἐν τοῖς ἀποκεκριμένοις.”⁶⁴ In a manner similar to Empedocles, he appears to have explained the particular characteristics of complex ‘aggregates’ in terms of the proportions of the basic constituents.⁶⁵ Macro-scale objects, while having all the ‘seeds’ within them, nonetheless have one kind of seed which predominates, thus providing its peculiar visible/sensible character.

1.2.3 The Atomists: Leucippus and Democritus

The Atomist ‘school’⁶⁶ was founded by Leucippus, but was continued by Democritus, who was its most famous and most important expositor. Much like Aristotle and Empedocles, the interests of Democritus were wide-

⁶²Aëtius, quoted in DK59A66. We have only indirect evidence for this position, but it is assumed also by Aristotle, in his discussion of natural finality in *Physics* II.8 (198b10-b17).

⁶³DK59B12.

⁶⁴DK59B14.

⁶⁵Cf. Guthrie, *A History of Greek Philosophy*, vol. II, p. 290.

⁶⁶According to Guthrie, the Atomists did not constitute a formal school in manner of the Platonic Academy or the Lyceum of the Peripatetics, but rather there was “a succession of philosophers of whom one was the disciple of the other,” *ibid.*, vol. II, p. 382. Democritus himself had quite a number of disciples, and the Atomist doctrine can be said to have continued after Aristotle within the teachings of the Epicurean school (*ibid.*).

ranging; the fragments of his writings and mentions in later philosophers indicate that he wrote on the traditional issues of ‘natural philosophy,’ cosmogony and cosmology, but also on issues of the mind, psychology, life after death, and ethical and political theory. Indeed, Clement of Alexandria cites Democritus as having said, “ἐγὼ δὲ τῶν κατ’ ἐμαντὸν ἀνθρώπων γῆν πλείστην ἐπεπλανησάμην ιστορέων τὰ μὴκιστα,”⁶⁷ and Diogenes Laërtius says that he studied “physical and moral issues, but also mathematics and the topics of general culture, and had a broad experience of the arts.”⁶⁸

Leucippus himself appears to have been the first to propose ‘atoms’ (*ἄτομοι*) as a solution to the classic Parmenidean problem of reconciling the world of change with the immutability of being, by postulating them as the ultimate and unchanging *ἀρχαί* of sensible, changeable beings. Aristotle himself gives us an excellent summary of his proposal in *On Generation and Corruption*, which is worth citing here in its entirety, due to its conciseness and completeness (I include the quote in English, due to its length):

But Leucippus thought he had a theory which would agree with the sense and would not abolish coming-to-be or destruction or motion or the plurality of existing things. So much he conceded to the phenomena, whereas to the proponents of unity he granted that there could not be movement without void, that the void was 'not being,' and nothing of what is is not being; what, strictly speaking, is, is completely full. But such being, he

⁶⁷DK68B299.

⁶⁸DK68A1, 37; English translation from the Spanish in Lan and Julia, *Los filósofos pre-socráticos*, §283.

Aristotle on Higher Natures

claimed, is not a unity. It consists of a plurality of things infinite in number and too small to be seen. They move in the void (for there is void), and their combination causes coming-to-be, their separation dissolution. They act and are acted upon as they happen to touch (for in this way they are not one) and generate by coming together and interlocking. A true unity can never give rise to multiplicity, nor a true plurality produce unity. That is impossible, but as Empedocles and others say that things are acted upon by means of pores, so he claimed that alteration and every form of being-acted-on takes place in this way: dissolution and destruction occur by means of the void, as also does growth when solid bodies slip in [sc. to fill empty spaces].⁶⁹

This citation includes many of the major ideas which Aristotle criticizes through-out his writings. In particular, we note the doctrine of the plenum and the void (the ‘atoms’ being tiny versions of Parmenides’ One),⁷⁰ the infinity of principles, the explanation of coming to be and passing away in terms of aggregation and separation, and motion being explained by the existence of the void. Democritus adds that each atom is eternal, never transforming into anything else; their only intrinsic differences are shape, arrangement, size and position.⁷¹ The motion of the atoms is equally eter-

⁶⁹*On Generation and Corruption*, 325a23-35; translation by Joachim.

⁷⁰Cf. Wardy, “Eleatic Pluralism”, p. 126, “[In Leucippus’s basic doctrine], the Eleatic cornerstone is left untouched insofar as there is no coming to be or passing away of the atoms themselves. It is granted that motion is impossible without void, but maintained that since what is not somehow is, locomotion can and does occur... Finally, since there is what is not to divide up homogeneous being, Leucippus and Democritus are free to postulate the existence of a multitude of bodies each of which is like the One.”

⁷¹“Δημόκριτος δ' οὐδὲν ἔτερον ἐξ ἐτέρου γίγνεσθαι τῶν πρώτων φησίν· ἀλλ' ὅμως γε αὐτῷ τὸ κοινὸν

nal, a brute fact whose ‘cause’ needs no further explanation.⁷² Thus, the Atomists recognized the need for a moving cause, much as did Anaxagoras and Empedocles, but in contrast to these other philosophers, they made no attempt to account for it in terms of an originating ‘mover,’ such as Love/Strife or *νοῦς*.

The relation of Atomism to the Eleatics

As the citation by Wardy indicates, it has long been held that the Atomists held to the central tenets of Parmenides’s Way of Truth, modifying it only in the ways necessary to account for motion and plurality. Guthrie, for example, states that “Leucippus looked ... to Parmenides, whose theory he modified only in the minimal ways just mentioned [i.e. an atom is neither infinite, unmoved nor without density]. What remains must still be ungenerated and imperishable, unchangeable, incapable of being added to or subtracted from, homogenous, finite and a plenum, continuous and indivisible.”⁷³

The question thus arises as to what extent the Atomists are dependent upon the Parmenidean argument against coming to be and passing away, in order that the ‘atoms’ (indivisibles) that they postulate be proof against

σῶμα πάντων ἔστιν ἀρχή, μεγέθει κατὰ μόρια καὶ σχήματι διαφέρον,” *Physics*, 203a33-25 and “Εἰ δὲ μὴ συνεχὲς τὸ πᾶν, ἀλλ’ ὥσπερ λέγει Δημόκριτος καὶ Λεύκιππος, διώρισμένα τῷ κενῷ, μίαν ἀναγκαῖον εἶναι πάντων τὴν κίνησιν. διώρισται μμὲν γὰρ τοῖς σχήμασιν τὴν δὲ φύσιν εἶναι αὐτῶν μίαν, ὥσπερ ἂν εὶ χρυσὸς ἔκαστον εἴη κεχωρισμένον,” *On the Heavens*, 275b30-34.

⁷²“Οὐ καλῶς δὲ λέγοντες οὐδὲ τοῦ διὰ τί τὴν ἀνάγκην ὅσοι λέγοντοι ὅτι οὔτως ἀεὶ γίγνεται, καὶ ταῦτην εἶναι νομίζουσιν ἀρχὴν ἐν αὐτοῖς, ὥσπερ Δημόκριτος ὁ Ἀβδηρίτης, ὅτι τοῦ μὲν ἀεὶ καὶ ἀπείρου οὐκ ἔστιν ἀρχή, τὸ δὲ διὰ τί ἀρχή, τὸ δ’ ἀεὶ ἀπειρον, ὥστε τὸ ἐρωτᾶν τὸ διὰ τί περὶ τῶν τοιούτων τινὸς τὸ ζητεῦν εἶναι φῆσι τοῦ ἀπείρου ἀρχῆν,” *Generation of Animals*, 742b17-22.

⁷³Guthrie, *A History of Greek Philosophy*, vol. II, 392.

Aristotle on Higher Natures

change. Could Atomism survive as a viable theory if the Parmenidean Way of Truth were found to be false? Graham holds that there is a difference here between Leucippus, founder of the Atomistic school, and his disciple Democritus: “Leucippus is an Eleatic, working in the framework of a constructive model of cosmology. Democritus is a reformer of Eleatic theory, with a sharp criticism of a defining theorem of Eleatic metaphysics, namely the distinction between what-is and what-is-not.”⁷⁴ According to this model, Leucippus, like Empedocles and Anaxagoras, accepts the basic axioms presented in Parmenides’s poem, but “reading the *Aletheia* in light of the *Doxa*, rather than vice-versa.”⁷⁵ The principles of light and night in Parmenides’s Way of Opinion become the basic principles upon which to build a pluralistic cosmology, with night representing solid, unchanging being, and light representing the void. In Graham’s reconstruction of the chronology of Atomism, Leucippus sees no reason to provide a detailed theoretical justification for the existence of atoms and the void, taking them as adequately warranted by the Way of Truth (that which is cannot not be, is a plenum, is immutable and indivisible) together with the Way of Opinion (there are two principles, one of which corresponds to being, and the other to not-being).⁷⁶ If this reading is correct, then Leucippus’s version of Atomism would be vulnerable to a successful attack on the Parmenidean theory.

Graham points out, nonetheless, that this is not the end of the story for Atomism. The defense by Melissus of Eleatic principles was so rig-

⁷⁴Graham, “Leucippus’s Atomism”, p. 347.

⁷⁵ibid., p. 345.

⁷⁶ibid., p. 346.

orous that he made it abundantly clear that the way of opinion was just that—unreliable *doxa* whose validity is precluded by the diamond-like perfection of the argument of the Way of Truth. Furthermore, in roughly the same time period Zeno presents his arguments for the immobility and unity of being. In this context, “Democritus appears as the man who provided a post-Eleatic foundation for atomism in response to a new Eleatic challenge, and to that extent marked a new beginning for cosmology.”⁷⁷ What would this post-Eleatic foundation have consisted in?

A clue to an answer may be provided by a look at Democritus’s main arguments as they have come down to us, principally in Aristotle (especially *On Generation and Corruption* I.2) as well as an important argument preserved in Plutarch.⁷⁸ These arguments have two important characteristics: they revolve around the notion of indivisible magnitudes, and they are mathematical, rather than dialectical, in character. States Alfieri,

L’atomismo a questa sostanza ultima arriva, o s’illude di arrivare: sostanza è l’indivisibile, che è il solo vero individuo che esista... e l’indivisibile è ciò che, pur essendo suscettibile ancora di divisione mentale... non è suscettibile di divisione reale, perché, non contenendo in sé alcun vuoto, no ha parti, è dunque *εν συνεχέσ*, come appunto vien definito l’essere in termini parmenidei.⁷⁹

In the Democratean arguments preserved by Aristotle in *GC* I.2, we find

⁷⁷Graham, “Leucippus’s Atomism”, p. 348.

⁷⁸Cf. Sedley, “Atomism’s Eleatic Roots”, p. 323.

⁷⁹Alfieri, *Atomos Idea*, pp. 58-9.

Aristotle on Higher Natures

no references to the aspect of the Parmenidean argument about how *what is* is unable to cease to be, but rather we see echoes of the argument of the Way of Truth concerning the indivisibility of what is. Sedley interprets GC I.2 as containing two versions of a single basic argument, one which strictly preserves the terms in which Democritus presented his original argument for indivisible magnitudes, and a second version in which Aristotle ‘lends a hand’ to Democritus, rephrasing his argument in terms of notions from Aristotle’s own metaphysics, such as potency and act.⁸⁰ The nucleus of this second version of the argument is that if a magnitude can be simultaneously be divided in potency, then this means that at some point it might actually come to be so, resulting in either points, or nothing at all. The original magnitude cannot be reconstructed out of either of these, thus it is impossible that it be potentially divisible at every point. Ergo, there must be atomic magnitudes.⁸¹

One might wonder why these atomic magnitudes are physically indivisible (*ἄτομος*), when they remain at least theoretically divisible (for they are said to have numerous shapes, meaning that one part of an atom can be distinguished in the mind from its other parts). Sedley provides the answer, in citing the argument by Democritus that is preserved in Plutarch, as mentioned above. This is the so-called ‘cone paradox,’ and is argued as follows:

If a cone were cut along a plane parallel to its base, what should we hold the surfaces of the segments to be, equal or un-

⁸⁰Sedley, “Atomism’s Eleatic Roots”, pp. 311-12.

⁸¹Aristotle, *On Generation and Corruption*, 316b20-28.

equal? For if they are unequal they will make the cone uneven, with many step-like indentations and rough edges. But if they are equal, the segments will be equal and the cone will turn out to have the properties of a cylinder, through consisting of equal, not unequal, circles, which is quite absurd.⁸²

Ergo, a true cone is uncuttable. As Sedley notes, this argument can apply equally well to other regular and irregular geometric figures which are discrete and a plenum: they will be divisible (if at all) only along a strictly delimited subset of internal planes.⁸³ Hence, Democritus has what he needs—uncuttable, discrete magnitudes—and he has no need to depend upon the Parmenidean argument for the unchangeability of *what is*. Atoms still share many of the characteristics of Parmenidean being, especially those of indivisibility and eternity, while being surrounded by the void (non-being), but those characteristics are based on a justification which is independent of the metaphysical argument of the great Eleatic.

Other aspects of Atomism

In addition to recognizing the need for a moving cause, as noted above, the Atomists were praised by Aristotle for having treated (even if slightly) of the formal cause and universal definition, by postulating ‘arrangement’ as a category of being above and beyond the shape and size of the atoms.⁸⁴

⁸²Plutarch, *Comm. not.* 1079E, as cited in Sedley, “Atomism's Eleatic Roots”, pp. 323-4.

⁸³ibid., p. 325.

⁸⁴“εἰς μὲν γὰρ τοὺς ἀρχαίους ἀποβλέψαντι δόξειεν ἂν εἶναι τῆς ὕλης (ἐπὶ μικρὸν γάρ τι μέρος Εμπεδοκλῆς καὶ Δημόκριτος τοῦ εἴδους καὶ τοῦ τί ἦν εἶναι ἡψαντο),” *Physics*, 194a20-22. Nevertheless, for the Atomists ‘arrangement’ appears to have more the character of an epiphenomenon than a true principle.

Aristotle on Higher Natures

Nevertheless, the efforts of Leucippus and Democritus, at least, appear to have been directed towards a radical elimination of principles which were not strictly explainable in terms of the physical atoms themselves. For instance, they reduced ‘soul’ (*ψυχή*) to something very similar to fire (and conflated *ψυχή* and *νοῦς* entirely).⁸⁵ All operations of nature are by ‘necessity’ (*ἀνάγκη*): “πάντα τε κατ’ ἀνάγκην γίνεσθαι, τῆς δύνης αἰτίας οὐσης τῆς γενέσεως πάντων, ἦν ἀνάγκην λέγει,”⁸⁶ there being no substantial unities (other than the atoms) which might provide any kind of formal or teleological causation;⁸⁷ complex systems and organisms presumably come about in the same ‘necessary’ manner. Indeed, the Atomists went farther than Empedocles and other *φυσιολόγοι*, in reducing many of the traditional *ἐναντία*, such as sweet/bitter and hot/cold, to ‘falsity’ or appearance; color also falls victim to the Atomist analysis: “νόμῳ γλυκύν, νόμῳ πικρόν, νόμῳ θερμόν, νόμῳ ψυχρόν, νόμῳ χροιή, ἐτεῇ δὲ ἄτομα καὶ κενόν...”⁸⁸

Other doctrines of Democritus that are mentioned or criticized by Aristotle, and which derive naturally from the former’s reductionism, include the action of like-on-like, the assimilation of the motions of the ‘soul’ to those of the atoms, and vision as ‘mirroring.’ In the first case, we have a continuation of the Empedoclean theory of the necessity for two objects to be ‘like’ in order for them to interact: “Δημόκριτος ... φησὶ γὰρ τὸ αὐτὸ καὶ ὅμοιον

⁸⁵“τὸν τε ἥλιον καὶ τὴν σελήνην ἐκ τοιούτων λείων καὶ περιφερῶν ὅγκων συγκεκρίσθαι, καὶ τὴν ψυχὴν ὁμοίως· ἦν καὶ νοῦν ταύτην εἶναι.” The quotation is from Diogenes Laërtius, and is cited in DK68A1, 44.

⁸⁶Quotation from Diogenes Laërtius, cited in DK68A1, 45.

⁸⁷“...φερομένας δὲ [τὸς ἀτόμους] ἐμπίπτειν καὶ περιπλέκεσθαι περιπλοκὴν τοιαύτην ἢ συμψαύειν μὲν αὐτὰ καὶ πλησίον ἀλλήλων εἶναι ποιεῖ, φύσιν μέντοι μίαν ἐξ ἐκείνων κατ’ ἀλήθειαν οὐδὲ ἡντινασθεννῆς· κομιδῇ γὰρ εὐηθεῖς εἶναι τὸ δύο ἢ τὰ πλείονα γενέσθαι ἂν ποτε ἔν.” Citation from Aristotle’s lost text *On Democritus*, in Simplicius *De caelo*, cited in Kirk and Raven, p. 418.

⁸⁸Kirk and Raven, p. 422; cf. DK68B9.

Chapter 1. The Search for the Άρχαι

εἶναι τό τε ποιοῦν καὶ τὸ πάσχον· οὐ γὰρ ἐγχωρεῖν τὰ ἔτερα καὶ διαφέροντα πάσχειν ὑπ’ ἀλλήλων, ἀλλὰ κανὸν ἔτερα ὅντα ποιῆτι εἰς ἄλληλα, οὐχ ἦτερα ἀλλ’ ἦταντόν τι ὑπάρχει, ταύτη τοῦτο συμβαίνειν αὐτοῖς.”⁸⁹ We see a development of this notion in Democritus’s theory of vision, whereby vision is assimilated to the phenomenon of reflection, a phenomenon which is clearly caused by and of the same kind as the light coming from a visible object.⁹⁰

As Kirk and Raven summarize the Atomist doctrine on sensation,

It is a necessary consequence of the atomist doctrine, that everything consists of atoms and the void, that all sensation should be explained as a form of contact or touch. The soul consists of spherical atoms spread through the body, and the mind was presumably regarded as a concentration of soul-atoms. Thus thought is a process analogous to sensation, and takes place when the soul- or mind-atoms are set in motion by the impingement of congruent atoms from outside.

A fragment found in Aëtius indicates that mental images are the direct result of images coming from without: “Λεύκιππος Δημόκριτος Ἐπίκουρος τὴν αἴσθησιν καὶ τὴν νόησιν γίνεσθαι εἰδώλων ἔξωθεν προσιόντων· μηδενὶ γὰρ ἐπιβάλλειν μηδετέραν χωρίς τοῦ προσπίπτοντος εἰδώλου.”⁹¹ There is thus no special ontological status corresponding to mental ‘motions’: the motion of the atoms

⁸⁹On *Generation and Corruption*, 323b10-15.

⁹⁰“Δημόκριτος δ’ ὅτι μὲν ὕδωρ εἶναι φησι, λέγει καλῶς, ὅτι δ’ οἴεται τὸ ὄρâν εἶναι τὴν ἔμφασιν, οὐ καλῶς· τοῦτο μὲν γὰρ συμβαίνει ὅτι τὸ ὄμμα λεῖον, καὶ ἔστιν οὐκ ἐν ἐκείνῳ ἀλλ’ ἐν τῷ ὄρâντι ἀνάκλασις γὰρ τὸ πάθος, ἀλλὰ καθόλου περὶ τῶν ἔμφαινομένων καὶ ἀνακλάσεως οὐδέν πω δῆλον ἦν, ὡς ἔοικεν. ἄποπον δὲ καὶ τὸ μὴ ἐπελθεῖν αὐτῷ ἀπορῆσαι διὰ τί ὁ δόκταλμὸς ὁρᾶ μόνον, τῶν δ’ ἄλλων οὐδέν ἐν οἷς ἔμφαινεται τὰ εἰδῶλα,” “De sensu et sensato”, 438a5-10.

⁹¹Cited in Kirk and Raven, p. 421; see also Lan and Julia, *Los filósofos presocráticos*.

Aristotle on Higher Natures

and that found in the soul are fundamentally of the same kind.

The fundamental achievement of Democritus, which sets him ap-part from his master Leucippus, appears to have been his development of a universal theory which, despite involving a radical reduction in the number of basic principles that it posited, was nevertheless able to explain (or attempt to explain) a wide variety of different types of phenomena. The influence and ingenuity of his system is reflected in the important role that Aristotle assigns to Democritus as the master of a major rival school, and in the praise which the Stagirite gives him: “Ολως δὲ παρὰ τὰ ἐπιπολῆς περὶ οὐδενὸς οὐδεὶς ἐπέστησεν ἔξω Δημοκρίτου. Οὗτος δ’ ἔοικε μὲν περὶ ἀπάντων φροντίσαι, ηδη δὲ ἐν τῷ πῶς διαφέρειν.”⁹²

1.3 Aristotle's derivation of the *ἀρχαί* in the *Physics*, Book I

Aristotle begins the *Physics* with a declaration of scientific principles: “Ἐπειδὴ τὸ εἰδέναι καὶ τὸ ἐπίστασθαι συμβαίνει περὶ πάσας τὰς μεθόδους, ὃν εἰσὶν ἀρχαὶ ἡ αἴτια ἡ στοιχεῖα, ἐκ τοῦ ταῦτα γνωρίζειν ... δῆλον ὅτι καὶ τῆς περὶ φύσεως ἐπιστήμης πειρατέον διορίσασθαι πρῶτον τὰ περὶ τὰς ἀρχάς.”⁹³ The *φυσιολόγοι*, as

⁹²On *Generation and Corruption*, 315b33-35.

⁹³*Physics*, 184a09-16. Bolzán points out that, in regards to scientific method, Aristotle was in substantial agreement with Democritus, even if he did not believe that the latter had derived correct conclusions: “La razón de no poder comprender hechos corrientes reside en la inexperience. Por ello es que quienes tienen mayor familiaridad con los hechos naturales, son más capaces de establecer principios que permiten relacionar mayor número de fenómenos. Mas quienes abusan del razonamiento dialéctico, se pronuncian demasiado fácilmente basados en un pequeño número de hechos’ (GC, 316a5). Se trata aquí de la diferencia entre el razonamiento simplemente *λογικῶς* de un Platón, y el razonamiento *φυσικῶς* de un Demócrito tratando de fundamentar sus opiniones con argumentos adecuados y sacados de la misma física (GC, 316a10). Esto no indica que Aristóteles mismo esté de acuerdo con Demócrito y su solución, sino que sólo lo está con su método” Bolzán, *Física, química y filosofía natural en Aristóteles*, p. 82.

we have seen, developed ever more sophisticated theories about what these *ἀρχαί* had to be, and Aristotle develops his own theory in conversation with these earlier thinkers.

The possible candidates for the *ἀρχαί*, as proposed by the philosophers that Aristotle quotes, are many and diverse. While each *φυσιολόγος* had his own theory which differed from the others to a greater or lesser degree, Aristotle finds enough in common to provide a summary of their positions which is succinct and clear:

Ἀναγκη δ' ἥτοι μίαν εἶναι τὴν ἀρχὴν ἢ πλείους, καὶ μίαν, ὅτοι ἀκίνητον,
ὅς φησι Παρμενίδης καὶ Μέλισσος, ἢ κινουμένην, ὡςπερ οἱ φυσικοί, οἱ
μὲν ἀέρα φάσκοντες εἶναι οἱ δ' ὕδωρ τὴν πρώτην ἀρχήν· εἰ δὲ πλείους, ἢ
πεπερασμένας ἢ ἀπείρους, καὶ εἰ πεπερασμένας πλείους δὲ μιᾶς, ἢ δύο
ἢ τρεῖς ἢ τέττερας ἢ ἄλλον τινὰ ἀριθμόν, καὶ εἰ ἀπείρους, ἢ οὕτως ὡςπερ
Δημόκριτος, τὸ γένος ἔν, σχῆματι δὲ <διαφερούσας>, ἢ εἴδει διαφερούσας
ἢ καὶ ἐναντίας.⁹⁴

It is clear that these thinkers did not all have the same sort of thing in mind in their investigations into the *ἀρχαί*. In particular, the differences between the Eleatic position and that of the *φυσιολόγοι* are significant. Nevertheless, in this passage, *ἀρχή* can be interpreted as signifying a ‘basic building block,’ something which is irreducibly present in a natural being, and which cannot be explained in terms of another such building block.⁹⁵ Thus, the ancient thinkers who postulated monism wished to assert that there

⁹⁴ *Physics*, 184b15-22.

⁹⁵ Aristotle says of the *ἀρχαί* that “δεῖ γὰρ τὰς ἀρχὰς μήτε ἐξ ἀλλήλων εἶναι μήτε ἐξ ἄλλων, καὶ ἐκ τούτων πάντα” *Physics*, 188a27.

Aristotle on Higher Natures

was only one kind of building block available for us to refer to in our account of how the universe is structured. The Eleatic monists asserted that ‘being’ was this one building block, and that in addition, this building block is one in number. The apparent multiplicity of beings is consigned to the ‘way of opinion,’ “Οὐ γὰρ μήποτε τοῦτο δαμῆ εἶναι μὴ ἔόντα· ἀλλὰ σὺ τῆσδ’ ἀφ’ ὁδοῦ διζήσιος εἰργε νόημα,”⁹⁶ since this requires saying that, in some sense, that which is is somehow not. The early materialists of the Ionian school, on the other hand, maintained that there was certainly a multiplicity of beings, but all of them being generated from one single underlying thing, be it Air, Fire or Water. The *φυσιολόγοι* (i.e. Empedocles, Anaxagoras and the Atomists) proposed multiple *ἀρχαί*, as I have detailed in the previous section.

In Book I of the *Physics*, Aristotle sets himself a twofold task: first, he will determine the truth about the *ἀρχαί*, specifying how many there are, and the nature of each; second, he intends to resolve once and for all the long-standing conundrum of how it can be possible for there to be genuine change. I detail his solution in the following subsections.

1.3.1 Parmenides and the doctrine of the One

It is apparent that Aristotle had doubts about the propriety of including a discussion about Parmenides in his treatise on *φύσις*. As Aristotle makes clear, those who completely deny any multiplicity in reality are really not

⁹⁶DK28B7.

studying the natural world,⁹⁷ nor is their investigation about ‘ἀρχαῖ,’ since *ἀρχαῖ* must be of some thing or things. Nevertheless, Aristotle admits that the Parmenidean doctrine of the One causes *ἀπορίαι* for natural philosophers as well, and thus a little bit of discussion on the topic might be worthwhile.⁹⁸

Aristotle takes two important steps in the development of his doctrine of *φύσις* in his discussion of the Parmenidean doctrine. First, he demonstrates that the *ἀρχαῖ* must be multiple. Since we know from induction (*ἐπαγογή*) that all (or at least some) natural things are moving, Parmenides's argument must be based on a misinterpretation of what 'being' means. 'Being' is not a univocal term: “ἀρχὴ δὲ οἰκειοτάτη πασῶν, ἐπειδὴ πολλαχῶς λέγεται τὸ ὅν...”⁹⁹ If we attempt to reduce being to one or another of the categories distinct from substance, we run into an immediate absurdity, since such things as qualities and quantities are predicated only of substance, and are not independent. But if we have to maintain quality and quantity and the other categories alongside substance, then being is multiple: “εἰ μὲν γὰρ ἔσται καὶ οὐσία καὶ ποιὸν καὶ ποσόν, καὶ ταῦτα εδῆτ’ ἀπολελυμένα ἀπ’ ἀλλήλων εἴτε μή, πολλὰ τὰ ὄντα...”¹⁰⁰

Nevertheless, demonstrating the categorical multiplicity of being does not directly address the heart of Parmenides' insight, that that which is

⁹⁷“τὸ μὲν οὖν εἰ ἔν καὶ ἀκίνητον τὸ ὄν σκοπεῖν οὐ περὶ φύσεώς ἔστι σκοπεῖν· ὥσπερ γὰρ καὶ τῷ γεωμέτρῃ οὐκέτι λόγος ἔστι πρὸς τὸν ἀνελόντα τὰς ἀρχάς, ἀλλ’ ητοι ἐτέρας ἐπιστήμης ἡ πασῶν κοινῆς, οὗτως οὐδὲ τῷ περὶ ἀρχῶν οὐ γὰρ ἔτι ἀρχὴ ἔστιν, εἰ ἔν μόνον καὶ οὕτως ἔν ἔστιν. ἡ γὰρ ἀρχὴ τινὸς ἡ τινῶν... ήμῦν δ’ ὑποκείσθω τὰ φύσει ἡ πάντα ἡ ἔνια κινούμενα εἶναι· δῆλον δ’ ἐκ τῆς ἐπαγωγῆς... οὐ μὴν ἀλλ’ ἐπειδὴ περὶ φύσεως μὲν οὖ, φυσικὰς δὲ ἀπορίας συμβαίνει λέγειν αὐτοῖς, ἵστως ἔχει καλῶς ἐπὶ μικρὸν διαλεχθῆναι περὶ αὐτῶν· ἔχει γὰρ φιλοσοφίαν ἡ σκέψις,” *Physics*, 185a1-04.

⁹⁸Ibid.

⁹⁹*Physics*, 185a21-22.

¹⁰⁰*Physics*, 185a21-26.

Aristotle on Higher Natures

what it is cannot cease to be what it is, without ceasing to be completely, in which case it is not, *simpliciter*, and we can no longer say that ‘it is.’ This is also the problem that led Plato to postulate the eternal Ideas or Forms, since ‘what Justice is’ must always be what it is, whether or not anything in the world instantiates it.

In fact, Aristotle acknowledges this difficulty, and to a certain point is in agreement. That which whiteness is, cannot ‘suffer by its contrary,’ i.e. participate in non-white, for this would mean that ‘whiteness’ would cease to be: “ἔστι δὲ ὁς οὐ νπὸν ἀλλήλων γὰρ πάσχειν τάνατία ἀδύνατον.”¹⁰¹ Rather than accepting that this should imply the immobility of being in general, Aristotle made an important conceptual leap, noting that when we say that ‘the white becomes black,’ what we are *not* saying is that ‘whiteness’ becomes ‘blackness,’ but rather that ‘that which is white’ ceases to be white, and instead comes to be ‘that which is black’ (or not-white). Indeed, the thing which changes moves, as it were, *into* the species, place or number that it becomes: “οὔτε γὰρ κινεῖ οὔτε κινεῖται τὸ εἶδος ή ὁ τόπος ή τὸ τοσόνδε, ἀλλ᾽ ἔστι κινοῦν καὶ κινούμενον καὶ εἰς ὁ κινεῖται.”¹⁰² This is the second of the two major steps that Aristotle takes in the development of his doctrine of *φύσις*.

This discovery enables us to advance considerably in our knowledge of what *φύσις* is: a natural being is something that can change by ‘moving’ from being in one way, to being in another way, all the while remaining in an important sense ‘the same.’ The two terms of the change, however, are to a certain degree ‘being’ and ‘not-being.’ For the natural being that

¹⁰¹*Physics*, 190b33.

¹⁰²*Physics*, 224b05-b07.

changes from being white to being black has gone, under another analysis, from being white to being non-white. These two end-points of change are equally real, but are irreducible to one another. Aristotle maintains these *ἐναντία* as irreducible opposites, pairs within which one member is as ‘that which is’ and the other as ‘that which is not.’ He thus maintains that in a certain sense, something can be said to arise from non-being, but not *καθ’ αὐτὸν*, but only *κατὰ συμβεβηκός*.¹⁰³

1.3.2 The *φυσιολόγοι* and the *ἐναντία*

The *ἐναντία* were certainly not an invention of Aristotle; indeed, the existence of ‘opposites’ which apparently transmuted into one another was one of the basic data from which the ancient Ionian philosophers developed their theories of the elements, from which all other things were built. Basic opposites such as ‘heavy’ and ‘light,’ ‘dark’ and ‘bright,’ ‘hot’ and ‘cold’ seemed to underlie the objects we encounter in daily life, and change occurs between these pairs. When the sun goes down, that which was light becomes dark; when wood is put on the fire, that which was cold becomes hot, and when the fire goes out, that which was hot becomes cold.

This apparent capacity for mutual inter-transformation between these *ἐναντία* gave rise to divergent opinions about the number of *ἀρχαῖ* that needed to be posited in order to account for this diversity. In Chapters 4 and 5 of the first book of the *Physics*, Aristotle addresses these theories, both those which assert that there can only be one *ἀρχή*, as well as those which assert

¹⁰³“ἡμεῖς δὲ καὶ αὐτοί φαμεν γίγνεσθαι μὲν μηθὲν ἀπλῶς ἐκ μὴ ὄντος, πῶς ἔντοι γίγνεσθαι ἐκ μὴ ὄντος, οἷον κατὰ συμβεβηκός...” *Physics*, 191b13-b15.

Aristotle on Higher Natures

that they must be infinite. In addition, he clarifies the distinction between the *ἐναντία* and the *ἀρχαῖ*, showing that they are the same from one point of view, but from another they are quite distinct.

Aristotle divides the opinions of the earlier natural philosophers into two groups, according to the number of basic ‘bodies’ they proposed. In the first group he places those earlier philosophers, such as Thales, Anaximenes and Heraclitus, who postulated a single underlying principle or body, from which the various basic elements were derived via a process of ‘densification’ or ‘rarefaction,’ (these latter being the basic contraries).¹⁰⁴ A second group of philosophers, notably Anaxagoras, Anaximander and Empedocles, asserted that the *ἐναντία* are contained in the one, and somehow emerge from it by a process of segregation, e.g. by ‘strife’, and later (in the case of Empedocles) returning to the one.¹⁰⁵ Among this second group of philosophers were those who asserted that the contraries (and thus the *ἀρχαῖ*) were finite, versus those who asserted that they were infinite.

Aristotle first treats of the second group of philosophers, those who maintain that the principles are either infinite, or that they arise out of each other. He progressively discards their various proposals, noting that there cannot be only one principle, for there cannot be only one opposite, and that neither can change be explained by mixing and separation.

¹⁰⁴Aristotle notes a strong similarity to Plato’s theory of the ‘greater’ and ‘smaller,’ although Plato’s contraries acted as the material principle with respect to the formal: “ταῦτα δ’ ἔστιν ἐναντία, καθόλου δ’ ὑπεροχὴ καὶ ἔλλειψις, ὥσπερ τὸ μέγα φησὶν Πλάτων καὶ τὸ μικρόν, πλὴν ὅτι δὲ μὲν ταῦτα ποιεῖ ὑλην τὸ δὲ ἐν τὸ εἶδος, οἱ δὲ τὸ μὲν ἐν τὸ ὑποκείμενον ὕλην, τὰ δ’ ἐναντία διαφορὰς καὶ εἴδη,” *Physics*, 187a16-18.

¹⁰⁵“οἱ δ’ ἐκ τοῦ ἐνὸς ἐνούσας τὰς ἐναντιότητας ἐκκρίνεοθαι, ὥσπερ Ἀναξίμανδρος φησι, καὶ ὅσοι δ’ ἐν καὶ πολλά φασιν εἶναι, ὥσπερ Ἐμπεδοκλῆς καὶ Ἀναξαγόρας· ἐκ τοῦ μίγματος γὰρ καὶ οὗτοι ἐκκρίνουσι τάλλα. διαφέρουσι δὲ ἀλλήλων τῷ τὸν μὲν πείσον ποιεῦν τούτων, τὸν δ’ ἄποξ, καὶ τὸν μὲν ἄπειρα, τά τε ὁμοιομερῆ καὶ τὰναντία, τὸν δὲ τὰ καλούμενα στοιχεῖα μόνον,” *Physics*, 187a20-26.

For everything cannot be contained in everything. According to the theory of Anaxagoras, “πάντα μὲν ἐνυπάρχει τὰ τοιαῦτα ἐν ἀλλήλοις, καὶ μὴ γίγνεται ἀλλ’ ἐκκρίνεται ἐνόντα … οἷον ἐκ σαρκὸς ὅδωρ ἐκκρινόμενον καὶ σὰρξ ἐξ ὅδατο”; this position, however, leads to an absurdity, for “εἰ δὲ μὴ στήσεται ἀλλ’ ἀεὶ ἔξει ἀφαίρεσιν, ἐν πεπερασμένῳ μεγέθει ἵσα πεπερασμένα ἐνέσται ἄπειρα τὸ πλῆθος· τοῦτο δ’ ἀδύνατον.”¹⁰⁶ Thus, the *ἀρχαί* are genuinely distinct, although the beings they make up are indeed composed.¹⁰⁷

In regards to the first group of philosophers—the ‘material monists’ Thales, Anaximenes and Heraclitus—Aristotle notes that they have indeed identified the primary pair of opposites as being ‘excess’ and ‘defect.’ Where these philosophers have gone wrong is not seeing that in addition to the contraries, which cannot become each other nor can be infinitely mixed, there must be a third principle which is of an entirely different order.¹⁰⁸

Aristotle thus retains the ancient doctrine of the contraries, identifying them as being either separate principles (form and privation) or as a single principle within which there can be excess or defect. But he is the first to

¹⁰⁶ *Physics*, 187b22-27.

¹⁰⁷ In his discussion of this second group of philosophers, Aristotle makes an important point, which will be key to our understanding of *φύσις*: he notes that a conclusive argument against the infinity of principles is that such an infinity would make *φύσις* unintelligible: “εἰ δὴ τὸ μὲν ἄπειρον ἢ ἄπειρον ἄγνωστον, τὸ μὲν κατά πλῆθος ἢ κατὰ μέγεθος ἄπειρον ἄγνωστον πόσον τι, τὸ δὲ κατ’ εἶδος ἄπειρον ἄγνωστον ποῖόν τι. τῶν δ’ ἀρχῶν ἄπειρων οὐσῶν καὶ κατὰ πλῆθος καὶ κατ’ εἶδος, ἀδύνατον εἰδέναι τὰ ἐκ τούτων. οὕτω γὰρ εἰδέναι τὸ σύνθετον ὑπολαμβάνομεν, ὅταν εἰδῶμεν ἐκ τίνων καὶ πόσων ἐστιν,” *Physics*, 187b7-12. This is an important step in Aristotle’s justification of his doctrine of *φύσις*. It is precisely the fact that *φύσις* is knowable that enables us to investigate it, and this knowability means that we can assert the finitude of the principles which make it up.

¹⁰⁸ “καὶ ἔοικε παλαιὰ εἶναι καὶ αὔτη ἡ δόξα, ὅτι τὸ ἐν καὶ ὑπεροχὴ καὶ ἔλλειψις ἀρχαὶ τῶν ὄντων εἰσί, πλὴν οὐ τὸν αὐτὸν τρόπον, ἀλλ’ οἱ μὲν ἀρχαὶ τὰ δύο μὲν ποιεῖν τὸ δὲ ἐν πάσχειν, τῶν δ’ ὑστέρων τινὲς τούναντίον τὸ μὲν ἐν ποιεῖν τὰ δὲ δύο πάσχειν φασὶ μᾶλλον. τὸ μὲν οὖν τρία φάσκειν τὰ στοιχεῖα εἶναι ἐκ τε τούτων καὶ ἐκ τοιούτων ἄλλων ἐπισκοποῦσι δόξειν ἀν ἔχειν τινὰ λόγουν, ὕσπερ εἴπομεν...” *Physics*, 189b12-b17.

Aristotle on Higher Natures

discover the character of the third principle, the *ὑποκειμένον* or ‘underlying,’ which is of an entirely different order than the formal principle(s).¹⁰⁹ This *ὑποκειμένον* is precisely what makes change possible. While ‘what it is to be white’ cannot cease to be what it is, the *ὑποκειμένον*, on the other hand, being of a different order from the *ἐναντία*, can indeed ‘move’ from being one to being another.¹¹⁰

This interpretation of the role of the *ὑποκειμένον* is traditional; cf. for instance Aquinas’s commentary on the *Physics*¹¹¹; Philoponus, though critical of Aristotle’s physics, interprets the passages in question in the ‘traditional’ fashion as well.¹¹² It is found in the 20th century in Mansion as well.¹¹³ Beginning in the 1970’s, however, this interpretation came under question, first by W. Charlton,¹¹⁴ and followed by B. Jones.¹¹⁵ Both of these authors hold that (at least in some cases) the *ὑποκειμένον* does not survive

¹⁰⁹While Plato had discovered the existence of a material principle, he had placed the ‘greater’ and the ‘lesser’ within this order, whereas Aristotle shows that these must belong to the formal order, since the greater itself does not become lesser.

¹¹⁰“ἔστι δὲ τὸ μὲν ὑποκείμενον ἀριθμῷ μὲν ἔν, εἴδει δὲ δύο (οὐ μὲν γὰρ ἄνθρωπος καὶ ὁ χρυσὸς καὶ ὅλως ἡ ὥλη ἀριθμητή· τὸδε γὰρ τι μᾶλλον, καὶ οὐ κατὰ συμβεβηκός ἐξ αὐτοῦ γίγνεται τὸ γυγόμενον· η̄ δὲ στέρησις καὶ η̄ ἐναντίωσος συμβεβηκός)· ἐν δὲ τὸ εἶδος, οἷον η̄ τάξις η̄ η̄ μουσικὴ η̄ τῶν ἄλλων τι τῶν οὕτω κατηγορουμένων,” *Physics*, 190b25-29.

¹¹¹Aquinas, *In Physicorum*, lib. I, lect. 12.

¹¹²Cf. Philoponus, *On Aristotle Physics* 1.4-9, pp. 153,16-22.

¹¹³Cf. Mansion, *Introduction a la Physique aristotélicienne*, pp. 71-75.

¹¹⁴Cf. Charlton, *Aristotle’s Physics*, p. 73: “It is indeed true that in all cases we must suppose an underlying thing, but the underlying thing is not a third factor over and above the opposites: it is the same thing as one of the opposites, viz. that from which the change takes place, but under a different description.”

¹¹⁵Jones sees Aristotle as engaged in a process of purely linguistic inquiry: “[W]e may dismiss any suggestion that we are dealing here with an empirical inquiry into change. Rather, he is considering linguistic phenomena,” Jones, “Aristotle’s Introduction of Matter”, p. 478. Following this view, Jones interprets the *ὑποκειμένον* as “that individual item, be it simply a piece of some stuff or else a substantial individual, such as a seed or an embryo, with which a process of coming into existence begins, and from which the product comes to exist, where the ‘from’ has to be understood as having a purely chronological force,” ibid., p. 478. As with Charlton, the *ὑποκειμένον* is identified as “that from which the change takes place,” but not as that which underlies and survives the change.

the process of change; in the process they eliminate Aristotle's ability to resolve the Parmenidean challenge, for their interpretations imply that that which comes to be must come to be from that which is not, *per se*. Later authors have challenged Charlton and Jones, beginning with A. Code,¹¹⁶ D. Bostock,¹¹⁷ and S. Waterlow.¹¹⁸

To my mind, the best and most complete answer to Charlton and Jones is found in Gill, *Aristotle on Substance*, in particular because the model of change Gill presents applies not only to non-substantial change (to which Waterlow's model is limited), but also accounts for generation and destruction, which Charlton saw as a serious gap in Aristotle's theory of change.¹¹⁹ Gill's model, which she terms the 'construction model,' shows how matter persists even through substantial change.¹²⁰ The construction model

¹¹⁶Code claims that Jones's conclusions are based upon a faulty reading of *Physics* 190a21-29, a critical passage which appears to suggest that the initial material substrate does not survive the change; i.e. that it is not bronze that survives in the statue that comes to be, but rather the statue is brazen. Cf. Code, "The Persistence of Aristotelian Matter", pp. 359-61. For Code, the controversial passage must be read in the opposite manner, allowing the persistence of the material substrate, since the spatio-temporal continuity of the bronze with which we begin with the bronze that makes up the finished statue demonstrates continuity; *ibid.*, p. 362.

¹¹⁷For Bostock, in "the most plausible version of the doctrine of chapter 7 the third principle is not what underlies in the sense of what is a subject of predicates (i.e. the thing said to become so-and-so), but rather what underlies in the sense of what persists through change," Bostock, "Aristotle on the Principles of Change", p. 14.

¹¹⁸Waterlow is concerned to save Aristotle from the Parmenidean paradox, which she holds is generated by emphasizing possible but less appropriate ways of describing change. There are many ways to talk about the man who becomes musical. Aristotle, she claims, denies that every possible way of describing this change is equally appropriate, and that the solution to the paradox (in cases of non-substantial change) lies in emphasizing as primary those forms of describing change which reveal that something underlies while something perishes and something comes to be. Cf. Waterlow, *Nature, Change, and Agency*, p. 16. For Aristotle, no other proof is required, for once he has shown that the phenomena are explained when the 'preferred' description has been discovered, the task of the philosopher has come to an end; cf. *ibid.*, 18-19.

¹¹⁹Charlton, *Aristotle's Physics*, p. 77.

¹²⁰Cf. Gill, *Aristotle on Substance*, pp. 157-64.

Aristotle on Higher Natures

is designed to account for those cases in which there is a coming to be or passing away of a substance, and hence a transition to or from non-being in a stronger sense than with accidental changes. Nonetheless, in order that change be possible, a generation—for instance—cannot be from absolute non-being. There is always something that persists, and at the most basic level what persists are the elements, which Gill interprets as ‘prime matter.’ The elements are in potency to higher states of being, e.g. blood, which can in turn be ‘worked up’¹²¹ into an embryo by the action of the semen,¹²² which is in potency to be a human being. In this case, the human being is at the top of an apex of less complex actualities, which during the process of development are ‘constructed’ into what they are in potency to *καθ' ἔξιν*. Similarly, the elements are in potency to all the products of corruption, but only *κατὰ στέρησιν*, i.e. as a result of the passing away of the highest actuality.

Throughout all this the elements persist ‘in potency,’ as properties which characterize the generated actuality, but which also serve to reconstitute the elemental matter (in Gill’s interpretation) when the process of corruption is complete.¹²³ Thus, in Gill’s model there is both something which remains as *ὑποκείμενον*, but which—*pace* Charlton and Jones—need not be identical with either of the end-points of the change, but rather acts as a genuine third principle underlying the coming to be and passing away of the forms characterizing the being undergoing change in the various stages

¹²¹Cf. *Generation of Animals*, 738a20-24.

¹²²Cf. *Generation of Animals*, 765b08-16.

¹²³Cf. ibid., p. 157. Note that Gill’s ‘construction model’ parallels the notion of ‘scaffolding of forms’ which I discuss in chapter 2, p. 116.

of its development and degeneration.¹²⁴

1.4 The *ἀρχαί* as formal and material principles, and their relation to *φύσις*

Aristotle has thus derived the necessity of a formal and material ‘part’ in natural substances. In this section, I will discuss how these *ἀρχαί* correspond to the concepts of form and matter in Aristotle’s ontology, followed by a discussion of how *φύσις* primarily plays the role of formal principle in the substances it makes to be.

1.4.1 The *ὑποκειμένον* and *ὑλη*

By the end of Book I of the *Physics*, Aristotle has provided the justification for positing two fundamental principles or *ἀρχαί* of beings which undergo change: a formal principle and a principle which underlies. In order to avoid the conclusion that ‘being’ becomes ‘non-being’ simpliciter, he shows that one principle of every being subject to change must be the underlying or *ὑποκειμένον*, which ‘undergoes’ the change in question, and remains numerically the same throughout the change; on the other hand,

¹²⁴I do not believe that it is necessary to accept Gill’s position on the elements as being ‘prime matter’ in order to hold that the construction model is essentially valid. It need only be accepted that the elements are material in regards to the entities constituted by them, while recognizing that the elements themselves, with their active and passive qualities and unique associated motions, have a determinate way of being and hence have form. If, as Brenner states, “matter and form are complementary principles of things subject to change,” (Brenner, “Prime Matter and Barrington Jones”, p. 224) then the elements, which are subject to change, must themselves be comprised of both substantial form and a matter which is in potency to become any one of the four. But this position does no harm to Gill’s construction model, which depends merely upon the secondary materiality of the elements themselves, i.e. their ability to be ‘worked up’ into more complex substances.

Aristotle on Higher Natures

what it changes to be is the formal principle.¹²⁵

Aristotle's final step in his definition of the *ὑποκειμένον* as ἀρχή is his specification of it as 'matter' or *ὕλη*: “ώς γὰρ πρὸς ἀνδριάντα χαλκὸς ἢ πρὸς κλίνην ξύλον ἢ πρὸς τῶν ἄλλων τι τῶν ἔχόντων μορφὴν [ἢ] ὕλη καὶ τὸ ἄμορφον ἔχει πρὶν λαβεῖν τὴν μορφήν...”¹²⁶ The *ὑποκειμένον* has the ability to take on a form, and it is considered as *ὕλη* insofar as it is able to do so, but has not yet done so.¹²⁷ Because the *ὑποκειμένον* is real and has a character which can be known via analogy, “οὕτως αὕτη πρὸς οὐσίαν ἔχει καὶ τὸ τὸδε τι καὶ τὸ ὅν.”¹²⁸ And because of this reality, and its ability to make something to be what it is to a certain degree, Aristotle calls the *ὑποκειμένον* ‘*φύσις*’: “ἡ δὲ *ὑποκειμένη φύσις* ἐπιστητὴ κατ’ ἀναλογίαν.”¹²⁹

Thus, Aristotle ends Book I of the *Physics* having shown the need for a material principle that can, to a certain degree, be called *φύσις*,¹³⁰ since to a certain degree (and most especially in certain cases, such as artifacts) the *ὕλη* provides the 'whatness' of the thing. In Book II of the *Physics*, Aristotle makes it clear that *φύσις* is more properly said to be the form; nevertheless, the connection of *φύσις* with matter serves to show that the form is connected with potency to some degree. This will be discussed further in Chapters 2 and 3, where I will discuss how *φύσις* implies potency.

¹²⁵“φανερὸν οὖν ὡς, εἴπερ εἰσὶν αἵτιαι καὶ ἀρχαὶ τῶν φύσει ὄντων, ἐξ ὧν πρώτων εἰσὶ καὶ γεγόνασι μὴ κατὰ συμβεβηκὸς ἀλλ’ ἔκαστον δὲ λέγεται κατὰ τὴν οὐσίαν, ὅτι γίγνεται πᾶν ἐκ τοῦ *ὑποκειμένου* καὶ τῆς μορφῆς,” *Physics*, 190b17-19.

¹²⁶*Physics*, 191a08-a11.

¹²⁷Cf. *On Generation and Corruption*, 320a3-5, “Ἐστὶ δὲ *ὕλη* μάλιστα μὲν καὶ κυρίως τὸ *ὑποκείμενον* γενέσεως καὶ φθορᾶς δεκτικόν, τρόπον δέ τινα καὶ τὸ ταῖς ἄλλαις μεταβολαῖς, ὅτι πάντα δεκτικὰ τὰ *ὑποκείμενα* ἐναντιώσεών τινων.”

¹²⁸*Physics*, 191a12-a13.

¹²⁹*Physics*, 191a07.

¹³⁰See *Physics*, 191b28-30

1.4.2 φύσις as formal principle

The question thus arises, given that Aristotle has identified *φύσις* as being a “ἀρχή [...] τοῦ κινεῖσθαι καὶ ἡρεμεῖ,” as to which of the two (or three) *ἀρχαί* he wishes to identify with *φύσις*. As noted above, there is at least one sense in which *φύσις* can be said to be matter. Nevertheless, this is not the entirety of the issue, as Aristotle makes clear in Book II, where he dedicates the first chapters to determining the answer to showing that ‘*φύσις*’ is primarily said of the formal principle.

The role of the form is, in the first place, as the actuality of the matter of the substance.¹³¹ This is less easily seen with natural substances, where the

¹³¹“Ἐτι δὲ οὐλη ἔστι δυνάμει ὅτι ἔλθοι ἀν εἰς τὸ εἶδος· ὅταν δὲ γε ἐνεργείᾳ ἦ, τότε ἐν τῷ εἴδει ἔστιν”, *Metaphysics*, 1050a15-17. My formulation of Aristotle’s doctrine was far from uncontroversial in 20th century English-language discussions. I hold that this was primarily due to a widespread tendency amongst English-speaking philosophers to interpret Aristotle’s doctrine of form through the prism of *Metaphysics* VI-VIII, neglecting the doctrine of potency and act found in *Metaphysics* IX.

Sellars, “Substance and Form in Aristotle”, pp. 697-8 is typical, in holding merely that “the form... is that by virtue of which [an organism or artifact] is a primary *substance*”, which is true as far as it goes, but misses the role of act in drawing what is potentially a substance into full reality. Albritton, “Forms of Particular Substances in Aristotle’s *Metaphysics*”, p. 707, responding to Sellars, throws into doubt Aristotle’s commitment to individual forms, which is tantamount to denying that they could be actualizers of matter in the composition of existing substances.

Nussbaum (1978) takes what may be termed an ‘empiricist’ view of form; speaking of the role of form in Aristotle’s biology, she states that “[form] is not a constituent of the animal over and above its material constituents... it is the arrangement of the constituents themselves” (Nussbaum, “Aristotle on Teleological Explanation”, p. 73), and “the form of a living being is not something separable from matter, it is something material, a functional state of matter—or, if you prefer, a first entelechy (the organization-to-function, analogous to sight)” (*ibid.*, p. 72).

In the 1980’s authors began to recover the importance of the potential/actual distinction for understanding material substance. Furth, for instance, has clearly recognized the causal priority of form in the being of material substance, and while he normally describes this via the ‘informs’ operator (e.g. “the Socratic shape *informs* the bronze,” producing a statue of Socrates), he also acknowledges that ‘informs’ could be replaced by ‘actualizes’ as a more elegant alternative (Furth, *Substance, Form, and Psyche*, p. 198). Charles, “Matter and Form: Unity, Persistence and Identity” and Scaltsas, “Substantial Holism” are further examples of this later tendency to emphasize the role of form as *actualizer* of its matter.

Aristotle on Higher Natures

form and the matter develop together in the growth of the organism, but it is more obvious in the case of artifacts, where the form is imposed on a pre-existing matter.¹³² The act of the resulting artifact is what it is, due to the form that has been imposed. As Aristotle notes, “ὅσων μὲν οὖν ἔτερόν τι ἔστι παρὰ τὴν χρῆσιν τὸ γιγνόμενον, τούτων μὲν ἡ ἐνέργεια ἐν τῷ ποιουμένῳ ἐστίν” οἷον ἡ τε οἰκοδόμησις ἐν τῷ οἰκο-δομουμένῳ.”¹³³ The Philosopher has stated several times that φύσις in natural substances is directly parallel to the artificial form imposed in works of art¹³⁴; thus, we can state that nature as form is the actuality of the natural substance, giving being to its matter and hosting its potentialities (potentially being posterior to actuality in account¹³⁵ and in substance¹³⁶).

Nature as form is also the principle of unity for the natural substance it makes actual. At *Metaphysics* VIII.6, Aristotle says “ἔστι δ’, ὥσπερ εἴρηται, ἡ ἐσχάτη ὕλη καὶ ἡ μορφὴ ταῦτὸ καὶ ἔν, δυνάμει, τὸ δὲ ἐνεργείᾳ, ὥστε ὅμοιον τὸ ζητεῖν τοῦ ἔνος τί αἴτιον καὶ τοῦ ἔν εἶναι.”¹³⁷ Since the form is what makes the matter to be actual, and the composite that results is one, we may say that the form is

¹³²This is despite the fact that, as Furth notes, artifacts (especially simple ones like statues and spheres) are, from one perspective, bad examples for substances, for the artifact lacks the true substance's ability to maintain itself through change—even in its own matter—over time; according to Furth, an artifact's form is “thin and exiguous,” and any process of maintenance and repair is not *self*-maintenance or *self*-repair. Cf. Furth, *Substance, Form, and Psyche*, p. 181. Aristotle, as Furth points out, explains the usefulness of artifactual examples by noting that there is something ‘analogous’ (*ἀνάλογον*) to substantial being in all of them (*Metaphysics*, 1043a4).

¹³³*Metaphysics*, 1050a30-1050b5.

¹³⁴This parallel underlies the argument for nature as end-directed in Physics II.8, as we shall see in the latter part of this study; for instance, Aristotle states at 199a16-19 that “ὅλως δὲ ἡ τέχνη τὰ μὲν ἐπιτελεῖ ἥ ἡ φύσις ἀδυνατεῖ ἀπεργάσασθαι, τὰ δὲ μιμεῖται. εἰ οὖν τὰ κατὰ τέχνην ἔνεκά του, δῆλον ὅτι καὶ τὰ κατὰ φύσιν”.

¹³⁵*Metaphysics*, 1049b12.

¹³⁶*Metaphysics*, 1050a5.

¹³⁷*Metaphysics*, 1045b19-21.

the principle of unity in a natural substance. Motion is most properly said to occur in those beings which are one subject, since for a motion to be truly one, it must be in a subject that is itself one.¹³⁸ M. Furth points out further that another indication of the linkage between *being formed* and *being one* in Aristotle's thought can be found in the discussion of embryonic development presented in the *Generation of Animals*. In the generation of a given animal, say, a horse, there are two aspects we can distinguish:

(1) the transformation of something undifferentiated and lacking specific form, into a fully differentiated and sharply defined specimen of a substantial species, and (2) the transformation of a 'uniform' (*όμοιομερές*) mass or agglomeration, something of the nature of a 'heap,' into a nonuniform (*ἀν-ομοιομερές*) entity having the higher order of unity, in which the whole is something beyond the parts, which Aristotle associates with an individual or 'this' (*τόδε τι*).¹³⁹

Nature as form is also said to be the cause of the 'whatness' of the substance that it actualizes. As Aristotle states in *Physics* II.2,

ώστε ἄλλον τρόπον ἡ φύσις ἀν εἴη τῶν ἔχοντων ἐν αὐτοῖς κινήσεως ἀρχὴν
ἡ μορφὴ καὶ τὸ εἶδος, οὐ χωριστὸν ὃν ἄλλον ἡ κατὰ τὸν λόγον. (τὸ δὲ ἐκ
τούτων φύσις μὲν οὐκ ἔστιν, φύσει δέ, οἷον ἄνθρωπος.) καὶ μᾶλλον αὕτη
φύσις τῆς ὕλης· ἔκαστον γὰρ τότε λέγεται ὅταν ἐντελεχείᾳ ἥ, μᾶλλον ἡ
ὅταν δυνάμει.¹⁴⁰

¹³⁸“καὶ τὸ κινούμενον ἐν εἶναι μὴ κατὰ συμβεβηκός,” *Physics*, 227b31.

¹³⁹Furth, “Aristotle on the Unity of Form”, p. 85.

¹⁴⁰*Physics*, 193b2-b7.

Aristotle on Higher Natures

And in Metaphysics VII.7, he states that “*εἶδος δὲ λέγω τὸ τί ἦν εἶναι ἐκάστου καὶ τὴν πρώτην οὐσίαν.*”¹⁴¹ From this we can deduce (although he does not appear to say so directly) that *φύσις*, taken as the formal act of a changeable being, gives it its ‘whatness’ or *τὸ τί ἦν εἶναι*.¹⁴²

Form—or *εἶδος*—is not, however, identical with *φύσις*, since form, as indicating an intelligible determination of some kind, can also be taken in a secondary sense to refer to privation.¹⁴³ *Φύσις* is, rather, a positive actuality that determines its matter to be a certain way, and is not merely a way of expressing a mode of being, which is how *εἶδος* is being used when it expresses privation. This difference between *φύσις* and *εἶδος* is that the former is an act which is determined and determining (and hence ‘formal’) of a being subject to change, whereas the latter can also be said of the determination as *thought*. While the formal act of a mobile being is host to many potencies, and thus is open to change,

la forma [pensada] es siempre la misma... Por consiguiente, la forma es acto, pero no lo es en cuanto se expresa en la idea (pues la idea es siempre la misma). El acto de la forma no se ha de buscar en la mismidad de la idea ni en sus determinaciones siempre idénticas. Así pues, la forma es acto, pero el acto no se reduce a forma, sino que también es acto el movimiento.¹⁴⁴

¹⁴¹ *Metaphysics*, 1032b01-02. I will discuss the connection of *τὸ τί ἦν εἶναι* and *φύσις* in greater depth in section 1.5, for the *τὸ τί ἷν εἶναι* is not a ‘part’ of the being, as the form is when taken in opposition with the matter of the thing.

¹⁴² From this we can also deduce that artifacts do not have a real ‘whatness’; they do not form genuine natural types. Their ‘whatness’ is relative to the use that human beings put them to.

¹⁴³ “ἡ δὲ μορφὴ καὶ ἡ φύσις διχῶς λέγεται· καὶ γὰρ ἡ στέρησις εἶδος πώς ἔστιν” *Physics*, 193b19.

¹⁴⁴ de Garay, *Los sentidos de la forma en Aristóteles*, pág. 106. I will discuss this difference in greater depth in Chapter 2, section 2.4.

The formal act is always positive and real (as opposed to the noetic *εἶδος*, which can express privation), and is open to change via the potencies that the actuality hosts, whereas the form as thought is immutable.¹⁴⁵ Thus, *φύσις* as act of the natural substance is formal, and is thus thinkable and expressible in definitions (and thus is the possible subject of science). Nevertheless, it is precisely the fact that *φύσις* is not ‘*εἶδος*’ as immobilized in *thought* which makes it possible for Aristotle to escape the Platonic trap of postulating eternal, subsistent ‘forms’ in which changeable things participate.

1.5 Φύσις in the broader context of Aristotle’s other works

In the *Physics*, Aristotle defines the term *φύσις* primarily in terms of the formal part of natural (i.e. changeable) substances. Nevertheless, in the *Metaphysics*, he clearly states that the primary sense of *φύσις* is that of ‘*οὐσία*,’ thus raising an important difficulty: which sense of *φύσις* really is primary?

¹⁴⁵“Asimismo la forma está definida, terminada, acabada. Es perfecta. Está toda en sí misma de una vez por todas. ‘A la forma no le falta nada’ (*Física* I.9, 192a 21). Su unidad y su necesidad es acabamiento. La forma es perfecta, en esta consideración, no por sus posibilidades, sino porque sus límites están ya fijados. Si se comparan las formas con los seres en movimiento, se observa que éstos buscan alcanzar unas determinaciones; son imperfectos respecto a esas formas deseadas. Por el contrario, la forma no busca ni desea nada (*Física* I.9, 192a 20), porque ya posee toda la determinación que puede tener. No todo está siempre cambiando, sino que hay también seres inmóviles (*Met.* IV.5, 101ob 33-35; IV.8, 1012b 22-31). La forma, en este sentido, comporta inmovilidad, fijeza, frente al movimiento,” de Garay, *Los sentidos de la forma en Aristóteles*, p. 57.

1.5.1 Φύσις as οὐσία

We have already seen, with the Pre-Socratics, that the sense of *φύσις* as ‘real constitution’ developed in order to explain the activities of complex beings in the light of basic principles. In Aristotle’s own terminology, the correlate to ‘real constitution’ is ‘essence,’ which Aristotle typically renders as ‘τὸ τι ἥν εἶναι’ (although in certain contexts he also uses the term ‘οὐσία’). The essence is said to be the entirety of the being which it constitutes, for there is no difference between the ‘real constitution’ (or essence) of the being and the being itself, as Aristotle makes clear in the following passage from Book VII of the *Metaphysics*:

καίτοι τί κωλύει καὶ νῦν εἶναι ἔντα εὐθὺς τί ἥν εἶναι, εἴπερ οὐσία τὸ τι ἥν εἶναι; ἀλλὰ μὴν οὐ μόνον ἔν, ἀλλὰ καὶ ὁ λόγος ὁ αὐτὸς αὐτῶν, ὡς δῆλον καὶ ἐκ τῶν εἰρημένων: οὐ γὰρ κατὰ συμβεβηκὸς ἐν τὸ ἐνὶ εἶναι καὶ ἔν. ἔτι εἰ ἄλλο ἔσται, εἰς ἅπειρον εἰσιν: τὸ μὲν γὰρ ἔσται τί ἥν εἶναι τοῦ ἐνὸς τὸ δὲ τὸ ἔν, ὥστε καὶ ἐπ’ ἐκείνων ὁ αὐτὸς ἔσται λόγος. ὅτι μὲν οὖν ἐπὶ τῶν πρώτων καὶ καθ’ αὐτὰ λεγομένων τὸ ἐκάστῳ εἶναι καὶ ἔκαστον τὸ αὐτὸ καὶ ἔν ἔστι.¹⁴⁶

In Book V of the *Metaphysics*, Aristotle gives his definitions of a number of key terms in his new science of ‘being *qua* being,’ and in this context he explains how the term *φύσις* is to be used. He identifies, in the process, a number of the senses which I have touched upon so far, including the sense of ‘genesis of a living thing’ (the primordial meaning of *φύσις*), ‘source of movement in natural beings’ (*φύσις* as part of the being, insofar as the

¹⁴⁶ *Metaphysics*, 1031b30-1032a6.

source is not the whole), ‘matter of the being’ (*φύσις* as material part) and ‘the form or essence’ (*φύσις* as formal part, as opposed to the matter).¹⁴⁷ However, he follows up this listing of senses by stating that the primary sense of the term *φύσις* indicates the ‘*οὐσία*’ of beings with an inner principle of motion, in the sense of their ‘real constitution’ or ‘essence’: “ἡ πρώτη φύσις καὶ κυρίως λεγομένη ἔστιν ἡ οὐσία ἡ τῶν ἔχοντων ἀρχὴν κινήσεως ἐν αὐτοῖς ἡ αὐτά.”¹⁴⁸

This sense of *φύσις* as essence is primary for Aristotle, because in the development of a science of mobile being, the sense of *φύσις* as part cannot be primary: having parts is precisely a characteristic of being (and by extension, of mobile being), but is not the notion of being *qua* mobile itself.¹⁴⁹ Thus, an investigation of the parts of mobile being is an important topic in his *Physics*, but physical science is concerned more generally with the properties of mobile being as such, including the determination of the notions of cause, motion, place and time, which pertain not to *φύσις* as a part of being, but rather to beings subject to change, as entire and complete beings.

Nevertheless, the sense of *φύσις* as the formal part of mobile being remains ‘primary’ in certain kinds of investigations. One such investigation involves the determination of what the *ἀρχαί* of mobile being are, and which (if any) of these *ἀρχαί* has priority over the other; this is precisely the in-

¹⁴⁷ *Metaphysics*, 1014b22-a12.

¹⁴⁸ *Metaphysics*, 1015a13-14.

¹⁴⁹ Here, ‘part’ can be interpreted in several ways: as one element of a complex being, and in this sense ‘form’ and ‘matter’ are parts of mobile being; or as individual aspects derivable from a concept related to being, and in this sense we can speak of ‘parts of oneness’ or ‘parts of being’ in a broader sense.

Aristotle on Higher Natures

vestigation we encounter in Book I of the *Physics*. Another investigation involves the issue of whether there exist self-movers, which forms part of Aristotle's larger investigation into the existence of a first unmoved cause of motion; in this context, Aristotle wishes to assert that there is a moved and an unmoved part in any self-mover, and the unmoved part will correspond to the *φύσις* as formal part of the being.¹⁵⁰ A third investigation involves the justification of whether there exist kinds of formal act which make higher beings to be, or whether only the elements or atoms can truly be said 'to be,' as the *φυσιολόγοι* sustained. This latter investigation is precisely the focus of this study, and thus the *φύσις* as formal act (in opposition to the material substrate) of mobile being will be highlighted. Thus, while the sense of *φύσις* as essence has primacy in the science of mobile being as a whole, the sense of *φύσις* as formal part will normally be the aspect to which I dedicate my attention.

1.6 Conclusions: the doctrine of the *ἀρχαί* and its implications

In this chapter, we have obtained an overall (if brief) view of the evolution of the term *φύσις* as a technical term among the Greek *φυσιολόγοι*, as well as a general picture of the doctrines of those natural philosophers who were most important to Aristotle as interlocutors: Empedocles, Anaxagoras and the Atomists. In particular, we have seen how *φύσις* came to have a number of distinct—though closely related—senses, and we have seen that

¹⁵⁰This is the position that Aristotle takes in the *Physics* and *On the Soul*; other works (especially *On the Motion of Animals*) seem to suggest otherwise. I will investigate this thorny issue further in Chapter 3.

these were taken up by Aristotle, refined, and integrated into his overall physical and metaphysical theories. In addition, we have seen how the development of the notion of the *ἀρχαῖ* of the physical world came to develop, and how Aristotle derived *φύσις* as one of these *ἀρχαῖ*. What, however, have we achieved towards understanding how Aristotle justifies the existence of higher *φύσεις*?

The main achievement of Aristotle's argumentation in Book I of the *Physics*, and his development of the doctrine of the *ἀρχαῖ*, is to provide a basis for understanding motion (*κίνησις*) and substantial change (*γένεσις* or *φθορά*), against those who would deny its reality. Those who deny change include those who, following the Eleatic 'temptation,' deny that there is genuinely motion in the universe, and those who assert that there is nothing more than aggregation and segregation, following the materialist view. Aristotle's achievement here will have a far-reaching impact on the rest of his philosophy, from his cosmology to his understanding of the human soul, and enables him to propose a theory of *φύσις* as a stable principle which underlies 'surface' changes.

While Aristotle has not yet—in the texts we have cited—reached a stage where he can demonstrate the existence of beings which have within themselves a 'principle of motion and change' (for up to this point he has only demonstrated the principles that underlie beings subject to change, and not the cause of that change) he nevertheless has made a leap which will have important consequences for his ability to defend *φύσις* against the *φυσιολόγοι*. This is because the theories of these materialist thinkers are also necessarily subject to an analysis in terms of the Aristotelian *ἀρχαῖ*, i.e.

Aristotle on Higher Natures

form and matter.

As Aristotle describes the Atomist position, Leucippus and Democritus propose a single *σῶμα* ('body'), which exists in an infinite multitude of indivisible units ('atoms') varying only by size and shape. This 'body' is of a single matter, much as many flakes of gold are all of the same material. The atoms, composed of this single matter and moving in the void, thus form larger bodies by aggregation; thus the Atomists are able to deny true coming-to-be. The postulation of 'atoms' by these thinkers does not, however, enable them to avoid the analysis of being in terms of the *ἀρχαί*. For the Atomists propose a single *kind* of material which varies in shape and size. But these are formal differences, supervening on a *ὕλη* (to use the Aristotelian term) which is naturally apt to take on these differing shapes. Thus, this underlying *σῶμα* is in potency to these formal modifications (even though the 'atoms', being eternal, do not change shape). Thus, we are left with having to propose a formal principle distinct from and irreducible to the material principle (since the *σῶμα* itself does not explain the shape of a given atom). Since the analysis in terms of the *ἀρχαί* is unavoidable even for the Atomists, the only question is whether Aristotle can prove that there are formal *ἀρχαί* which can generate higher unities (such as organisms). We can state that the existence of *φύσις* at the level of the elements is already partially demonstrated by Aristotle's derivation of the formal and material *ἀρχαί*.

Empedocles postulates, for his part, four 'roots' which have particular 'offices' (characteristics or properties), which through combinations in particular ratios form all the known substances of the cosmos. However, the

fact that each ‘root’ is a *determined something* implies formality, a particular way of being that is unique to it and it alone, and which manifests itself in particular behaviors or way of interacting. The fact that the particular ‘form’ of each root is able to be present in multiple instances means that there must be, in addition, a material principle which is able to take on this formality, even if a given root never changes to be other. For all the roots share a common ‘something,’ such as corporality or spatiality, and that which they share in common must be able to receive the form of a particular root.

Anaxagoras, finally, postulates bodies that are infinitely divisible, each containing within it the multiplicity of basic ‘seeds’ or qualities which exist in the world, and which have their visible and sensible characteristics according to the proportion of these ‘seeds’ which predominate (at whatever level of division one wishes to achieve). But qualities (as embodied in the seeds) are determinations or particular ways of being, and are thus formal. While Anaxagoras may wish to claim that all existing formalities can be encountered (even if in tiny proportions) in *every* body that is divided, it is nonetheless the case that he is proposing formal and material aspects in his theory. In order for these qualities to be existent in multiple individuals, there must also be something which individuates and gives them the ability to be located; otherwise, they would be Platonically existent, and not physically existent. And this individuating and localizing substrate, in which the qualities inhere, must be ‘matter,’ insofar as it is something able to receive the formality of the various ‘seeds.’

Thus, the accounts given by the *φυσιολόγοι* require form and matter as

Aristotle on Higher Natures

even deeper principles than the elements or atoms that they themselves posit as most basic. Within the ambit of form, the *φυσιο-λόγοι* also require something akin to ‘essence.’ For what it is to be, for instance, a material ‘root’ of the kind *ἀνήρ*, is a determination or particular way to be, and dramatically different from being a root of the kind *γῆ*. Similarly, to be an ‘atom’ of a certain size and shape is a determination and particular way to be, distinct from other atoms, and which gives the atom in question its abilities and characteristics. Aristotle notes that “ἐπὶ μικρὸν γάρ τι μέρος Εμπεδοκλῆς καὶ Δημόκριτος τοῦ εἴδους καὶ τοῦ τί ἦν εἶναι ἤψαντο,”¹⁵¹ so it is clear that these thinkers had at least a vague idea of the necessity of the formal determination of being and its expressibility in the definition.

At the end of his derivation of the *ἀρχαί* in terms of ‘matter’ and ‘form,’ Aristotle has not merely set out an alternative vision of what might possibly be the first principles of nature, as other natural philosophers had done. Rather he has gone much further, providing an analysis of the principles of mobile being that is applicable to *any* theory that wishes to treat of the physical world. The necessary character of this analysis provides a solid foundation for his later insistence that there exist higher-level *φύσεις*, such as those of organisms. For once he has established the necessity of formal act and material substrate, it becomes a question of *which* kinds of formal acts exist, and it no longer is absurd to postulate higher formal acts, since the ‘genus’ of such formal acts has already been established to be an absolutely necessary postulate.

¹⁵¹*Physics*, 194a20-22; in a similar way, they touched on the moving cause, without really grasping its importance, as already mentioned.

2. *Φύσις* and Ways of Being

In this chapter, I will discuss Aristotle's 'multivocal' analysis of being and its impact on his ability to sustain the existence of higher-level *φύσεις* against his critics, the *φυσιολόγοι*. In the first section, I will discuss the evolution of the Greek word *τὸ ὅν* into a philosophical term of art. In the second section, I will describe how Aristotle shows that 'being' must be said multiply according to the 'categories,' irreducibly different ways of saying that something is (or is a being) via the faculty of judgment, but which correspond to genuine distinctions in reality. In the third section, I will examine the differences between 'being-as-real' and 'being-as-truth,' or real and noetic being. This distinction becomes very important for Aristotle to refute Parmenides; in addition, the dissociation of these two kinds of being will also remove the justification that the *φυσιολόγοι* have for asserting the absolute changelessness of 'that which is.' In the fourth, and most extensive, section, I will cover the doctrine of 'being' as actuality and as potency, connecting these notions with the 'parts' of mobile being that Aristotle demonstrates in *Physics*, Book I. In so doing, I will show how *φύσις* as formal act is a host of potencies, such that it can be a 'principle of change'; in addition, I will investigate the phenomenon of 'communication of form,' showing that *φύσις* can be a principle of change in *another*. Finally, I will conclude this chapter with a summary of what has been accomplished,

highlighting exactly how Aristotle's arguments against the *φυσιολόγοι* are affected, and his assertion of higher-level *φύσεις* made plausible.¹

2.1 The development of the term *τὸ ὅν* in the Pre-Socratics

The *φυσιολόγοι* had long been interested in the question of what 'really is,' and this led them to propose their various theories concerning the permanent, unchanging *ἀρχαί* that underlie the world of change and appearance, as we have discussed in Chapter 1. Over the course of the development of Greek natural philosophy, we can observe how this led to a focus on the 'isness' of the things of the world, and an identification of the usefulness of the word '*ὅν*' and its derivatives to express or highlight the degree of 'isness,' reality or existence of the things being discussed.

In early Greek, beginning with Homer, *ὅν* is present as a standard participle: "it is the [neuter] form taken by the verb in various subordinate or coordinate constructions, many of which can be translated into English as relative clauses of circumstance, cause, and the like."² Even at this early stage of Greek, several distinct uses can be identified for the participle, which will later become important for its use in philosophical contexts. In particular, Kahn identifies two such uses, the veridical use (*τὰ ἔόντα λέγειν*, "to tell the true story"³) and the so-called existential Type V (*ἄμα μὲν τῆς προδοσίας οὖσης, ἄμα δὲ καὶ χειμῶνος ὄντος*, "[Brasidas easily overcame the guard]

¹In this chapter, I will not discuss the distinction between 'accidental being' and 'per se being,' which is the first of the distinctions between ways of being that Aristotle discusses in *Metaphysics* V.7. I will discuss accidental being in Chapter 4.

²Kahn, *The Verb 'Be' in Ancient Greek*, p. 453.

³Hdt. I.95.1, cited in Kahn, p. 454.

since there was treachery [among them] and also a storm”⁴) which will be of especial importance for the development of the philosophical use of the term *τὸ δν* (or its variant in Ionic, *τὸ ἐόν*).

The existential use of the participle *τὸ δν* in its plural form (*τὰ ἐόντα*) is attested in Homer: *ὅς γδη τά τ’ ἐόντα τά τ’ ἐσσόμενα πρό τ’ ἐόντα*, “(Calchas) who knew the things that were, that had been, and those that were to be,”⁵ where it denotes “all the actions and events which a soothsayer is supposed to divine.”⁶ This is very close in meaning to the earliest attested use of forms of *τὸ δν* by a Presocratic philosopher, in Anaximander,⁷ where the philosopher is using the participles *τῶν δντων* and *τοῖς οὖσι* to speak of ‘things that are,’ apart from any further determinations.⁸

A second important early Greek usage of the plural participle form *τὰ δντα* is what Kahn terms the ‘veridical’ usage, where *τὰ δντα λέγειν* means to ‘speak the truth’ or ‘state the facts.’⁹ Here, instead of referring merely to ‘things that are,’ *τὰ δντα* refers to ‘things that truly are.’ This is very close to the usage we find in Parmenides, where we see a new focus on the ‘realness’ that is implied by saying that something ‘is’: “*Εἰ δ’ ἄγ’ ἐγών ἐρέω... ή μὲν δπως ἔστιν τε καὶ ὡς οὐκ ἔστι μὴ εἶναι.*”¹⁰ For the Eleatic, saying that something ‘is’ implies that it ‘cannot not be,’ for to be able to be other is, in some

⁴Thuc. IV. 103.5, cited in Kahn, loc. cit.

⁵*Iliad* 1.70, cited in Kahn, 455.

⁶Ibid.

⁷Cf. Kahn, *Anaximander and the Origins of Greek Cosmology*, pp. 29 and 35; cf. also DK12B1.

⁸This presupposes that we accept the fidelity of the fragment from Simplicius to the Anaximandrian original, something that Kahn believes to be warranted, despite the use of Attic forms of the participle; cf. Kahn, *The Verb 'Be' in Ancient Greek*, p. 456.

⁹ibid., p. 455.

¹⁰DK28B2.

Aristotle on Higher Natures

sense, a ‘not being’ what it is, and “οὐ γὰρ μήποτε τοῦτο δαμῆ εἶναι μὴ ἔόντα.”¹¹ Parmenides thus connected ‘realness’ with that which is *necessarily* what it is, remaining unchanging beyond all surface ‘appearance’ of change. In Parmenides we encounter, in addition, a technical philosophical use of the participle ἔόν (the equivalent to ὅν in the Ionic dialect used by Parmenides), as referring to *something* that exists or that truly is.¹²

Around the time of Parmenides’s flourishing, it becomes more frequent to find the term τὸ ὅν used in philosophical contexts. Prior to the Eleatic, philosophical usages of τὸ ὅν in its various forms are sparse indeed¹³; after him, the term is found used in two technical senses by the philosophers who followed Parmenides, either as disciples or as masters of rival schools.¹⁴ The first of these senses is ‘ὅν’ in the sense of ‘something which is,’ a ‘being,’ but independent of reference to particular determinations or deeper principles. We begin to see expressions such as “ἀθάνατόν τε εἶναι καὶ νοέειν πάντα

¹¹DK28B7.

¹²Furth notes, as do Kirk and Raven, that εἶναι (and hence ἔόν) have two senses that are not clearly distinguished in Greek authors of this period. One is the existential sense, already mentioned above. The second is a ‘predicative’ sense, where some property is asserted of a subject. “The notion of ‘being’ studied by Parmenides and by early Greek philosophy in general, is not ‘confined’ to either of our two distinct concepts, that of existence and that of being something-or-other in the sense of having such-and-such properties (being a man, being green); rather, these notions are impacted or *fused* in the early Greek concept of being,” Furth, “The Pre-Socratics”, p. 243. The ‘veridical’ sense of ὅν/ἔόν discerned by Kahn would thus be a variant of the basic predicative sense of the verb and its participial forms. Berti sums up these arguments as follows: “Sarebbe anacronistico, infatti, supporre che egli avesse già chiara la distinzione tra copula e predicato, o quella tra predicato di tipo semplicemente attributivo, predicato di tipo esistenziale e predicato di tipo veritativo,” Berti, “L’essere e le sue regioni”, p. 346.

¹³Kahn 2003, p. 456 n. 1.

¹⁴The timing of the sudden popularity of the term τὸ ὅν amongst philosophers of this time period is highly suggestive of a Parmenidean influence, but it is important to avoid the error *post hoc, ergo propter hoc*. In the absence of more concrete evidence, we can only speculate about the degree of influence Parmenides exercised on other philosophers in this regard.

*καὶ ὁρῆν καὶ ἀκούειν καὶ εἰδέναι πάντα, ἔόντα τε καὶ ἐσόμενα,*¹⁵ “περὶ γὰρ ἀδελφεὰ τὰ τῶντος πρότιστα δύο εἴδεα τὰν ἀναστροφὰν ἔχει,”¹⁶ and “ἀνάγκα τὰ ἔόντα εἶμεν πάντα ἢ περιαίνοντα ἢ ἄπειρα ἢ περαίνοντὰ τε καὶ ἄπειρα.”¹⁷ This sense is close to that of the nominal English form ‘being’ (as opposed to the participial sense seen in, e.g., ‘he is being good’).

We also see a developing sense of *ὄν* as ‘that which *truly* is,’ following the Parmenidean example, among philosophers widely considered to have been influenced by Parmenides’s argument.¹⁸ This sense is clear in a quote from Empedocles, where he claims that the ‘roots’ truly are, and cannot pass away: “ἔκ τε γὰρ οὐδάμ’ ἔόντος ἀμήχανόν ἐστι γενέσθαι, καὶ τ’ ἐὸν ἔξαπολέσθαι ἀνήνθστον καὶ ἄπυστον.”¹⁹ Similarly, in Melissus, we find the following quote: “ὅ γὰρ κόσμος ὁ πρόσθεν ἐών οὐκ ἀπόλλυται οὔτε ὁ μὴ ἐών γίνεται,”²⁰ with a clear sense of absolutely necessary permanence. Anaxagoras, in turn, clearly states that ‘that which is’ cannot cease to be: “τὸ γὰρ ἐὸν οὐκ ἔστι τὸ μὴ οὐκ εἶναι.”²¹

Thus, the term ‘being’ or *ὄν* came to have a dual association in the Pre-Socratics. Among some philosophers it appears to have come to mean ‘a thing which is,’ independent of any given determination. Among others,

¹⁵Diogenes of Apollonia, DK64B3, here as meaning ‘those things which are or will come to be.’

¹⁶Archytas, DK47B1, 10; the sense here is ‘those things composed of the first principles.’

¹⁷Philolaus, DK44B2, 2; the apparent sense here is the ‘transient things’ of the world, and not the ‘principles.’

¹⁸This influence does not necessarily mean that Parmenides was the first to introduce the distinction between necessary and contingent being; it is, however, probable that these later writers encountered the distinction in his poem.

¹⁹Empedocles, DK31B12; the sense here of *ἐὸν* is that of ‘that which exists and cannot cease to be,’ following Wright, *Empedocles: the Extant Fragments*, pp. 172-73.

²⁰DK30B7, 3.

²¹DK59B3.

Aristotle on Higher Natures

likely under the influence of Parmenides's argument, the term came to be associated with the notion of that which is necessary in the world, i.e. that which does not cease to be what it is. In that way, they could say that the *ἀρχαὶ* truly 'are,' while the transient and composite things which are made up of the *ἀρχαὶ* 'are not.'

2.2 Being and the categories

The genius of Aristotle was to realize that *ὄντα* is not a univocal term, but is in fact said 'multiply.' That is, there are many true ways to say that something is a being. The term *ὄντα* derived from *εἶναι* in order to indicate 'something that is'; Aristotle saw that there are as many senses of *ὄντα* as there are ways of using *εἶναι* itself.²²

2.2.1 The categorial analysis of being in Aristotle

The first of these 'ways of being' is what Aristotle calls the 'figures of predication,' or what are more commonly called the 'categories' of being. For instance, we may say that "the cat is on the mat," or "the orange is tasty," and that these expressions indicate 'things that exist' in several ways. In the first place, we have a subject that is said to be, *simpliciter*: the cat or the orange. But, there is also the determination of the cat or the orange:

²²It is worth noting that in the opinion of Berti, Aristotle's development of the doctrine of the 'multivocality' of being was in explicit response to the Eleatic doctrine of the absolute univocity of the term; cf. Berti, "L'essere e le sue regioni", p. 356, "nel libro I della *Fisica* infatti, proprio per defendere l'esistenza della natura, Aristotele critica Parmenide e Melisso affermando che 'l'essere si dice in molti sensi (*πολλαχῶς λέγεται τὸ ὄντα*)' (*Phys.* I 2, 185 a 21), così come 'in molti sensi si dice anche l'uno (*τὸ ἕν*), allo stesso modo dell'essere' (185 b 6)."

'being-on-the-mat' and 'being-tasty' are also 'something that is,' for unless we admit that they *are*, we are unable to speak about them, and indeed would be denying that these determinations are real. But it is just as real, in the current situation, that the cat is indeed in the place I have indicated, as is the existence of the cat itself. The real, therefore, is multidimensional; 'being' does not merely refer to one way of existing, but to all the different (and irreducible) kinds of determinations that we can find in reality.²³

Aristotle's early work *The Categories* explains the senses of 'categorial being' in the following way:

Τῶν κατὰ μηδεμίαν συμπλοκὴν λεγομένων ἔκαστον ήτοι οὐσίαν σημαίνει
 η ποσὸν η ποιὸν η πρός τι η ποῦ η ποτὲ η κεῖσθαι η ἔχειν η ποιεῖν η πάσχειν.
 ἔστι δὲ οὐσία μὲν ὡς τύπῳ εἰπεῖν οἶνον ἀνθρωπος, ἵππος· ποσὸν δὲ οἶνον
 λευκὸν, γραμματικόν· πρός τι δὲ οἶνον διπλάσιον, ἥμισυ, μεῖζον· ποῦ δὲ

²³Not all commentators are in agreement that Aristotle's categories have an ontological origin; Trendelenburg, for instance, holds that the categories, while referring to objective reality, nonetheless have their origin in grammatical considerations: "Im Besondern ist aber auch schon Anfangs angedeutet, dass die Kategorien die aus der Auflösung des Satzes entstandenen Elemente sind... so tragen die Kategorien Zeichen ihres Ursprunges an sich und treiben ihre Wurzeln in den einfachen Satz zurück," Trendelenburg, *Geschichte der Kategorienlehre*, p. 13. G. E. Anscombe proposed a similar, linguistic vision of the categories, interpreting Aristotle's intention as "[finding] a complete list of fairly simple kinds of things, with significant logical differences, that might be said about a subject," Anscombe and Geach, *Three Philosophers*, p. 14. Another similar account may be found in Ryle, "Categories", p. 66: "Any two predicates which satisfy the same interrogative are of the same category, and any two which do not satisfy the same interrogative are of different categories. In the main, Aristotle seems to content himself with taking ordinary language as his clue to the list of heads of questions, and so of types of predicates."

Nevertheless, there are still to be found those who defend a more realist account of the categories, such as Wedin, who argues that Aristotle's theory "is a theory about *what is*, more precisely, about the basic sorts of things that are... This theory tells us what things must exist and in what relations they must stand for a given such statement to be true," Wedin, *Aristotle's Theory of Substance*, p. 37. Cf. also Sanford, "Categories and Metaphysics", p. 20, "There is, I think, plenty of reason to suppose a kinship between [our minds and the world], one that is predicated upon the way in which the world is and our receptivity to the world—hence the importance of categories, which are at once logical and metaphysical."

Aristotle on Higher Natures

οὗτον ἐν Λυκείῳ, ἐν ἀγορᾷ· ποτὲ δὲ οὗτον ἔχθες, πέρυσιν· κεῖσθαι δὲ οὗτον ἀνάκειται,
κάθηται· ἔχειν δὲ οὗτον ὑποδέδεται, ὥπλισται· ποιεῖν δὲ οὗτον τέμνει, καίει·
πάσχειν δὲ οὗτον τέμνεται, καίεται.²⁴

Of all these senses of ‘being,’ one is primary: that which refers to *οὐσία*, which is the ‘subject’ of the other figures of predication, or ways of using the term ‘*όν*.’²⁵ What the *φυσιολόγοι* have identified as ‘being’ is only one of the several senses of the term.²⁶ Nevertheless, their analyses of the natural world must also take heed of the distinction that Aristotle has made between ways of being, as we shall see in the next subsection.

²⁴ *Categories*, 1b25-2a4.

²⁵ “ἡ καὶ ὁ ὄρισμὸς ὡσπερ καὶ τὸ τί ἔστι πλεοναχῶς λέγεται; καὶ γὰρ τὸ τί ἔστιν ἔνα μὲν τρόπον σημαίνει τὴν οὐσίαν καὶ τὸ τόδε τι, ἄλλον δὲ ἔκαστον τῶν κατηγορουμένων, ποσὸν ποιὸν καὶ ὅσα ἄλλα τοιαῦτα. ὡσπερ γὰρ καὶ τὸ ἔστιν ὑπάρχει πᾶσιν, ἄλλ’ οὐχ ὁμοίως ἀλλὰ τῷ μὲν πρώτως τοῖς δ’ ἐπομένως, οὕτω καὶ τὸ τί ἔστιν ἀπλῶς μὲν τῇ οὐσίᾳ πώς δὲ τοῦς ἄλλοις: καὶ γὰρ τὸ ποιὸν ἐρούμεθ’ ἀν τί ἔστιν, ὡστε καὶ τὸ ποιὸν τῶν τί ἔστιν, ἄλλ’ οὐχ ἀπλῶς, ἄλλ’ ὡσπερ ἐπὶ τοῦ μὴ ὄντος λογικῶς φασί τινες εἶναι τὸ μὴ ὄν, οὐχ ἀπλῶς ἀλλὰ μὴ ὄν, οὕτω καὶ τὸ ποιόν,” *Metaphysics*, 1030a17-25. Vigo notes that the primacy or priority of substance over the accidental categories does not merely hold at the ‘logical’ level: “Por el contrario, la prioridad lógica de la sustancia respecto de las categorías sólo resulta inteligible a partir de su prioridad ontológica: su capacidad para ser definida autónomamente no es sino un reflejo en el plano lógico de su capacidad para existir autónomamente; viceversa, la imposibilidad de definir autónomamente los categóremas accidentales es un reflejo de su incapacidad para existir con independencia de la sustancia,” Vigo, “Prioridad ontológica y prioridad lógica”, p. 85.

²⁶ “La funzione, che abbiamo chiamato di ‘vicario universale’, propria del verbo ‘essere’, non conduce così all'affermazione della sua unità, come in Parmenide, bensì proprio a quella della sua molteplicità,” Berti, “L'essere e le sue regioni”, p. 357. Loux further notes that the failure to note this multiplicity on the part of the *φυσιολόγοι* (following Parmenides) is at the root of their failure to understand the possibility of change: “The upshot of [Physics] A.7, however, is just that ontologies like these are misguided in failing to recognize that attributes are attributes of other things... and Aristotle will want to insist that once we recognize these facts, coming to be is no longer held hostage to the Parmenidean argument,” Loux, “Aristotle and Parmenides: An Interpretation of Physics A8”, p. 293.

2.2.2 The multivocality of ‘being’ and the *φυσιολόγοι*

It is certainly not the case that one must, a priori, accept that being can be said multiply. Indeed, the negation of this is at the heart of the Parmenidean argument: that being has only one meaning, ‘that which necessarily is what it is,’ and the other senses of the term are suppressed as indicating kinds of non-being.²⁷ ‘That which is’²⁸ cannot, for instance, have location, for there is nothing else that might give it ‘place’: “οὐ γὰρ φατὸν οὐδὲ νοητόν ἔστιν ὅπως οὐκ ἔστι.”²⁹ It cannot have quantity, for that would make it divisible, and “οὐδὲ διαιρετόν ἔστιν, ἐπεὶ πᾶν ἔστιν ὁμοῖον,” and “τῷ ξυνεχέσ πᾶν ἔστιν ἐὸν γὰρ ἐόντι πελάζει.”³⁰ Despite his use of the image of the sphere, “τετελεσμένον ἔστι πάντοθεν, εὐκύκλου σφαίρης ἐναλίγκιον ὅγκωι, μεσοσόθεν ἰσοπαλὲς πάντηι,”³¹ *ὄν* is not characterized by having shape or size, but rather by completeness and lack of need for anything.³²

Nevertheless, the price one has to pay for asserting an absolutely unique meaning to *ὄν* is precisely the Parmenidean price: one loses the ability to assert that there is any kind of being other than the one absolutely necessary Being.³³ And, as Aristotle points out in *Physics* I.2 (185a1-2), “τὸ μὲν

²⁷Cf. *Physics* 186a25.

²⁸I.e. the universe; cf. Ross, “Commentary on the Metaphysics”, p. 245.

²⁹DK28B8, 8.

³⁰DK28B8, 22/25.

³¹DK28B8, 42-44.

³²As Tarán points out, “The point [of the simile of the sphere] is that the mass of a sphere in equilibrium around the middle is in all parts of equal strength... that Being is complete everywhere means that everywhere it is just Being, and this preserves the identity of Being as the homogeneity of the sphere keeps it in equilibrium” Tarán, *Parmenides, A Text with Translation, Commentary and Critical Essays*, p. 159.

³³Cherniss notes that Aristotle takes the Eleatics to task on precisely this point: “Primamente ataca el concepto de Ser desde el punto de vista de las categorías, mostrando que, si es sustancia, cualidad y cantidad, es múltiple y, si es todo cantidad o cualidad, se viola el axioma de que sólo la sustancia es separable,” Cherniss, *La crítica aristotélica a*

Aristotle on Higher Natures

οὐν εἰ ἐν καὶ ἀκίνητον τὸ ὄν σκοπεῖν οὐ περὶ φύσεώς ἔστι σκοπεῖν.” What the natural philosopher is looking for is precisely an explanation of the very evident fact of change. But this requires, in turn, an abandonment of the univocity of being, for in order to assert that something changes, there must be a something which *is* what it is, despite its undergoing modification in some manner that does not touch its ‘whatness.’³⁴ In the case of those changes which do not require us to say that ‘that which *is*’ ceases to be what it is (i.e. in *κίνεσις* as opposed to *μεταβολή*), we have a contrast between that kind of being which indicates the maintenance of the essential ‘whatness’ of the thing (and this is the being of *οὐσία* as subject) and those ways of being which are potentially transient, and thus ‘accidental’ to the being as subject: “ἐπεὶ οὖν τῶν κατηγορουμένων τὰ μὲν τί ἔστι σημαίνει, τὰ δὲ ποιόν, τὰ δὲ ποσόν, τὰ δὲ πρός τι, τὰ δὲ ποιεῖν ἢ πάσχειν, τὰ δὲ πού, τὰ δὲ ποτέ, ἐκάστῳ τούτων τὸ εἶναι ταῦτα σημαίνει.”³⁵ In the case of more radical change, where the very ‘whatness’ ceases to be, we must maintain that there is a ‘something un-

la filosofía presocrática, pp. 84-85.

Gershenson and Greenberg further analyze Aristotle’s argument to show that he forces the Eleatics to admit that being is multiple as soon as they admit predication at all. At *Physics* 186b4-12, Aristotle addresses the predication ‘being is white’. Gershenson and Greenberg state that “merely to say that being is white is not to make being have two meanings, as the Eleatics would be quick to point out, for white itself may not be an existent thing. However, if white is not an existent thing, then the Existential itself cannot partake of being, because in partaking of white, or any other predicate, it is partaking of non-existence. Thus, the necessity of making the Existential partake of being forces the Eleatics to make white another aspect of existence in the full sense, another ‘that which exists’,” Gershenson and Greenberg, “Aristotle Confronts the Eleatics: Two Arguments on ‘The One’”, p. 147. Hence, if the Eleatics refuse to accede to Aristotle’s argument and do not admit plurality, they lose the ability to predicate anything of *τὸ ὅπερ ὄν*, including that it partakes of being.

³⁴In this sense, Aristotle maintains aspects of the Parmenidean doctrine of *τὸ ὄν*: substance (*οὐσία*) is that which truly is, and is one, in the highest sense (*πρώτως*) and which is the source of unity which the other categories have *πρὸς ἔν*. Cf. Berti, “L’essere e le sue regioni”, pp. 361-2.

³⁵*Metaphysics*, 1017a20-25.

derlying' which is or remains, and this too is a sense of 'is' which is not the same as 'whatness.'

If we are unable to make a distinction between subject and accidents, we will be unable to do more than the Heracliteans, who say that “πάντα χορεῖ καὶ οὐδὲν μένει,”³⁶ for there will be no ‘this’ that changes. Indeed, the Heraclitean temptation is equally devastating for the student of nature as is the Parmenidean, for if there is no ‘something’ that changes, it is difficult to say that there is, in fact, change at all. The *φυσιολόγοι*, for their part, were unwilling to cede fully to either temptation. They postulated ‘subjects’ of accidental change, whether the ‘roots’ of Empedocles, the ‘seeds’ of Anaxagoras or the ‘atoms’ of Leucippus and Democritus. These eternally existent subjects could not cease to be (and thus they denied change in the category of *οὐσία*),³⁷ but they could change in various other ways, which enabled them to form aggregates, and for these aggregates, in turn, to separate into their basic components once again.³⁸ But this, in turn, re-

³⁶Quoted in Plato’s *Cratylus*, cited in Diels (22A6). Kirk holds that the extreme doctrine of universal change was probably not held by Heraclitus himself, but by disciples such as Cratylus, who took their master’s doctrines to extremes unsupported by him; cf. Kirk, *Heraclitus: The Cosmic Fragments*, p. 374. (It is hence to these disciples that I will be referring to when I speak of ‘Heracliteans’ or ‘the Heraclitean doctrine’.) The quotation “πάντα χορεῖ καὶ οὐδὲν μένει” is likely related to the famous fragment of Heraclitus which contains his river analogy (DK22B42). Heraclitus himself merely states “ποταμοῖσι τοῖσιν αὐτοῖσιν ἐμβαίνοθσιν ἔτερα καὶ ἔτερα ὕδατα ἐπιρρεῖ,” which has the effect of highlighting the “coincidence between stability (of the whole river) and change (of the waters flowing past a fixed point), rather than continuity of change,” Kirk, *Heraclitus: The Cosmic Fragments*, p. 377. Thanks to A. Vigo (private conversation) for bringing this point to my attention.

³⁷As Aristotle analyzes the category corresponding to the ‘τά ἀπλά σώματα,’ *Metaphysics*, 1017b10.

³⁸P. Curd argues that the basic foundation for the new theories of Empedocles, Anaxagoras and the Atomists was already present in the *Περὶ φύσεως* of Parmenides, insofar as—she claims—the Eleatic never argued for ‘numerical monism’: “I conclude, then, that the Parmenidean rejection of division and difference within what-is does not force us to interpret Parmenides as a numerical monist,” Curd, *The Legacy of Parmenides*, p. 97. For Curd, “Parmenides is committed to and argues for the internal unity of each thing that is,” ibid.,

Aristotle on Higher Natures

quires the introduction of an irreducible variety in the ways of saying that something is, or in Aristotle's terms, the ways in which something can be an *ōn*.

Aristotle himself points out the necessity for 'alteration' (*ἀλλοίωσις*) in the theories of the *φυσιολόγοι* in the following terms:

Toῖς μὲν οὖν ἐξ ἑνὸς πάντα κατασκευάζουσιν ἀναγκαῖον λέγειν τὴν γένεσιν καὶ τὴν φθορὰν ἀλλοίωσιν· ἀεὶ γὰρ μένειν τὸ ὑποκείμενον ταῦτὸ καὶ ἔν· τὸ δὲ τοιοῦτον ἀλλοιοῦσθαι φαμεν· τοῖς δὲ τὰ γένη πλείω ποιοῦσι διαφέρειν τὴν ἀλλοίωσιν τῆς γενέσεως· συν-ιόντων γὰρ καὶ διαλυομένων ἡ γένεσις συμβαίνει καὶ ἡ φθορά... ἀναγκαῖον δὲ καὶ τούτοις τὴν ἀλλοίωσιν εἶναι μέν τι φάναι παρὰ τὴν γένεσιν, ἀδύνατον μέντοι κατὰ τὰ ὑπ’ ἐκείνων λεγόμενα.³⁹

Since *ἀλλοίωσις* pertains to the coming-to-be or passing-away of qualities (or quantity) in a subject, it is easy for Aristotle to show, in the case of Empedocles, that elimination of change in the categories of quality and

p. 96, and each thing-that-is is characterized by being "(1) ungenerable and indistructible, (2) indivisible, (3) immobile, and (4) complete or perfect," *ibid.*, p. 69. Curd argues that these criteria do not exclude multiplicity and difference between the things-that-are: "it seems that Parmenides did not think that external differences cause internal differences," *ibid.*, p. 96, and hence, while a thing-that-is "must be a predicational unity [i.e. must comply with the four criteria set out above], Parmenides' theory leaves open the question of how many such entities there are," *ibid.*, p. 97. She sees the first generation of post-Parmenidean philosophers as merely developing different possible explanations for what the things-that-are are like, and how they interact to generate the world we know.

While Curd's arguments are interesting, I am not convinced that numerical plurality was allowed by Parmenides's theory, given the universal early testimony in favor of his holding to the position that *τὸ ἔον* is not just one internally, but unique and exclusive of multiplicity. Furthermore, Parmenides argues so strongly for the unicity of being that it would have been hard for him to have missed the resulting difficulties that his position raises for the multiplicity of *τὰ ὄντα*. We can assume that had he wished to allow for numeric multiplicity of that-which-is, he would have dedicated a portion of his poem to addressing such an obvious problem; the fact that he did not (in the fragments we preserve and in the doxography) is strong evidence in favor of the position that Parmenides *was* a numerical monist, and not just a 'predicational monist' as Curd holds.

³⁹*On Generation and Corruption*, 314b1-13.

quantity would produce absurd results, for it would be impossible for a thing to grow or diminish while retaining the same ‘essence’ or description; likewise, it would be impossible for something which is black to become white. Nevertheless, this is precisely what we observe happening.⁴⁰ Thus we can conclude that “τοῖς δὲ τὰ γένη πλείω ποιοῦσι διαφέρειν τὴν ἀλλοίωσιν τῆς γενέσεως,”⁴¹ and hence there is a necessity for a distinct kind of *ὄν* in the categories of quality or quantity, since from the being of a substance we cannot derive that of the supervening quality or quantity that is hosted by the substance.

In the case of Empedocles, we can extend Aristotle’s argument to show that other categories are also necessary within his theory. For instance, Empedocles states that “τοτὲ μὲν γὰρ ἐν ηὔξηθη μόνον εἶναι ἐκ πλεόνων . . . καὶ ταῦτ’ ἀλλάσσοντα διαμπερὲς οὐδαμὰ λήγει, ἀλλοτε μὲν Φιλότητι συνερχόμεν’ εἰς ἐν ἄπαντα, ἀλλοτε δ’ αὖ δίχ’ ἔκαστα φορεύμενα Νείκεος ἔχθει.”⁴² But for the One to ‘sunder’ or ‘reunite,’ there must be change in the category of place. And while Empedocles denies change within the ‘roots’ themselves, the elements must be able to interact, and this requires the positing of the categories of action and passion.⁴³ A similar argument can be made for Anaxagoras’s ‘seeds,’ with the addition that since Anaxagoras admits the divisibility of his *ἀρχαῖ*, he must also admit the category of quantity.

In the case of Democritus and Leucippus, we can make a similar argument to demonstrate that the categories of substance, place and action/passion

⁴⁰On *Generation and Corruption*, 314b14-315a2.

⁴¹On *Generation and Corruption*, 314b3.

⁴²DK31B17.

⁴³I will discuss this issue further in section 2.4.4.

Aristotle on Higher Natures

must be admitted in the Atomist account. In addition, it can be shown that he also needs the category of quantity. While the atoms are miniature versions of the Parmenidean ‘One,’ as discussed in Chapter 1, and thus are eternally what they are, he is said to have asserted a common ‘body’ or *σῶμα* which has a common character. Aristotle points out that this ‘common body’ is a basis for other ways of being which are not reducible to *σῶμα*: “Δημόκριτος δ’ οὐδὲν ἔτερον ἐξ ἔτέρου γίγνεσθαι τῶν πρώτω φησίν ἀλλ’ ὅμως γε αὐτῷ τὸ κοινὸν σῶμα πάντων ἐστὶν ἀρχή, μεγέθει κατὰ μόρια καὶ σχήματι διαφέρον.”⁴⁴ Since it is not the same to be *σῶμα* as it is to be a *σῶμα* of one or another size, or a *σῶμα* of a given figure, we can derive the categories as irreducible ways of being within the Atomist account, even if they are not categories in which change occurs.

2.2.3 Conclusions concerning categorial being

In this investigation regarding the second of several ‘ways of being’ that Aristotle identifies at *Metaphysics* V.7, we have shown that Aristotle’s categorial analysis of being applies as much to the accounts of the *φυσιολόγοι* as it does to the particular theory that Aristotle himself proposes of the ‘elements’ (Aristotle’s theory of the ‘simple bodies,’ which correspond in a rough way to Empedocles’s fourfold roots).

How does this discovery affect Aristotle’s argument for the existence of higher *φύσεις*, which is the focus of this study? An initial response might be that it affects it little, if at all—the question is, after all, whether in the cat-

⁴⁴*Physics*, 203a33-25.

egory of *οὐσία* there are natures higher than those of the elements, and this is yet to be shown. Nevertheless, Aristotle can legitimately claim to have demonstrated real kinds of being which are above and beyond the physical *ἀρχαί* (i.e. basic bodies underlying more complex beings) posited by the *φυσιολόγοι*, whatever the genuine character of those *ἀρχαί* might be. Having demonstrated that there are in fact other ‘ways of being’ than eternal self-identity, it becomes harder for the *φυσιολόγοι* to assert the necessity of eternal simple bodies, which they originally postulated precisely in order to not fall victim to the Parmenidean argument prohibiting that what ‘is’ might cease to be.⁴⁵ If ‘being’ is more than necessary self-identity, as it must be if we are to admit change, then we can no longer assert that the only road of inquiry is that “ἢ μὲν ὅπως ἔστιν τε καὶ ὡς οὐκ ἔστι μὴ εἶναι.”⁴⁶ If Aristotle is right that the *φυσιολόγοι* based their proposals of eternal phys-

⁴⁵Guthrie notes that “Leucippus looked rather to Parmenides, whose theory he modified only in the minimal ways just mentioned. What exists must still be ungenerated and imperishable, unchangeable, incapable of being added to or subtracted from, homogeneous, finite and a plenum, continuous and indivisible” Guthrie, *A History of Greek Philosophy*, p. 392, and Naddaf interprets Empedocles in a similar manner: “When examining Empedocles’s poem *Peri phuseos*, the first thing of note is that he clearly wants to accommodate the consequences of Parmenides’s way of truth. In fact, Empedocles actually castigates his contemporaries and predecessors for failing to recognize the new sine qua non of any *peri phuseos* account: that nothing can come into existence from what did not previously exist,” Naddaf, *The Greek Concept of Nature*, p. 141.

Leszl’s view, on the contrary, is that interpreting Empedocles and Leucippus as attempting to reconcile the “new Parmenidean logic” with the indisputable fact of change is “still possible... but this hypothesis does not explain the great differences between their positions, and does not provide them with a satisfactory reply to Parmenides. Even to postulate a ‘combination’ of immutable elements, which did not exist before, would go against his exclusion of a passage from not-being to being,” Leszl, “Aristotle on the Unity of Presocratic Philosophy”, p. 361. Berti, on the other hand, upholds the traditional view that the post-Parmenidean *φυσιολόγοι* “hanno condiviso la concezione parmenidea dell’essere... oppure hanno infranto l’unità dell’essere, conservando tuttavia l’omogeneità e l’immutabilità delle sue parti, fossero queste i quattro elementi (Empedocle), i semi di tutte le cose (Anassagora) o gli atomi (Leucippo e Democrito),” Berti, “L’essere e le sue regioni”, p. 345.

⁴⁶DK28B2.

Aristotle on Higher Natures

ical *ἀρχαῖ* on a modified Parmenidean argument,⁴⁷ then the failure of this argument also substantially weakens their ability to assert the existence of such *ἀρχαῖ*.⁴⁸

Indeed, we might go farther, and note that, since Aristotle has demonstrated the existence of deeper *ἀρχαῖ* than those which the *φυσιολόγοι* postulated, i.e. the formal and material *ἀρχαῖ* derived in *Physics I*, he has also undermined the ‘eternity’ of the physical *ἀρχαῖ* that they propose. If all mobile being is ultimately composed of formal and material principles, with the material principle being the potential *ἀρχή*, then the physical *ἀρχαῖ* proposed by the *φυσιολόγοι* cannot be eternal if the material principle is not such as to prohibit passing away. Aristotle contends, in *On the Heavens I.12* (281a28-b25) that unless a contingent being is absolutely indestructible, it must pass away given an infinite extent of time.⁴⁹ But if in Aristotle’s view the absolute indivisibility (and hence indestructibility) of the physical *ἀρχαῖ* of the *φυσιολόγοι* was derived from the Parmenidean argument, as *On Generation and Corruption* 325a24-b12 appears to suggest, then Aristotle can claim that the basis for the materialist argument for immutable ‘elements’ would stand or fall along with the Parmenidean argument itself.

The hypothesis (following Guthrie, Naddaf and Berti) that the Atomists, Empedocles and Anaxagoras depend on the Parmenidean argument—that

⁴⁷See the discussion in Chapter 1, p. 34.

⁴⁸In the following section, on noetic and real being, I will explore Aristotle’s explanation of the fundamental Parmenidean mistake, so that it will become clear why ‘real’ being is not the same as necessarily self-identical being.

⁴⁹“εἰ δέ τι ἄπειρον χρόνον ἔχει πλειόνων δύναμιν, οὐκ ἔστιν ἐν ἀλλῷ χρόνῳ, ἀλλὰ τοῦθ' ἄμα. Ωστ' εἴ τι ἄπειρον χρόνον ὃν φθαρτόν ἔστι, δύναμιν ἔχοι ἀν τοῦ μὴ εἶναι. εἰ δὴ ἄπειρον χρόνον, ἔστω ὑπάρχον δ δύναται. ἄμα ἄρ' ἔσται τε καὶ οὐκ ἔσται κατ' ἐνέργειαν,” *On the Heavens*, 281b17-b22.

what is cannot change, because that would require it not being what it is, which cannot even be thought—would account for why all of these thinkers considered their basic units of being to be immutable. Leucippus and Democritus, for instance, postulate atoms which are so simple that no division, and hence no corruption, can affect them. Thus the name ‘ἄτομος.’ But the atoms are not in fact completely simple, since they are postulated to have size and form.⁵⁰ What, then, accounts for their not being able to change form, like gold that melts and reforms in another shape without ever being divided? The fact that the Atomists associate their atoms with Being (and the vacuum as Non-Being) suggests strongly that their immutability is a legacy of Parmenides’s argument, since each atom (Being) cannot become what it is not, since it is ‘unthinkable’ that this should occur. Similarly for the four ‘roots’ of Empedocles⁵¹: the reason that each has its own eternal ‘office’ and cannot change characteristics to become a different root is again a strong indication that Empedocles is also in agreement with, and is dependent upon, the dictum of Parmenides. Anaxagoras is in a similar situation with regards to his immutable ‘seeds’ which cannot come to be nor pass away nor change to become other.

I believe that the hypothesis I have just enumerated is plausible, and would strengthen Aristotle’s position vis-à-vis the *φυσιολόγοι*, since if Parmenides’s argument were to fail, the basis for the immutability of their basic units of being would be undermined. They would then be in the same position as Aristotle, who does indeed posit eternal (and thus absolutely

⁵⁰Cf. *Metaphysics*, 985b04-21.

⁵¹Cf. DK31B17, 27-35.

Aristotle on Higher Natures

indestructible) physical beings, i.e. the celestial objects. These beings are eternal and indestructible because of their special ‘fifth’ matter, which does not admit of passing away.⁵² Similarly, if the *φυσιολόγοι* wish to assert the eternity of the ‘*στοιχεῖα*’ (using Aristotle’s term), as far as Aristotle is concerned they would need other arguments, such as those that he himself adduces for the eternity of the celestial beings.

Against my reading of the relationship between Parmenides and the *φυσιολόγοι* of the succeeding generation is the fact that Aristotle nowhere argues explicitly for the position I have hypothesized as being his; *On Generation and Corruption* 325a24-b12 is at best suggestive of such an argument. Secondly, we have a doxographic report (through Aëtius) of Epicurus’s position on the indestructibility of the atoms,⁵³ wherein he postulates that there are no atoms in the shape of an anchor, or of a trident, etc., since these are fragile figures, and atoms must be “incorruptible, not being subject to external forces.” If we presume that Epicurus had access to the original writings of Democritus, it is strange that he does not mention the argument of Parmenides as grounding for the indestructibility of the atoms, instead of their merely having strong shapes. At the very least, this gives reason for believing that Democritus never explicitly linked his own arguments with those of Parmenides, at least in this regard. Nonetheless, there are various possibilities as to why they might not have mentioned Parmenides, in addition to possibility that they were not dependent upon him.

⁵²Cf. *On the Heavens*, 269b14-16.

⁵³Aëtius I, 3, 18 (*Dox.* 285-286; 270 *Us.*); cited in Luria, *Democrito*, p. 315.

Despite these reservations about my hypothesis, I nevertheless hold it to be a plausible one, which expresses a position Aristotle might well have taken in his arguments with the *φυσιολόγοι*. It would certainly make easier his task of defending his thesis of ‘higher *φύσις*’ against these philosophers, since an important support for their positions about the incorruptibility of their various basic units of being would be undermined were the Parmenidean argument to be found to be false. I discuss a further Aristotelian critique of Parmenides’s position in the following section.

2.3 Real vs. noetic being

In *Metaphysics* V.7, Aristotle describes the various ways in which the term ‘*ὄν*’ may be used, one of which is the ‘categorial’ sense that I have described in the previous section. There are several other ways of using this term, which are transversal to the categories, in that they can be applied equally within any of the categories. The other three ways of using the term ‘*ὄν*’ are: as ‘being *per accidens*’ or as ‘being *per se*’ (*τὸ δὲ τὸ κατὰ συμβεβηκός* and *τὸ δὲ τὸ καθ' αὐτό*), ‘being in act’ or ‘being in potency’ (*τὸ δὲ τὸ δυνάμει* or *τὸ δὲ τὸ ἐντελεχείᾳ*), and finally ‘being as true’ or ‘non-being as false’ (*τὸ δὲ μὴ εἶναι ὅτι οὐκ ἀληθὲς ἀλλὰ ψεῦδος*). In this section, I will discuss the impact of Aristotle’s analysis of the last of these ‘ways of being’ on the arguments of the *φυσιολόγοι*, in particular showing why, from an Aristotelian perspective, Parmenides’s argument does not extend to real being.

2.3.1 The characteristics of noetic being

Aristotle explains ‘being as true or false’ in the following way: “*ἔτι τὸ εἶναι σημαίνει καὶ τὸ ἔστιν ὅτι ἀληθές, τὸ δὲ μὴ εἶναι ὅτι οὐκ ἀληθὲς ἀλλὰ ψεῦδος, ὁμοίως ἐπὶ καταφάσεως καὶ ἀποφάσεως, οἷον ὅτι ἔστι Σωκράτης μου·σικός, ὅτι ἀληθὲς τοῦτο, ἢ ὅτι ἔστι Σωκράτης οὐ λευκός, ὅτι ἀληθές: τὸ δ’ οὐκ ἔστιν ἡ διάμετρος σύμμετρος, ὅτι ψεῦδος.*”⁵⁴ This sense of being, which I will term ‘noetic,’ has also been called ‘gnoseological’ or ‘veritative,’ for its connection to knowledge and to truth, respectively. I will use the term ‘noetic,’ since this term highlights the fact that this kind of being exists in the *νοῦς* of a rational being, and not elsewhere.⁵⁵ Where he introduces this sense of the term ‘*ὄν*,’ he describes it in terms of judgment or predication: this kind of being exists when a ‘way of being’ is asserted of a subject, as in saying that “Socrates is white,” or that “the diagonal is commensurate.” ‘Being’ is associated with true judgment, i.e. asserting of Socrates that he is white, when in fact he is. ‘Non-being,’ on the other hand, is associated with falsehood, i.e. when one asserts that the diagonal is commensurate with the side, when in fact it is not.⁵⁶

Since noetic being pertains to judgments, this ‘way of being’ has certain peculiarities that derive from its character as something having its existence in the mind.⁵⁷ In particular, a judgment consists fundamentally of a predicate of some kind (the predicate will fall into one of the ‘*τὰ σχήματα*

⁵⁴ *Metaphysics*, 1017a9-b9.

⁵⁵ “οὐ γάρ ἔστι τὸ ψεῦδος καὶ τὸ ἀληθές ἐν τοῖς πράγμασιν· οἷον τὸ μὲν ἀγαθὸν ἀληθὲς τὸ δὲ κακὸν εὐθὺς ψεῦδος· ἀλλ’ ἐν διαινοΐᾳ,” *Metaphysics*, 1027b24-26.

⁵⁶ “τὸ ὄν τὸ ἀπλῶς λεγόμενον λέγεται πολλαχῶς... ἔτερον δὲ τὸ ὡς ἀληθές, καὶ τὸ μὴ ὄν ὡς τὸ ψεῦδος,” *Metaphysics*, 1026a31-b3.

⁵⁷ As Brentano puts it, “judgment itself is the subject to which being belongs as a predicate,” *On the Several Senses of Being in Aristotle*, p. 23.

*τῆς κατηγορίας*⁵⁸) which is either composed with (via *καταφάσις*) or divided from (via *ἀποφάσις*) a subject. This operation of the intellect operates, therefore, on predicates and subjects, which themselves have the form of a *λόγος* ('concept' or 'account,' depending on context) or an *εἶδος* (considered as noetic form, not as formal act).⁵⁹ Noetic being, in turn, is subordinate to and derived from 'ἢν κυρίως,' that which truly is—the self-subsistent *οὐσία* to which being pertains primarily, and the separations and compositions to be found in existing beings.⁶⁰

The *λόγος* or 'account' is the noetic correlate to the formal act in the mobile beings which we know through our senses. While the Aristotelian epistemology is too complex to treat here (and has been well treated elsewhere⁶¹), we can briefly note that 'understanding' of a being in the world comes about through a process of 'separation' of the formal aspect of that being, first through reception of its sensible form,⁶² which the *νοῦς* can separate to derive intelligible form.⁶³ The important thing to note is that 'un-

⁵⁸Cf. *Metaphysics*, 1026a31-b3.

⁵⁹Cf. de Garay, *Los sentidos de la forma en Aristóteles*, p. 56.

⁶⁰"ἐπεὶ δὲ ἡ συμπλοκὴ ἔστιν καὶ ἡ διαιρέσις ἐν διανοίᾳ ἀλλ᾽ οὐκ ἐν τοῖς πράγμασι, τὸ δ᾽ οὔτως ὃν ἔτερον ὃν τῶν κυρίων—ἢ γὰρ τὸ τί ἔστιν ἢ ὅτι ποιὸν ἢ ὅτι ποσὸν ἢ τι ἄλλο συνάπτει ἢ ἀφαιρεῖ ἡ διάνοια, τὸ μὲν ὡς συμβεβηκὸς καὶ τὸ ὡς ἀληθῆς ὃν ἀφετέον—τὸ γὰρ αἴτιον τοῦ μὲν ἀριστον τοῦ δὲ τῆς διανοίας τι πάθος, καὶ ἀμφότερα περὶ τὸ λοιπὸν γένος τοῦ ὄντος, καὶ οὐκ ἔξω δηλούσιν οὖσάν τινα φύσιν τοῦ ὄντος," *Metaphysics*, 1027b32-1028a2.

⁶¹I have found Jonathan Lear's *Aristotle: The Desire to Understand* (Cambridge, 1995) to be useful, in particular Chapter 4 (pp. 96-151).

⁶²"ἡ μὲν αἰσθησίς ἔστι τὸ δεκτικὸν τῶν αἰσθητῶν εἰδῶν ἄνευ τῆς ὥλης, οἷον ὁ κηρὸς τοῦ δακτυλίου ἄνευ τοῦ σιδήρου καὶ τοῦ χρυσοῦ δέχεται τὸ σημεῖον, λαμβάνει δὲ τὸ χρυσοῦν ἢ τὸ χαλκοῦν σημεῖον, ἀλλ᾽ οὐχ ἢ χρυσὸς ἢ χαλκός· ὁμοίως δὲ καὶ ἡ αἰσθησίς ἐκάστου ὑπὸ τοῦ ἔχοντος χρῶμα ἢ χυμὸν ἢ φόφον πάσχει, ἀλλ᾽ οὐχ ἢ ἔκαστον ἐκείνων λέγεται, ἀλλ᾽ ἢ τοιοῦδι, καὶ κατὰ τὸν λόγον," *On the Soul*, 424a17-24.

⁶³"εἰ δῆτε τὸ νοεῖν ὡσπερ τὸ αἰσθάνεσθαι, ἢ πάσχειν τι ἄν εἴη ὑπὸ τοῦ νοητοῦ ἢ τι τοιοῦτον ἔτερον. ἀπαθέτης ἄρα δεῖ εἶναι, δεκτικὸν δὲ τοῦ εἴδους καὶ δυνάμει τοιοῦτον ἀλλὰ μὴ τοῦτο, καὶ ὁμοίως ἔχειν, ὡσπερ τὸ αἰσθητικὸν πρὸς τὰ αἰσθητά, οὕτω τὸν νοῦν πρὸς τὰ νοητά," *On the Soul*, 429a14-19. While traditionally this process has been termed 'abstraction,' J. J. Cleary has argued convincingly that the term *ἀφαίρεσις* has as its core meaning "a logical method which allows

Aristotle on Higher Natures

derstanding' a mobile being involves a process of separation of the formal aspect from the material; that which is thought is the *λόγος* of the thing, but the thing itself, *as real*, is not in the mind.

Proof of this can be seen in the differences between being in the mind (noetic being) and real, physical being. As Aristotle has shown, physical being is characterized necessarily by having a formal and a material aspect. The formal aspect, since it is a determination and a 'limiting' of being, is understandable and thinkable once it has been 'separated' (*χωριζός*) in the mind, and this separation does not falsify the thing thought⁶⁴ (since there is a relation of analogy between the thing as thought and the thing as real, which allows for genuine knowledge of the object⁶⁵). Nevertheless, matter is, *per se*, unintelligible: “ἡ δ' ὥλη ἄγνωστος καθ' αὐτήν.”⁶⁶ Our knowledge of matter is only by analogy, “ἡ δὲ ὑποκειμένη φύσις ἐπιστητὴ κατ' ἀναλογίαν,”⁶⁷ for matter, as such, is that which is undetermined and afor- mal (in potency to receive form, but prior to its reception). Thus, we cannot know the thing in all of its reality, since the material aspect of its being es- capes being known in itself.

Further, the physical world is characterized by motion and by coming to be and passing away,⁶⁸ whereas forms as thought are neither mobile⁶⁹

one to intellectually isolate the primary subject of a given attribute.” Cf. Cleary, “On the Terminology of ‘Abstraction’ in Aristotle”, pp. 22-23.

⁶⁴“διὸ καὶ χωρίζει ὁ μαθηματικὸς ἡ χωριστὰ γὰρ τῇ νοήσει κινήσεώς ἔστι, καὶ οὐδὲν διαφέρει, οὐδὲ γίγνεται ψεῦδος χωριζόντων,” *Physics*, 193b32-35.

⁶⁵Cf. de Garay, *Los sentidos de la forma en Aristóteles*, p. 132.

⁶⁶*Metaphysics*, 1036a8-9.

⁶⁷*Physics*, 191a7-8.

⁶⁸Cf. *Metaphysics*, 1069a31-b2.

⁶⁹“χωριστὰ γὰρ τῇ νοήσει κινήσεώς ἔστι,” *Physics*, 193b34.

nor generable nor corruptible.⁷⁰ While one can think things which do not exist as real, one cannot think them *as moving*, since they must ‘exist in act’ in order to move.⁷¹ The lack of motion in noetic being, and the analogical distance between being in the mind and being in physical reality, is also insinuated by Aristotle’s own terminology for speaking of the essence or ‘quiddity’ of a being—‘τὸ τί ἦν εἶναι,’ or ‘what it *was* to be’—the essence as known is immobile and fully determined, as the past too is immobile and fully determined.⁷² Thus, our knowledge of mobile things is *qua* mobile (for the essence of the thing, as known, includes its materiality⁷³), but not as being *in movement*, for intellection and judgment take place over the things as known apart from their motion in time.⁷⁴

⁷⁰“Ἐπεὶ δὲ οὐσία ἔτέρα, τό τε σύνολον καὶ ὁ λόγος (λέγω δὲ ὅτι ή μὲν οὕτως ἐστὶν οὐσία, σὺν τῇ ὑλῇ συνειλημμένος ὁ λόγος, ή δὲ ὁ λόγος ὅλως), ὅσαι μὲν οὖν οὕτω λέγονται, τούτων μὲν ἐστι φθορά (καὶ γὰρ γένεσις), τοῦ δὲ λόγου οὐκ ἐστιν οὕτως ὡστε φθείρεσθαι (οὐδὲ γὰρ γένεσις, οὐ γὰρ γίγνεται τὸ οἰκίᾳ εἶναι ἀλλὰ τὸ τῆδε τῇ οἰκίᾳ), ἀλλ’ ἄνευ γενέσεως καὶ φθορᾶς εἰσὶ καὶ οὐκ εἰσὶν δεδεικταὶ γὰρ ὅτι οὐδεὶς ταῦτα γεννᾷ οὐδὲ ποιεῖ,” *Metaphysics*, 1039b20-30.

⁷¹“δοκεῖ γὰρ ή ἐνέργεια μάλιστα ἡ κίνησις εἶναι, διὸ καὶ τοῦς μὴ οὖσιν οὐκ ἀποδιδόσαι τὸ κινεῖσθαι, ἀλλας δέ τινας κατηγορίας, οῶν διανοητὰ καὶ ἐπιθυμητὰ εἶναι τὰ μὴ ὄντα, κινούμενα δὲ οὖ, τοῦτο δὲ ὅτι οὐκ ὄντα ἐνέργειά ἔσονται ἐνέργειᾳ. τῶν γὰρ μὴ ὄντων ἔντα δυνάμει ἐστὶν οὐκ ἐστι δέ, ὅτι οὐκ ἐντελεχείᾳ ἐστίν,” *Metaphysics*, 1047a30-b3.

⁷²Cf. de Garay: “De este modo, [ἡν] considered as indicating anteriority] sería una referencia a la prioridad de la forma en tanto que la esencia y lo necesario anteceden a lo concreto contingente y accidental. El imperfecto 'era' aludiría así a la anterioridad de la forma frente a lo que existe distendido en el tiempo y sufre cambios. 'Era' señalaría así una prioridad no temporal de la forma, previa precisamente a la distinción por el tiempo. En este sentido, τὸ τί ἦν εἶναι se referiría a aquel sentido de forma inmutable por encima del cambio, que es el fin: cfr. Met., VIII.4, 1044 a 36-b1” de Garay, *Los sentidos de la forma en Aristóteles*, 60-61, n. 81.

⁷³“οὐθενὸς γὰρ ἄνευ κινήσεως ὁ λόγος αὐτῶν, ἀλλ’ ἀεὶ ἔχει ὑλην,” *Metaphysics*, 1026a2.

⁷⁴De Garay states this as follows: “Respecto a las diferencias y determinaciones en las cosas naturales frente a los nombres y lo pensado, baste por ahora una observación: ‘ninguna de las cosas naturales puede prescindir del movimiento en su enunciado, y siempre implican materia’ (Met. VI.1, 1026a2-3). El mundo físico se caracteriza frente a lo pensado porque incluye movimiento y materia. Cuando se piensa algo físico, en cambio, se le priva de su movilidad y de su materia: el caballo pensado carece de su actividad natural, de su peso y tamaño... Por eso, las diferencias y determinaciones físicas han de articularse con el movimiento y la materia; y, en consecuencia, la realidad natural dotada de movimiento y materia difiere de la presencia de la misma realidad natural en tanto que objeto pensado,”

2.3.2 The Parmenidean error and the φυσιολόγοι

The Parmenidean error, from the point of view of Aristotle's metaphysics, can be explained as a consequence of a subtle confusion between noetic being—first of all, being as truth, and secondly, the characteristics of the components of being as truth, i.e. concepts or *λόγοι*—and real being. Parmenides gives the heart of his argument in fragment II⁷⁵ of his poem. In this fragment, he teaches that there are two ways of inquiry that can be followed. In line 3 he gives the first of these two ways, namely that “it is” and “it cannot be that it is not.”⁷⁶ Secondly, in line 5, he states the second path of inquiry, “it is not, and it is necessary that it not be”; he quickly notes, in line 6, that “this is a path which is wholly unknowable.” From this basis, Parmenides is able to deduce the attributes of *τὸ ἔόν* in fragment VIII, namely that “Being is ungenerated and imperishable, whole, unique, immovable and complete. It was not once nor will it be, since it is now altogether, one,

de Garay, *Los sentidos de la forma en Aristóteles*, p. 53.

⁷⁵DK28B2.

*Eἰ δ’ ἄγ’ ἐγών ἐρέω, κόμισαι δὲ σὺ μῦθον ἀκούσας,
αἴπερ ὁδοὶ μοῦναι διξήσιός εἰσι νοῆσαι·
ἡ μὲν ὅπως ἔστιν τε καὶ ὡς οὐκ ἔστι μὴ εἶναι,
Πειθοῦς ἔστι κέλευθος - Ἀληθείῃ γὰρ ὀπηδεῖ - ,
ἡ δ’ ὡς οὐκ ἔστιν τε καὶ ὡς χρεών ἔστι μὴ εἶναι,
τὴν δὴ τοι φράζω παναπευθέα ἔμμεν ἀταρπόν·
οὔτε γὰρ ἂν γνοίης τό γε μὴ ἔόν - οὐ γὰρ ἀνυστόν -
οὔτε φράσαις.*

⁷⁶Tarán's translation has “exists”, holding that there is no implicit subject: “ἔστιν and οὐκ ἔστιν in lines 3 and 5 are used as impersonals, and no subject has to be understood with them,” Tarán, *Parmenides, A Text with Translation, Commentary and Critical Essays*, p. 36. However, in translating Parmenides I follow Owen, who holds (with most exegetes) that there is in fact an implicit subject, *τὸ ἔόν* [what is]. (Owen is cited in Guthrie, *A History of Greek Philosophy*, p. 15).

continuous.”⁷⁷

The root cause of Parmenides’s subtle error, from an Aristotelian perspective, is explained by E. Alarcón in the following manner.⁷⁸ We note that at the very core of Parmenides's argument, there is an implicit assertion of the Principle of Non-Contradiction (PNC), i.e. that “what is” cannot not be. This principle, which Aristotle develops in Book IV of the Metaphysics, is the first principle of knowledge. In Book II, furthermore, he states that that which is maximally true is cause of the true. Hence, Parmenides's argument implicitly rests on the highest truth, on which all other truths depend. However, the PNC is the highest truth because it is necessary, and therefore provides full certainty, which is a requirement for knowledge in its full sense. But, the necessity of this judgment, which is the PNC, provides eternality, and this assimilates it to the atemporality of concepts (*λόγοι*). Therefore one can easily understand how Parmenides, arguing on the basis of the PNC, could confuse this foundational principle, which is an atemporal truth, with the analysis of the notion of being, which is not a judgment nor a truth nor is being as truth, but which is atemporal and immobile, as corresponds to the status of concepts in the mind, as discussed above.

A further clue to the soundness of this analysis is found in fragment

⁷⁷Translation from Tarán, *Parmenides, A Text with Translation, Commentary and Critical Essays*, p. 85. Tarán (177) holds that this description does not imply atemporality, but it seems abundantly clear from the denial of tense associated with *τὸ ἐόν* that Parmenides is not merely denying that it is ungenerated and incorruptible, but that it exists only in a ‘now’ without duration. This is also, as Tarán (176) points out, the opinion of a majority of commentators.

⁷⁸Personal conversation, March 30, 2011.

Aristotle on Higher Natures

III, “τὸ γὰρ αὐτὸν νοεῖν ἐστίν τε καὶ εἶναι,”⁷⁹ where we see that Parmenides is identifying the characteristics of that which is thought and that which *is*, in his strong sense. That which is thought are concepts and judgments, but only one judgment can be thought, “ἐστίν,” which in turns points to that which is, or *τὸ ἔόν*. But *τὸ ἔόν* as thought is a concept, and it is this concept to which Parmenides applies the characteristics of being found in fragment VIII, cited above. Hence it becomes clear that the Eleatic focused on being and its oneness at the conceptual level, where intelligibility results from formality: “οὐ μὴν ἀλλὰ τοσοῦτόν γε οἰκεῖόν ἐστι τῇ νῦν σκέψει. Παρμενίδης μὲν γὰρ ἔοικε τοῦ κατὰ τὸν λόγον ἐνὸς ἀπτεσθαι...”⁸⁰ And indeed, being at the conceptual level is precisely characterized by its absolute immobility and indivisible oneness: “Así pues, cabe caracterizar a la forma según el principio de contradicción, como esencia, definición, unicidad, necesidad, perfección, acabamiento, inmovilidad, mismidad, fijeza, negación, determinación, diferencia, alteridad, presencia.”⁸¹ As Curd has noted, this is how Parmenides characterizes *τὸ ἔόν*: “[there are] four signs of what-is. It is

⁷⁹DK28B3

⁸⁰Metaphysics, 986b19. Cf. Boeri, “Aristóteles contra Parménides: el problema del cambio y la posibilidad de una ciencia física”, p. 63: “No es cierto, por tanto, que Aristóteles no haya tenido en cuenta el hecho de que el ser del que habla Parménides es el ser inmutable que se manifiesta en el pensamiento. Precisamente porque advierte que el ser del que habla Parménides es el ser inmutable que, en cierto modo, implica la no existencia o el no ser de los fenómenos como tales es que la ontología de Parménides no se ajusta al verdadero estado de cosas.”

⁸¹De Garay, *Los sentidos de la forma en Aristóteles*, p. 58. Cf. also Cherniss, *La crítica aristotélica a la filosofía presocrática*, 95, n. 298: “Basta por el momento comprender que los eleátas enfatizaban la realidad inmutable, que se manifiesta en el pensamiento y en los objetos del pensamiento, como opuesta a la inestabilidad de los fenómenos físicos, y que, a la manera de los que efectúan un descubrimiento sorprendente, reservaron al nuevo concepto el derecho exclusivo a la consideración. Pero no es imposible que, encima de eso, hubieran considerado a este Ser trascendental como de algún modo físico, aun cuando sostuvieron sin duda que era diferente de cualquier cosa perceptible.”

(1) ungenerable and indestructible, (2) indivisible, (3) immobile, and (4) complete or perfect.”⁸² But this immobility, indivisibility and absolute perfection and completeness is a result of the necessity for determination in the concept or *λόγος*, and it is illicit to apply to real being the characteristics of *τὸ ἐόν qua* concept.⁸³ It is not the same to be thought and to be, pace Parmenides.⁸⁴ The notion of being, much like our concept of ‘white,’ is derived from our experience and our intellective grasping of things which truly are, and depends on those things for its meaning: “οὐ γὰρ ἔσται ὅν τι αὐτὸ εἶναι, εἰ μὴ πολλὰ τὸ ὅν σημαίνει οὕτως ὥστε εἶναι τι ἔκαστον.”⁸⁵

⁸²Curd, *The Legacy of Parmenides*, p. 69.

⁸³“De Caelo 298 B 21-24 informa que ni [Parmenides] ni [Meliso] creía en la existencia de algo que no fuese la sustancia sensible, pero aquí la doctrina eleática es explicada al decirse que esos hombres advirtieron que los objetos del pensamiento deben ser invariables y eternos, y aplicaron estas características al mundo sensible,” Cherniss, *La crítica aristotélica a la filosofía presocrática*, 41, n. 85. As Guiu points out, this text from *De caelo* “es importante sobre todo porque añade el error que, a juicio de Aristóteles, subyace en la concepción eleática de la realidad: la transferencia de lo que sólo es verdad en el orden inteligible al orden de lo sensible. Lo que es verdadero para el pensar no necesariamente ha de ser verdadero para el ser (sensible), precisamente porque la naturaleza espiritual del *nous* impone unas características que no se hallan en la realidad sensible,” Guiu, “La lectura de Parménides en la *Física* de Aristóteles”, p. 34.

⁸⁴DK28B3. Kahn points out that Parmenides is upholding a form of a correspondence theory of truth, and that (like Aristotle) he applies to the real “the logical laws (excluded middle, non-contradiction, identity) which he has discovered in thought and language”; also like Aristotle, these laws “are understood by him as constituting the very structure of the real,” Kahn, “The Thesis of Parmenides”, p. 723. The difference is that unlike Aristotle, Parmenides does not acknowledge that the correspondence of the noetic and the real in regards to these laws does not rule out the possibility that in other regards real being may have characteristics that differ from those of being as thought.

The fact that Parmenides does not distinguish the existential and predicative senses of *τὸ ἐόν/εἶναι* is suggestive (cf. Kirk and Raven, *The Presocratic Philosophers*, pp. 270-1): given his dramatic emphasis on the univocity of these terms, it is less surprising that he would have been unable or unwilling to concede the possibility of a distinction between noetic and real being, and hence the possibility of real being having properties distinct from that of noetic being. Verbeke notes that Parmenides felt justified in rejecting the consideration of such properties, such as change or becoming, insofar as they are “not liable to any rational interpretation,” Verbeke, “The Meaning of Potency in Aristotle”, p. 59. The task of Aristotle in the *Physics* will precisely be to show that change and becoming are able to be given a rational interpretation.

⁸⁵*Physics*, 186b1; see also the discussion in Chapter I.3 of the *Physics* on the difficulties

Aristotle on Higher Natures

Given that it is illicit to apply uncritically the characteristics of noetic being to the ambit of the real, then if we accept Guthrie, Naddaf and Graham's (and my) hypothesis of the dependence of most of the *φυσιολόγοι* on the Parmenidean argument, as explained in the previous chapter, we can see that it will be equally illicit for these *φυσιολόγοι* to deny substantial change (i.e. *γένησις* and *φθορά*) within the category of substance. Since it is only at the noetic level that 'that which is' cannot cease to be what it is, these *φυσιολόγοι* will no longer have their justification for denying substantial change—coming to be and passing away—of *οὐσίαι*, those things which truly are, in the primary sense (the material 'roots' or 'atoms,' in their own theories). It *might* be the case that the physically existing *οὐσίαι* neither come to be nor pass away (as Aristotle will argue in the case of certain other *οὐσίαι*, i.e. the celestial beings), but there would no longer be any basis for asserting that this is a necessary consequence of their *being*.⁸⁶

with Parmenides's assertion of the univocity of being. John Watson expresses the dependence of the *ἐπιστήμη* of the primary notions on experience as follows: "Now, 'science,' as we have seen, arises out of and presupposes 'experience' (*ἐμπειρία*), in which the universal is apprehended as involved in a number of instances; but it is only in 'science' that the universal is known as the universal..." Thus, in its earlier stage, intelligence is dependent upon sensible experience, from which it receives the material in which it discerns the universal," Watson, "The Metaphysic of Aristotle, II: The First Principles of Knowledge", p. 120.

⁸⁶As explained in the previous chapter (p. 36), Democritus is an exception to this dependence upon Parmenides's argument. Hence, his version of Atomism is not affected by the defect in the Eleatic's argument which I have identified here. Aristotle argues directly against Democritus in *GC* I.2 (317a1-13). His argument here is mathematically-based: Democritus errs in assuming that in a continuous magnitude, a point is adjacent to another point, such that in dividing the magnitude simultaneously at every point, the magnitude is thoroughly divided, either into points or nothing (out of neither of which can the magnitude be reconstructed). But this is not the case; points are not adjacent to each other, hence given any actual division of the magnitude, there will always remain divisible magnitudes between any two given points of the divided magnitude. As D. Sedley states, "Aristotle's aim in this is to show that, *even with an infinitely divisible continuum*, division at every point would be impossible, and thus to block off the atomist inference from the impossibility of division at every point to the non-existence of an infinitely divisible

2.3.3 Conclusions on noetic and real being

Once we focus our efforts on the physical world as the place of change, and attempt to explain how the facts about the world as we know it can be reconciled with a doctrine of being, it becomes necessary to posit that being is not univocal; that there are a number of distinct ways to say that something ‘is’ (or is a being). Up to this point, we have identified two such ‘ways of being’—the being of the categories, and noetic being—which are transversal to each other. A being may be said to be in *both* ways, as a being in one or another category, and as being noetic or real. If the hypothesis of the dependence of the *φυσιολόγοι* on Parmenides’s argument is valid, then Aristotle has thoroughly undermined the bases for the ‘eternal’ physical *ἀρχαί* postulated by the *φυσιολόγοι*, by showing that being is said multiply, and that the immobility and necessity of Parmenidean being is associated with noetic, and not real, being. Democritus, as we have seen, is a different case, and is directly refuted by Aristotle via a separate argument.

It still remains to be seen, however, *how* it can be that something which truly is what it is, can change to be something other. We see that such change is no longer prohibited, since the prohibition of change applies to being as grasped by the intellect. Nevertheless, further exploration is needed to understand how change in fact takes place. We have already, in Chapter 1, seen that mobile being is composed of a formal and a material principle. We are thus now in a position to see how these principles of mobile being provide the key to understanding the process of substantial change.

continuum—or, in other words, to the existence of atoms,” “GC I.2”, p. 79.

2.4 The doctrine of potency and act

Parmenides found himself compelled to deny the possibility of change, because change implies ‘not-being’ in some sense, and not-being precisely cannot be: “πῶς δ’ ἂν κε γένοιτο; εἰ γὰρ ἔγεντ’, οὐκ ἔστι, οὐδ’ εἴ ποτε μέλλει ἔσεσθαι.”⁸⁷ Yet he was also unable to deny the phenomena entirely, and Aristotle notes that he was forced to posit two principles in order to explain the facts of change in sensation.⁸⁸ These two principles he calls ‘hot’ and ‘cold,’ or ‘fire’ and ‘earth,’ the former of the pair associated with being, and the latter with non-being. Thus even Parmenides, whom Socrates said to be “αἰδοῦνός τέ μοι” and “δεινός τε,”⁸⁹ found himself forced to say that ‘that which is not’ somehow is.

Aristotle, too, had to face this challenge, and his response was the development of his doctrine of potency and act as ‘ways of being’ transversal to categorial and noetic being.⁹⁰ In this section, I will investigate the role that

⁸⁷DK28B8, 20.

⁸⁸“ἀναγκαῖόμενος δ’ ἀκολουθεῖν τοῖς φαινομένοις, καὶ τὸ ἐν μὲν κατὰ τὸν λόγον πλείω δὲ κατὰ τὴν αἵσθησιν ὑπολαμβάνων εἶναι, δύο τὰς αἱτίας καὶ δύο τὰς ἀρχὰς πάλιν τίθησι, θερμὸν καὶ ψυχρόν, οἷον πῦρ καὶ γῆν λέγων· τούτων δὲ κατὰ μὲν τὸ ὄν τὸ θερμὸν τάττει θάτερον δὲ κατὰ τὸ μὴ ὄν,” *Metaphysics*, 986b29-35.

⁸⁹Plato, *Theatetus*, 183e3.

⁹⁰Cf. Witt, *Ways of Being*, p. 55: “the distinction between being X potentially and being X actually is not simply another vocabulary for describing entities in the category of substance. It is a cross-categorical ontological distinction.” Similarly for Brentano, “there are as many modes of potential and actual being as there are categories; through the latter we shall understand the number of, and differences between, the former,” Brentano, *On the Several Senses of Being in Aristotle*, p. 33. G. Reale, on the other hand, sees the doctrine of potency and act connected to categorial being via the doctrine of the causes: “è evidente che l’indagine della potenza e dell’atto dovrà avere un rapporto intrinsecamente necessario anche con l’indagine delle cause, dei principî e degli elementi dell’essere e della sostanza, cioè con l’aitiologia. Materia e forma, alle quali si riducono potenza e atto, sono, precisamente: elemento, la prima, e principio e causa, la seconda, dell’essere e delle sostanze sensibili,” Reale, *Il concetto di filosofia prima*, p. 204. Potency and act, insofar as they are connected to matter and form, are cross-categorial precisely in the manner that there are matter and form in the various categories other than substance; cf. e.g.,

being as potency and act plays in Aristotle's doctrine of *φύσις*, and the conclusions that we can draw about the characteristics of *φύσις* and his ability to justify his physical doctrine against his various critics.

The doctrine of potency and act is vital to Aristotle's doctrine of *φύσις*, in showing how change is possible, for insofar as we say that something is in potency, we are saying that something that now is not, *qua* existent, is nevertheless real, insofar as it *can be* (and indeed, in some cases, must necessarily come to be). Certain aspects of this issue have already been discussed in the previous chapter, where we discussed Aristotle's derivation of the formal and material 'parts' of mobile being; nevertheless, the doctrine of potency and act goes beyond the ambit of mobile being, applying to all being *qua* being.⁹¹

I have divided this section into two overall parts. In the first part of the section, I will first focus on the doctrine of potency and act, and how it relates to *φύσις*, beginning with a discussion of the doctrine of potency and act itself, with an emphasis on those aspects which will be of importance for understanding *φύσις*. Second, I will relate potency and act to the *ἀρχαί* of form and matter, discussed in the previous chapter. Third, I will examine how Aristotle's discussion (in Book II of the *Physics*) of *φύσις* as form and as matter allows us to understand its relation to potency and act. In the second part of this section, I will discuss the 'communication' of form.

Metaphysics, 1050b22.

⁹¹Cf. *Metaphysics*, 1046a1-2, “ὅ βονλόμεθα νῦν ἐπὶ πλέον γάρ ἔστιν ἡ δύναμις καὶ ἡ ἐνέργεια τῶν μόνον λεγομένων κατὰ κίνησιν.” Cf. Owens, *The Doctrine of Being in the Aristotelian ‘Metaphysics’*, p. 403, “Change, as found in sensible things, serves ... as the basis for the study of act and potency. The goal of the investigation, however, lies beyond the order of change.”

Aristotle on Higher Natures

Aristotle's doctrine of motion and change depends heavily on his assertion that *οὐσία* can be a cause of formal actualization in other beings, so I will examine how Aristotle analyzes this process. In addition, I will examine how *φύσις* is identified as a communicator of form.

2.4.1 Potency and act as ‘ways of being’

In *Physics* I.8, Aristotle notes that the discussion of the *ἀρχαί* can be framed in several ways. First, it can be framed in terms of the contraries and the underlying, which is the manner in which he treats of the question in Book I. However, he says, “εἰς μὲν δὴ τρόπος οὗτος, ἄλλος δ' ὅτι ἐνδέχεται ταῦτὰ λέγειν κατὰ τὴν δύναμιν καὶ τὴν ἐνέργειαν...”⁹² He goes on to state that potency and act have been better treated elsewhere.⁹³ In Aristotle's classification of the sciences, potency and act pertain to metaphysics and not to physics, since they are ways of speaking about being *qua* being, and not merely being subject to change. Nevertheless, the doctrine of potency and act, insofar as it is a necessary truth drawn from metaphysical speculation, is fundamental for understanding *φύσις*, not least because, as he states in *Metaphysics* Book IX, “καὶ γὰρ ἡ φύσις ἐν ταῦτῷ γίγνεται· ἐν ταῦτῷ γὰρ γένει τῇ δυνάμει.”⁹⁴ Understanding potency and act will show how *φύσις* can be a

⁹²*Physics*, 191b28-30. Cf. also “ἡ ὑλη ἔστι δυνάμει,” *Metaphysics*, 1050a15 and “ἡ οὐσία καὶ τὸ εἶδος ἐνέργειά ἔστιν,” *Metaphysics*, 1050b2-3 (cited in Reale, *Il concetto di filosofia prima*, p. 204).

⁹³At first glance, this would appear to be a reference to Book IX (Θ) of the *Metaphysics*. Nevertheless, Jaeger dates the development of Aristotle's physical theory to a fairly early date (perhaps shortly after leaving the Academy (cf. Jaeger, *Aristoteles: Grundlegung*, pp. 325-6), whereas he analyzes the *Metaphysics* as a later work strongly dependent upon the *Physics* (cf. *ibid.*, p. 311). Perhaps this reference is a later redaction?

⁹⁴*Metaphysics*, 1049b7.

source of motion, either in the natural substance itself that the *φύσις* forms (*ἐν αὐτῷ ή αὐτό*), or in another being (*ἐν ἄλλῳ*).

In this book of the *Physics*, Aristotle has already shown how change is possible in natural substances. Why does he introduce, above and beyond the ‘parts’ of mobile being—*εἶδος* and *ὑλή*—two new senses of being *qua* being? The answer is that at the level of his metaphysical doctrine, the notion of *ἐνέργεια* points to the deepest characterization of reality, that which distinguishes it from thought as an accident of a rational being, or the immobile Ideal: to be is in some sense a ‘doing,’⁹⁵ a doing which pertains to individuals which are being what they are as subsistent *οὐσίαι*.⁹⁶ In addition, he needs to resolve the deepest Parmenidean challenge: how that which is can, in some sense, be other than it currently is, and this requires the doctrine of potency. In the following section, I will show how Aristotle argues for the necessity of postulating being *δυνάμει*, in particular against the Megarians, but also against Parmenides.

⁹⁵Strictly speaking, activity or ‘doing’ is an accident of a substantial being. Nonetheless, ‘doing’ is a useful metaphor for indicating the dynamism which characterizes being in act. This is particularly true due to the fact that we know act or *ἐνέργεια* through movement, one kind of ‘doing’: “ἐλήλυθε δὲ ἡ ἐνέργεια τοῦνομα, ἡ πρὸς τὴν ἐντελέχειαν συντιθεμένη, καὶ ἐπὶ τὰ ἄλλα ἐκ τῶν κινήσεων μάλιστα δοκεῖ γὰρ ἡ ἐνέργεια μάλιστα ἡ κίνησις εἶναι,” Aristotle, *Metaphysics*, 1047a30-b3.

⁹⁶Cf. Frede, “the [word *ἐνέργεια*] tends generally to be used by Aristotle for doings, things something does, like pushing something, melting something, reading a book, cutting a tree, puzzling over something, seeing something, and the like. Hence it is also translated as ‘activity,’” “Aristotle’s Notion of Potentiality in *Metaphysics Θ*”, p. 181.

2.4.2 The Megarians: Aristotle's argument for potency in addition to actuality

In *Metaphysics* IX.3, Aristotle presents a set of arguments against the *Μεγαρικοί*, a school of philosophers who claimed that “ὅταν ἐνεργῇ μόνον δύνασθαι, ὅταν δὲ μὴ ἐνεργῇ οὐ δύνασθαι.”⁹⁷ Why does he introduce an entire chapter of Book IX to refute the doctrine of this school? Charlotte Witt explains Aristotle's intention as follows:

Aristotle does not find the Megarian position ludicrous, because it resembles his own in certain respects. Both Aristotle and the Megarians assign ontological priority to actuality in relation to *dunamis*. Yet, Aristotle *also* wants to maintain, against the Megarians, that powers exist even when they are not active or actual... [but] he needs to explain what is wrong with their view without compromising his own position that actuality is prior to *dunamis*.⁹⁸

Witt identifies three distinct arguments in IX.3: the first part of the chapter (1046b29-a10) contains two arguments, which she identifies as the ‘Techne Argument’ and the ‘Perception Argument.’ The first of these focuses on agent powers, in this case house-building, and “argues that the Megarian posits the possession and loss of the capacity for house building without providing an explanation for this change.”⁹⁹ The ‘Perception Argument,’ on the other hand, “argues that the Megarian account of per-

⁹⁷*Metaphysics*, 1046b20.

⁹⁸Witt, *Ways of Being*, p. 23.

⁹⁹Ibid.

ceptual qualities equates their being perceptible with their being actually perceived. But this is a kind of Protagorean relativism that ought to be rejected.”¹⁰⁰ Finally, in the second part of the chapter (1047a10-29), he introduces what Witt calls the ‘Immobility Argument,’ which “argues that the Megarian position eliminates all movement and change, [concluding] very broadly with the charge that the Megarians deny the distinction between *dunamis* and actuality altogether.”¹⁰¹

The first argument, the ‘Techne Argument,’ is interesting for its relationship with causality. Aristotle states that, if we follow the Megarian position, “ὅταν παύσηται, οὐχ ἔξει τὴν τέχνην.” But then, how can the house builder build again? “πάλιν δ’ εὐθὺς οἰκοδο-μήσει πῶς λαβάν; ”¹⁰² The Megarians are asserting that a rational capacity, i.e. the art of house-building, can appear without any cause of its presence in the artist.¹⁰³ But this is impossible. Potency, then, must be asserted to *be*, even if it is not actual, so that we can explain how an art (or any other active potency, such as a rock’s ability to fall) can be exercised, despite not being exercised in every moment. To

¹⁰⁰Ibid.

¹⁰¹Ibid. Verbeke considers to the Megarians to have upheld a position slightly at variance with the radical position attributed to them here. Their argument, he claims, revolves around the unknowability of that which is in potency: “in their view, it is impossible to show the presence of any potency without the process of actualization,” Verbeke, “The Meaning of Potency in Aristotle”, p. 66. What is at stake is the impossibility of the deduction of the presence of a prior potentiality on the basis of a given actualization, and not the more radical position that potency simply does not exist when not actualized.

¹⁰²*Metaphysics*, 1046b3-4.

¹⁰³In relation to this issue, Verbeke points out that Aristotle’s answer to this Megarian position is closely related to certain basic aspects of his philosophical system. “A habit [such as the capacity to build houses] is not something that suddenly arises and then after a while totally disappears. As the result of previous actions, and having been acquired gradually, it is characterized by its stability and the competence of its performances... So the answer given by Aristotle to the Megarians is that the capacity of a craftsman neither suddenly arises nor suddenly disappears,” “The Meaning of Potency in Aristotle”, p. 63.

Aristotle on Higher Natures

deny the reality of potency is to fall into unreason, by denying causality.¹⁰⁴ The need for a cause for change is important for *φύσις*, since without *φύσις* as cause of a definitive kind of change, there would be no explanation for the particular kind of changes that a given mobile being really undergoes ‘always or for the most part.’ We will see how this influences Aristotle’s argument for the existence of natural teleology later, in Chapter 4.

The third argument, the ‘Immobility Argument,’ is similar to arguments that Aristotle has already made against Parmenides, insofar as it depends on claiming that the denial of change is a clear absurdity. Nevertheless, as Witt notes, the fundamental charge here is not so much that the Megarians are denying change, but rather that they must admit a distinction between actuality and potency, in order not to fall into the Parmenidean trap: “*εἴτι εἰ ἀδύνατον τὸ ἐστερημένον δυνάμεως, τὸ μὴ γιγνόμενον ἀδύνατον ἔσται γενέσθαι... ὥστε οὗτοι οἱ λόγοι ἐξαιροῦσι καὶ κίνησιν καὶ γένεσιν.*”¹⁰⁵ But to avoid this trap, potency and actuality must be distinct, and both must be ways of ‘being,’ since potency must be real if it is to permit and explain change in the real. Thus, the ‘Immobility Argument’ points to potency specifically as an aspect of the real (which Parmenides did not distinguish properly from the noetic), complementary to and present within that which is actual.

¹⁰⁴Aristotle extends this argument to potency in general, not just rational potencies. Verbeke states that “Aristotle concludes that the development of a being is not from mere absence to the presence of an act, but from a potential presence to an actual presence. If the evolution were from mere non-being to actualization, it would be hard to explain why a process of becoming is possible in some cases and not in others,” *ibid.*, p. 57.

¹⁰⁵*Metaphysics*, 1047a10-13.

2.4.3 Aristotle's dilucidation of the notions of potency and act

Potency and act, then, are two ways of speaking about being *qua* being. In an important passage of the Metaphysics, Aristotle states: “ἔτι τὸ εἶναι σημαίνει καὶ τὸ ὄν τὸ μὲν δυνάμει ῥητὸν τὸ δ’ ἐντελεχείᾳ τῶν εἰρημένων τούτων.”¹⁰⁶ This way of saying that something is a being is transversal to the analysis of being via the categories; a being may validly be said to be in potency or in act in any of the categories in which motion occurs. In the category of substance, a boy may be said to be in potency to be a man (for the man has his form fully)¹⁰⁷; in the category of quality, the boy may be said to be in potency to being sunburned because he is light-skinned; in the category of place, he may be said to be actually at the beach.

Because they are ways of speaking about being, the terms ‘potency’ and ‘act’ are, strictly speaking, indefinable. They are among the primary no-

¹⁰⁶ *Metaphysics*, 1017a35-b2.

¹⁰⁷“Αλλὰ μὴν καὶ οὐσίᾳ γε, πρῶτον μὲν ὅτι τὰ τῇ γενέσει ὕστερα τῷ εἴδει καὶ τῇ οὐσίᾳ πρότερα (οἷον ἀνὴρ παιδὸς καὶ ἄνθρωπος σπέρματος· τὸ μὲν γὰρ ηδη ἔχει τὸ εἶδος τὸ δ’ οὐ),” *Metaphysics*, 1050a4-7. Witt asks, “isn’t a baby already actually a human being?” Her response is that “In *Metaphysics* IX, chapter 8, Aristotle contrasts a man, who already has the form, with a boy, who does not (1050a4-7). Being human admits of degrees, and Aristotle’s notion of being X potentially allows for different degrees of being something,” Witt, *Ways of Being*, p. 53. I suggest that Witt’s formulation is incomplete: from the perspective of categorial being, the baby *is* a human substance, in a sense that does not admit of degrees, whereas from the perspective of potency and act, there are degrees of realization of act. One can say that the baby is in potency to being a man, for he has not yet developed the full actuality that characterized the grown man. But substance, *per se*, does not admit of degrees; via the law of Excluded Middle, a being either *is* or *is not* a human being, hence it is strictly incorrect to say that “being human admits of degrees,” as does Witt.

Kosman puts the point as follows: “The activity of being a human being, for example, is fully realized by any individual human being at all, simply by virtue of its being human... [While] a person may not even have actualized the rude potentialities for developed forms of disposition characteristic of being human, may not yet, for example, have learned to speak. But what this fact shows is that although substances are always actively being what they are, what they are need not be any such simple and fully realized activity,” Kosman, “The Activity of Being in Aristotle’s *Metaphysics*”, pp. 207-209.

Aristotle on Higher Natures

tions that we grasp immediately upon knowing being, and thus have no ‘*όρισμός*’ or definition in the strict sense (there being true definitions only of substance, cf. *Metaphysics*, 1031a1-15). Nevertheless, we can give indicative explanations, such that we are able to know the conditions under which a being is said to be in potency or in act.¹⁰⁸

Act

Act, or *ἐνεργέια*, is primarily said to be the existence of the thing.¹⁰⁹ But, since something can be said to *ὑπάρχει* even when it has not yet fully achieved (or been given) its form, Aristotle states that “*μὴ οὕτως ὥσπερ λέγομεν δυνάμει λέγομεν δὲ δυνάμει οὖν ἐν τῷ ξύλῳ Ερμῆν καὶ ἐν τῇ ὅλῃ τὴν ἡμίσειαν, δτι ἀφαιρεθείη ἄν.*”¹¹⁰ The best that can be done is to indicate cases, and the reader, by induction, can come to an understanding of what is indicated by the term *ἐνεργέια*.¹¹¹ He gives the following five cases as illustrating act in comparison with potency:

... ὡς τὸ οἰκοδομοῦν πρὸς τὸ οἰκοδομικόν, καὶ τὸ ἐργηγορὸς πρὸ τὸ καθεῦδον,
καὶ τὸ ὄρῶν πρὸς τὸ μῦνον μὲν ὅψιν δὲ ἔχον, καὶ τὸ ἀποκεκριμένον ἐκ τῆς
ὑλῆς πρὸς τὴν ὑλήν, καὶ τὸ ἀπειργασμένον πρὸ τὸ ἀνέργαστον. ταύτης
δὲ τῆς διαφορᾶς θατέρῳ μορίῳ ἔστω ἡ ἐνέργεια ἀφωρισμένη θάτέρῳ δὲ
τὸ δυνατόν.¹¹²

¹⁰⁸“*δῆλον δ’ ἐπὶ τῶν καθ’ ἔκαστα τῇ παγωγῇ δὲ βουλόμεθα λέγειν, καὶ οὐ δεῖ παντὸς ὅρον ζητεῖν ἀλλὰ καὶ τὸ ἀνάλογον συνορᾶν,*” *Metaphysics*, 1048a35-b1.

¹⁰⁹“*ἔστι δη ἐνέργεια τὸ ὑπάρχειν τὸ πρᾶγμα,*” *Metaphysics*, 1048a32.

¹¹⁰*Metaphysics*, 1048a33-34.

¹¹¹“*δῆλον δ’ ἐπὶ τῶν καθ’ ἔκαστα τῇ παγωγῇ δὲ βουλόμεθα λέγειν, καὶ οὐ δεῖ παντὸς ὅρον ζητεῖν ἀλλὰ καὶ τὸ ἀνάλογον συνορᾶν,*” *Metaphysics*, 1048a35-b1.

¹¹²*Metaphysics*, 1048b1-b7. States Owens, “this procedure in determining act and potency is according to Aristotle’s usual empirical manner. The instances of act are pointed

The term *ἐνέργεια* is derived from ‘*ἔργον*’ (work),¹¹³ and thus indicates the connection of *ἐνέργεια* with motion, a sense which is retained in the (Latinate) English term ‘act.’¹¹⁴ Act is also termed ‘*ἐντελεχεία*,’ and this term is used in a nearly synonymous fashion with *ἐνέργεια*.¹¹⁵ Nevertheless, *ἐντελεχεία* is derived from the term ‘*τέλος*’ (fulfillment, completion),¹¹⁶ and thus emphasizes the sense of ‘perfection,’ ‘lack of potency’ or ‘full realness.’¹¹⁷

Yepes (following Monllor, Chung-Hwan, Trepanier, Bonitz and Le Blond¹¹⁸) identifies a third sense of *ἐνέργεια* or act, in addition to the senses already

out in contrast to the instances of the corresponding potency. Neither is *deduced* from the other. Despite the external appearance of the method, no attempt is made to define act in terms of potency. Both are indicated simply by induction,” *The Doctrine of Being in the Aristotelian ‘Metaphysics’*, p. 404.

¹¹³Liddell and Scott, *An Intermediate Greek-English Lexicon*, entry for *ἔργον*.

¹¹⁴Aristotle explicitly connects act with motion, by indicating that the presence of motion is precisely a sign of a thing’s being in act, versus merely existing at the noetic level: “ἐλήλυθε δ’ ἡ ἐνέργεια τοῦνομα, ἡ πρὸς τὴν ἐντελέχειαν συντιθεμένη, καὶ ἐπὶ τὰ ἄλλα ἐκ τῶν κινήσεων μάλιστα· δοκεῖ γὰρ ἡ ἐνέργεια μάλιστα ἡ κίνησις εἶναι,” *Metaphysics*, 1047a30-b3.

¹¹⁵Indeed, in Book IX of the *Metaphysics*, he uses the expressions “ἡ δύναμις καὶ ἡ ἐνέργεια” and “τὸ δὲ κατὰ δύναμιν καὶ ἐντελέχειαν” within the same paragraph, where they clearly indicate the same basic pair of notions; cf. *Metaphysics*, 1045b33ff.

¹¹⁶ibid., entry for *τέλος*. Owens notes, however, that “the original Aristotelian term in the literary works seems to have been *ἐνδελέχεια*, meaning ‘permanence’,” Owens, *The Doctrine of Being in the Aristotelian ‘Metaphysics’*, 404 n. 14.

¹¹⁷According to Chung-Hwan, the term *ἐνέργεια* “is used not only in reference to movement, but also to signify other things, i.e. besides this ‘kinetic’ meaning it has still other meanings. [Nevertheless], the ‘kinetic’ meaning is its original meaning, and the term originally signifies movement... its other meanings are derivative,” Chung-Hwan, “The Relation between the Terms *ἐνέργεια* and *ἐντελέχεια* in the Philosophy of Aristotle”, p. 15. On the other hand, “the term *ἐντελέχεια* has a ‘static’ meaning and signifies that in which a process terminates, i.e. the state of having arrived at the end, or that mode of existence which is opposite to potentiality, namely, actuality,” ibid., p. 15.

Yepes summarizes the *status quaestionis* as follows: “*Energeia* significó primero el movimiento, y luego pasó a aludir al acto en toda su plenitud de sentidos, y al acto en general. Como ya señaló Bonitz, *entelecheia* ha seguido el itinerario contrario: desde la designación del estado de plenitud de ser propio de la *ousía*, a fuerza de uso y por extensión, ha pasado a significar los restantes sentidos de acto (operación, *kinesis*), y por ello en muchos pasajes del Corpus Aristotelicum sustituye a la palabra *energeia* y asimila sus mismos significados,” Yepes, “Los sentidos del acto en Aristóteles”, pág. 503.

¹¹⁸ibid., p. 494.

identified, of motion and of perfection. This is the sense of operation or *πράξις*, which involves an overcoming of the division between act as motion and act as perfection: *ἐνέργεια* is that motion in which its proper end is already accomplished: “praxis perfectas son aquellas en las que hay simultaneidad completa entre la acción y el fin: ‘uno piensa y ha pensado’. Son las operaciones cognoscitivas.”¹¹⁹ Act in this third sense allows Aristotle to explain how the mind functions: the content of thinking is called ‘act,’ indeed, he states that “ἡ νόησις ἐνέργεια.”¹²⁰ Act in this sense is also applicable to eternal things, in particular God, for whom “su acto es también placer, entendimiento que se entiende a si mismo, donde se identifican entendimiento e inteligible, ‘y tiene vida, pues el acto del entendimiento es vida, y El es acto,’ ‘vida nobilísima y eterna.’”¹²¹ This sense of ‘act’ is perhaps also its most metaphysical, insofar as *ἐνέργεια* in this sense is that which Aristotle uses to describe the inner life of God, who is pure act, thinking Himself eternally, indeed, outside of time.

Potency

Potency, or ‘δύναμις,’ on the other hand, also has a number of possible uses, one referring to the noetic or logical sense of being, and several of which refer to real being. In the logical sense, the participial form *δύνατον* is frequently used to indicate what is possible: “ἔστι δὲ δυνατὸν τοῦτο ω̄ ἔὰν ὑπάρξῃ ἡ ἐνέργεια οὐ λέγεται ἔχειν τὴν δύναμιν, οὐθὲν ἔσται ἀδύνατον.”¹²² Thus, it

¹¹⁹ibid., p. 505.

¹²⁰*Metaphysics*, 1051a30.

¹²¹Yepes, “Los sentidos del acto en Aristóteles”, p. 510.

¹²²*Metaphysics*, 1047a24-25.

is certainly possible that there be an equine animal with a single horn, since nothing impossible follows from supposing such a creature to be in act. Brentano emphasizes that there is also a ‘real’ sense of *δυνατὸν*, meaning that which exists in potency, as opposed that which is merely logically non-contradictory.¹²³

The nominal form ‘*δύναμις*’ has several distinct meanings, each of which is understandable only via the notion of actuality.¹²⁴ According to Aristotle, the primary or basic meaning is as “ἀρχὴ μεταβολῆς ἐν ἄλλῳ η̄ ἄλλο.”¹²⁵ This definition hides two senses, the first of which is that of an active ‘power’ present in an agent which makes it able to effect change in another being, such as heat and the art of building.¹²⁶ A second, closely related sense is that of a passive power, i.e. a potency to be acted upon, by another being or by itself *qua* other.¹²⁷ Witt notes that “Aristotle’s discussion of agent and passive powers strongly suggests they can be given a dispositional analysis... [these powers] are dispositions that a substance has to act upon another substance or to be acted upon by another substance.”¹²⁸ ‘Disposition,’ in this sense, has a necessitating character: when a non-rational

¹²³Brentano, *On the Several Senses of Being in Aristotle*, p. 28.

¹²⁴Cf. Brentano, “Potential being cannot be defined except with the aid of the concept of actuality, for the latter is prior in both concept and substance, as we are told in *Met.* IX.8,” *On the Several Senses of Being in Aristotle*, p. 29. Verbeke further notes that what is in potency in a given being is only knowable through actuality: “As for knowing whether a particular potency is present or not, one has to rely on its actualization,” Verbeke, “The Meaning of Potency in Aristotle”, p. 57; this knowledge, further, is not direct knowledge, but by analogy: “Since potency is not directly observable, it must be known in an analogical way,” ibid., p. 57.

¹²⁵*Metaphysics*, 1046a10-11.

¹²⁶*Metaphysics*, 1046a25-27.

¹²⁷“ἡ μὲν γὰρ τοῦ παθεῖν ἐστὶ δύναμις, ἡ ἐν αὐτῷ τῷ πάσχοντι ἀρχὴ μεταβολῆς παθητικῆς ὑπ’ ἄλλου η̄ ἄλλο,” *Metaphysics*, 1046a11-13.

¹²⁸Witt, *Ways of Being*, p. 42.

Aristotle on Higher Natures

agent and patient meet under the proper conditions, the agent *must* act upon the patient, and the patient *must* be actualized in the corresponding way.¹²⁹ For rational powers, such as the *δύναμις* of house-building, the conditions for the necessity of actualization are more complex, involving the *όρεξις* of the rational being. I will discuss the distinction between rational and non-rational powers in greater depth below.

According to Kosman and Witt, there is a final sense of *δύναμις*, which Witt terms the ‘ontological sense’.¹³⁰ In Aristotle’s list of five parallel cases of actuality and potency, cited above, Witt notes that they are not simply a listing of active and passive powers, but rather a set of examples of two different ways of being: being in actuality and being in potency. Furthermore, “in *Metaphysics* IX Aristotle differentiates between two basic meanings of *dunamis*—causal power and potency.”¹³¹ For instance, in regards to the house-building *δύναμις*, “although [it] is an agent power, Aristotle is here using it to exemplify two ways of being something. When active, the house-building power is actually; when inactive, it is potentially.”¹³² Similarly, in this ‘ontological’ sense, a being is said to be ‘in potency’ (*δυνάμει*) in the passive sense when it can be brought into actual being via a single motion or change from an agent, provided that nothing external impedes. Kosman states that this sense of *δύναμις* points to a “deeper structural feature” of being, namely the ability to appear at times as “inactive yet exis-

¹²⁹“τὰς μὲν τοιαύτας δυνάμεις ἀνάγκη, ὅταν ὡς δύνανται τὸ ποιητικὸν καὶ τὸ παθητικὸν πλησιάζωσι, τὸ μὲν ποιέν τὸ δὲ πάσχειν,” *Metaphysics*, 1048a5-6.

¹³⁰Witt, *Ways of Being*, p. 72. Kosman does not give a name to this sense of *δύναμις*, although he too identifies it as distinct; cf. Kosman, “The Activity of Being in Aristotle’s *Metaphysics*”, p. 204.

¹³¹Witt, *Ways of Being*, p. 72.

¹³²ibid., p. 47.

tent”, “τὸ ἔχειν μὴ ἐνέργειν δέ,” in the words of Aristotle, and at other times as “τὸ ἐνέργειν.”¹³³

Brentano, writing in the 19th century, notes that Aristotle himself gives a listing of the different ‘modes’ in which the term *δύναμις* can be used. No ‘ontological’ mode (in Witt’s or Kosman’s sense) is found among them,¹³⁴ but nevertheless, Brentano speaks of the same ‘ways of being’ that Kosman and Witt highlight, while using the terminology Aristotle has already provided: *δυνάμει ὅν* and *ἐνέργειᾳ ὅν*.¹³⁵ Being in potency is thus, according to Brentano, a species of real being: despite the fact that a thing properly speaking has non-being, “in a manner of speaking [it] exists insofar as it is potentially, and it is this which leads [Aristotle] to a special wide sense of real being, which comprises as well that which potentially is.”¹³⁶ In this sense *φύσις* is an inherent power (*δύναμις*) which can draw something from *δυνάμει ὅν* into *ἐνέργειᾳ ὅν*: “something is potential through nature if it can be lead to actuality by its peculiar active principle or its inherent natural power, provided only that no external hindrance stands in the way.”¹³⁷

Frede, on the other hand, denies that Aristotle distinguishes a separate ontological sense of *δύναμις*. He asserts that “the claim... is not that besides *δύναμις* in its basic sense [of an originative source of change in another thing or in the thing itself *qua* other (*Metaphysics* 104611-12)] there is another kind of *δύναμις*, namely, potentiality. The claim is rather that *δύναμις* in the

¹³³Kosman, “The Activity of Being in Aristotle’s *Metaphysics*”, p. 204.

¹³⁴Brentano, *On the Several Senses of Being in Aristotle*, p. 31; cf. *Metaphysics*, 1019a15-33.

¹³⁵ibid., p. 34.

¹³⁶ibid., p. 28.

¹³⁷ibid., p. 34.

Aristotle on Higher Natures

sense of ‘potentiality’ covers $\deltaύναμις$ in the basic sense, but extends to other kinds of $\deltaύναμις$.¹³⁸ In Frede’s estimation, there is no textual warrant for postulating potentiality as a further kind of $\deltaύναμις$, such as the ‘ontological’ sense of Witt. While Aristotle states at *Metaphysics* IX, 1048a27-29 that “λέγομεν δυνατὸν... καὶ ἔτερως” (i.e. in addition to its basic sense); in Frede’s reading of this passage there is no question of a further kind of $\deltaύναμις$ being spoken of, but rather the kinds of $\deltaύναμις$ already distinguished by Aristotle but “taken in a certain way, namely as corresponding analogously to an appropriate kind of actuality and as, thus contrasted, conferring a degree of reality,”¹³⁹

In my opinion, all of these authors are in agreement on the fundamental point that Aristotle distinguishes actuality from another way of being, one which shares features with non-being—insofar as being is primarily act—but nonetheless is truly real insofar as it *can* come to be in act, given the right conditions. The disagreements between the various philosophers hinge upon whether Aristotle distinguishes this kind of being by associating it with a distinct sense of the term $\deltaύναμις$ equivalent to what we now call ‘potentiality.’ This is a difficult and controverted question, whose answer finally is of limited importance. The more important point, which all of the philosophers involved in the discussion appear to admit, is that Aristotle distinguishes two ‘ways of being,’ $\deltaύναμει \deltaν$ and $\epsilonνέργειᾳ \deltaν$, and that these ways of being provide Aristotle with a means of responding to a wide variety of problems which were $\alphaπορίαι$ for earlier philosophers, such as how

¹³⁸Frede, “Aristotle’s Notion of Potentiality in *Metaphysics Θ*”, p. 184.

¹³⁹ibid., p. 186.

motion is possible, or what the principle of unity in a composite substance is, or how one can be in possession of knowledge while not exercising it.

Rational and non-rational potencies

A second important aspect of Aristotle's doctrine of *δύναμις* is that there are both rational and non-rational potencies.¹⁴⁰ The former potencies are characteristic of beings with intellect, and include the potencies of art and science. Learning an art gives a person more capacities than he had before; for instance, the man who before could not build a boat out of certain materials is now, after learning the shipbuilder's art, able to turn the materials into a boat in act. Thus, since the shipbuilder's art is a source of change in another, it meets the definition that Aristotle sets out for an active potency. The medical art is another example of a rational potency. The doctor, however, need not only act to cure others, but can also cure himself. Nevertheless, he is not curing himself *qua* doctor, but rather *qua* patient. Thus, the medical art is a source of change “ἐν ἄλλῳ ἢ ἐν ἄλλο.”

Aristotle makes several distinctions between rational and irrational potencies. The first is that with rational potencies, the form of the product

¹⁴⁰“Ἐπεὶ δ' αἱ μὲν ἐν τοῖς ἀφύχοις ἐνυπάρχουσιν ἀρχαὶ τοιαῦται, αἱ δ' ἐν τοῖς ἐμψύχοις καὶ ἐν ψυχῇς ἐν τῷ λόγον ἔχοντι, δῆλον ὅτι καὶ τῶν δυνάμεων αἱ μὲν ἔσονται ἀλογοί αἱ δὲ μετὰ λόγον διὸ πᾶσαι αἱ τέχναι καὶ αἱ ποητικαὶ ἐπιστήμαι δυνάμεις εἰσίν· ἀρχαὶ γὰρ μεταβλητικαὶ εἰσιν ἐν ἄλλῳ ἢ ἐν ἄλλῳ.” *Metaphysics*, 1046a35-b5. Witt points out that Aristotle does not draw a radical distinction between these two types of *δυνάμεις*, unlike many other philosophers. Both are powers to produce change in another being or in the same being *qua* other; cf. Witt, *Ways of Being*, p. 59. Indeed, far from taking for granted this common characteristic, “Aristotle's argument in *Metaphysics* IX is to assimilate rational powers to nonrational powers by formulating a dispositional analysis of them in chapter 5. There he makes clear that both nonrational powers *and* rational powers are to be defined in terms of their activation conditions,” ibid., p. 61.

Aristotle on Higher Natures

is different from the form of the agent. As Witt puts it, “house builders do not build house builders,”¹⁴¹ but rather houses. Secondly, nonrational powers are ‘determined to one effect,’ as Aquinas puts it,¹⁴² whereas rational powers are able to produce contrary effects, “ἀνταὶ μὲν γὰρ πᾶσαι μία ἐνὸς ποιητική, ἔκεῖναι δὲ τῶν ἐναντίων.”¹⁴³ Thirdly, rational potencies are found only in ‘ensouled’ beings (*ἐν ἐμψύχῳ*), whereas non-rational potencies are found both in non-en-souled and ensouled beings. This is because the *ψυχή* of the latter kind of being may include a hierarchy of powers, from the basic faculty of nourishment, to movement in regard to place, sensation, and finally thought (*νοῦς*, the highest power in natural substances).¹⁴⁴ Rational potencies are open to the production of contrary effects because, in a sense, the same account is of both the form and its privation.¹⁴⁵ Since reason can consider both the positive effect (i.e. the application of the form to the receptive matter) and the absence of this form, the rational being can act so as to achieve either of these.¹⁴⁶ This brings in the fourth and final

¹⁴¹ibid., p. 63.

¹⁴²Aquinas, *In Metaphysic.* lib. IX, lect. 2, 4.

¹⁴³*Metaphysics*, 1048a9.

¹⁴⁴“Τῶν δὲ δυνάμεων τῆς ψυχῆς αἱ λεχθεῖσαι τοῖς μὲν ὑπάρχουσι πᾶσαι, καθάπερ εἴπομεν, τοῖς δὲ τινὲς αὐτῶν, ἐνίοις δὲ μίᾳ μόνῃ. δυνάμεις δ’ εἴπομεν θρεπτικόν, ὀρεκτικόν, αἰσθητικόν, κινητικὸν κατὰ τόπον, διανοητικόν. ὑπάρχει δὲ τοῖς μὲν φυτοῖς τὸ θρεπτικὸν μόνον, ἐτέροις δὲ τοῦτο τε καὶ τὸ αἰσθητικὸν. εἰ δὲ τὸ αἰσθητικόν, καὶ τὸ ὀρεκτικόν ὅρεξις μὲν γὰρ ἐπιθυμίᾳ καὶ θυμῷ καὶ βούλησις, τὰ δὲ ζῶα πάντ’ ἔχοντις μίαν γε τῶν αἰσθήσεως, τὴν ἀφήν· ὡδ’ αἰσθησις ὑπάρχει, τούτῳ ἥδονῇ τε καὶ λύπῃ καὶ τὸ ἥδον τε καὶ λυπηρόν, οὖς δὲ τὰῦτα, καὶ ἡ ἐπιθυμίᾳ· τοῦ γὰρ ἥδεος ὅρεξις αὔτη... ἐνίοις δέει πρὸς τούτοις ὑπάρχει καὶ τὸ κατὰ τόπον κινητικόν, ἐτέροις δὲ καὶ τὸ διανοητικόν τε καὶ νοῦς, οἶον ἀνθρώποις καὶ εἴ τι τοιοῦτον ἔτερόν ἔστιν ἢ καὶ τιμιώτερον,” *On the Soul*, 414a32-b20.

¹⁴⁵“ὅ δὲ λόγος ὁ αὐτὸς δηλοῖ τὸ πρᾶγμα καὶ τὴν στέρησιν, πλὴν οὐχ ὠσαύτως,” *Metaphysics*, 1046b3-9.

¹⁴⁶“ἐπεὶ δὲ τὰ ἐναντία οὐκ ἐγγιγνεται ἐν τῷ αὐτῷ, ἢ δ’ ἐπιστήμη δύναμις τῷ λόγον ἔχειν, καὶ ἡ ψυχὴ κινήσεως ἔχει ἀρχήν, τὸ μὲν ὑγιεινὸν ὑγίειαν μόνον ποιεῖ καὶ τὸ θερμαντικὸν θερμότητα καὶ τὸ ψυκτικὸν ψυχρότητα, ὁ δ’ ἐπιστήμην ἄμφω. λόγος γάρ ἔστιν ἀμφοῖν μὲν, οὐχ δμοῖν δέ, καὶ ἐν ψυχῇ ἢ ἔχει κινήσεως ἀρχήν ὥστε ἄμφω ἀπὸ τῆς αὐτῆς ἀρχῆς κινήσει πρὸς ταῦτα συνάφασσα· διὸ τὰ κατὰ λόγον δυνατὰ τοῖς ἄνευ λόγου δυνατοῖς ποιεῖ τάναντία· μιᾷ γὰρ ἀρχῇ περιέχεται, τῷ λόγῳ,” *Metaphysics*, 1046b15-24.

difference between rational and nonrational powers: rational powers require the intervention of an additional factor, choice or desire, in order to be activated under the proper conditions, whereas for nonrational powers, it is sufficient that the corresponding activation conditions be fulfilled.¹⁴⁷

Two aspects of Aristotle's doctrine of *ψυχή* as discussed here will be key to his justification of the existence of *φύσις*. In the first place, those kinds of *φύσις* which are said to be *ψυχή* contain a hierarchy of powers. This means that form as act is able to host a variety of potencies, with the lesser potencies contained 'virtually' within the higher ones. I will discuss this more in the following section. Secondly, the existence of powers which are open to the consideration and performance of opposites is something absolutely unique to rational potencies. This will be important in Aristotle's demonstration of *φύσεις* of a higher order than the elements, by showing that higher *φύσεις* are needed to explain the existence of rational potencies, since the simple natures proposed by the *φυσιολόγοι* are 'determined to one effect.'

2.4.4 Form as act and form as potency

In Chapter 1, I noted several characteristics of the formal *ἀρχή* of a natural being. First, the form or *εἶδος*, considered as a 'part' of a mobile being, is the act of the matter of the substance,¹⁴⁸ making the latter to be in actuality what, *qua* matter, it only was in potency. Secondly, the form makes the natural being to be *one* being with a single account or *λόγος*, rather

¹⁴⁷Witt, *Ways of Being*, p. 65.

¹⁴⁸Cf. *Metaphysics*, 1050a15-17.

Aristotle on Higher Natures

than a ‘heap’ or simple aggregation: “ἡ οὐσία ἐν οὕτως, ἀλλ’ οὐχ ὡς λέγονσι τινες οὖν μονάς τις οὖσα ἡ στιγμή, ἀλλ’ ἐντελέχεια καὶ φύσις τις ἐκάστη.”¹⁴⁹ Finally, the form is what provides the ‘whatness’ of the being: “εἶδος δὲ λέγω τὸ τι ἦν εἶναι ἐκάστου καὶ τὴν πρώτην οὐσίαν.”¹⁵⁰ The form makes a thing to be a unified substance of its given kind.

How this can be so is clarified if we look at form and matter from the perspective of potency and act; as Aristotle says in *Metaphysics* VIII.6, “εἰ δ’ ἔστιν, ὥσπερ λέγομεν, τὸ μὲν ὕλη τὸ δὲ μορφή, καὶ τὸ μὲν δυνάμει τὸ δὲ ἐνεργείᾳ, οὐκέτι ἀπορίᾳ δόξειεν ἂν εἶναι τὸ ζητούμενον.”¹⁵¹ This is because “τὸ δυνάμει καὶ τὸ ἐνεργείᾳ ἐν πώς ἔστιν.”¹⁵² This might seem to be begging the question, for we could ask in turn “what makes potency and act one?” If we recall, however, that act is a kind of ‘doing,’¹⁵³ the presence of the act necessarily implies the presence of the ability to perform that act; similarly, the ability (or potency) for a particular ‘doing’ is always present as the ability or potency to perform the correlate act. As Kosman puts it,

It is in this sense in which δύναμις and ἐνέργεια explain the unity of substance... [for] ability and realization are the same thing, present together in that full exercise of being that is nothing other than the activity of the one entity that both are. And it is in this sense that matter is the ability of which form, as the being which that matter is, is nothing other than the full real-

¹⁴⁹ *Metaphysics*, 1044a4-9. Aristotle is here arguing against the Pythagorean notion of substance or *οὐσία* as a number.

¹⁵⁰ *Metaphysics*, 1032b1-2.

¹⁵¹ *Metaphysics*, 1045a24-25.

¹⁵² *Metaphysics*, 1045b21.

¹⁵³ In a metaphorical sense, as discussed above.

ization.¹⁵⁴

The ‘scaffolding’ or iterative structuring of forms

Nevertheless, the *εἶδος* also has a sense in which it can be seen as a material *ἀρχή*. Once a substance comes into being, it brings with it several kinds of potency.¹⁵⁵ In the first place, in virtue of its *εἶδος*, a thing may be *ὑλή* for other kinds of form, which can either be superimposed upon the existing form (as in the case of the bow shaped from wood), or else the existing form can be entirely replaced by the supervening form (in the case of food, which is potentially nourishing due to its *εἶδος*, but which becomes flesh by an imposition of a new form).¹⁵⁶ As Wieland puts it,

Für den Reflexionscharakter des *ὑλή*-Begriffs spricht vor-allem die Iterierbarkeit der *ὑλή*-*εἶδος*-Relation. Was unter dem einen Aspekt Stoff für eine Form ist (etwa das Erz für eine Statue), ist unter einem anderen Aspekt Form eines anderen Stoffes (also das Erz, insofern es aus den Elementen besteht).¹⁵⁷

This iterative relationship between form and matter is primarily said of those beings which are *φύσει*, for only in these cases is there a true substantial form imposed. In the case of the bow or the house, there is only

¹⁵⁴Kosman, “The Activity of Being in Aristotle’s *Metaphysics*”, p. 205.

¹⁵⁵Cf. Kosman, “Determinate being is the condition of the openness to further determination that alone allows an entity to serve as a logical or ontic subject,” ibid., p. 197.

¹⁵⁶“καὶ ὥσπερ τὸ πῦρ ἀψάμενον τοῦ κανστοῦ, οὔτως ἐν τῷ αὐξανομένῳ καὶ ὄντι ἐντελεχείᾳ σαρκὶ τὸ ἐνὸν αὐξητικὸν προσελθόντος δυνάμει σαρκὸς ἐποίησεν ἐντελεχείᾳ σάρκα,” *On Generation and Corruption*, 322a10-13.

¹⁵⁷Wieland, *Die aristotelische Physik*, p. 209. Cf. also Lewis, “A Thing and its Matter”, p. 248.

Aristotle on Higher Natures

rearrangement or change of shape; in the case of the human being, however, he is truly composed of flesh as his matter; the flesh, in turn, truly has earth as its respective matter.¹⁵⁸

In *On the Soul* II.3, Aristotle discusses the various types of soul or ‘ψυχή’,¹⁵⁹ showing how the various powers or faculties associated with a particular type of soul are related in a hierarchical manner. Just as in mathematics, certain forms imply that which is included in the account of ‘lesser’ forms. For instance, just as the account of ‘quadrilateral’ implies that of ‘triangle,’ in a similar way the nutritive faculty is implied by the sensitive.¹⁶⁰ This hi-

¹⁵⁸Vigo (private conversation) points out that this iterative structure of matter and form in organisms is not to be understood as a ‘layering’ of more complex upon simpler organisms: a higher animal, like a man, is not composed of simpler animals. Rather, there is only one form in a substance, although the powers of its material parts remain ‘virtually’ present, as Aristotle points out in *On Generation and Corruption*, 327b22-30: “Ἐπεὶ δὲ στὶ τὰ μὲν δυνάμει τὰ δὲ ἐνεργείᾳ τῶν ὄντων, ἐνδέχεται τὰ μικρέστα εἶναι πᾶς καὶ μὴ εἶναι... οὕτε διαμένουσιν οὖν ἐνεργείᾳ ὥσπερ τὸ σῶμα καὶ τὸ λευκόν, οὕτε θάτερον οὔτ’ ἄμφω σώζεται γὰρ ή δύναμις αὐτῶν.” Cf. also Gill, “in part because the preexisting matter survives as a set of properties that modify the higher object, Aristotle says that the preexisting matter survives in the product potentially... But more important, he says that the preexisting matter survives potentially because those same properties, which merely modify the higher complex, are sufficient to identify a simpler stuff [i.e. the elements]. Thus, when the higher object is destroyed, the simpler stuff will be recreated as a separately existing entity, identified by those properties,” *Aristotle on Substance*, p. 157. Cf. also Lewis, who makes the identical point (Lewis, “A Thing and its Matter”, p. 274).

¹⁵⁹Aristotle defines ψυχή as being the form of that which has life: “λέγομεν οὖν, ἀρχὴν λαβόντες τῆς σκέψεως, διωρίσθαι τὸ ἔμψυχον τοῦ ἀψύχου τῷ ζῆν. πλεοναχῶς δὲ τοῦ ζῆν λεγομένου, κανὸν τούτων ἐνυπάρχῃ μόνον, ζῆν αὐτό φαμεν, οἷον νοῦς, αἰσθησις, κίνησις καὶ στάσις ἡ κατὰ τόπον, ἔτι κίνησις ἡ κατὰ τροφὴν καὶ φύσισ τε καὶ αὐξησις,” *On the Soul*, 413a20-25. In this study, I will treat ψυχή as a subtype of φύσις (considered as the formal part of a natural substance), i.e. that kind of φύσις characteristic of beings which have life; ψυχή thereby excludes the simple bodies (i.e. the elements) and homoeomerous substances and includes, in particular, organisms.

¹⁶⁰“(παραπλησίως δὲ ἔχει τῷ περὶ τῶν σχημάτων καὶ τὰ κατὰ ψυχήν ἀεὶ γὰρ ἐν τῷ ἐφεξῆς ὑπάρχει δυνάμει τὸ πρότερον ἐπί τε τῶν σχημάτων καὶ ἐπὶ τῶν ἐμψύχων, οἷον ἐν τετραγώνῳ μὲν τρίγωνον, ἐν αἰσθητικῷ δὲ τὸ θρεπτικόν.) ὥστε καθ’ ἔκαστον ζητητέον, τίς ἐκάστου ψυχή, οἷον τίς φυτοῦ καὶ τίς ἀνθρώπου ἡ θηρίου. διὰ τίνα δὲ αἰτίαν τῷ ἐφεξῆς οὔτως ἔχουσι, σκεπτέον. ἀνευ μὲν γὰρ τοῦ θρεπτικοῦ τὸ αἰσθητικὸν οὐκ ἔστιν τοῦ δὲ αἰσθητικοῦ χωρίζεται τὸ θρεπτικὸν ἐν τοῖς φυτοῖς. πάλιν δὲ ἀνευ μὲν τοῦ ἀπτικοῦ τῶν ἄλλων αἰσθήσεων οὐδεμίᾳ ὑπάρχει, ἀφὴ δὲ ἀνευ τῶν ἄλλων ὑπάρχει πολλὰ γὰρ τῶν ζώων οὔτ’ ὅψιν οὔτ’ ἀκοὴν ἔχουσιν οὔτ’ ὁσμῆς αἰσθησιν,” *On the Soul*, 414b28-415a7.

erarchical subordination of powers begins with the basic powers of growth and nutrition, which belong to simple organisms such as algae or fungi. Such organisms are able to maintain themselves by consuming nutrients, and can extend themselves spatially via growth (although they cannot move themselves from place to place).¹⁶¹ A higher organism, whose *φύσις* is endowed with greater powers, must have at least these powers: thus, the sensitive power depends on the nutritive and growth powers (for the sense organ must be able to grow and to maintain itself via nutrition).¹⁶² The account or *λόγος* of higher organisms will thus include or imply the accounts of lower organisms.

As noted, the relationship of a higher *φύσις* to a lower one is not a simple one. For a higher *φύσις* does not ‘include’ in a direct manner lower *φύσεις*: an animal is not a composite of simpler animals. Each *φύσις* is autonomous within its genus, and indeed (in a certain sense, though not strictly) is a contrary of other *φύσεις*: “ἄνθρωπος γὰρ ἵππου ἔτερον τῷ εἶδει καὶ τάναντίᾳ ἀλλήλων.”¹⁶³ Nevertheless, a higher *φύσις* does include certain of the powers of the lower types of soul. How does this happen? How is it possible for a higher *φύσις* to somehow include lower ones, without being an agglomeration?

The answer to this question depends on the analysis of *φύσις* as material principle. For as we have noted, the existence of a given form as act of its corresponding matter creates the potency for the resulting being to become

¹⁶¹Nutrition implies the communication of form, which will be discussed further below, in section 2.4.4.

¹⁶²Ibid.

¹⁶³*Physics*, 186a21.

matter for a higher form. Just as earth is matter for wood, which can then become matter for a bed or a bow, the organs which provide the powers for lower beings are matter for the existence in act of higher *φύσις*. Thus, the ‘flesh’ of simple plants such as algae, which is capable of imposing its form upon food and thus integrating nutrients to achieve maintenance and growth, is matter for higher forms, such as more complex plants. A flowering plant, for instance, must have this ‘plant flesh’ in order to construct its stalk, leaves and petals. Similarly, in simple animals such as garden slugs, there is the ability for locomotion, via the contraction of muscles, a specialized kind of flesh. Higher animals, for example, those which hunt for their prey, must have this kind of flesh in order to do so.

Aristotle makes this point in *On the Soul* II.2, where he states: “οὗτω δὲ γίνεται καὶ κατὰ λόγον· ἐκάστου γὰρ ἡ ἐντελέχεια ἐν τῷ δυνάμει ὑπάρχοντι καὶ τῇ οἰκείᾳ ὥλη πέφυκεν ἐγγίνεσθαι. ὅτι μὲν οὖν ἐντελέχειά τις ἔστι καὶ λόγος τοῦ δύναμιν ἔχοντος εἶναι τοιούτου, φανερὸν ἐκ τούτων.”¹⁶⁴ Not just any matter can host a soul: algae cannot come to be from fire, a garden slug cannot come to be from flesh without the capacity for muscular contraction, a hunting animal cannot come to be from a body without the organs for sight and smell. The higher *φύσις* which makes a wolf to be what it is, is a principle which gives a genuine unity to matter which, considered in itself and not *qua* part of another being, has its own *φύσις*. I call this the ‘scaffolding’ of higher forms upon lower ones; this phenomenon will become important for Aristotle to defend the reality of forms that are higher than the simple natures.

¹⁶⁴ *On the Soul*, 414a25-28.

This image of the ‘scaffolding’ of higher forms upon lower ones can be misunderstood. I have already pointed out that Aristotle does not view living substances as agglomerates of simpler living substances; a higher animal like a horse is not an agglomerate of simpler animals with lower types of soul. But there is another possible misunderstanding, namely a materialist view whereby the animal is a construction of its material parts, which contribute their powers to the whole, thereby constituting (and entirely explaining) the existence and attributes of the entire animal. But as Ackrill points out, this cannot be the case under Aristotle’s account, for the matter of an ensouled being cannot exist apart from the being of which it is the matter: “the material in this case is *not* capable of existing *except* as the material of an animal, as matter *so in-formed*.¹⁶⁵

Ackrill sees a difficulty with Aristotle’s position here: if we hold that “ἔχονσιν ὥλην ἡστὸν φύσις τοιαύτη ὡστ’ ἐνδέχεσθαι καὶ εἶναι καὶ μή,”¹⁶⁶ then it would seem that the bodily parts of organisms do not meet the criterion for being matter, for they cannot both be and not be; there is no ‘this something’ which, like bronze, can take on the form of the statue or not take it on. “For the body is this head, these arms, etc. (or this flesh, these bones, etc.), but there was no such thing as this head before birth and there will not be a head, properly speaking, after death.”¹⁶⁷

F. Lewis attempts to provide an answer to the dilemma—which Ackrill himself leaves unresolved—in terms which provide for a certain kind of ‘scaffolding of form,’ as I have described it above. Lewis points out that

¹⁶⁵ Ackrill, “Aristotle’s Definitions of ‘Psuche’”, p. 126; his emphasis.

¹⁶⁶ *Metaphysics*, 1039b29.

¹⁶⁷ Ackrill, “Aristotle’s Definitions of ‘Psuche’”, p. 126.

Aristotle on Higher Natures

blood, in Aristotle's account, is characterized by having its principle of activity external to it. While blood is naturally hot, it does not generate its own heat, but receives its heat from the heart, which is hence called “*ἀρχή τοῦ αἵματος*.”¹⁶⁸ Lewis thus calls heat the *form analogue* of blood; it is not strictly the form of blood, but plays an analogous role. He then extends this account to more complex organs and thence to the body as a whole: “the form of the animal performs in two different roles: it is *the constitutive form-analogue of the animal's body and its various organs*, but it is also *the constitutive form simpliciter of the whole living animal*. ”¹⁶⁹ Thus, he grants a certain autonomy to the various parts of the animal, allowing them to be justly called matter for the whole (for they will have their own, incomplete forms, and hence will escape Ackrill's dilemma, for there will be a sense in which they can both be and not be components of the whole, just as blood can both be and not be in the body¹⁷⁰). Furthermore, there will still be a single form of the whole, so that Aristotle's stricture about their being only a single form in a single substance will be obeyed. As Lewis puts it, the relation of the soul to the body is the same as that of heat to blood—it is essential to the body, but nonetheless an external principle of behavior.¹⁷¹

I am not convinced by Lewis's proposal. It is not at all clear how Lewis can sustain the position that—for Aristotle—a soul is both an external form-analogue to the body and its various parts, and also the single substantial

¹⁶⁸ *Parts of Animals*, 666a24, cited in Lewis, “A Thing and its Matter”, p. 264.

¹⁶⁹ *ibid.*, p. 270.

¹⁷⁰ This characteristic of blood is suggested by Aristotle's denial that blood is part of the body—as Lewis (p. 266 n. 39) reads *Parts of Animals*, 656b21—along with the Stagirite's description of blood as being ‘in a receptacle’ within the body; cf. *Parts of Animals*, 650a34.

¹⁷¹ *ibid.*, p. 270.

form for the animal as a whole. For Aristotle makes it quite clear that the unity between body and *ψυχή* is of a maximal kind: “διὸ καὶ οὐ δεῖ ζητεῖν εἰ ἐν ἡ ψυχὴ καὶ τὸ σῶμα, ὥσπερ οὐδὲ τὸν κηρὸν καὶ τὸ σχῆμα, οὐδὲ ὅλως τὴν ἐκάστου ὕλην καὶ τὸ οὐκ ὕλη τὸ γάρ ἐν καὶ τὸ εἶναι ἐπεὶ πλεοναχῶς λέγεται, τὸ κυρίως ἡ ἐντελέχεια ἔστιν.”¹⁷² The Stagirite further makes it clear that the unity extends all the way down to the most basic material of a substance, which remains ‘virtually’ in the composite substance, but does not have substantiality of its own.¹⁷³ Lewis wishes to avoid “supposing that a thing and a thing and its matter are identical,”¹⁷⁴ for there must be some way in which they are distinct. But Aristotle does not claim that a thing and its matter are ‘identical,’ but rather that they are ‘one,’ while remaining “χωριστὸν δὲ... κατὰ τὸν λόγον.”¹⁷⁵ Lewis’s proposal, in making bodily parts into incomplete beings which receive their principles of full actuality from outside, breaks down the substantial unity of the organic being, and indeed is more of a materialist position than Lewis seems to realize.

If we are to understand organisms to be somehow ‘scaffolded,’ it must be in the sense of a scaffold whose existential support comes from the top, i.e. the unitary, simple *ψυχή* which makes the animal *be* in act. For “ἀναγκαῖον ἄρα τὴν ψυχὴν οὐσίαν εἶναι ὡς εἶδος σώματος φυσικοῦ δυνάμει ζωὴν ἔχοντος. ἡ δὲ οὐσία ἐντελέχεια· τοιούτου ἄρα σώματος ἐντελέχεια,”¹⁷⁶ For that which is potential, i.e. the body potentially having life, is posterior to and dependent upon

¹⁷²On the Soul, 412b8-9.

¹⁷³cf. On Generation and Corruption, 327b22-30.

¹⁷⁴Lewis, “A Thing and its Matter”, p. 270.

¹⁷⁵Physics, 193b5-6. Cf. Kosman, “Animals and Other Beings in Aristotle”, p. 362, “The term ‘matter’ refers to entities taken a certain way; matter is a *principle of being* or nature, and not a *category of entity* in nature.”

¹⁷⁶On the Soul, 412a20-23.

act.

Φύσις as ἀρχή of operations

A second sense in which *εἶδος* is ‘potential’ is that it is the basis for the active potencies connatural to a given *φύσις*.¹⁷⁷ At the lowest level, that of the elements, each of the four traditional Greek elements exercises two characteristic activities, corresponding to the *ἐναντία* which form the given element.¹⁷⁸ For instance, fire is both light and hot, and thus both rises and heats. Provided that nothing impedes (and, in some cases, provided that they are in a situation of proximity to a patient), and that they are not in their natural locations,¹⁷⁹ the elements always act according to their natural operations.¹⁸⁰ Thus, fire will burn wood whenever it is in proximity, imposing the form of hotness on the wood; similarly, provided that air (per-

¹⁷⁷Cf. Frede, “Aristotle’s Notion of Potentiality in *Metaphysics Θ*”, p. 176: “though [composite substances] are actualities, their being is tied to potentiality in two closely related ways: (i) they need the appropriate matter for their realization; (ii) they themselves, though actualities, are constituted by a set of potentialities. For, to be a horse, for example, is essentially to be able to do the kinds of things horses do under the appropriate conditions.”

¹⁷⁸“Ἐπεὶ δὲ τέτταρα τὰ στοιχεῖα, τῶν δὲ τεττάρων ἔξι αἱ συζεύξεις, τὰ δ’ ἐναντία οὐ πέφυκε συνδυάζεσθαι (θερμὸν γὰρ καὶ ψυχρὸν εἴναι τὸ αὐτὸ καὶ πάλιν ξηρὸν καὶ ὑγρὸν ἀδύνατον), φανερὸν δτι τέτταρες ἔστοναι αἱ τῶν στοιχείων συζεύξεις, θερμοῦ καὶ ξηροῦ, καὶ θερμοῦ καὶ ὑγροῦ, καὶ πάλιν ψυχροῦ καὶ ὑγροῦ, καὶ ψυχροῦ καὶ ξηροῦ. καὶ ἡκολούθηκε κατὰ λόγον τοῦς ἀπλοῦς φαινομένοις σώμασι, πυρί καὶ ἀέρι καὶ ὕδατι καὶ γῆ τὸ μὲν γὰρ πύρ θερμόν καὶ ζηρόν, δ δ’ ἀὴρ θερμὸν καὶ ὑγρόν (οἷον ἀτμὸς γὰρ ὁ ἀέρ), τὸ δ’ ὕδωρ ψυχρὸν καὶ ὑγρόν, ἡ δὲ γῆ ψυχρὸν καὶ ξηρόν...” *On Generation and Corruption*, 330a30-b5.

¹⁷⁹“ἐπεὶ δὲ τὸ πᾶσιν ὑφιστάμενον φέρεται πρὸς τὸ μέσον, ἀνάγκη τὸ πᾶσιν ἐπιπολάζον φέρεσθαι πρὸς τὸ ἔσχατον τῆς χώρας, ἐν ᾧ ποιοῦνται τὴν κίνησιν ἐναντίον γὰρ τὸ μὲν μέσον τῷ σχάτῳ, τὸ δ’ ὑφιστάμενον ἀεὶ τῷ ἐπιπολάζοντι. διὸ καὶ εὐλόγιος τὸ βαρὺ καὶ κοῦφον δύο ἔστιν καὶ γὰρ οἱ τόποι δύο, τὸ μέσον καὶ τὸ ἔσχατον,” *On the Heavens*, 312a4-8.

¹⁸⁰“ὅτι δ’ ἔστι τι ἀπλῶς κοῦφον καὶ ἀπλῶς βαρύ, ἐκ τῶνδ’ ἔστι φανερόν. λέγω δ’ ἀπλῶς κοῦφον ὃ ἀεὶ ἄνω καὶ βαρὺ ὃ ἀεὶ κάτω πέφυκε φέρεσθαι μὴ κωλυόμενον τοιαῦτα γάρ ἔστι τινα, καὶ οὐχ ὕσπερ οἴονται τινες πάντ’ ἔχειν βάρος· βαρὺ μὲν γὰρ δοκεῖ τισίν εἶναι, καὶ ἐτέροις, καὶ ἀεὶ φέρεσθαι πρὸς τὸ μέσον,” *On the Heavens*, 311b14-19.

haps in vigorous motion, e.g. a strong wind) or earth (in the form of a cave ceiling) do not impede, the fire will rise.

In regards to potency and act and *φύσις* as ἀρχή of operations, Gill identifies two ‘models’ of potentiality and actuality in Aristotle; under the first model, “potentialities, whether active or passive, are always directed to an end or a goal—an actuality; and the potentiality is identified as the potentiality that it is with reference to the actuality. So, for example, a person’s passive potentiality for health is identified as that potentiality with reference to health; the doctor’s active potentiality for health is also, though in a different way, identified with reference to health. Active and passive potentiality pairs correspond because they are related to the same end or actuality.”¹⁸¹ This is the model that applies to change (*κατὰ κίνησιν*).

On the other hand, the second model of potentiality and actuality has as its focus the being and persistence of an entity unified by means of change¹⁸²; and hence is the sense of potency and act related to *φύσις*.¹⁸³ In the second model, an organism expresses its potencies through *activities*, such as sight or thought, and these activities serve to preserve the organism in being: “the motion proper to the second model results in the same state that the patient was previously in, and is caused by an agent that acts in respect of a property like the initial state of the patient.”¹⁸⁴

In Book II of the *Physics*, Aristotle states that *φύσις* is most properly said to be form: “μᾶλλον αὕτη φύσις τῆς ὕλης ἔκαστον γὰρ τότε λέγεται ὅταν

¹⁸¹Gill, *Aristotle on Substance*, p. 174.

¹⁸²cf. ibid., p. 214.

¹⁸³cf. ibid., p. 218.

¹⁸⁴ibid., p. 226.

Aristotle on Higher Natures

ἐντελεχείᾳ ἥ, μᾶλλον ἥ ὅταν δυνάμει.”¹⁸⁵ Indeed, the fact that *φύσις* is primarily *εἶδος* explains how *φύσις* is said to be both form and matter, as discussed in Chapter 1. For *φύσις* gives to a simple being, such as fire or water, not only its natural motions, such as moving upwards or downwards, or warming or cooling, but also its capacity to be *ὑλή* for other natural substances, such as flesh, wood or bronze. *Φύσις* as form makes the being to be what it is, but it can be considered as a ‘material’ principle insofar as it makes a being able to take on other, higher forms.

***Φύσις* as a communicator of form**

An important facet of Aristotle’s doctrine of *φύσις* involves the capacity of natural substances to ‘communicate’ their forms to other beings.¹⁸⁶ We

¹⁸⁵ *Physics*, 193b5–193b7. We have already discussed in Chapter 1 the sense in which *φύσις* is primarily said of *εἶδος* as part of natural substances, and the sense in which it is primarily *οὐσία*. Here the question is whether the actual or the potential part is most *φύσις*, and it is clear that it must be the former, since potency and matter are dependent (or ‘posterior to’, in Aristotle’s parlance) upon act. “Πάσης δὴ τῆς τουαύτης προτέρα ἔστιν ἡ ἐνέργεια καὶ λόγω καὶ τῇ οὐσίᾳ· χρόνῳ δὲ ἔστι μὲν ὡς, ἔστι δὲ ὡς οὖν,” *Metaphysics*, 1049b9–10. Cf. Witt, “The Priority of Actuality in Aristotle”, p. 217, “the priority in being of actuality means that actualities can exist independently of potentialities, but potentialities cannot exist independently of the existence of actualities.”

¹⁸⁶ Crubellier, one of the few authors to write directly about this topic, also employs the terminology of ‘communication of form’: “for [Aristotle] a natural process basically consists in some object taking some form; that is, in a process of information... More precisely, what I mean by ‘information’ here is the communication of the form by an agent to the affected thing,” Crubellier, “GC I.9”, p. 283. Nonetheless, there is a terminological difficulty involved in speaking of ‘communication’ of form, since, as we shall see below, a natural substance does not truly *impose* its form upon another being which was entirely lacking that form. Rather, in order for a being to receive a new form, as in the case of the bronze receiving the form of Hermes, the potency for that form must have been present. Thus, from one point of view, it would be more proper to speak of ‘eduction’ of form, or the ‘actualization’ of potency, or the relation of ‘action’ and ‘passion.’ Nevertheless, the term ‘communication,’ despite not being an Aristotelian term, has the advantage of emphasizing the causative role of the being which has the active potency (the agent), and of highlighting the fact that the very form which is ‘educated’ is precisely the form caused by the agent, and not any of the other (possibly infinite) forms which the being hosts in

have already encountered this capacity in regards to the simple bodies and the homeomerous substances (such as flesh, metal and wood).¹⁸⁷ Aristotle has also pointed this out with regards to organisms, which are able to communicate their forms via reproduction.¹⁸⁸ This capacity to reproduce substantial form is precisely what distinguishes natural substances from products of art: the latter cannot reproduce their substantial form. This is because, strictly speaking, they do not have one; artifacts only have form in one of the other categories.

Nevertheless, communication of form occurs in all types of motion: “εἰδος δὲ ἀεὶ οἷσεται τι τὸ κινοῦν, ἥτοι τόδε ή τοιόνδε ή τοσόνδε, ὃ ἔσται ἀρχὴ καὶ αἴτιον τῆς κινήσεως, ὅταν κινῇ, οἷον ὁ ἐντελεχείᾳ ἄνθρωπος ποιεῖ ἐκ τοῦ δυνάμει ὅντος ἀνθρώπου ἄνθρωπον.”¹⁸⁹ While a bed cannot reproduce itself *qua* bed, it can reproduce its accidental form. Thus, if we put the bed on a carpet, the carpet will quickly adopt indentations corresponding to the shape of the feet of the bed. Natural substances can reproduce themselves by imposing their form on appropriate matter; thus, a fruit tree reproduces itself by imposing its form upon its seed. The imposition of form also occurs in the realm of the senses and intellect: we know individual things by acquiring their

potency. In addition, it highlights the ‘commonality’ that comes to be as a result of the action/passion, i.e. the sharing of a form which is one in account, while two (or more) in number. Thus, I will retain the terminology of ‘communication,’ for the rhetorical advantages mentioned here, with the caveat that form does not ‘communicate’ in the way implied by the common usage of the term today, which focuses on linguistic or proto-linguistic interaction between ensouled beings.

¹⁸⁷Beginning with the lowest level, that of the elements, we see that the elements tend to communicate their forms to other substances. Fire burns by communicating itself, water dissolves by communicating itself, earth dries or cools by communicating its own form. Cf. *On Generation and Corruption*, 322a10-16.

¹⁸⁸Cf. *Physics*, 192b16-23.

¹⁸⁹*Physics*, 202a8-202a12.

Aristotle on Higher Natures

essences in our intellects.¹⁹⁰ And learning of the arts and sciences occurs via the communication of the corresponding form.¹⁹¹ In locomotion, a similar communication occurs: if I wish to move a stone, I must first move my hand, which (perhaps) moves a stick, which moves a stone.¹⁹²

Communication of form, in Aristotle's analysis, is fundamentally an actualization of a potency present in the patient, under the influence of the agent. Because the agent is already in act under the account in question, the agent is not said to be moved itself; rather, “ἐστὶν ἡ κίνησις ἐν τῷ κινητῷ.”¹⁹³ It is for this reason that a natural substance can be an “αὐτὸς αὐτῷ κινοῦν” which stands at the head of a causal chain: the mover, insofar as it moves, is not moved.¹⁹⁴ Because the mover moves by bringing into actuality some potency in the patient, it is possible that the patient not be capable of fully receiving the form of the agent, thus producing a form which is partly the same and partly different. In animal reproduction, for instance, the seed of the father may be unable to reproduce its species in the ‘catamenia’¹⁹⁵ of the mother, and in such cases we see the appearance of ‘monsters’ or defective organisms, which are nevertheless considered to be of the same species as the parent—the two-headed lamb is still a sheep, and the sterile

¹⁹⁰“Ἐκ τε δὴ τούτων τῶν λόγων ἐν καὶ ταῦτὸ οὐ κατὰ συμβεβηκὸς αὐτὸ ἔκαστον καὶ τὸ τί ἦν εἶναι, καὶ δτι γε τὸ ἐπίστασθαι ἔκαστον τοῦτό ἐστι, τὸ τί ἦν εἶναι ἐπίστασθαι, ὥστε καὶ κατὰ τὴν ἔκθεσιν ἀνάγκη ἐν τι εἶναι ἄμφω” *Metaphysics*, 1031b19–23.

¹⁹¹Aristotle, *Metaphysics*, 1049b25ff.

¹⁹²“εἰ οὖν κινούμενόν τι κινεῖ, ἀνάγκη στῆναι καὶ μὴ εἰς ἅπειρον ἵέναι· εἰ γὰρ ἡ βακτηρία κινεῖ τῷ κινεῖσθαι ὑπὸ τῆς χειρός, ἡ χεὶρ κινεῖ τὴν βακτηρίαν· εἰ δὲ καὶ ταῦτη ἄλλο κινεῖ, καὶ ταῦτην ἔτερόν τι τὸ κινοῦν. ὅταν δή τινι κινῆ ἀεὶ ἔτερον, ἀνάγκη εἶναι πρότερον τό αὐτὸς αὐτῷ κινοῦν. εἰ οὖν κινεῖται μὲν τοῦτο, μὴ ἄλλο δὲ τὸ κινοῦν αὐτό, ἀνάγκη αὐτὸς αὐτὸς κινεῖν· ὥστε καὶ κατὰ τοῦτον τὸν λόγον ἡτοι εὐθὺς τὸ κινούμενον ὑπὸ τοῦ αὐτὸς κινοῦντος κινεῖται, ἢ ἔρχεται ποτε εἰς τὸ τοιοῦτον” *Physics*, 256a29–b2.

¹⁹³*Physics*, 202a13

¹⁹⁴I will examine the issue of self-motion and the relation of mover to moved in self-movers more extensively in Chapter 3.

¹⁹⁵Cf. *Generation of Animals*, 767b15–24.

pig is still a pig.¹⁹⁶ In other cases, a being which is naturally capable of being actualized in a particular way—such as a billiard ball, which is formed so as to be easily able to roll—may be blocked from responding according to its nature. In these cases the ‘communication of form’ may be *equivocal*, in the sense that the form brought into being in the patient is of a different species than that of the agent. If the billiard ball is struck by the cue ball while it is unable to move, what is produced is not locomotion, but heat.

This ‘communication of form’ is something mysterious, and Aristotle does not seem to specify exactly how it occurs. The closest he comes to an explanation is in *On Generation and Corruption* I.7-9, where he elaborates on the notions of action and passion. However, as M. Crubellier notes, while Aristotle asks several times in these chapters “In what way can these processes occur?” he spends most of his time explaining and critiquing the positions of his ‘atomist’ opponents, i.e. Democritus and Leucippus (as well as Empedocles and Plato, whom he assimilates to the atomist model).¹⁹⁷ In Chapters 6-7, he does set out some preliminary conditions for the communication of form, namely that the mover and the moved be in contact, that they be of the same ‘genus’ (i.e. category), and that within that genus they be opposites. Given these conditions, it is ‘necessary’ that the agent act and the patient suffer.¹⁹⁸ He also specifies a further important condition, namely that the body being affected be affected ‘though and through’: “*Ei γάρ ἔστι τὸ μὲν δυνάμει τὸ δ’ ἐντελεχείᾳ τοιοῦτον, πέφυκεν οὐ τῇ μὲν τῇ δ’ οὐ πάσχειν,*

¹⁹⁶Cf. *Generation of Animals*, 769b10-18.

¹⁹⁷Crubellier, “GC I.9”, p. 271.

¹⁹⁸*On Generation and Corruption*, 323b16-324a14. Indeed, Aristotle takes it as a ‘law of nature’ that “καὶ αἱ δυνάμεις ἄλογοι... ὅταν ὡς δύνανται τὸ ποιητικὸν καὶ τὸ παθητικὸν πλησιάζωσι, τὸ μὲν ποιεῖν τὸ δὲ πάσχειν,” *Metaphysics*, 1048a4-6.

Aristotle on Higher Natures

ἀλλὰ πάντη καθ' ὅσον ἔστι τοιοῦτον.”¹⁹⁹

From one point of view, a modern reader (or ancient *φυσιο-λόγος*) might be disappointed in Aristotle's explanation, for it goes into very little detail as how and why one being might be affected by another. Nevertheless, it is not too difficult to see why his position is what it is. Given that a being is made to be a single instance of its kind by its possessing a single form,²⁰⁰ if it is affected in its body, it must be affected through and through, otherwise, as Crubellier notes, “it would not be really one body, or its name would be equivocal.”²⁰¹ Aristotle's position is completed by the doctrine of potency and act: one body lacks the actuality possessed by the other, and hence is susceptible to undergoing change caused by the other, via the communication of form from one body in its entirety to the other, ‘through and through.’

It is worth noting that even the models of nature proposed by Aristotle's materialist opponents fall victim to the same necessity of postulating communication of form. The ‘atoms’ of Democritus and Leucippus, which move in a void, act upon each other by contact, and insofar as one atom is able to move another, it must ‘communicate’ its activity.²⁰² Thus, the

¹⁹⁹ *On Generation and Corruption*, 327b30-32.

²⁰⁰ “Ἐτι δ' ἔστι μὲν ὡς ὁτιοῦν ἐν φαμεν εἶναι ἀνὴρ ποσὸν καὶ συνεχέσ, ἔστι δ' ὡς οὐ, ἀνὴρ μή τι ὅλον ἐργάζεται τοῦτο δὲ ἀνὴρ μή τὸ εἶδος ἔχει ἐν: οἶνον οὐκ ἀνὴρ φαίμεν ὁμοίως ἐν ἰδόντες ὁπωσοῦν τὰ μέρη συγκείμενα τοῦ ὑποδήματος, ἐὰν μὴ διὰ τὴν συνέχειαν, ἀλλ' ἐὰν οὔτως ὥστε ὑπόδημα εἶναι καὶ εἰδός τι ἔχειν ἥδη ἐν,” *Metaphysics*, 1016b12-16.

²⁰¹ Crubellier, “GC I.9”, p. 284.

²⁰² “Λεύκιππος δ' ἔχειν φύγηθη λόγους οἵ τινες πρὸς τὴν αἰσθησιν ὁμολογούμενα λέγοντες οὐκ ἀναιρήσουσιν οὔτε γένεσιν οὔτε φθορὰν οὔτε κίνησιν καὶ τὸ πλήθος τῶν ὄντων. ὁμολογήσας δὲ ταῦτα μὲν τοῖς φαινομένοις, τοῦς δὲ τὸ ἐν κατασκευάζουσιν ὡς οὐκ ἀνὴρ κίνησιν οὖσαν ἀνευ κενοῦ τὸ τε κενὸν μὴ ὅν, καὶ τοῦ ὄντος οὐθὲν μὴ ὅν φησιν εἶναι. τὸ γὰρ κυρίως ὃν παμπλῆρες ὅντες ἀλλ' εἶναι τὸ τοιοῦτον οὐχ ἐν, ἀλλ' ἄπειρα τὸ πλήθος καὶ ἀόρατα διὰ σμικρότητα τῶν ὅγκων. ταῦτα δ' ἐν τῷ κενῷ φέρεσθαι (κενὸν γὰρ εἶναι), καὶ συνιστάμενα μὲν γένεσιν ποιεῖν, διαλυόμενα δὲ φθοράν. ποιεῖν δὲ καὶ πάσχειν γάρ τυγχάνουσιν ἀπτόμενα· ταύτη γὰρ οὐχ ἐν εἶναι. καὶ συντιθέμενα δὲ καὶ περιπλεκόμενα γεννᾶν,” *On*

Atomists, in admitting that atoms suffer by one another upon making contact, require that at least accidental form (such as direction and speed of movement) be able to be communicated between the ‘indivisibles’ they postulate.²⁰³ Furthermore, Aristotle points out that Democritus appears to also allow for communication of the form of ‘hotness,’ or at least the presuppositions of his theory demand that he do.²⁰⁴ Hence, we see that the ‘communication of form’ is part and parcel of the Atomist theory of nature.

The theory of Empedocles presents a similar challenge to Aristotle’s theory of *φύσις*. I will reserve the bulk of my discussion of Empedocles’s position for Chapter 4, where I will discuss Aristotle’s refutation of Empedocles’s denial of natural finality. Nevertheless, in the context of investigating the communication of form, it will be worthwhile to see how Aristotle’s arguments for forms able to communicate themselves apply also to Empedocles’s physical theory. In particular, Empedocles’s analysis of the elements would seem to require an analysis in terms of *φύσις*. First, each of his elements or ‘roots’ has a given ‘office’ or ‘honor’ (*τιμή*) and ‘character’ (*ἦθος*); all of them, however, occupy space and are bodies. Thus, even more than the ‘atoms’ of Leucippus and Democritus, the elements of Empedocles have a *τὸ τι ἦν εἶναι*, and a *ὑποκειμένον* which is in potency to receive the ‘what it was to be’ of the given element. What Empedocles’s elements do *not* appear to have is their own proper motions, as in the theory of Aristotle,²⁰⁵ and thus Empedocles postulates the action of Love and Strife to account

Generation and Corruption, 325a23-35.

²⁰³Cf. *On Generation and Corruption*, 326b2-5.

²⁰⁴Cf. *On Generation and Corruption*, 326a10-13.

²⁰⁵*On the Heavens*, 307b17-24.

for the fact that the elements do in fact move, form mixtures and separate.

Nevertheless, Empedocles is still vulnerable to the need for postulating the ‘communication of form’ (‘action’ and ‘passion’ in Aristotle’s terminology), in order to account for observed interactions between the elements. For since Empedocles’s elements do not move themselves, “*ἔτι δὲ τί τὸ κινοῦν; εἰ μὲν γὰρ ἔτερον, παθητικόν· εἰ δ’ αὐτὸν ἄντο ἔκαστον, η̄ διαιρετὸν ἔσται, κατ’ ἄλλο μὲν κινοῦν· κατ’ ἄλλο δὲ κινούμενον, η̄ κατὰ ταῦτα τάναντία ὑπάρξει, καὶ ή ὅλη οὐ μόνον ἀριθμῷ ἔσται μία ἀλλὰ καὶ δυνάμει.*”²⁰⁶ Empedocles relies on a theory of ‘pores’ to explain the phenomena of ‘interaction,’ while maintaining the impassivity of the elements. Aristotle demonstrates that this is no escape from the necessity to postulate action and passion: “*ὅλως δὲ τὸ πόρους ποιεῖν περίεργον· εἰ μὲν γὰρ μηδὲν ποιεῖν κατὰ τὴν ἀφήν, οὐδὲ διά τῶν πόρων ποιήσει διιόν· εἰ δὲ τῷ ἄπτεσθαι, καὶ μὴ πόρων ὄντων τὰ μὲν πείσεται τὰ δὲ ποιήσει τῶν πρὸς ἄλληλα τοῦτον τὸν τρόπον πεφυκότων.*”²⁰⁷

We can make a similar argument regarding the interaction of the ‘opposites’ postulated by Empedocles.²⁰⁸ Aristotle also postulated the *ἐναντία*; the former’s theory, however, postulates that only *likes* interact, not opposites: “*ὂς γλυκὺν μὲν γλυκὺν μάρπτε, πικρὸν δ’ ἐπὶ πικρὸν ὅρουσεν, ὁξὺν δ’ ἐπ’ ὁξὺν ἔβη, δαερὸν δ’ ἐποχεῖτο δαηρῶι.*”²⁰⁹ In order, however, for a quantity of one element to react negatively to another (as do water and oil, for instance²¹⁰) the elements must either have natural motions that are distinct, or else the elements must somehow ‘communicate’ their ‘whatness,’ so that there

²⁰⁶On *Generation and Corruption*, 326b3-7.

²⁰⁷On *Generation and Corruption*, 326b22-25.

²⁰⁸DK31B22.

²⁰⁹DK31B90.

²¹⁰“*οἴνῳ . . . μᾶλλον ἐνάρθμιον, αὐτὰρ ἐλαίῳ οὐκ ἐθέλει,*” DK31B91.

can be a reaction of rejection or acceptance. For presumably ‘Love’ acts equally on the combined body of water and wine, as on the water and oil. In the former case, there is mixture, in the latter, separation, the only difference being the ‘whatness’ of each component. We see instances of true non-interaction in cases where the categories of the things are different: for instance, it makes no difference to the white that the man in whom it exists is here or there, or large or small. But in fact we *do* see interaction between the Empedoclean elements, which reject each other, based on their essences.

Empedocles does appear to recognize the fact that form must be able to communicate itself, in order to account for observed data. For instance, he postulates that all things have ‘effluences’ that flow out from a given body, and impact other bodies (through pores), to a degree dependent on the similarity between the elemental mixtures of the bodies concerned.²¹¹ In his analysis of vision, the fire of light goes out from the eyes through tiny pores, mixing with the fire of things observed.²¹² But for the fire of the eye to be able to ‘meet’ with corresponding fire outside the eye, and thus react in sympathy, producing vision, there must be some ‘communication’ of the ‘whatness’ of fire.²¹³

Thus, we are left with the necessity for postulating the communication of form at the level of the elements, since some such communication be-

²¹¹“γνούς ὅτι πάντων εἰσὶν ἀπορροαί, ὅσσον ἐγένεντο...” DK31B89.

²¹²“ὦς δὲ τότε ἐν μήνυξιν ἐεργμένον ὡγύγιον πῦρ λεπτήσιν [το]ύθονησι λοχάζετο κύκλοπα κούρην, [α]λλὰ χοάνησι δίλατα τετρήσατο θεοπεσίησιν· αὐτὸν δὲ ὑδατος μὲν βένθος ἀπέστεγον ἀμφιναέντος, πῦρ δὲ ἔξω διλεσκον, σύσον ταναύτερον ἦν,” DK31B84.

²¹³“Σωκράτης: οὐκοῦν λέγετε ἀπορροάς τινας τῶν ὄντων κατὰ Εμπεδοκλέα; ... ἐκ τούτων δὴ σύνεις ὅτι λέγω ἔφη Πίνδαρος. ἔστιν γὰρ χρόα ἀπορροὴ σχημάτων ὅφει σύμμετρος καὶ αἰσθητός,” Plato, *Meno*, p. 76c.

tween beings is the only non-occasionalist explanation which can account for the reality of interaction between mobile beings. Further, if Aristotle's analysis of the *ἀρχαί* succeeds, then a change in the state of one being caused by the action of another will have to be a change in the formal *ἀρχή* in one of the categories. In short, Empedocles is subject to the basic aspects of the analysis of *φύσις* postulated by Aristotle (as are the Atomists, as discussed above), although the particulars of his theory may differ from those of the Stagirite.

2.5 Conclusion: *φύσις* and the ‘ways of being’

In this exploration of the senses of *ὄντα* and their relation to Aristotle's doctrine of *φύσις*, we have achieved a number of important objectives. The Aristotelian analysis of ‘being’ or *ὄντα* as an analogical term is both a necessary analysis, as well as one which allows for the resolution of a number of major issues related to being and change which went unresolved in the theories of the *φυσιολόγοι* and other Pre-Socratics, such as Parmenides. Aristotle's ability to resolve these *ἀπορίαι* via an elegant, simple analysis at the metaphysical level provides his theory with an explanatory power that goes far beyond that of his opponents' theories.

In the first section of this chapter, I explored the usage of the term *ὄντα* in the Pre-Socratics, showing how the term had several senses in pre-philosophical usage: an existential sense ('a thing that exists or occurs'), a predicative sense (attributing such-and-such properties to a subject) and, in plural form, a veridical sense ('the truth' or 'the facts'). Our earliest tes-

timony to a philosophical use of the term—in Anaximander—sees the term being used non-technically, in its existential sense, referring to ‘a thing that exists or occurs,’ considered independently of its particular determinations. Some two generations later, when Parmenides writes his revolutionary poem, we see the veridical and existential senses merging, so that *εόν* is used in the sense of ‘that which *truly* or necessarily is.’

In this regard, Parmenides appears to have a tremendous impact upon succeeding philosophers, for *εόν/ον* become frequently used in philosophical contexts. For those who were convinced by Parmenides’s argument, these terms retain their technical sense of ‘that which necessarily/immutably/truly is’ (albeit without the Parmenidean monism); other philosophers unconvinced by Eleatic arguments used *εόν/ον* in the sense of ‘something which is,’ a ‘being,’ but independent of reference to particular determinations. Thus by the time of Aristotle, *εόν/ον* had become a term of art amongst philosophers, which set the stage for his own elaboration of its various senses in *Metaphysics* V.7.

In the second section, I described ‘being’ as analyzed in terms of Aristotle’s ‘categories’; I looked briefly at Aristotle’s description of the doctrine as given in his *Categories*, along with various theories concerning the origin of the doctrine of the categories. This was followed by an analysis of the effect of the doctrine of the categories on Parmenides and the *φυσιολόγοι*. According to the categorial analysis of being, we assign ‘*ον*’ in its most primary sense to the being of *οὐσία πρῶτον*: those beings which are self-subsistent subjects, or substances, and to which all other senses of being are referred. Aristotle argues that the categorial analysis of being must be applicable to

Aristotle on Higher Natures

the kinds of being postulated by the *φυσιολόγοι*; he gives an explicit argument for this in the case of the categories of quantity and quality, and similar arguments are easily derivable for the other categories of being. The derivation of the categories of being has several effects on Aristotle's theory of higher *φύσις*. In particular, by demonstrating that being must be said multiply, at least at the level of categorial analysis, Aristotle shows that Parmenides was wrong to assert a single meaning for *εἶναι* and *δοῦναι*, and that therefore the *φυσιολόγοι*—aside from Democritus—were incorrect in taking Parmenides's argument as a sufficient basis for asserting unchanging, eternal ‘elements’ or *ἀρχαῖ*. Secondly, it shows how we can reconcile change with stability, thus avoiding the ‘Heraclitean’ trap of asserting constant and total flux in order to account for the reality of movement and change.

In the third section, on the analysis of being as ‘noetic’ or ‘real,’ I began by investigating the manner in which Aristotle makes this distinction in his *Metaphysics*, showing that ‘being as truth’ (or noetic being, as I have called it), regards the being which is said of true judgments (while false judgments are said to be ‘non-being’). The components of judgments are notions or concepts, which—as *εἴδεα* in thought—are immobile, necessary and perfectly complete. Noetic being is a subsidiary way of being, dependent upon the ‘real’ being characteristic of existing substances, from the grasping of which we derive our primary notions. The real being that we know in this way is characterized by motion and by composition of form with matter, with the partial unintelligibility that results from this composition.

Next, I investigated the roots of the Parmenidean error. I cited Alar-

cón's argument, which explains how Parmenides confuses the atemporal-ity of the highest truth, namely the Principle of Non-Contradiction, with the analysis of the notion of being, which, as a concept, is atemporal and immobile. But concepts are components of noetic being, and since it is illicit to restrict the particular characteristics of the primary sense of being—the real—to those of a derived sense of being—the noetic and its components—we see that Parmenides is unjustified in claiming that real being is immobile in the way that concepts are. I have hypothesized that this error, in turn, removes the justification that many among the *φυσιολόγοι* thought they had for denying substantial change among their ‘elements,’ and opens the way for Aristotle to posit genuine coming to be and passing away, not only at the level of the elements, but also at the level of higher beings.

In the fourth section I discussed the doctrine of potency and act. I began by describing the Aristotelian doctrine, highlighting its connection to his philosophy of nature, insofar as it shows how change is possible, as a transition from that which is in potency—i.e. not now existent but nevertheless real—to that which is in act—i.e. a ‘doing’ or activity of an individual, either *qua* determined accidentally, or *qua* being the type of substance that it is. I followed with an exploration of Aristotle’s argument for distinguishing potency from act, in response to the Megarian assertion that a thing is ‘potent’ only when it is in act. The Megarian argument allowed Aristotle to show the necessity for potency as a distinct notion, in order to not violate causality. In this connection, I noted that *φύσις* as a principle within the genus of potency will be necessary to adequately explain the species-

Aristotle on Higher Natures

specific operations of particular kinds of beings. The Megarian argument also allows Aristotle to clearly distinguish potency from act, while showing that both of them are ways of being within the ambit of the ‘real.’

Following my exposition of the Megarian argument, I summarized Aristotle’s ‘dilucidation’ of the notions of potency and act (since, strictly speaking, there is no definition of these primary notions). Act, which is the primary of the two notions, refers in the first place to the ‘existence of the thing.’ It is a notion derived from our experience of motion, but which we are able to extend analogically to the character of existence as a ‘doing.’ Potency, while analyzable at the noetic level as referring to that which is ‘possible,’ is primarily of interest in the context of this study in terms of its ‘real’ application. In referring to the real, potency can have an active or passive sense, depending on whether the being ‘in potency’ is capable of being the agent or recipient of a given change. Furthermore, the contrast (as illustrated by Aristotle in *Metaphysics* IX.6) between potency and act illuminates the ‘ontological’ dimension of these terms: there are two ‘ways of being,’ δυνάμει δύναται and ἐνέργειᾳ δύναται, the first of which refers to that thing which is properly said have non-being, but which in a broad sense exists insofar as it is potentially, and the latter of which refers to what is said to have being in the primary and full sense of an active ‘doing’ of some kind.

The important thing about demonstrating the reality of being as potency and act is that it shows us a way out of the Parmenidean trap of saying that ‘what is’ cannot cease to be what it is. The apparent impossibility of coming to be is caused by adopting a unitary sense of being, and this is precisely the conundrum that shackled Parmenides to the conclusion that

one can only say that ‘it is’ and that it cannot be said in any way that ‘it is not.’ But in processes of change, a thing is not said to be what it is not *simpliciter*, but rather according to a dimension of being that remained hidden to Parmenides, namely the being of ‘can be’ ($\delta\upsilon\upsilon\acute{a}\mu\epsilon\iota\ \check{\sigma}\nu$).

The Aristotelian analysis of being in terms of act and potency will play an important role in his ability to justify higher $\phi\upsilon\sigma\iota\varsigma$, for several reasons. In the first place, it provides a metaphysical explanation of how change is possible, showing that the real is characterized by being in act, but also as ‘hosting’ within that act a genuine capacity to ‘be other.’ Secondly, the existence of rational potencies opens the door to Aristotle to show that there exist potencies which are inescapably dependent upon higher natures, being thoroughly inexplicable in terms of the operations of the ‘simple bodies.’ This is due to the fact that the active qualities of the simple bodies must activate given the appropriate physical conditions, whereas rational potencies need not activate due to the intellect’s being able to consider both the actualization as well as the corresponding privation: based on the rational potency of the art of medicine, the physician can heal, fail to heal, or even do harm. Thirdly, since formal act is the host of active and passive potencies, that which is ‘form’ under one description is ‘matter’ and potential under another description. This I call the ‘scaffolding’ of forms, and explains how true higher beings can come about: a higher $\phi\upsilon\sigma\iota\varsigma$ is the formal act of matter which, considered as itself formal and actual, provides the lower-level potencies necessary for a higher-order substance to be in act.

Finally, under the heading of the discussion of potency and act, I dis-

Aristotle on Higher Natures

cussed the issue of the ‘communication of form,’ showing that formal act, in making a natural substance to be real, does not isolate that being from others, sealing it off hermetically. Rather, the fact of motion and change requires that we recognize the capacity of form to be ‘communicated,’ through the relation of agent and patient, such that a being which is in passive potency to actualize a given form, may, under the causative action of the agent, come to be in act in a given formal way. This ‘communication’ of form is a necessary postulate in any physical theory that purports to explain the phenomenon of interaction; Aristotle himself demonstrates this in the course of his critique of Empedocles’s theory of pores, and a similar demonstration can be derived for the theories postulated by the Atomists.

To summarize the results of my investigation up to this point, I believe the following claims can be justifiably made. First, that the arguments of the majority of the *φυσιολόγοι* are strongly undermined by Aristotle’s refutation of Parmenides, which he makes through his careful analysis of the various senses of the terms *δύναμις* and *εἶναι*; Democritus is refuted by a separate argument. The way is wide open for Aristotle to demonstrate the existence of generable and corruptible *φύσεις* at the elemental level, and once we have genuine ‘coming to be’ at the elemental level, it becomes reasonable to posit it at higher levels as well. Secondly, he has derived a theory of potency and act that goes farther than merely showing that change must be real; it also shows how the structure of the real includes a ‘capacity to be’ in addition to the primary mode of ‘actually being.’ This discovery opens the way for Aristotle to show that there exist higher beings with complex hierarchies of ‘powers,’ including rational powers, which cannot be explained without

postulating *φύσεις* of a higher order than the elements. Finally, the doctrine of potency and act shows us how *φύσις* can be a ‘principle of change’ in the being itself (for *φύσις* as source of potency is the cause of the operations of the being), and that through the ‘communication of form’ it can be a principle of change in other beings.

At this point, we still lack an analysis of change and motion that will enable to us understand how a formal principle, as we have derived it here, *could* communicate form and thereby cause change in other beings. There are several *ἀπορίαι* remaining in regards to motion and change that must be resolved, before we can derive the full Aristotelian doctrine of *φύσις* as principle of motion and rest in a substance. In Chapter 3, I will analyze Aristotle’s theory of motion, showing how *φύσις* is a principle of motion under this theory.

There are several other aspects lacking in a complete justification of the doctrine of *φύσις* as Aristotle has developed it. In the first place, we need to show that a given *φύσις* will be characterized by certain ‘operations’ which it will always perform, provided that nothing impedes. This aspect will be discussed in Chapter 4, which focuses on natural finality and the materialist doctrine of chance. Finally, we still lack a full justification for the existence of kinds of *φύσις* higher than the elements. Up to now, I have focused on showing that Aristotle’s doctrines of the *ἀρχαῖ* and potency and act apply equally as much to the materialist philosophers with whom he is arguing, as to the higher beings (especially organisms) which are of primary interest to Aristotle. I have taken this approach, because the ‘reality’ of these higher beings is one of the major issues under challenge by the materialists; for a

Aristotle on Higher Natures

convincing defense against the *φυσιολόγοι*, Aristotle will have to show why his postulation of higher substantial forms is necessary, and the materialist analysis false in this regard. This issue will be taken up in Chapter 5.

3. *Φύσις* as Principle of Motion

In this chapter, I will discuss the Aristotelian analysis of motion and change, in order to show how *φύσις* can be an ‘ἀρχή κινήσεως καὶ στάσεως,’ and how such an *ἀρχή* is in fact necessary to explain observed phenomena. I divide this chapter into three major sections.

The first of these sections will discuss Aristotle’s theory of motion in general, and as it applies to the motion of beings which have a *φύσις*. In this section, I will first give a brief description of the major points of the Aristotelian theory of motion and change, as background for the discussion to follow. In the second section, I will investigate the difficult topic of Aristotle’s theory of the relation between the mover and the moved, in particular the case of self-movers. In the third major section of this chapter, I will look at how the ‘communication of form’¹ occurs in motion and change, such that self-movers can be seen to be genuine initiators of change in beings other than themselves. In this section, I will investigate the conditions for this communication of form (in particular touch or contact), the different ways in which this transmission can occur, and finally I will advance a potential solution to the difficulties relating to this issue. Finally, in the chapter’s conclusion, I will summarize how the discoveries of this chapter aid in providing an additional ‘leg’ for Aristotle’s justification of the exis-

¹See Chapter 2, page 125, for clarifications on my terminology in this regard.

tence of *φύσις*.

3.1 The Aristotelian analysis of motion and change

Aristotle's analysis of motion and change is one of his most innovative and important contributions to the philosophical debates of his time, as he himself points out: “*Οτι δὲ μοναχῶς οὕτω λύεται καὶ ἡ τῶν ἀρχαίων ἀπορία, λέγωμεν μετὰ ταῦτα. ζητοῦντες γὰρ οἱ κατὰ φιλοσοφίαν πρῶτοι τὴν ἀλήθειαν καὶ τὴν φύσιν τῶν ὄντων ἐξετράπησαν οὖν ὁδόν τινα ἀλλην ἀπωσθέντες ὑπὸ ἀπειρίας...*”² His analysis of motion will be critical for understanding how a natural substance can be a mover, both of itself and of others; thus, in this section, I lay out a brief sketch of his theory of motion, prior to moving on the analysis of the possibility of self-motion.

3.1.1 A brief look at Aristotle's theory

A substantial majority of the *Physics* is taken up by Aristotle's discussion of motion and change, related concepts—such as place, time, continuity and the infinite—and the resolution of several *ἀπορίαι* relating to motion, such as whether there is an absolute First Mover, and the resolution of Zeno's paradoxes. Given that Aristotle has defined *φύσις* as a principle of motion and rest, and given that the possibility of motion and its explanation were topics of intense debate during his time, it is understandable that he would dedicate such a substantial portion of his work on the science of physics to an explanation and analysis of this phenomenon. As Aristotle

²*Physics*, 191a23-25.

puts it at the beginning of Book III of the *Physics*, “Ἐπεὶ δ’ ἡ φύσις μέν ἔστιν ἀρχὴ κινήσεως καὶ μεταβολῆς, ἡ δὲ μέθοδος ἡμῶν περὶ φύσεώς ἔστι, δεῖ μὴ λανθάνειν τί ἔστι κίνησις· ἀναγκαῖον γὰρ ἀγνοουμένης αὐτῆς ἀγνοεῖσθαι καὶ τὴν φύσιν.”³

As noted in Chapter 1, Aristotle proposed his theory of the ‘ἀρχαῖ’ in order to account for the fact of change, a fact easily demonstrated by induction: “ἡμῶν δ’ ὑποκείσθω τὰ φύσει ἡ πάντα ἡ ἔντα κινούμενα εἶναι δῆλον δ’ ἐκ τῆς ἐπαγωγῆς.”⁴ In order for something to come to be or pass away, without postulating coming to be or passing away in an absolute sense, Aristotle postulated that the material *ἀρχή* remained intact throughout the change, such that something one in number might ‘move’ from being in a certain way to being in another way. Coming to be and passing away are thus admitted, but only in the sense of ‘an underlying something coming to be in some new way.’ A certain way of being comes to be at the level of the formal *ἀρχή*, in a being in which this new way of being previously ‘existed’ (*ὑπάρχει*) in potency. There is thus no radical coming to be or passing away of something from nothing, but from ‘being-in-potency’ to ‘being-in-act.’

3.1.2 The definition of motion

Aristotle defines motion as follows: “ἡ τοῦ δυνάμει ὄντος ἐντελέχεια, ἥ τοιοῦτον, κίνησίς ἔστιν...”⁵ This concise definition of motion is a minefield of difficulties, despite appearances to the contrary. As Aristotle himself has said, motion is “χαλεπὴν μὲν ἴδεῖν, ἐνδεχομένην δ’ εἶναι.”⁶ The most common way of

³*Physics*, 200b12-13.

⁴*Physics*, 185a15-16.

⁵*Physics*, 201a12.

⁶*Physics*, 202a1-2.

Aristotle on Higher Natures

explaining the definition of motion is to hold that the term *ἐντελέχεια* means ‘actualization’; this is the interpretation of Ross, for instance. Hence, for Ross and those who follow his lead,⁷ “motion is ‘the actualization of that which is potentially, as such.’ I.e. if there is something which is actually x and potentially y, motion is the making actual of its y-ness.”⁸

This interpretation of Aristotle’s definition has been challenged by Kosman, who notes that Ross (and those who follow him) have interpreted the definition in such a way as to make it vacuous, because ‘actualization’ is already a process or kind of motion, and hence the definiens already includes the definiendum. Kosman notes that Aquinas makes a similar accusation of those who would define change as “exitus de potentia in actum... Qui in definiendo errasse inveniuntur, eo quod in definitione motus posuerunt quaedam quae sunt posteriora motu: exitus enim est quaedam species motus.”⁹ Waterlow similarly criticizes Ross for interpreting Aristotle as producing a blatantly circular definition of motion, for the same reasons as Kosman.¹⁰

If we are not to translate *ἐντελέχεια* as ‘actualization,’ we appear to run into a conundrum. The other possible translation of *ἐντελέχεια* is as ‘actuality,’ which in Chapter 2 (p. 106) we noted was the primary meaning of the term, along with senses meaning ‘perfection,’ ‘lack of potency’ or ‘full

⁷Such as E. Zeller, P. Wicksteed and F. M. Cornford; cf. Waterlow, *Nature, Change, and Agency*, p. 112.

⁸Ross, *Aristotle*, p. 81; cited in Kosman, “Aristotle’s Definition of Motion”, p. 41. This interpretation is also followed by Lear; cf. Lear, *Aristotle: The Desire to Understand*, p. 60.

⁹Aquinas, *In Physicorum*, Lib. III, lect. 2, n. 2.

¹⁰Waterlow, *Nature, Change, and Agency*, p. 112.

realness.¹¹ But as both Waterlow and Kosman point out, while the terms ‘actualization’ and ‘realization’ capture the dynamism of change, ‘actuality’ appears to leave it out.¹² By translating *ἐντελέχεια* as ‘actuality’, however, we obtain a definition of motion that appears to define the end product of the process, and not the process itself. For the actuality of a piece of bronze’s ability to be a statue is a statue. It also makes mysterious the final portion of the definition, “*ἡ τοιοῦτον*.” What would it mean to be the actuality of a potency *qua* potency, if the actuality of a potency is just the end product itself? This is the difficulty which Ross et al. had intended to avoid by translating *ἐντελέχεια* as ‘actualization,’ at the price of making the definition circular.

Ross¹³ notes that Aristotle attempts to clarify this issue at the end of *Physics* III.1, where he states

ἐνδέχεται γὰρ ἔκαστον ὅτε μὲν ἐνεργεῖν ὅτε δὲ μή, οὖν τὸ οἰκοδομητόν,
καὶ ἡ τοῦ οἰκοδομητοῦ ἐνέργεια, ἢ οἰκοδομητόν, οἰκοδόμησίς ἐστιν (ἢ γὰρ
οἰκοδόμησις ἡ ἐνέργεια [τοῦ οἰκοδομητοῦ] ἢ ἡ οἰκία· ἀλλ’ ὅταν οἰκία ἡ, οὐκέτι
οἰκοδομητὸν ἔστιν οἰκοδομεῖται δὲ τὸ οἰκοδομητόν.¹⁴

Here Aristotle clarifies the meaning of *ἡ* (translated into English either as ‘as such’ or as ‘*qua*’) in reference to the definition of motion, and in doing so resolves the problems associated with translating *ἐντελέχεια* as ‘actuality’ in the definition of motion. For the buildable in potency is potential,

¹¹Cf. also Kosman, “Aristotle’s Definition of Motion”, p. 42.

¹²Waterlow, *Nature, Change, and Agency*, p. 113; Kosman, “Aristotle’s Definition of Motion”, p. 44.

¹³Ross, “Commentary on Aristotle’s Physics”, p. 536.

¹⁴*Physics*, 201b8-13.

Aristotle on Higher Natures

the buildable in actuality is the house, but the actuality of the buildable in potency *qua* in potency means we are referring to not to either of the extremes, but to the buildable as incomplete actuality, i.e. as still retaining a part of its potency for being built. Aquinas puts the point as follows:

Unde neque est potentia existentis in potentia, neque est actus existentis in actu, sed est actus existentis in potentia: ut per id quod dicitur actus, designetur ordo eius ad anteriorem potentiam, et per id quod dicitur in potentia existentis, designetur ordo eius ad ulteriorem actum.¹⁵

This ‘actuality’ of a potency *qua* potency occurs within the various categories: “οἷον τοῦ μὲν ἀλλοιωτοῦ, ἢ ἀλλοιωτόν, ἀλλοίωσις, τοῦ δὲ αὐξήτου καὶ τοῦ ἀντικειμένου φθιτοῦ (οὐδὲν γὰρ ὅνομα κοινὸν ἐπ’ ἀμφοῖν) αὔξησις καὶ φθίσις, τοῦ δὲ γενητοῦ καὶ φθαρτοῦ γένεσις καὶ φθορά, τοῦ δὲ φορητοῦ φορά.”¹⁶ The analysis of being in terms of potency and act is transversal to the categories; as noted in Chapter 2, a being can be said to be in act or in potency in several of the categories. Thus, Aristotle notes that motion “οὐκ ἔστι δὲ κίνησις παρὰ τὰ πράγματα μεταβάλλει γὰρ ἀεὶ τὸ μεταβάλλον ἢ κατ’ οὐσίαν ἢ κατὰ ποσὸν ἢ κατὰ ποιὸν ἢ κατὰ τόπον.”¹⁷

In this context, Aristotle introduces several important terms to describe the two beings involved in the motion (for Aristotle always analyzes motion in terms of pairs: the mover and the moved). First, we can speak in terms of ‘agent’ and ‘patient’ (*ποιητικὸν* and *παθητικόν*), which refer to the kinds

¹⁵Aquinas, *In Physicorum*, Lib. III, lect. 2, n. 3. Cf. also Lear, *Aristotle: The Desire to Understand*, p. 61 for a similar explanation of the *directionality* of motion.

¹⁶*Physics*, 201a13-19.

¹⁷*Physics*, 200b33-35.

of potency existing in the beings involved. The ‘agent’ is the being which has an active potency, i.e. which currently has the form in act, and the ‘patient’ is the being with a passive potency, the being in which the potency is being brought into act. Second, we can speak in terms of ‘mover’ and ‘moved’ (*κινοῦν* and *κινητόν*). This way of speaking highlights the fact that the change is occurring in the ‘moved’; in Aristotle’s analysis, the ‘mover’ does not move under the same account: “ἐστὶν ἡ κίνησις ἐν τῷ κινητῷ· ἐντελέχεια γάρ ἔστι τούτου [καὶ] ὑπὸ τοῦ κινητικοῦ.”¹⁸

3.2 Self movers and things that move themselves

In this section of my thesis, I will discuss the issues that arise from Aristotle’s discussion of movers and motion in Books VII and VIII of the *Physics*, as well as texts from *De motu animalium*, *De anima* and the *Nicomachean Ethics*. I will begin with a look at whether Aristotle admits the possibility of self-movers, followed by an examination of how Aristotle in fact defends the existence of natural self-movers. I continue by discussing what it means, in Aristotelian terms, to be a self-mover, and how animals are to be considered as self-movers, in particular focusing on possible resolutions for problematic aspects of the Aristotelian theory.

The existence (or non-existence) of self-movers is particularly important for the case against the *φύσιολογοι*. Aristotle’s materialist opponents, in particular Democritus and Empedocles, assert that these apparently self-moving organisms are not movers per se, but rather that the fortuitous

¹⁸*Physics*, 202a13-14. The mover may indeed be moved, as the stick which moves the stone is moved by the hand, but it is not moved *qua* mover, but rather *qua* mobile.

combination of the basic elements (or atoms) results in large-scale aggregates that move in ways characteristic of organisms, but without there being any particular ‘whatness’ present that could serve as a genuine mover. The atoms (or, for Empedocles, the elements, moved by ‘Love’ and ‘Strife’) are the only genuine movers, and chance is the cause of the apparent ‘natural’ orderliness we observe in the world: “εἰσὶ δὲ τινες οὖς καὶ τούρανοῦ τοῦδε καὶ τῶν κόσμων πάντων αἰτιῶνται τὸ αὐτόματον ἀπὸ ταύτομάτου γὰρ γενέσθαι τὴν δίνην καὶ τὴν κίνησιν τὴν διακρίνασαν εἰς ταύτην τὴν τάξιν τὸ πᾶν.”¹⁹ Thus, seen from the perspective of the *φυσιολόγοι*, Aristotle will have the burden of proving that there exist finite, sublunar self-movers that are not merely aggregates of elements. His proof of their existence will be an important step in demonstrating that there are higher *φύσεις* than just the elements. If, for instance, the *φύσις* of horse is genuinely an initiator of the motions characteristic of horses (when this *φύσις* is actualizing a body so as to compose an actual, individual horse-type substance) then we have an instance of a true subsisting higher unity that cannot be reduced to the actions of elements in aggregate.

3.2.1 Are self-movers possible?

The argument of *Physics* VII.1

The first question that needs to be answered is whether in fact Aristotle needs, or in fact allows for, self-movers in his system. For while he speaks frequently about “τὸ αὐτὸν αὐτὸν κινοῦν” and “ἃ κινεῖ αὐτὰ ἔαυτά” in the *Physics*

¹⁹ *Physics*, 196a25-28.

and elsewhere, there are also texts which appear to demonstrate the inconsistency of the very notion of self-movers. As Wardy puts it in *The Chain of Change*,

In a preliminary section [of *Physics* VII.1] (241b39-44 / 241b27-33), Aristotle warns us off ascribing self-motion to anything just because it moves as a whole and not as a result of anything external. Since self-motion could hardly be otherwise described, this direction amounts to Aristotle's firmly withdrawing the concept from circulation, forbidding it any application whatsoever. In fact, perhaps he goes further, not just denying that anything can be properly described as a self-mover, but also implying that the idea is incoherent: there is no way of describing an imaginable movement which does not treat it as an interaction between parts.²⁰

The argument to which Wardy is referring is that expounded in *Physics* VII.1, which appears to eliminate all possibility of bodies that move themselves *per se*. Aristotle argues that, given a supposed self-mover AB, which is moving $\kappa\alpha\theta'$ $\alpha\nu\tau\acute{o}$, and not by a part of it moving, AB can be divided, because all mobiles are continuous and thus divisible. But suppose we divide the mover at C, such that we have the parts AC and CB. If CB rests, AB must also rest (because AB was posited as moving as a whole, and the whole cannot move while a part does not). But if the whole must rest because a part rests, the whole cannot be moving $\kappa\alpha\theta'$ $\alpha\nu\tau\acute{o}$, but is dependent upon the part

²⁰Wardy, *The Chain of Change*, p. 94.

Aristotle on Higher Natures

for its motion. Again, if we posit that one part (CB) is a mover and another (AC) is moved, then the mover is either unmoved or moved; if CB is moved, then as mover it is not an unmoved mover, and is moved by another, and the whole is not a genuine self-mover. But if CB is not moved, then it must either be a self mover, or be resting. If it is resting, AB cannot move either, for the whole cannot move when the part rests (per the postulate above). But if it is a self-mover, it is susceptible to the same analysis, for as a mobile, it is divisible, and we have an infinite chain of ‘self-movers,’ none of which moves itself. Thus, no divisible being can move itself *καθ’ αὐτό*. But all body is divisible; ergo, no body can move itself *qua* body.

Wardy’s thesis is that book VII is an integral part of the *Physics*, that it belongs where it does, and is strongly linked both to book VIII and to books V-VI.²¹ Hence, the doctrine of the impossibility of genuine self-movers must also underlie Aristotle’s discussion in *Physics* VIII.4-6. Sorabji follows Wardy in this interpretation: “...in apparent self-movers what is moved is moved by something else.”²² Aristotle’s use of the terms “τὸ αὐτὸν αὐτὸν κινοῦν” and “ἄ κινεῖ αὐτὰ ἔαυτά” would have to be taken to refer to merely *apparent* self-movers, and the proofs which have been traditionally thought to prove the existence of sublunar (i.e. animal) self-movers must be simply preliminary steps in the process of proving the existence of a sin-

²¹Ibid., p. 89; cf. also Olszewsky, “Self-Movers and Unmoved Movers”, p. 390.

²²Sorabji, “Introduction to *On Aristotle Physics 7*”, p. 1. Here, Sorabji is paraphrasing the β version of the text of *Physics* VII.1-3, which draws a sharper conclusion about the necessity for supposed ‘self-movers’ to be moved by something *else*: “ἐπεὶ δὲ τὸ κινούμενον ὑπὸ τίνος κινεῖται, ἀνάγκη καὶ τὸ κινούμενον πᾶν ἐν τόπῳ κινεῖσθαι ὑπ’ ἄλλου,” “Physics VII”, β, 242a15-17. The α version simply states that “πᾶν ἀνάγκη τὸ κινούμενον ὑπὸ τίνος κινεῖσθαι,” “Physics VII”, α, 242a46. Guthrie also interprets Aristotle as denying the possibility of self-movers; cf. Guthrie, “Introduction to *On the Heavens*”, p. xxi.

Chapter 3. Φύσις as Principle of Motion

gle first mover, without parts or magnitude, which Aristotle undertakes to demonstrate conclusively in *Physics* VIII.10.

Other authors have analyzed the status of *Physics* VII differently. For instance, Ross holds that “there are several indications that the book is not an integral part of the *Physics*, but is, even if it be by Aristotle, an excrecence on the main plan.”²³ Insofar as dating *Physics* VII, Ross makes the suggestion that it may be a composition of Aristotle’s Assos period, shortly after leaving the Academy at Athens.²⁴ Jaeger notes the presence of other members of the Platonic Academy at Assos,²⁵ which would account for the strong Platonic influences Olszewsky notes in *Physics* VII, where (according to both Olszewsky’s and Ross’s accounts) Aristotle is still engaged in a close dialogue with the doctrines of Plato.²⁶ Furthermore, Olszewsky holds that, due to its early composition, we ought not to be surprised to find many aspects of later Aristotelian doctrine absent in *Physics* VII, in particular his standard account of natural motion, the doctrine of the hylomorphic constitution of natural beings, and the notions of potency and act that un-

²³Ross, “Physics, Introduction.”, p. 15.

²⁴ibid., p. 18; cf. Jaeger, *Aristoteles: Grundlegung*, p. 116.

²⁵ibid., p. 117.

²⁶Olszewsky, “Self-Movers and Unmoved Movers”, pp. 399-403; cf. also Ross, “Physics, Introduction.”, p. 17. Olszewsky lists other elements of Platonic influence, such as the discussion of locomotion as combination and separation (β , 243b29), and the analysis of the virtues of bodies as “mixture and symmetry” of primary qualities (α , 246b5-6). “It is academics, not peripatetics, that talked in terms of mixtures and proportions, and of combination and separation,” Olszewsky, “Self-Movers and Unmoved Movers”, pp. 399-400. He concludes that “the concerns about alteration here might plausibly have been prompted by the accounts of the property analysis of coming to be as presented in the *Timaeus*. Understood in this context, after the *Sophist*, and after the *Categories*, we could see the struggles with alteration in VII-3 as Aristotle’s attempt to come to terms with change in relation to his own treatment of categorization on the one hand and with Plato’s new-found efforts to account for the nature of change on the other,” ibid., p. 400.

Aristotle on Higher Natures

derlie these doctrines.²⁷ Thus analyzed, it is no surprise that, as Ross states, “book vii remains within the region of the material and does not unfold the notion of an unmoved mover which moves in a non-physical way.”²⁸

If Olszewsky’s and Ross’s account of the early origin and Platonic orientation of *Physics* VII is correct, we can understand why the chapter 1 argument (especially in the β version) concludes that self-movers (interpreted as things which move themselves as a whole) are impossible. Aristotle is attacking the Platonic doctrine of the soul as a self-mover which both moves itself as a whole and is moved as a whole.²⁹ Aristotle does not introduce, in the *Physics* VII.1 argument, the distinction between form and matter that would have allowed him to resolve the issue of how $\tau\alpha\ \epsilon\mu\psi\nu\chi\alpha$ can be considered as genuine self-movers, with the soul-form as unmoved mover and the body-matter as that which is moved. Hence, rather than following Wardy et al. in interpreting *Physics* VII.1 as exposing the doctrine of self-motion as incoherent *simpliciter*, we need merely interpret it as an early stage on the way to the mature Aristotelian doctrine of hylomorphic composed self-movers that move and are moved, but not in the same respect and at the same time.

²⁷Ibid., p. 404. According to Olszewsky (ibid.), the α version of *Physics* VII takes steps towards a hylomorphic conception of the composition of natural objects, but remains very poorly developed.

²⁸Ross, “Physics, Introduction.”, pp. 16-17.

²⁹Ross, “Commentary on Aristotle’s Physics”, p. 668; Olszewsky, “Self-Movers and Unmoved Movers”, pp. 404-5. Cf. Plato, *Phaedrus*, 245c-d, “μόνον δὴ τὸ αὐτὸ κινοῦν, ἄτε οὐκ ἀπολεῖπον ἔαντο, οὕποτε λήγει κινούμενον, ἀλλὰ καὶ τοῖς ἄλλοις ὅσα κινεῖται τοῦτο πηγὴ καὶ ἀρχὴ κινήσεως.”

Reduction to the First Unmoved Mover?

The question might arise as to why Aristotle believes that all motion is not ultimately traceable to the one First Mover as the initiator, and instead believes that he must postulate intermediate self-movers. It would be tempting to simply state that, while it is true that there is indeed a first mover for every motion we observe, that this first mover is none other than the ultimate First Mover of everything, and that beings such as men and animals are no more genuine originators of motion than is the stick in the hand of the man, or the wall that causes a ball to rebound. Indeed, this would appear to be the position that Aristotle takes in *Physics* VIII.6, where he asserts that animals, in moving, are in fact moved by external, environmental factors.³⁰ If all motions of supposed self-movers, such as animals, are in fact the result of environmental movement (which is in turn traceable to the motions of the celestial spheres), then it would appear to be more proper to say that there is only one true First Mover, and that ‘self-movers’ are only apparently movers of themselves. This would be a kind of ‘Democritean’ reduction of self-motion: at the level of superficial appearances, we see things that move themselves; at a deeper level of analysis, however, there are conjunctions of numerous environmental factors that are the true explanations of whatever motion appears to be a ‘self-motion.’³¹

³⁰“τοῦτο δὴ δεῖ λαβεῖν, ὅτι μίαν κίνησιν αὐτὰ κινεῖ, καὶ ὅτι ταύτην οὐ κυρίως. οὐ γὰρ ἐξ αὐτοῦ τὸ αἴτιον, ἀλλ᾽ ἔνεισιν ἄλλαι κινήσεις φυσικαὶ τοῖς ζῷοις, ἃς οὐ κινοῦνται δι’ αὐτῶν, οἷον αὖξησις φθίσις ἀναπνοή, ἃς κινεῖται τῶν ζώων ἔκαστον ἡρεμοῦν καὶ οὐ κινούμενον τὴν ὑφ’ αὐτοῦ κίνησιν,” *Physics*, 259b9-13.

³¹This possibility becomes all the more cogent, since Aristotle’s analysis of motion implies the simultaneity of action and passion, and thus that any given causal chain is in simultaneous motion as an entirety. Since the existence of motion in the universe at any given moment in time is always traceable to the First Mover, it would thus seem possi-

Aristotle on Higher Natures

Aristotle, however, does not seek to perform a reduction of this sort.³² Instead, he claims that certain natural substances, specifically those which have life, are genuine initiators of certain kinds of change in themselves and in other beings, and are not simply intermediary movers (as is the stick, when I move the stone by means of the stick), nor accidentally moved, as the components of a dust cloud move together, without there being a *φύσις* of dust-cloud needed to explain the apparent unity of motion. Aristotle identifies these self-movers with “τὸ τῶν ἐμψύχων καὶ τὸ τῶν ζώων γένος.”³³ He asserts that it is clear that there such beings exist, “δῆλον τοίνυν ὅτι, εἰ καὶ μυριάκις ἔνια [ἀρχαὶ] τῶν ἀκινήτων μὲν κινούντων δέ, καὶ πολλὰ τῶν αὐτὰ ἑαυτὰ κινούντων, φθείρεται...”³⁴ but this is not an assertion that was uncontested by his contemporaries.

Aristotle will have to argue for his position, for the issue in question—for the *φυσιολόγοι*—is precisely *whether* there exist such beings with souls able to move them. While Aristotle has claimed that it is clearly the case that there are such beings,³⁵ a *φυσιολόγος* might respond by reminding Aristotle

ble to perform such a ‘Democritean reduction’ by eliminating any reference to particular self-movers.

³²This is because there is a distinction in the types of causality involved: the First Mover is an immobile final cause; animals, on the other hand, are not immobile final causes, while they can be immobile movers in regards to the moving or efficient cause.

³³*Physics*, 259b3-5. Note that not all motions by organisms are self-motions; Aristotle sees many of their motions as being caused by external factors: “ταῦτα δὲ καὶ δόξαν παρεῖχε μή ποτε ἐνδέχεται κίνησιν ἐγγίγνεσθαι μὴ οὖσαν ὄλως, διὰ τὸ ἐν τούτοις ὁρᾶν ἡμᾶς τοῦτο συμβαῖνον [ἀκίνητα γὰρ ποτε ὄντα κινεῖται πάλιν, ὡς δοκεῖ], τοῦτο δὴ δεῖ λαβεῖν, ὅτι μίαν κίνησιν αὐτὰ κινεῖ, καὶ ὅτι ταῦτην οὐ κυρίως οὐ γὰρ ἐξ αὐτοῦ τὸ αἴτιον, ἀλλ᾽ ἐνεισιν ἄλλαι κινήσεις φυσικαὶ τοῖς ζῷοις, ἂς οὐ κινοῦνται δι᾽ αὐτῶν, οἷον αὖξησις φθίσις ἀναπνοή, ἂς κινεῖται τῶν ζώων ἔκαστον ἡρεμοῦν καὶ οὐ κινούμενον τὴν ύφ' αὐτοῦ κίνησιν. τούτου δ' αἴτιον τὸ περιέχον καὶ πολλὰ τῶν εἰσιόντων, οἷον ἐνίων ἡ τροφή· πεττομένης μὲν γὰρ καθεύδοντιν, διακρινομένης δ' ἐγείρονται καὶ κινοῦσιν ἑαυτούς, τῆς πρώτης ἀρχῆς ἐξωθεν οὖσης, διὸ οὐκ ἀεὶ κινοῦνται συνεχῶς ύφ' αὐτῶν ἄλλο γὰρ τὸ κινοῦν, αὐτὸ κινούμενον καὶ μεταβάλλον πρὸς ἔκαστον τῶν κινούντων ἑαυτά.” Aristotle, *Physics*, 259b4-b18.

³⁴*Physics*, 258b30-35.

³⁵“ὅρῶμεν δὲ καὶ φανερῶς ὄντα τοιαῦτα ἃ κινεῖ αὐτὰ ἑαυτά, οἷον τὸ τῶν ἐμψύχων καὶ τὸ τῶν ζώων

that many things *appear* to be clear, until a closer look is taken at the issue. Perhaps we are simply unable, as yet, to identify the precise factors which cause motion in the so-called ‘self-movers’; this does not, by any means, provide proof that such factors do not exist. Therefore, it would be useful to have a demonstration that there are kinds of finite motions—produced by finite sublunar beings—which are not reducible to the ultimate causative source in the natural world: the celestial motions, in particular the movement of the sun along the ecliptic, which is responsible for the coming to be and passing away of the elements, as well as the coming to be and passing away of organisms in their life cycles.³⁶ In the following section, I will describe Aristotle’s attempts to prove the existence of animal (and of course human) self-motion.

3.2.2 A proof for the existence of self-movers

A first step in proving the existence of self-movers is by showing that all individual motions must terminate in an unmoved mover.³⁷ Aristotle gives a number of different arguments for this position. In *Physics* VII.1 (242a49-243a31), he argues that if there is no first mover, there will be infinite motion in finite time, which is impossible.³⁸ Since Aristotle postu-

γένος,” *Physics*, 259b3-5.

³⁶“Διὸ καὶ οὐκ ἡ πρώτη φορὰ αἰτίᾳ ἐστὶ γενέσεως καὶ φθορᾶς, ἀλλ᾽ ἡ κατὰ τὸν λοξὸν κύκλον ἐν ταύτῃ γάρ καὶ τὸ συνεχές ἐστι καὶ τὸ κινέσθαι δύο κινήσεις· ἀνάγκη γάρ, εἴ γε ἀεὶ ἔσται συνεχῆς γένεσις καὶ φθορά, ἀεὶ μέν τι κινέσθαι, ἵνα μὴ ἐπιλείπωσιν αἴτιοι μεταβολαί, δύο δ’, ὅπως μὴ θάτερον συμβαίνη μόνον,” Aristotle, *On Generation and Corruption*, 336a32-b3.

³⁷This unmoved mover need not be the absolute First Mover, for self-movers are unmoved *qua* initiators of motion, but can be moved in many other ways; cf. Aristotle, *Physics*, 259b4-b20, where Aristotle notes that animals are not originators of motion *ex nihilo*.

³⁸“ἐπεὶ δὲ πᾶν τὸ κινούμενον ἀνάγκη κινέσθαι ὑπό τινος, εάν γέ τι κινήται τὴν ἐν τόπῳ κίνησιν ὑπ’ ἄλλου κινουμένου, καὶ πάλιν τὸ κινοῦν ὑπ’ ἄλλου κινουμένου κινήται κάκενο ὑφ’ ἐτέρου καὶ ἀεὶ οὕτως,

Aristotle on Higher Natures

lates simultaneous motion (i.e. when A moves B, and B moves C, A and C are moving at the exact same time),³⁹ he can show that if there is a motion M_0 , which takes time t , and there is an infinite number of movers $M_1 \dots M_\infty$ stretching back along the causal chain which ends at M_0 , all of these movers will be moving at time t . But there can be no actual infinity, as he has already shown in Book III.⁴⁰ Thus all causal chains must be finite, ending in something which moves but is not itself moved. While this proof does not directly address self-movers, it does show the necessity for an unmoved mover at the head of any causal chain, a critical step in his eventual demonstration of the $\psi\nu\chi\eta\acute{\eta}$ as the unmoved mover of animal bodies.

A second important point regarding motion in the Aristotelian theory involves the fact that the mover (*qua* mover) does not, and cannot, move itself. Since that which communicates form must have that form itself in act,⁴¹ and that which is in act under one account cannot be in potency under the same account, the mover must be, under some account, distinct from the thing moved:

ἀδύνατον δὴ τὸ αὐτὸν πάντη κινοῦν πάντη κινεῖν αὐτὸν φέροιτο γὰρ ἀν
ὅλον καὶ φέροι τὴν αὐτὴν φοράν, ἐν δὲ καὶ ἄτομον τῷ εἶδει, καὶ ἀλλοιοῦτο

ἀνάγκη εἶναι τι τὸ πρῶτον κινοῦν, καὶ μὴ βαδίζειν εἰς ἄπειρον... εἴη δὲ ἄπειρος ἐν πεπερασμένῳ, τοῦτο δὲ ἀδύνατον,” ibid., 242a17-b17.

³⁹Cf. Vigo, “Aristóteles y la finitud extensiva del tiempo”, p. 185: “Ar. concibe dicha totalidad de causas o condiciones (*vgr.* los motores y lo movido en cada caso por ellos) como un sistema dado *todo al mismo tiempo*, en cada instante de la sucesión temporal, y no como una cadena de causas o condiciones sucesivas que, en tanto causadas o condicionadas, remitieran, a su vez, en cada caso, a una causa o condición anterior en el tiempo.”

⁴⁰“ἄλλος ἀδύνατον τὸ ἐντελεχείᾳ δὲ ἄπειρον ποσὸν γάρ τι εἶναι ἀναγκαῖον. κατὰ συμβεβηκός ἔρα ὑπάρχει τὸ ἄπειρον. ἄλλος εἰς οὕτως, εἴρηται δτι οὐκ ἐνδέχεται αὐτὸν λέγειν ἀρχήν, ἄλλος δὲ συμβέβηκε, τὸν ἀέρα ἢ τὸ ἄρτιον,” Physics, 204a23-29.

⁴¹“εἶδος δὲ ἀεὶ οἰσται τι τὸ κινοῦν, ἵτοι τόδε ἢ τοιόνδε ἢ τοσόνδε, δὲ ἔσται ἀρχὴ καὶ αἴτιον τῆς κινήσεως, ὅταν κινῆ, οἷον δὲ ἐντελεχείᾳ ἀνθρωπος ποιεῖ ἐκ τοῦ δυνάμει ὄντος ἀνθρώπου ἀνθρωπον,” Physics, 202a9-12.

Chapter 3. Φύσις as Principle of Motion

καὶ ἀλλοιοῦ, ὥστε διδάσκοι ἄν καὶ μανθάνοι ἄμα, καὶ ὑγιάζοι καὶ ὑγιάζοιτο τὴν αὐτὴν ὑγίειαν. ἔτι διώρισται ὅτι κινεῖται τὸ κινητόν τοῦτο δ' ἐστὶν δυνάμει κινούμενον, οὐκ ἐντελεχείᾳ, τὸ δὲ δυνάμει εἰς ἐντελέχειαν βαδίζει, ἔτιν δ' ἡ κίνησις ἐντελέχεια κινητοῦ ἀτελής. τὸ δὲ κινοῦν ἥδη ἐνεργείᾳ ἔτιν, οἷον θερμαίνει τὸ θερμὸν καὶ ὅλως γεννᾷ τὸ ἔχον τὸ εἶδος. ὥσθ' ἄμα τὸ αὐτὸ κατὰ τὸ αὐτὸ θερμὸν ἔσται καὶ οὐ θερμόν.⁴²

This implies that in any possible self-mover, that which is moved must be in some way distinct from that which moves.

Based on these two premises, in *Physics* VIII.5 256a29-b3 Aristotle first directly argues in favor of the existence of self-movers, deriving the necessity for an *αὐτὸ αὐτῷ κινοῦν*, by noting that an infinite causal chain will not have anything that begins the motion, and thus the motion will not begin. Therefore, a self-mover must be at the head of a causal chain, and this chain must be finite:

εἰ οὖν κινούμενόν τι κινεῖ, ἀνάγκη στῆναι καὶ μὴ εἰς ἅπειρον ἴέναι· εἰ γὰρ ἡ βακτηρία κινεῖ τῷ κινεῖσθαι ὑπὸ τῆς χειρός, ἡ χεὶρ κινεῖ τὴν βακτηρίαν· εἰ δὲ καὶ ταύτῃ ἄλλο κινεῖ, καὶ ταύτην ἔτερόν τι τὸ κινοῦν. ὅταν δή τινι κινῇ ἀεὶ ἔτερον, ἀνάγκη ἴναι πρότερον τό αὐτὸ αὐτῷ κινοῦν. εἰ οὖν κινεῖται μὲν τοῦτο, μὴ ἄλλο δὲ τὸ κινοῦν αὐτό, ἀνάγκη αὐτὸ αὐτὸ κινεῖν· ὥστε καὶ κατὰ τοῦτον τὸν λόγον ἥτοι εὐθὺς τὸ κινούμενον ὑπὸ τοῦ αὐτὸ κινοῦντος κινεῖται, ἡ ἔρχεται ποτε εἰς τὸ τοιοῦτον.⁴³

Aristotle claims that this argument, however, directly justifies the need to postulate a self-mover (the penultimate mover in the chain is moved *ὑπὸ*

⁴²*Physics*, 257b2-b10.

⁴³Ibid., 256a25-b1.

Aristotle on Higher Natures

τοῦ αὐτὸς κινοῦντος κινεῖται). But self-movers are not the same as the eternal First Mover, for self-movers are divided into a part that moves and a part that is moved, and thus they must be bodily (for that which is moved must be an infinitely divisible body⁴⁴) Thus, he can claim here to have directly proven the existence of finite self-movers.

Aristotle provides a second, related proof at VIII.5, 256b27-257-a27. Suppose that in order to move, a mover must itself be in motion. This gives us two possibilities: the mover is being moved by the same motion with which it moves, or else it is being moved by another kind of motion. Either alternative leads to absurdities. In the first case, we will be forced to hold that the teacher, while teaching, is being taught the very same lesson he imparts, or that he who throws is also being thrown. This is clearly an absurdity. But so is the other possibility: that the mover is being moved by another species of motion; e.g. the mover that causes locomotion is itself in increase, and so on in the same manner. The absurdity arises because the forms of motion are limited in number, so that we will eventually circle back to the original type of motion by which the mover moves, and “*ἔστι κανεὶ εἰ εὐθὺς ἔφη τὸ φέρον φέρεσθαι καὶ διδάσκεσθαι τὸ διδάσκον.*”⁴⁵ As a result, we are obliged to admit that the first thing which is in motion must derive its motion from either something which is at rest, or from itself.⁴⁶ Aristotle concludes by stating that if it were necessary to consider whether

⁴⁴“ἀναγκαῖον δὴ τὸ κινούμενον ἄπαν εἶναι διαιρετὸν εἰς ἀεὶ διαιρετά· τοῦτο γὰρ δέδεικται πρότερον ἐν τοῖς καθόλου τοῖς περὶ φύσεως, ὅτι πᾶν τὸ καθ’ αὐτὸς κινούμενον συνεχές,” Aristotle, *Physics*, 257b2-b10.

⁴⁵*Physics*, 257a9-10.

⁴⁶“ῶστε οὕτοις ὑπὸ ἡρεμοῦντος κινήσεται τὸ κινούμενον πρῶτον, ἢ αὐτὸς ἔαντὸς κινήσει,” *Physics*, 257a27-28.

a thing which was moved by another or a self-mover was the cause and principle of motion, all would decide for the self-mover, since that which is independently a cause is always prior to that which is dependent upon another.⁴⁷

Furley notes that these two proofs have something in common: they begin from the proposition that we can distinguish chains of movers, i.e. where A is moved by B which is moved by C. Given that Aristotle has already demonstrated that it is impossible for an infinite causal chain to be in motion at a single time, the causal chain must come to a stop, with a mover which is not moved by another but by itself. Furley expresses surprise at the fact that Aristotle would summarize the results of these proofs with the disjunctive expression “ὅστε ἡτοι ὑπὸ ἡρεμοῦντος κινήσεται τὸ κινούμενον πρῶτον, η ἀντὸ ἔαυτὸ κινήσει,”⁴⁸ since the first disjunct could be taken to refer to the ultimate Unmoved Mover of the universe. He states, however, that “the reason why Aristotle can regard this disjunctive conclusion as the same as the other is clear from its context in chapters 4 and 5, in which the concept of a self-mover is analyzed. As a whole, a thing may be said to move itself; but within the whole it must always be possible to distinguish a mover and a moved.”⁴⁹

⁴⁷Cf. *Physics*, 257a28-33.

⁴⁸*Physics*, 257a27-28.

⁴⁹Furley, “Self-Movers”, p. 4.

3.2.3 How self-motion occurs

Having described Aristotle's proofs for self-motion, we have now to describe how self-motion takes place: what do we mean when we say that a mover self-moves? Beings which move by *ψυχή* are moving by an inner formal principle, which *qua* formal principle does not move⁵⁰; rather, the being *qua* that which is made to be in act by the form, i.e. its matter, is what moves.⁵¹ Or, adopting the terminology of *On the Soul*, we can say that the soul moves its body;⁵² the soul does not itself move, except accidentally, insofar as it is the soul of a body which in fact does move.⁵³ Aristotle excludes from the class of self-movers any being which is not ensouled, and in particular he emphasizes that the elements are not self-movers. Self-motion, he says, is a characteristic of living things, and the simple bodies are emphatically not living.⁵⁴

Since, as *ἀρχή*, the form is not identical with the matter (and therefore the matter, or the 'underlying,' is able to cease to be in one way and come to be in another), we can analyze self-motion in a natural being in terms of the *ἀρχαῖ*:⁵⁵ the formal *ἀρχή*, as a principle or source of motion, causes the

⁵⁰Cf. *Physics*, 198a33-b4 and *On Generation and Corruption*, 335b35-336a2.

⁵¹Cf. *On Generation and Corruption*, 335b30-32, cited in Sauvé Meyer, "Self-Movement and External Causation", 72, n. 11.

⁵²"ἀλλὰ μὴν καὶ ὅθεν πρῶτον ἡ κατὰ τόπον κίνησις, ψυχή," *On the Soul*, 415b20.

⁵³"ἐπεὶ δ' ἔστι καὶ σῶμα καὶ τοιόνδε, ζωὴν γὰρ ἔχον, οὐκ ἀν εἴη σῶμα ἡ ψυχή· οὐ γάρ ἔστι τῶν καθ' ὑποκειμένου τὸ σῶμα, μᾶλλον δ' ὡς ὑποκειμενον καὶ ὄλη. ἀναγκαῖον ἄρα τὴν ψυχὴν οὐσίαν εἶναι ὡς εἶδος σώματος φυσικοῦ δυνάμει ζωὴν ἔχοντος. ἡ δ' οὐσία ἐντελέχεια· τοιούτου ἄρα σώματος ἐντελέχεια," *On the Soul*, 412a16-20. Simplicius states this as follows: "ὅμοιογενῆται δὲ ὑπὸ τῆς ψυχῆς τὸ σῶμα κινεῖσθαι. ἢτις τῷ κινεῖσθαι τὸ σῶμα συγκινεῖται αὐτῷ," Simplicius, *In Phys.* 242r46-47.

⁵⁴*Physics*, 255a5-16.

⁵⁵This analysis is legitimated by Aristotle's own equation of the soul with the formal *ἀρχή*: "ἀναγκαῖον ἄρα τὴν ψυχὴν οὐσίαν εἶναι ὡς εἶδος σώματος φυσικοῦ δυνάμει ζωὴν ἔχοντος. ἡ δ' οὐσία ἐντελέχεια· τοιούτου ἄρα σώματος ἐντελέχεια," *On the Soul*, 412a18-21. Cf. also *On the*

actualization of some way of being which is latent in the matter as potency. Since the matter being actualized belongs to the same being which the form actualizes, the motion comes to be in that same being, and self-motion occurs. Aristotle is very careful to specify how this occurs, so as to avoid the conclusion that the same thing is moving itself just as it is moving. Furley summarizes the argument as follows: “As a whole, a thing may be said to move itself; but within the whole it must always be possible to distinguish a mover and a moved.”⁵⁶

Aristotle applies the same analysis to living creatures in chapter 4 (254b14-33). While this might seem superfluous on his part, given that he denies self-motion to anything without a soul (i.e. continuous, simple substances), we soon discover that he has good reason for looking further into the question of self-motion in living beings. For, as Furley states, there can be no doubt that a distinction exists between the mover and the moved; nonetheless, it is far from obvious how to draw the distinction.⁵⁷ Aristotle states, “ἔοικεν γὰρ ὥσπερ ἐν τοῖς πλοίοις καὶ τοῖς μὴ φύσει συνισταμένοις, οὕτω καὶ ἐν τοῖς ζῷοις εἶναι διηρημένον τὸ κινοῦν καὶ τὸ κινούμενον, καὶ οὕτω τὸ ἄπαν αὐτὸν αὐτὸν κινεῖν.”⁵⁸ This statement, along with what he states in *On the Soul* 413a8—“ἔτι δὲ ἀδηλον εἰ οὕτως ἐντελέχεια τοῦ σώματος ἡ ψυχὴ <ἢ> ὥσπερ πλωτὴρ

Soul, 412b10-12: “καθόλου μὲν οὖν εἴρηται τί ἔστιν ἡ ψυχή· οὐσίᾳ γὰρ ἡ κατὰ τὸν λόγον. τοῦτο δὲ τὸ τί ἦν εἶναι τῷ τοιῳδὶ σώματι.” The body, in turn, is identified with the material ἀρχή: “ἐπεὶ δ’ ἔστιν καὶ σῶμα καὶ τοιόνδε, ζῷην γὰρ ἔχον, οὐκ ἂν εἴη σῶμα ἡ ψυχή· οὐ γάρ ἔστι τῷν καθ’ ὑποκειμένου τὸ σῶμα, μᾶλλον δ’ ὡς ὑποκείμενον καὶ ὅλη,” *On the Soul*, 412a17-21.

⁵⁶Furley, “Self-Movers”, p. 4. Cf. “δῆλον δὴ ὅτι τὸ πᾶν αὐτὸν ἔαντὸν κινεῖ οὐ τῷ αὐτοῦ τι εἶναι τοιούτον οἷον αὐτὸν αὐτὸν κινεῖν, ἀλλ’ ὅλον κινεῖν αὐτὸν ἔαντό, κινούμενόν τε καὶ κινοῦν τῷ αὐτοῦ τι εἶναι τὸ κινοῦν καὶ τὸ κινούμενον. οὐ γὰρ ὅλον κινεῖν οὐδὲ ὅλον κινεῖται, ἀλλὰ κινεῖ μὲν ἡ τὸ A, κινεῖται δὲ ἡ τὸ B μόνον,” *Physics*, 258a22-27.

⁵⁷ibid., pp. 4-5.

⁵⁸*Physics*, 254b30-33.

Aristotle on Higher Natures

“πλοίου” —makes it appear that Aristotle is moving back to the “soul in the body but not *of* the body” conception of Plato.

Furley, however, questions this analysis of Aristotle’s position, holding instead that Simplicius’s interpretation gets the right nuance. While it is obvious that living creatures are moved by their souls, it is not at all clear how the mover-soul is to be distinguished from the body which it moves. Self-motion, continues Simplicius, is in appearance like the motion of vehicles like boats and chariots, where the cause of the motion is the pilot or the charioteer. However, these have spatial individuality and a nature that is distinct from that which they move, and there is doubt as to whether the soul is in an individual in this fashion.⁵⁹ But that Aristotle’s chosen solution is not that of the separated boatman or charioteer is clear from passages in *On the Soul* such as “καθόλου μὲν οὖν εἴρηται τί ἔστιν ἡ ψυχή· οὐσίᾳ γὰρ ἡ κατὰ τὸν λόγον. τοῦτο δὲ τὸ τί ἦν εἶναι τῷ τοιωδὶ σώματι,”⁶⁰ and “ὅτι μὲν οὖν ἐντελέχειά τίς ἔστι καὶ λόγος τοῦ δύναμιν ἔχοντος εἶναι τοιούτου, φανερὸν ἐκ τούτων,”⁶¹ which are compatible with the main lines of Aristotle’s doctrine on the soul, as developed in *On the Soul* and elsewhere.

In the case of beings which move themselves, the form which actualizes the matter of the being, making it to *be* simpliciter, can also cause the matter (or body) of the being to come to be in a particular (accidental) way.⁶² For instance, the body of the horse is in potency to move in certain ways, for

⁵⁹Cf. Simplicius, *In Phys.* 1208.30ff, cited in Furley, “Self-Movers”, p. 5.

⁶⁰*On the Soul*, 412b10-12.

⁶¹*On the Soul*, 414a27-28.

⁶²“ὅτι μὲν οὖν ἄρρενίαν οἵν τ’ εἶναι τὴν ψυχὴν οὔτε κύκλῳ περιφέρεσθαι, δῆλον ἐκ τῶν εἰρημένων. κατὰ συμβεβηκός δὲ κινεῖσθαι, καθάπερ εἴπομεν, ἔστι, καὶ κινεῖν ἔαντήν, οἷον κινεῖσθαι μὲν ἐν ὕψῃ, τοῦτο δὲ κινεῖσθαι ὑπὸ τῆς ψυχῆς ἄλλως δ’ οὐχ οἷόν τε κινεῖσθαι κατὰ τόπον αὐτήν,” *On the Soul*, 408a31-33.

Chapter 3. *Φύσις* as Principle of Motion

instance by moving its legs. The formal act of the horse, which is its *ψυχή*, is already actualizing the matter of the horse, its body, and thus there is no internal impediment to the drawing into being of a change in position in the horse's legs.⁶³ The impediment, if there is one, may be external: for instance, the horse may be tied and thus unable to move its legs at will. Or, there may be an internal impediment, such as disease in the leg, which will impede the *ψυχή* of horse from acting upon the body.⁶⁴ This will not be *qua* nature of horse nor *qua* body of horse, but due to a defect in the individual matter of the individual horse. Thus, the causation of self-motion in a natural substance is directly analogous to causing motion in another; in this case, however, there is no need for contact, since there already exists a genuine unity made actual by the form of the natural substance itself. I will

⁶³While Aristotle almost always states that the *ψυχή* moves the body, it is clear from his analysis of the soul that it is a type of *φύσις*, i.e. a kind of nature which makes the substance to be a living being, and able to be a self-mover to some degree. We see, therefore, that occasionally Aristotle will directly refer to the *φύσις* as a mover; for instance, at *Physics* VIII.3, 254b16-17, he can say that “ὅσων δ' ἡ ἀρχὴ ἐν αὐτοῖς τῆς κινήσεως, ταῦτα φύσει φαμὲν κινεῖσθαι,” and at *Parts of Animals*, 641a18-33, “ἄλλως τε καὶ τῆς φύσεως διχῶς λεγομένης καὶ οὐσῆς, τῆς μὲν ὡς ὄλης, τῆς δ' ὡς ἡ κινόνσα καὶ ὡς τὸ τέλος.” Nonetheless, apart from these few citations, Aristotle is remarkably consistent in calling the soul, and not the nature, a mover. I believe this to be due to the fact that he does not wish to confuse the simple bodies, which are *φύσει*, with living beings, *τὰ ἑμψύχα*, which are self-movers in a way that the simple bodies cannot be.

⁶⁴This highlights an important aspect of Aristotle's conception of *ψυχή*: the formal act that is the nature of the horse is not only able to draw matter (which is in potency a horse's body) into being a horse's body in act, thus acting in the category of substance, but in addition, it can act in the other categories. For the *ψυχή* of horse causes growth in the body, qualitative changes in the body (e.g. the color or density of the horse's coat may change with the season), locomotion, and relationships of action-passion (e.g. the horse may eat grass or throw its rider). Thus, we may say that *ψυχή* is ‘pluripotent’; it is not merely a cause of coming to be and continued existence in the category of substance, but also of coming to be in the other categories as well. Aristotle makes this point in the *De anima*: “ἔστι δὲ καὶ ἀλλοίωσις καὶ αὔξησις κατὰ ψυχήν ἡ μὲν γὰρ αἰσθητὸς ἀλλοίωσίς τις εἶναι δοκεῖ, αἰσθάνεται δ' οὐθὲν δὲ μὴ μετέχει ψυχῆς, ὁμοίως δὲ καὶ περὶ αὔξησεώς τε καὶ φθίσεως ἔχει· οὐδέν γὰρ φθίνει οὐδὲ αὔξεται φυσικῶς μὴ τρεφόμενον, τρέφεται δ' οὐθὲν δὲ μὴ κοινωνεῖ ζωῆς,” *On the Soul*, 415b21-27.

discuss external causation in Section 3.3, on the communication of form.

Two points remain to be made concerning how self-movers move themselves. In the first place, self-motion primarily relates to locomotion, under Aristotle's account.⁶⁵ Not all change that comes about in accordance with the *φύσις* of an animal is self-motion, for to count as a self-motion, the animal must be able to both initiate and halt its motion, which the simple bodies cannot do. Secondly, in *On the Soul*, and particularly in *On the Motion of Animals*, he highlights the role of the external desired thing (the *όρεκτόν*) as the 'unmoved' mover which moves the appetite, which is the ultimate internal moved mover, since mind never moves except through appetite.⁶⁶

3.2.4 Tensions concerning the notion of self-movement

Today, the majority of commentators agree that Aristotle holds that at least the higher animals are self-movers. Nonetheless, we can distinguish between strong and weak accounts of self-movers. Those who are partisans of a strong account, such as Susan Sauvé, hold that "in claiming that we are the origins of our actions, Aristotle implies that we are self-movers, and this in turn implies that nothing external to us moves us to have the

⁶⁵"μάλιστα δὲ δῆλον ὅτι τὸ κινοῦν αὐτὸν μάλιστα ταύτην κινεῖ κυρίως, τὴν κατὰ τόπον καίτου φαμὲν τοῦτο εἶναι τῶν κινούμενων καὶ κινούντων ἀρχὴν καὶ πρῶτον τοῦς κινούμενοις, τὸ αὐτὸν κινοῦν. ὅτι μὲν τοίνυν τῶν κινήσεων ἡ φορὰ πρώτη, φανερὸν ἐν τούτων," *Physics*, 261a22-27. Cf. also Wolfson, "The Plurality of Immovable Movers in Aristotle and Averroës", p. 237.

⁶⁶"ἐν δή τι τὸ κινοῦν, τὸ δρεκτικόν. εἰ γάρ δύο, νοῦς καὶ δρεξις, ἐκίνουν, κατὰ κοινὸν ἄν τι ἐκίνουν εἶδος· νῦν δὲ ὁ μὲν νοῦς οὐ φαίνεται κινῶν ἄνευ δρεξεως (ἢ γάρ βούλησις δρεξις, ὅταν δὲ κατὰ τὸν λογισμὸν κινήται, καὶ κατὰ βούλησιν κινεῖται), ἡ δ' δρεξις κινεῖ καὶ παρὰ τὸν λογισμὸν ἡ γάρ ἐπιθυμία δρεξις τίς ἔστιν," *On the Soul*, 433a22-26.

desires by means of which we move ourselves.”⁶⁷ On this reading there is a problem with how to account for the fact that objects of the senses are “*όρεκτά*” and hence make Aristotle appear to accept the principle that in self-motion, the unmoved mover is in a sense “outside” the animal. Sauvé places the emphasis on efficient causation, and holds that a self-mover genuinely moves itself because there is no other efficient mover that causes it to move.⁶⁸

Proponents of a weaker account of self-movers, such as M. L. Gill, D. Furley and most other commentators, hold that certain aspects of an animal’s environment serve to explain the triggering of motion, or even that the perceived external object is the true ‘unmoved mover’ in the causal chain. For instance, Gill maintains that self-movers, despite not being genuinely unmoved movers—because they react to external stimuli in deciding to move or not—nevertheless deserve their special status because, unlike other objects that undergo motion, “they contain an active source—a principle of motion and rest—and so, unlike commonplace objects that experience motion, they can sustain and direct their own, often intricate, behavior.”⁶⁹ Nonetheless, the impetus for the self-mover’s activity must come from the environment, since the internal active principle cannot trigger its own motion. Gill thus sees a cooperation between internal and external factors in explaining self-motion. In order to explain why a given motion

⁶⁷Sauvé Meyer, “Self-Movement and External Causation”, p. 68.

⁶⁸“A self-mover has this special causal status because, unlike a moved mover, it does not cause movement (*κίνειν*) by itself being moved to do so by anything else... In other words, a self-mover is properly called the origin of its movement because it is the efficient cause of that movement, and nothing else is the efficient cause of its causing that movement,” *ibid.*, p. 66.

⁶⁹Gill, “Aristotle on Self-Motion”, p. 28.

Aristotle on Higher Natures

takes one form and not another, one need not seek out an infinite number of prior changes, but rather one may appeal directly to the animal's nature—its inner active principle—to explain *how* it moves (hence preserving its status as a self-mover), while the fact that the animal's motion occurs here and now is explained by triggering factors due to the environment, ultimately traceable to the motion of the sun.⁷⁰

Why does Aristotle consider it important that self-movers be in some way moved by their environment? As Gill has noted, there is the question of explaining how a particular self-motion is triggered. In addition, Furley holds that Aristotle has a further concern, connected with the proof for the First Unmoved Mover of the universe which the Stagirite seeks to demonstrate over the course of *Physics* VIII. On the one hand, he wishes to maintain our intuition that self-motion in animals is not caused by external agents in the way that motion in inanimate objects is. Secondly, he wishes to avoid the conclusion that if finite self-movers (i.e. animals) can be responsible for the triggering or initiation of their own motion, without any prior motion having taken place, then motion might not be eternal in the universe. Animals could have begun to move in a system where no prior motion took place, thus refuting his a priori argument in *Physics* VIII.1 that demonstrates that time and motion must be eternal, without any starting point.⁷¹ Hence, the compromise position that animals are not radi-

⁷⁰ibid., p. 28.

⁷¹Furley, "Self-Movers", pp. 7-8. Cf. also Morison, "Self-Motion in Physics VIII", p. 75, "No wonder he thought that it was so important to grasp that animals do not move themselves strictly speaking because one part moves another—it is precisely this fact which means that his argument in *Physics* VIII can proceed according to plan. The self-motion of animals is not properly speaking self-motion, because one part of the animal moves another, and this means that the unmoved movers within the animals—their souls—are

cal starting points for motion, but that they depend on being parts of an environment already in motion.

Aristotle does not specify precisely how to understand the dynamic interrelationship of the self-mover with its environment. In particular, his position in *On the Motion of Animals* appears to undermine the idea he developed in *Physics* VIII.4-5 that a self-mover consists of an unmoved part (the form or *ψυχή*) and a moved part which the former moves. At *On the Motion of Animals* 700b23-26, he states that the mover is in fact the object of desire (and also of thought),⁷² and that the first mover (i.e. the thing desired) imparts movement without being moved, while desire imparts motion while being itself moved.⁷³ In addition, there are texts such as *Physics* 259b4-b20, which indicate that self-movers are moved also by their environments. Hence the dilemma arises: do Aristotelian self-movers move themselves in any important sense, or do they simply respond to external factors in the environment, such that they are in fact mere moved movers? Numerous theories have been developed which attempt to show how Aristotle can ‘escape’ from the dilemma he seems to have created for himself. I will discuss two of the most prominent theories here.

actually moved accidentally, thus ruling them out as causes of the continual motion of the universe.”

⁷²“ὅστε κινεῖ πρῶτον τὸ ὀρεκτὸν καὶ διανοητόν.”

⁷³“τὸ μὲν οὖν πρῶτον οὐ κινούμενον κινεῖ, ἡ δὲ ὄρεξις καὶ τὸ ὀρεκτικὸν κινούμενον κινεῖ.” *On the Motion of Animals*, 700b36-701a1.

The Intentionality Escape

The so-called ‘Intentionality Escape,’⁷⁴ defended independently by D. Furley and M. Nussbaum, emphasizes the role of intentional states (in particular, *phantasia*) in the initiation of movement in self-movers. In order that *ōrēxis* may function as a mover, the animal must first have a *phantasia* which presents a given object (either of sensation or of thought) as a possible good.⁷⁵ If it is perceived as a good, the *ōrēktón* can arouse desire and thereby movement. Hence, the importance of an object’s being perceived (or understood, in the case of humans) *as good* in order to produce the initiation of motion. *On the Motion of Animals* puts this process as follows: “τὰ μὲν γὰρ ὄργανικὰ μέρη παρασκευάζει ἐπιτηδείως τὰ πάθη, ἡ δ’ ὥρεξις τὰ πάθη, τὴν δ’ ὥρεξιν ἡ φαντασία· αὕτη δὲ γίνεται ἢ διὰ νοήσεως ἢ δι’ αἰσθήσεως.”⁷⁶

Aristotle begins his discussion of how the soul moves the body by noting that living creatures are responsible for a vast swath of the motions we encounter in the physical world: “τῶν γὰρ ἄλλων παρὰ τὴν τοῦ ὄλου κίνησιν τὰ ἔμψυχα αἴτια τῆς κινήσεως, ὅσα μὴ κινεῖται ὑπ’ ἄλληλων διὰ τὸ προσκόπτειν ἄλληλοις.”⁷⁷ And here he admits that, in a sense, the animal as self-mover is indeed moved, but by the object of desire (through the mediation of *phantasia* and *diánoia*): “ἄστε κινεῖ πρῶτον τὸ ὄρεκτὸν καὶ διανοητὸν.”⁷⁸ Indeed, it seems to be undeniable that animals and humans act for reasons,⁷⁹ for

⁷⁴See Freeland, “Aristotle on Perception”, p. 37.

⁷⁵ “[Φαντασία] is closely linked to the operations of desire and somehow presents the object of desire to the animal in such a way that it can be moved to action,” Nussbaum, “The Role of Phantasia”, p. 240.

⁷⁶ *On the Motion of Animals*, 702a18-20

⁷⁷ *On the Motion of Animals*, 700b5-13.

⁷⁸ *On the Motion of Animals*, 700b22.

⁷⁹This is topic that I will discuss further in the following chapters, since it is key to diffe-

there are many things which cannot cause animal or human motion except via a grasping of the thing desired as a good.

This is most obviously true in the case of humans, since in many cases there is no physicalist explanation for an action, without appealing to an account in terms of a reasoned ‘why.’ I can go to a used book fair, and pass over a number of attractive and interesting books, only to finally purchase an old, dusty, moth-eaten volume, which can hardly be opened due to its age, because it is a first edition. The value added by the concept ‘first edition’ has no convincing reduction to physical or material explanations, but rather indicates a ‘good’ only at the purely noetic level.

Similarly, operation on the basis of something analogous to *λόγος* can be seen amongst animals as well, even if we do not wish to assert that *νοῦς* is genuinely found amongst non-human animals. Aristotle is very clear that among animals, only human beings possess ‘mind’ or *νοῦς*.⁸⁰ Animals, on the one hand, have at most ‘experience’ or *ἐμπειρίας*, and of that little: “τὰ μὲν οὖν ἄλλα ταῖς φαντασίαις ζῆ καὶ ταῖς μνήμαις, ἐμπειρίας δὲ μετέχει μικρόν.”⁸¹ Human beings, on the other hand, act through art and reasoning: “τὸ δὲ τῶν ἀνθρώπων γένος καὶ τέχνη καὶ λογισμοῖς.”⁸² Thus, while animals can certainly grasp that objects belong to certain categories, and perform inferences in order to arrive at desired ends, the faculty that they possess does not extend to ‘*ἐπιστήμη*,’ which requires the capacity for universal judgment, which

rentiating genuine ‘operations’ and ‘actions’ carried out by ensouled beings from the mere actualization of active qualities among the simple natures and homoeomerous bodies.

⁸⁰He leaves open whether there may also be higher beings which also possess *νοῦς*: “ἐνίοις δὲ εἰς πρὸς τούτους ὑπάρχει καὶ τὸ κατὰ τόπον κινητικόν, ἔτεροις δὲ καὶ τὸ διανοητικόν τε καὶ νοῦς, οἷον ἀνθρώποις καὶ εἴ τι τοιοῦτον ἔτερόν ἐστιν ἢ καὶ τιμιώτερον,” *On the Soul*, 414a32-b20.

⁸¹*Metaphysics*, 980b25-26.

⁸²Ibid.

Aristotle on Higher Natures

Aristotle denies that animals possess.

Nevertheless, Aristotle claims that animals share *phantasia* with humans, and this gives them the ability to perform something like ‘thinking’: “εἰ τις τὴν φαντασίαν τιθείη ὡς νόησίν τινα.”⁸³ In animals, it is *phantasia* that moves ὅρεξις, which produces motion as a result of some grasping of the thing desired as a good (although in animals, due to their lacking *λογισμός*, this may only be an apparent good). G. Watson explains the difference between animal and human action as follows:

When creatures are acting in their own right, they do things because they want to do them. An animal is capable of moving itself in so far as it is capable of desire. But it cannot have desire unless it has phantasia. All phantasia is connected with either reasoning or perception, *phantasia* δὲ πᾶσα ἢ λογιστικὴ ἢ αἰσθετική, and while reasoning is confined to man, the animals other than man share in the phantasia that is connected with perception (De Anima 433 b27-30).⁸⁴

According to Furley, the introduction of *phantasia* as a fundamental part of the process of motion, first in *On the Soul* and later in *On the Motion of Animals*, will allow Aristotle to preserve the distinctions he has made in *Physics* VIII concerning the necessity for an unmoved part and a moved part in any self-mover, in addition to an external influence that triggers the motion. Both animate and inanimate movers require external movers to explain the initiation of their motion, but only animate self-movers requi-

⁸³On the Soul, 433a9.

⁸⁴Watson, “Φαντασία in Aristotle, De Anima 3.3”, p. 102.

Chapter 3. *Φύσις* as Principle of Motion

re the perception of external things as having meaning for them.⁸⁵ States Furley, “[a]n animal is correctly described as a self-mover, because when it moves, its soul moves its body, and the external cause of the motion (the *ἀρεκτόν*) is a cause of motion only because it is ‘seen’ as such by a faculty of the soul.”⁸⁶ He notes that there must nonetheless be an external object perceived as good in order that motion occur, and thus the self-mover is not a totally autonomous origin of motion.⁸⁷ While it is the case that animal motion must be triggered externally, and the object of desire must be perceived via a *φαντασία*, the *kind* of motion thus triggered is entirely dependent upon the *φύσις* of the animal in question.⁸⁸

Furley nonetheless points out that this account of how self-motion oc-

⁸⁵Cf. Nussbaum, “Aristotle on Teleological Explanation”, pp. 86–87. Nussbaum differs from Furley, however, in denying that there is any causal-efficient explanation of the role of desires and beliefs in the production of motion in a self-mover: “There is... no genuinely efficient-causal explanation of intentional activity that remains on the formal or functional level,” *ibid.*, p. 88. This is because, for Nussbaum, formal and final causes are the *explanations* that serve best to explain the activities of organisms, but she does not mean to imply that there are necessarily efficient ‘Humean’ causes in operation that always correspond to the same functional or final explanations (*ibid.*).

⁸⁶Furley, “Self-Movers”, p. 13.

⁸⁷This is an important point for Aristotle’s cosmology, as mentioned above, insofar as the existence of self-movers that could autonomously originate motion would put into peril his argument for the necessity of the eternal motion of the universe; cf. *ibid.*, p. 7.

⁸⁸Cf. the explanation offered by Gill on the role that *φύσις* plays in explaining animal motion: “Even if self-motions fail to be fully explained by appeal to an internal cause, self-movers merit their special status because they contain an active source—a principle of motion and rest—and so, unlike commonplace objects that experience motion, they can sustain and direct their own, often intricate, behavior. Even so, since the internal active principle cannot trigger the motion, the impetus derives from the creature’s environment. Does this reliance on external factors undermine Aristotle’s argument in *Phys.* VIII.5? I think not... An animal responds to some stimulants and not others because of its nature (*φύσις*)—its inner active principle—which should also determine how the response is manifested. Therefore, in explaining why an animal starts moving on a particular occasion, one need not track down an infinite number of previous changes; instead one can appeal, first, to the animal’s nature, which determines why a stimulus of a particular sort arouses a response of a particular kind, and second, to the sun’s motion, which accounts for the patterns of interaction in the sublunary region,” Gill, “Aristotle on Self-Motion”, p. 28.

Aristotle on Higher Natures

curs, based on an externally perceived object of desire, is not without its difficulties. In the first place, in *On the Soul* I.3 Aristotle makes it quite clear that he denies that the soul is moved.⁸⁹ How is it possible, then, that it should be affected or moved by an ὄρεκτόν via a φαντασία that moves the ὄρεκτικόν? For the ὄρεκτικόν is certainly a part of the soul; indeed, later in *On the Soul* (III.10) it is described “deliberately, emphatically and repeatedly as a *moved mover*.⁹⁰ Ultimately, to respond to this issue, Aristotle appeals to a special sense of alteration or ἀλλοίωσις, which corresponds to the activation of a first actuality, as when, for instance, a knower in potency becomes a knower in the full sense of actively exercising that knowledge. This, then, is the only kind of motion that the soul suffers in having an αἴσθησις. This solution is not entirely satisfactory, for Aristotle is forced to admit that in having a perception the soul undergoes motion of a special kind, and hence is not unmoved in an absolute sense.⁹¹

The ‘Final Cause’ Escape

Cynthia Freeland, in her article “Aristotle on Perception, Appetition and Self-Motion,” holds that the ‘Intentionality Escape,’ as described by Furley and Nussbaum, has several flaws that make it unable to properly express the totality of Aristotle’s doctrine concerning animal self-movers. In the first place, it requires the drawing of divisions between kinds of animal mo-

⁸⁹“Ἐπισκεπτέον δὲ πρῶτον μὲν περὶ κινήσεως· ἵστως γὰρ οὐ μόνον ψεῦδος ἔστι τὸ τὴν οὐσίαν αὐτῆς τοιαύτην εἶναι οὖν φασὶν οἱ λέγοντες ψυχὴν εἶναι τὸ κινοῦν ἔαντὸ δὲ δυνάμενον κινεῖν, ἀλλ’ ἐν τι τῶν ἀδυνάτων τὸ ὑπάρχειν αὐτῇ κίνησιν,” *On the Soul*, 405b32-406a2.

⁹⁰Furley, “Self-Movers”, p. 9.

⁹¹“ἡ μὲν γὰρ αἴσθησις ἀλλοίωσίς τις εἶναι δοκεῖ, αἰσθάνεται δ’ οὐθὲν δὲ μὴ μετέχει ψυχῆς,” *On the Soul*, 415b24-25.

vements, such that one set of such movements is representative of ‘actions’ (which enjoy the status of self-motions), and another set is representative of ‘mere movements’ (which do not) In this way, Furley⁹² describes the emergence of periodical cicadas as a case of the result of a deterministic chain of efficient-mechanical causes, and which does not rise to the level of being self-motion. Freeland sees it as problematic that Aristotle would accept the distinction between self-motion and necessitated motion as Furley has proposed it, such that it excludes a large swath of animal motions from being classified as self-motion.⁹³

Furthermore, Freeland sees the Intentionality Escape as representing Aristotle’s puzzle in *Physics* VIII as though it concerned the issues of free will and causal determinism. “An animal will not be ‘determined’ to pursue, say, food in its environment unless it perceives it as food.”⁹⁴ Intentionality thus inserts a ‘gap’ into the deterministic chain of efficient causes. This gap is especially prominent in the case of human beings, whose moral responsibility for their actions is highlighted in the sections of the *Nicomachean Ethics* which Furley cites. In the *EN* man is presented as the master of his character, such that he is responsible for his acts in regards to external objects perceived as goods, in addition to acts undertaken due to character, for men create their character by means of repeated good or bad actions.⁹⁵ Hence, human actions seem to provide a particularly acute dilemma, since in order for us to be morally responsible for what we do, we cannot appeal

⁹²Furley, “Self-Movers”, p. 8.

⁹³Freeland, “Aristotle on Perception”, pp. 38-39.

⁹⁴Ibid., p. 39; cf. also Nussbaum, “Aristotle on Teleological Explanation”, p. 87.

⁹⁵*Nicomachean Ethics*, 1114a3-9.

Aristotle on Higher Natures

to the influence of objects of pleasure or to defective character to exculpate ourselves. Yet as I have mentioned above, Aristotle remains wedded to the position that all movers, excepting the ultimate Unmoved Mover, are moved movers, either due to efficient causality, or due the *δρεκτόν* that moves the appetite, in order to avoid the cosmological problem of movers that are radical initiators of causal chains. Thus, the Intentionality Escape inadvertently brings this underlying aporia into sharp focus.

Finally, Freeland critiques the Intentionality Escape for focusing on adequate explanations, and not sufficiently on real causation. Nussbaum is particularly clear about her position that Aristotelian ‘causes’ are in reality methods for providing the best possible explanation, and in particular that the final cause is merely a more synthetic, informative way of stating what would otherwise have to be stated via a bewildering array of material-efficient causes.⁹⁶ Furley is similarly critiqued: sometimes he appears to recognize the need for explanations that are genuinely reflective of the real causal order. Sometimes, on the other hand, he appears to be in agreement with those thinkers who hold that “Aristotle’s four causes are just four types of explanation.”⁹⁷

It is in regard to final causation that Freeland makes her most cogent critique of the Intentionality Escape, proposing what she terms the “Final Cause Escape.” Under this model, animals are self-movers, despite there being efficient causes of their motions, if those motions have a final cause,

⁹⁶Cf. *ibid.*, p. 60 and *ibid.*, p. 73.

⁹⁷Freeland, “Aristotle on Perception”, p. 40. Freeland cites Moravcsik (1974), Annas (1982), Sorabji (1980) and Fine (1987) as being proponents of this way of analyzing the four causes in Aristotle.

or are performed in pursuance of some good. For Freeland, it is the goal-directedness of animal activity, rather than the necessary presence of intentional states, which is what marks off self-motion from externally-imposed movement, or movement undertaken by the simple bodies. Hence, animals which are held to lack intentionality may nonetheless be self-movers, insofar as they are engaged in movement which is ‘for something’ (*ἐνεκά τον*).⁹⁸ This is because, according to Freeland, objective teleology is more basic for Aristotle than subjective perception of external objects *qua* goods for an individual. Any account of objective goods must be given in terms of what is good for the species⁹⁹ Aristotle explains the actions of individual animals as purposive behavior directed to the good for that animal’s kind. In Freeland’s scheme, there is a causal dependence of intentional states upon the final causes operative in a given kind of animal, such that the most basic causal chain begins with the animal seeking its good, and nature providing the capacities required for the pursuit and attainment of that good.

According to Aristotle, animals have self-motion because it is necessary for the attainment of a good for a given animal type. The explanation of why a hummingbird hovers near a hibiscus is that it is seeking food, a good for its species. More generally, animals have locomotion because it contributes to their being (i.e. survival) or to their living better.¹⁰⁰ Intentionality is like this as well: in a given animal it is inferred by the animal’s capacity to react to its environment according to sensible input. But intentionality

⁹⁸Ibid., p. 41.

⁹⁹Ibid., p. 42.

¹⁰⁰Ibid., p. 45.

Aristotle on Higher Natures

is possessed because it provides a good for the animal.¹⁰¹ Freeland proposes that causal descriptions in terms of final causes are more informative than descriptions in terms of animal perception and *φαντασία*, because final causes are more basic; indeed, when describing animal behavior in terms of final causes, one is touching upon real causal connections, for final causality is indubitably real for Aristotle.

Freeland is quite willing to admit that perception and imagination are in operation in instances of self-motion, and even that they may be necessary. Where she parts with Furley and Nussbaum is in regards to the sufficiency of the presence of intentionality to make a given animal a self-mover. Intentionality is only one of several factors that must be present for an animal to be said to be a self-mover. In addition, the tendency to seek a given good must be ‘built-in’ to the animal. For instance, in order for the hovering of a hummingbird near a flower to be an instance of self-motion, its activity must be directed towards a goal that is objectively good for hummingbirds (in this case flower nectar, which is objectively food for hummingbirds). Finally, it must be the case that it is not the perceived object of desire that moves the animal, in a causal-efficient sense; rather, it must be the soul of the animal itself.¹⁰² Animals, states Freeland, have the ability to set and pursue their own goals,¹⁰³ which are given by nature and are hence internal to the animal. “When the spider spins its web, it works toward an end; it is self-moving because this is an end posited by its very own nature, and

¹⁰¹Ibid., p. 47.

¹⁰²Ibid., p. 51.

¹⁰³Ibid., p. 52. This is what distinguishes them from the elements, which are moved by things outside themselves: their generator, which brings them into being, and their natural places, which draw them into activity.

because its motions are actualized by a principle from within the spider's own soul.”¹⁰⁴

3.2.5 Conclusions on sublunar self-movers

In this section, I have discussed the controversial issue of self-movers in Aristotle's system of natural philosophy. In the first subsection I discussed the issues surrounding the very possibility of self-movers, showing that texts such as *Physics* VII.1 need not be taken as a denial of the possibility. I also examined the question of whether or not it would be possible to eliminate finite self-movers and simply reduce all sublunar motion to being the result of the motion of the first Unmoved Mover. Second, I described Aristotle's various ‘proofs’ which establish the existence of self-movers (although not all are presented formally as proofs), presented in Book VIII of the *Physics* and in *On the Motion of Animals*. These arguments establish a number of points: 1) that any causal chain must be finite, terminating in an unmoved first mover; 2) an animal which is a genuine self-mover cannot be moved *καθ' αὐτό* by a part of its body, but rather the motion must proceed from the soul; 3) animals can be true self-movers despite not initiating motion *ex nihilo*, and 4) that certain causal chains *must* in fact terminate in an animal self-mover as moving cause. Based on these arguments, Aristotle has provided important grounding for his theory of higher *φύσις*, both in the sense of showing *how* *ψυχή*, as a type of *φύσις*, can be a genuine immanent principle of motion, and by showing that *φύσις* in this sense is a necessary

¹⁰⁴Ibid., p. 53.

Aristotle on Higher Natures

postulate for any theory that wishes to explain observed phenomena.

Following discussion of the proofs that Aristotle offers, I discussed the question of how self-motion occurs, showing that beings which move by $\psi\nu\chi\eta'$ are moving by an inner formal principle, which *qua* formal principle does not move. Stated in another way, the soul moves the body. I also examined the difficult question of how to draw the distinction between the mover and the moved, so that Aristotle is not interpreted as holding the “soul in the body but not *of* the body” conception of Plato. I noted several passages from Aristotle which clearly state that the soul is the form and essence of the body, not merely a boat pilot who is borne along with the ship he steers, but of which he forms no constitutive part. Given this view of the soul, I showed that the $\psi\nu\chi\eta'$, as act of the body which it makes to be, is normally able to act without impediment in moving the body in the various categories, i.e. that $\psi\nu\chi\eta'$ is ‘pluripotent.’

Despite Aristotle’s clear assertions that it is the soul which moves the body, complications arise for such a simple account of self-motion. First of all, Aristotle does not wish to make animal self-movers an absolutely unmoved source of motion, in order to avoid the cosmological consequences of postulating radical initiators of motion in the cosmos which are distinct from the one, primary Unmoved Mover of the universe. In consequence, he emphasizes that for many, if not all, cases of apparent self-movement, there is a stimulus which enters from without, either something physical, such as food, or something ‘intentional,’ such as a perception of a desired object; these stimuli account for the initiating of the motion in the animal. How to understand, then, the ‘self-mover’ as possessing an unmoved mover which

serves to initiate change, either in another or in itself *qua* other?

Numerous solutions to this dilemma have been proposed, ranging from denying that Aristotle has any room in his doctrine for genuine self-movers (Wardy and Sorabji), to Sauvé's strong position that nothing external to us moves us to have the desires by which we move ourselves. A consensus, however, has formed around the position that there is a cooperation between internal and external factors in explaining self-motion. For Gill, one may appeal directly to the animal's nature in order to explain why a given motion takes one form and not another. For Furley and Nussbaum, proponents of the so-called 'Intentionality Escape,' the key lies in the external object of perception seen as a good, which moves the *ἀρεκτικόν* while remaining itself unmoved. Finally, Freeland defends the 'Final Cause Escape,' whereby the emphasis is placed on the objective causality of the final causes which are connatural to the animal, such that an animal can be said to be a self-mover if it moves in accordance with these causes (with the internal mechanisms of perception and intentionality as subservient to the final cause). According to both the Intentionality Escape and the Final Cause Escape, the soul remains the primary principle of motion, and hence animals can be said to be *self*-movers, despite there being initiation of motion from without.

How do these conclusions affect Aristotle's critique of Presocratic materialism and the defense of his theory of nature? Given the fact that over the course of his discussion of the issue of self-movers beginning in Book VII, Aristotle is not debating the materialists per se, but rather Platonic doctrines about the soul as self-mover and the Demiurge as initiator of mo-

Aristotle on Higher Natures

tion (and hence time) in the universe,¹⁰⁵ we do not have texts that directly address these questions.

Nevertheless, I see two areas where the Aristotelian argument for self-movers and their properties impacts his overall argument against Democritus, Empedocles and Anaxagoras. In the first place, in demonstrating the existence, in *Physics* VIII.4-5, of finite unmoved movers (i.e. animal souls), he also demonstrates the existence of a non-eternal principle which, not being material, is nonetheless able to direct the motion of the material components of a given body. Hence, insofar as the soul moves the body, not all motion can be reduced to material necessity. In the second place, in his argument for the key role of intentional states, in particular *φαντασία*, in the production of self-motion, he shows the need to posit the capacity of soul to assess a given object of sensation in terms of its benefit to the animal—i.e. to determine that the object of sensation is a good (or not). The key aspect here is that there may be no convincing reduction to physical or material explanation for whether a given object is a good or not, since there are goods which are only such at the ‘noetic’ level. Hence, he has demonstrated the necessity for a non-reducible *δύναμις* which makes animals able to make choices based on experience and learned strategies, and makes humans able to consider objects of perception via *λογίσματα*.

¹⁰⁵Cf. *Physics*, 241b37-242a49 and *Physics*, 251b16-18.

3.3 Communication of form in motion and change

At this point, I will change the focus of investigation to look more closely at the issue of how natural substances are able to be the first movers in a finite causal chain involving other physical beings. This involves what I have earlier termed the ‘communication of form,’ which is a difficult issue, and appears to provoke *ἀπορία* for Aristotle’s theory of *φύσις*. In this section, I will look at the difficulties involved, followed by an exploration of relevant texts that can help in reaching a solution. I will propose a solution to the problem, indicating how Aristotle’s theory of contact can explain how formal act can communicate itself to other beings which are in potency to acquire the given form in act. Finally, I will draw some conclusions about the character of *φύσις* which we can derive from its being a ‘communicator’ of form.

3.3.1 The difficulty of the ‘communication of form’

The difficulty arises because certain aspects of Aristotle’s physical and metaphysical theories appear to militate against the possibility of form ‘spreading’ or ‘communicating’ itself. In the first place, Aristotle proposes that a form is the actuality of its matter,¹⁰⁶ and the matter or body thus actualized must be continuous, i.e. undivided in act,¹⁰⁷ although it is potentially infinitely divisible.¹⁰⁸ The form (as act) makes what is potentially multiple to

¹⁰⁶Cf. *On the Soul*, 412a16-35.

¹⁰⁷Cf. *Metaphysics*, 1016b12-16.

¹⁰⁸“τὸ δ’ ἄπειρον οὐ ταῦτὸν ἐν μεγέθει καὶ κινήσει καὶ χρόνῳ, ὡς μία τις φύσις, ἀλλὰ τὸ ὕστερον λέγεται κατὰ τὸ πρότερον, ὃν κίνησις μὲν ὅτι τὸ μέγεθος ἐφ’ οὐ κινεῖται ἢ ἀλλοιοῦται ἢ αὐξάνεται, ὁ χρόνος δὲ διὰ τὴν κίνησιν. νῦν μὲν οὖν χρώμεθα τούτοις, ὕστερον δὲ ἐροῦμεν καὶ τί ἔστιν ἔκαστον, καὶ

Aristotle on Higher Natures

be a genuine unity; thus it also can be said that where there is not a genuine unity, there cannot be a single *φύσις* (in the sense of instance) actualizing both. Rather, where there is multiplicity of matter, there will be multiplicity of form.¹⁰⁹ Thus, it would seem to follow that it is impossible that a given form (in terms of *φύσις*) be in act beyond the bounds of the matter it actualizes.

Nevertheless, this is clearly not what Aristotle observes happening. For *φύσις* is dynamic: fire extends itself and makes wood burn, flesh grows by integrating food, men reproduce by causing their ‘seed’ to take on the capacity for reproducing human *φύσις* in the menses in the woman’s womb. In Aristotle’s universe, natural beings are not isolated one from another in the manner of Leibniz’s monads; rather, a being which has a *φύσις* is naturally open to other beings, both in the sense of being able to receive forms (via passive *δύναμις*) or impose a form it carries onto another being (via active *δύναμις*). Indeed, so ‘contagious’ is *εἶδος* (in the sense of formal actuality) that it *necessarily* communicates itself when in proximity to a being which is in potency to receive it (provided that nothing impedes). He states in regards to non-rational potencies, “τὰς μὲν τοιαύτας δυνάμεις ἀνάγκη, ὅταν ὡς δύνανται τὸ ποιητικὸν καὶ τὸ παθητικὸν πλησιάζωσι, τὸ μὲν ποιεῖν τὸ δὲ πάσχειν.”¹¹⁰

As Meehan points out, Aristotle was aware of several other apparent absurdities that appear to arise from his theory of the communication of form: 1) that the actuality for each participant in the efficient-causal relation will not be *in* both participants; 2) there will be a single identical actualization

διότι πᾶν μέγεθος εἰς μεγέθη διαιρετόν,” *Physics*, 207b21-26.

¹⁰⁹ *Metaphysics*, 1016b30-1017a2.

¹¹⁰ *Metaphysics*, 1048a5-07.

for two things which are thought to be different; and thus 3) action and passion are not different in reality, and hence to act is the same as to suffer, building the same as being built.¹¹¹ Aristotle answers these issues as follows. 1) It is not absurd, as his critics assert, that the actualization of one thing should be in another.¹¹² The case of teaching is illustrative: the action of teaching is not one because it is something isolated, cut off from its subject, but rather is the action of the teacher upon the student. It is said to be ‘in the student’ because it is the student’s activity that is definitive of whether or not teaching is going on... if he is not learning as a result of the teacher’s activity, then the teacher is not in fact teaching. 2) Provided that the actualizations are not described in the same way, there is nothing to prevent two things from having the same actualization; they must simply be related as what can act to what is acting.¹¹³ And 3) the agent need not be acted upon by the patient, to act is not the same thing as to suffer, because, as Meehan states, Aristotle holds that while teaching and learning are the same activity materially considered, “each has a formality that makes them both extramentally and conceptually different.”¹¹⁴ It does not follow that to learn is the same as to teach, any more than the fact that a single distance exists between two things means that there is no difference between the two vectors AB and BA.¹¹⁵

¹¹¹Meehan, *Efficient causality*, p. 62.

¹¹²“ἢ οὕτε τὸ τὴν ἄλλον ἐνέργειαν ἐν ἑτέρῳ εἶναι ἄποπον (ἴστι γὰρ ἡ δίδαξις ἐνέργεια τοῦ διδασκαλικοῦ, ἔν τινι μέντοι, καὶ οὐκ ἀποτετμημένη, ἀλλὰ τοῦδε ἐν τῷδε),” *Physics*, 202b5-7.

¹¹³“οὕτε μίαν δυοῖν κωλύει οὐθὲν τὴν αὐτὴν εἶναι (μὴ ὡς τῷ εἶναι τὸ αὐτό, ἀλλ’ ὡς ὑπάρχει τὸ δυνάμει ὃν πρὸς τὸ ἐνεργοῦν),” *Physics*, 202b8-10.

¹¹⁴Meehan, *Efficient causality*, p. 63.

¹¹⁵“οὐ μὴν ἀλλ’ οὐδὲ εἰ ἡ δίδαξις τῇ μαθήσει τὸ αὐτό, καὶ τὸ μανθάνειν τῷ διδάσκειν, ὥσπερ οὐδὲ εἰ ἡ διάστασις μία τῶν διεστηκότων, καὶ τὸ διύστασθαι ἐνθένθε ἐκεῖσε κάκειθεν δεῦρο ἐν καὶ τὸ αὐτό.” *Physics*, 202b15-18.

3.3.2 The conditions for communication of form

Having shown that the communication of form from agent to patient is not impossible nor absurd, Aristotle gives a number of necessary conditions for this communication of actuality to occur. As mentioned above, the agent and the patient must be in such a relation that the change is possible; this means that the patient must have the corresponding passive potency to be brought into actual being according to the actuality possessed by the agent.¹¹⁶ This means that the patient must be in a contrary manner to the form to be imposed, for all change is between contraries.¹¹⁷ Further, the patient must be in a state such that, with a single action, the potency it hosts can be brought into actuality by the agent.¹¹⁸ For instance, unrefined gold ore cannot be made into a gold statue; the ore must first be refined so that the subject is actually, and not merely remotely, gold. Secondly, there must be an absence of impediment, such that there is no obstruction to the operation of the agent upon the patient.¹¹⁹ Finally, there must be proximity between the agent and the patient. Strictly speaking, this means that there must be contact between their bodies; even in cases such as fire heating at a distance, what is happening is that the air is in contact with the fire, and the heated air then heats the patient.¹²⁰

¹¹⁶ *Metaphysics*, 1046a20-30.

¹¹⁷ “ἡ γὰρ ἐξ ἐναντίου ἡ εἰς ἐναντίον κίνησίς ἔστιν...” *Physics*, 226b3.

¹¹⁸ *Metaphysics*, 1048b35-1049a12.

¹¹⁹ Meehan points out that this implies more than just the absence or deficiency of an active or passive potency on the part of the beings involved; rather, “the word ‘impediment’... is applied to that circumstance or group of them, extrinsic to the potential cause and the potential subject which prevent both of these potencies from being actualized,” *ibid.*, 72, n. 49.

¹²⁰ “λέγω δ’ οἷον οὐ μόνον ἀπτόμενον θερμαίνει τὸ πῦρ, ἀλλὰ κανὸν ἀποθεν ἦτον μὲν γὰρ ἀέρα τὸ πῦρ, δ’ ἀὴρ τὸ σῶμα θερμαίνει, πεφυκὼς ποιεῖν καὶ πάσχειν,” *On Generation and Corruption*, 327a3-

Contact plays a crucial role in change and motion. Aristotle insists that action at a distance is impossible, and that contact is even present in cases where no apparent touch is occurring.¹²¹ Seeing that touch or contact is essential for one being to draw another from potency into act, it behoves us to determine more carefully what touch involves, and why it makes possible the ‘communication’ of form. As the Stagirite himself says,

“ἀλλὰ μὴν εἰ περὶ τοῦ ποιεῖν καὶ πάσχειν καὶ περὶ μίξεως θεωρητέον,
ἀνάγκη καὶ περὶ ἀφῆσ· οὔτε γὰρ ποιεῖν ταῦτα καὶ πάσχειν δύναται κυρίως
ἄ μὴ οἶόν τε ἄψασθαι ἀλλήλων, οὔτε μὴ ἀψάμενά πως ἐνδέχεται μιχθῆναι
πρῶτον. ὥστε περὶ τριῶν τοῦτων διοριστέον, τί ἀφὴ καὶ τί μίξις καὶ τί
ποίησις.”¹²²

Being in contact means to be touching, which Aristotle defines as “having the extremes together.”¹²³ This is distinguished from ‘continuous’ (*συνεχῆς*), which is defined as ‘having the extremes be one.’¹²⁴ Being in contact is further distinguished from ‘being in succession,’ which is defined as ‘having nothing of the same kind between.’¹²⁵ Those things which are together are in succession, having nothing of the same kind between, but there is also nothing of another kind between, either. This being the case, the division between the two is dimensionless and itself indivisible. This situation is

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¹²¹Cf. *On Dreams*, ch. 2: “παραπλήσιον γὰρ τὸ πάθος ἐπί τε τούτων καὶ ἐπὶ τῶν φερομένων ἔσικεν εἶναι. καὶ γὰρ ἐπὶ τῶν φερομένων τοῦ κινήσαντος οὐκέτι θιγγάνοντος κινεῖται· τὸ γὰρ κινήσαν ἐκίνησεν ἀέρα τινά, καὶ πάλιν οὗτος κινούμενος ἔτερον· καὶ τοῦ τον δὴ τὸν τρόπον, ἔως ἂν στῇ, ποιεῖται τὴν κίνησιν καὶ ἐν ἀέρι καὶ ἐν τοῖς ὑγροῖς,” “On Dreams”, 459a25-b3.

¹²²*On Generation and Corruption*, 322b22-27.

¹²³“...συνεχῆ μὲν ὅν τὰ ἔσχατα ἔν, ἀπτόμενα δ’ ὅν ἄμα,” *Physics*, 231a22-23.

¹²⁴Ibid.

¹²⁵Ibid.

similar to that of a continuum, i.e. of a body undivided in act. For in a continuum, it is also true that the parts have nothing separating them. What is lacking when two beings touch is precisely a single unifying formal act which makes the two parts one.

3.3.3 Kinds of motions and changes resulting from communication of form

A number of different motions or changes can occur when contact occurs between two beings. Aristotle gives the examples of fire spreading to dry logs,¹²⁶ which is analogous to how flesh grows by the absorption of food:¹²⁷ it can be either coming to be or growth. If the fire increases by spreading to other logs, while maintaining continuity, this is growth; if the fire causes separate flame in the logs, this is coming to be. In the case of food being absorbed in flesh, this can be growth (if bulk is added) or nutrition, if the food merely keeps alive what is already there.¹²⁸ In addition, we have human generation, for the man generates the child by imposing the form of man on the seed (i.e. sperm) which can in turn act as a proxy to impose the form of man upon the embryo in the womb.¹²⁹ In the cases of generation, what was temporarily in contact or touching, after the formal change occurs, the newly formed being separates and continues a distinct existence, whereas in the case of growth, what was once separate becomes

¹²⁶*On Generation and Corruption*, 322a10-16.

¹²⁷Ibid.

¹²⁸*On Generation and Corruption*, 322a17-28.

¹²⁹“Πότε δὲ δυνάμει ἔστιν ἔκαστον καὶ πότε οὐ, διοριστέον· οὐ γὰρ ὁποτεοῦν. οἶνον δὲ γῆ ἄρ' ἔστι δυνάμει ἀνθρωπος· η οὖ, ἀλλὰ μᾶλλον ὅταν ἥδη γένεται σπέρμα, καὶ οὐδὲ τότε ἴσως...” *Metaphysics*, 1048b35-1049a4.

one with the moving cause of the change. Other kinds of motion do not involve modification of the essence of the being which is in potency to be modified. In locomotion, the being which causes the motion must be in contact with the thing to be moved, but the thing moved remains what it is: a soccer ball kicked by a player does not cease to be a soccer ball, for the change is not in the category of substance. Nevertheless, the player has a motion which is imparted to the ball via touch. Similarly, we have changes (more specifically, motion or *κίνησις*) in the categories of quantity and quality, where the mover imparts some form without changing the essence of the thing which is moved. For instance, ice imparts cold to the hand that holds it, without changing the substance of the hand, and rubber may be stretched without ceasing to be rubber.

I will discuss these types of ‘communication of form’ separately. First I will look at the case of essential change, followed by an investigation of change in the other categories. With essential change, we have two beings, one of which is in potency to receive a substantial form (a *φύσις*) imparted by the other. Here, the unity¹³⁰ generated by contact between the bodies of the two beings provides the situation necessary for there to be potency to true unity. Only a single action is necessary to bring this unity into being.¹³¹

In the case of growth and nutrition, that is precisely the action that occurs when food becomes absorbed into flesh, or wood is added to a fire.

¹³⁰“τῶν δὲ καθ' ἑαυτὰ ἐν λεγομένων τὰ μὲν λέγεται τῷ συνεχῆ εἶναι, οἷον φάκελος δεσμῷ καὶ ξύλα κόλλῃ: καὶ γραμμή, κἄν κεκαμμένη ἦ, συνεχῆς δέ, μία λέγεται, ὥσπερ καὶ τῶν μερῶν ἔκαστον, οἷον σκέλος καὶ βραχίων. αὐτῶν δὲ τούτων μᾶλλον ἐν τὰ φύσει συνεχῆ η τέχνη,” *Metaphysics*, 1015b35-1016a3.

¹³¹Cf. the definition of potency, *Metaphysics*, 1048b35-1049a12.

Aristotle on Higher Natures

The unity caused by contact is a lesser kind of unity,¹³² but it is a sufficient unity such that what originally was only remotely in potency (i.e. this food is in remote potency to be transformed and made part of this flesh, when the two are well separated) is now in potency in the full sense, as the house is in potency when all the materials are present and the builder has arrived. The *φύσις* of the agent need merely draw into actuality the unity potentially present in the flesh-food (or wood-fire) pair which are joined through touch. For wood is matter for fire, and food is matter for flesh; that which exists in potency is drawn to be in actuality in the patient.

In the case of coming to be, the process is somewhat different, in that once a potential *φύσις* is drawn into being in the patient by the action of the agent, the patient does not become a unity with the agent. For instance, in the case of fire, a candle can be used to light a fire in a fireplace, and once the kindling has caught fire, the candle is put back on the mantel. The fire that continues in the fireplace is said to have ‘come to be’ and not to be a case of growth.¹³³ Thus, we do not have a case of a potential unity between two beings being brought to be a true unity; rather, the *φύσις* of the agent is able to draw an identical *φύσις* from potency into act in the patient, despite no genuine unity ever having existed between the agent and patient. Contact without unity in the full sense, therefore, is somehow sufficient for an agent to draw what is in potency in the patient into act.

¹³²I.e. similar to that produced by art, cf. op cit., 1016a3.

¹³³*On Generation and Corruption*, 322a16.

3.3.4 A possible solution to the difficulty

What is it about contact that is so special, that makes it both a necessary condition (and in the correct situation, a sufficient condition) for change or motion to occur? And in regards to Aristotle's definition of *φύσις* as a principle of motion or rest (primarily in the being which has a nature, but also in other beings), how is it possible that one being, i.e. the patient, which is a unity and really distinct from the agent, should be affected by an agent, which is genuinely other? For if we cannot show that communication of form between two beings is possible, then this will cause a strong difficulty for Aristotle's theory of *φύσις*.

A part of the difficulty can be resolved by noting that motion and change do not really involve 'transmitting' form in a strict sense. For that which comes into being (either as a coming-to-be or *γένεσις*, or as a motion or *κίνησις*) is already present, as a potency, in the patient. It is not the case that the patient is absolutely other than that which it comes to be, but in a sense it already *is* what it will be, as the Hermes is said to 'be' in the bronze.¹³⁴ Thus, it is more properly said to be a 'drawing into act' than a transmission.

In the second place, we can note that *qua* itself form is not limited by place, nor is it truly in *any* place.¹³⁵ The formal act which makes a natural substance to be, on the other hand, *is* localized (since the body which it

¹³⁴Cf. *Metaphysics*, 1017b4-05.

¹³⁵"ἔστι δὲ κινούμενον τὸ μὲν καθ' αὐτὸ ἐνεργείᾳ, τὸ δὲ κατὰ συμβεβηκός· κατὰ συμβεβηκός δὲ τὸ μὲν ἐνδεχόμενον κινεῖσθαι καθ' αὐτό, οἷον τὰ μόρια τοῦ σώματος καὶ ὁ ἐν τῷ πλοίῳ ἥλος, τὰ δ' οὐκ ἐνδεχόμενα ἀλλ' αἰεὶ κατὰ συμβεβηκός, οἷον ἡ λευκότης καὶ ἡ ἐπιστήμη· ταῦτα γὰρ οὔτω μεταβέβληκε τὸν τόπον, ὅτι ἐν ὧ ὑπάρχουσι μεταβάλλει," *Physics*, 211a18-24.

makes to be has place). But it is not distance or space that is principally the difficulty, for the form of man is present in every part of the man, as act of the body which has that part, and there is not less ‘humanness’ in the finger for being distant from the ‘center’ of the man. Thus the effectiveness of touch or contact is not due to proximity per se, and the fact that the patient is in a different place is not an obstacle, for the *φύσις* that is in the agent is not limited by place, as it is not body, but the act of a localized body. Place and touch are important, rather, because juxtaposition and contact are required for a unity (of contiguity) to come about.

Rather, it appears that *φύσις* is limited by *other beings* with their own *φύσις*, which present impediments to the *φύσις* bringing them into act.¹³⁶ Since there is no void, every natural substance is surrounded by other substances, which may impede its ‘transmitting’ of its *φύσις*. This impediment can be of two kinds. First, there is the impediment of lack of potency in the other being. The agent cannot act unless the patient is contrary to (or ‘un-like’) the patient in the correct genus: “ἀλλ᾽ ἐπεὶ οὐ τὸ τυχῆν πέφυκε πάσχειν καὶ ποιεῖν, ἀλλ᾽ ὅσα ἡ ἐναντία ἔστιν ἡ ἐναντίωσιν ἔχει, ἀνάγκη καὶ τὸ ποιοῦν καὶ τὸ πάσχον τῷ γένει μὲν ὅμοιον εἶναι καὶ ταῦτό, τῷ δὲ εἶδει ἀνόμοιον καὶ ἐναντίον.”¹³⁷ For instance, a fire is kept within the fireplace because the bricks (made of earth) are not in potency to be burned. A second kind of impediment is a being which is in potency to be another (i.e. water, which can be turned into wine), but which ‘resists’ the active potency of the agent, due to its

¹³⁶ Aristotle notes, for instance, in regards to natural substances that “οὐκοῦν ὡς πράττεται, οὔτω πέφυκε, καὶ ὡς πέφυκεν, οὔτω πράττεται ἔκαστον, ἀν μή τι ἐμποδίζῃ,” *Physics*, 199a8-15.

¹³⁷ *On Generation and Corruption*, 323b30-35.

greater strength.¹³⁸

The role of contact in the ‘communication of form’ has to do with impediments. Once the two beings have been brought into contact, there is no space between them (their ends are together, although they are not one). Thus, while there is a division in act between the agent and the patient, this division is dimensionless, and thus no body can exist between the agent and patient (for all body has dimension¹³⁹). Once the agent and patient are in contact, there is precisely *nothing* between them, and that which is not anything cannot act as an impediment: there is nothing between that which is in act and that which can be in act. And since *φύσις* is such that it always acts when there is no impediment, it must act in this situation. Form being non-spatial, the *εἶδος* of the natural substance can bring the matter of the patient into being as effortlessly as it makes the matter of the agent be what it is. And it will do this without fail, provided that its *φύσις* is ‘dominant’ (*τὸ κρατοῦν*).

3.3.5 Waterlow’s unitary subject theory

Waterlow advances a theory along similar lines in order to explain change within the context of an agent-patient relationship, and which, if correct,

¹³⁸“τῶν δὲ ποιητικῶν καὶ παθητικῶν ὅσα εὐδιαιρετα, πολλὰ μὲν ὀλίγους καὶ μεγάλα μικροῖς συντιθέμενα οὐ ποιεῖ μίξιν, ἀλλ’ αὐξησιν τοῦ κρατοῦντος* μεταβάλλει γὰρ θάτερον εἰς τὸ κρατοῦν, οἷον σταλαγμὸς οἴνου μυρίοις χοεύσιν ὕδατος οὐ μίγνθται· λύεται γὰρ τὸ εἶδος καὶ μεταβάλλει εἰς τὸ πᾶν ὕδωρ. ὅταν δὲ ταῦς δυνάμεσιν ἴσαζῃ πως, τότε μεταβάλλει μὲν κάτερον εἰς τὸ κρατοῦν ἐκ τοῦ αὐτοῦ φύσεως, οὐ γίνεται δ’ θάτερον, ἀλλὰ μεταξὺ καὶ κοινόν,” *On Generation and Corruption*, 328a24-32.

¹³⁹“οὐ μὴν ἀλλ’ ἔχει γε ἀπορίαν, εἰ ἔστι, τί ἔστι, πότερον ὅγκος τις σώματος η̄ τις ἔτέρα φύσις· ζητητέον γὰρ τὸ γένος αὐτοῦ πρῶτον. διαστήματα μὲν οὖν ἔχει τρία, μῆκος καὶ πλάτος καὶ βάθος, οἷς δριζεται σῶμα πᾶν. ἀδύνατον δὲ σῶμα εἶναι τὸν τόπον· ἐν ταύτῳ γὰρ ἀν εἴη δύο σώματα,” *Physics*, 209a5-7.

Aristotle on Higher Natures

would resolve the conundrum of the ‘communication of form.’ She begins by stating that, in *Physics* III.3, action / passion is treated of as though it were a single event, “of which the agency of one individual and the patency of another are distinguishable but inseparable aspects.”¹⁴⁰ She then proceeds to ask what our justification would be for saying that there are two individuals involved, prior to analyzing the event into agent and patient relations. Considered prior to this analysis, she holds that instead of two subjects, we will have a *single subject*, which only reveals different factors, i.e. the agent and the patient, after an analysis is performed. Waterlow asks,

[A]lthough Aristotle’s analogies in Book II between natural and artificial change are intended to illustrate the former by the latter, why should we not reverse the analogy, and regard the artifex and his material as forming, in the change, a concrete organic unity, as if the material were an extension of his own body?¹⁴¹

The change, in this case that of house-building, would terminate with the dissolution of the single subject into two distinct unities, each a free-standing substance.

Aware that this is a counterintuitive interpretation of Aristotle’s doctrine of action and passion, and indeed of substance, she states that the only reason that we would suspect the presence of two distinct subjects while the

¹⁴⁰Waterlow, *Nature, Change, and Agency*, pp. 200-1.

¹⁴¹ibid., p. 201. She cites as justification Aristotle’s comparison of a stick moved by the hand to an extra limb; cf. *On the Motion of Animals*, 702a31-b11.

action and passion are underway is that the two individuals were present before and after the change. During the change itself, there is no reason to suppose that there are two different beings involved, any more than there is reason to hold that the simple bodies—the elements—were present as full substances during the time of existence of a substance, just because they were present before and after the generation and later corruption of that substance. The advantage to Waterlow's interpretation is that it removes all need for ‘communication of form,’ since during a change involving two beings, there is only one ‘substance,’ so to speak, during the process of change, and hence change apparently involving two beings is really a self-change, and “there is no actual agency and patency... Since there are not two beings to connect, there can be neither problem nor solution about the nature and status of the connection.”¹⁴²

Waterlow admits that this interpretation would be counterintuitive for both us and for Aristotle, and that indeed that “Aristotle... never follows out the line of thought just sketched.”¹⁴³ I suggest that, while her solution is intriguing, there are solid reasons why the Stagirite never developed such a response to the problem of agency and patency. The most cogent reason has to do with Aristotle’s own metaphysics. In order to form a unity, even a temporary one, of the sort that Waterlow speaks of, such that action and passion could be reduced to self-change, there must be a unitary form that makes the subject to be one.¹⁴⁴ But the unity that is formed between agent

¹⁴²Waterlow, *Nature, Change, and Agency*, p. 202.

¹⁴³ibid., p. 203.

¹⁴⁴“ὅλως δὲ ὅν ἡ νόησις ἀδιαιρέτος ἡ νοοῦσα τὸ τί ἦν εἶναι, καὶ μὴ δύναται χωρίσαι μήτε χρόνῳ μήτε τόπῳ μήτε λόγῳ, μάλιστα ταῦτα ἔν, καὶ τούτων ὅσα οὐσίαι,” *Metaphysics*, 1016b1-3.

Aristotle on Higher Natures

and patient is an accidental unity, for the form which ‘unites’ the agent and the patient, under Waterlow’s proposal, is an accidental form of some kind: the agent imposes a form within the categories of quality, quantity, or place.

Furthermore, there is no suggestion by Aristotle that during an occasion of transmission of form (or action and passion), the substantial forms of the two objects are somehow lost, only to reconstitute themselves upon termination of the change. Indeed, this would be impossible, for the possibility of action and passion depends upon there being two beings, one in active potency and the other in passive potency, such that contact and the correct environmental conditions can bring about the change in question. Aristotle even extends this ‘duality’ model to instances of self-change, wherein the changing being is analyzed as being distinguishable into a mover and a moved (i.e. soul and body), and the self-mover moves itself not *qua* undifferentiated unity, but *qua* other.¹⁴⁵

My own position, as stated above, is that the role of contact in the transmission of form is not that of forming a unity that would stand over and supersede the individual unities of the agent and the patient, but rather that of eliminating impediments. This appears to be as far as Aristotle himself has gone, on the few occasions that he has discussed the issue (particularly in *On Generation and Corruption I.6-10*).

¹⁴⁵Waterlow herself notes that this is the direction of Aristotle’s thought: “He looks for distinct agents and patients even in the apparently intransitive natural changes of single living organisms, which for him are unitary not by some stretch of the conceptual imagination, but fundamentally and paradigmatically so,” *ibid.*, p. 203.

3.4 Conclusions regarding motion and change

In this chapter we have examined several issues regarding Aristotle's theory of motion and change and its relation to his doctrine of *φύσις*. Specifically, we have determined three things. First, we have shown how, and in what sense, an organic substance can move itself, since we have shown that the '*εἶδος*' (i.e. the *ψυχή*) of the substance acts as an immobile mover with respect to its body. Secondly, we have shown that it is necessary that there be sublunar immobile movers (i.e. substances which exist by *φύσις*), in order to account for the existence of kinds of motion other than cyclical locomotion.¹⁴⁶ Finally, we have shown how, in addition to being a source of motion for itself, a natural substance can 'communicate' its form, by drawing other beings into act in a determinate manner, via contact.

From this basis, we now have a more complete justification for the existence of higher *φύσεις*. We have seen that, given the demonstration of the division of mobile being into its *ἀρχαί* of *εἶδος* and *ὑλή*, the formal 'part' of the natural substance can act as an immobile mover (via the active potencies that the formal *ἀρχή* hosts). Further, that *φύσις* as an immobile mover in a natural substance makes that substance to be a self-mover, and that such natural self-movers movers are required to explain observed instances of motion. Finally, we have investigated how natural substances, as self-movers, can produce motion in other beings through bodily contact.

¹⁴⁶Taking into account Aristotle's model of the universe, whereby the celestial bodies are in constant circular motion, including the sphere of the sun, which moving along the ecliptic, produces the cyclical changes of the seasons. For Aristotle, the sun's motion is also responsible for the generation and corruption of the elements, in a cycle which imitates that of the celestial bodies, but within the sublunar world of change.

Aristotle on Higher Natures

This latter step gives Aristotle the justification for asserting that natural substances can act in the world through the operations for which they are apt (*πέφυκεν*).

It remains now to discuss Aristotle's justification of finality in natural substances, and of the existence of *φύσεις* higher than the simple natures (or elements), which I will discuss in the following two chapters. We will find that a good part of the necessary bases for his justification of these positions has already been laid in the argumentation we have discussed up to now.

4. The Arguments for Natural Finality

At this point I have shown how Aristotle provides justification for a number of ‘legs’ supporting his theory of *φύσις*. In particular, I have shown how his analysis of the principles of mobile being, if correct, not only provides us with an understanding of how change and motion can come about, but also applies equally to the theories of the Greek materialists. Secondly, I have shown how *φύσις* can be a principle of active potency, despite being primarily said to be a formal principle. Thirdly, I have shown how self-movers can be said to exist, and described an argument, derived from Aristotle’s arguments for the existence of a First Motor, that shows that there must be finite sub-lunar self-movers. In addition, I have shown how contact makes it possible for these self-movers to exercise their characteristic operations in the world.

In this chapter, I will discuss a major objection that the ancient materialists made to Aristotle’s theory,¹ and one which is still made today. The *φυσιολόγοι* wish to say that they can offer explanations which need none of the Stagirite’s ‘higher’ *φύσεις*: such higher *φύσεις* would have to be subject to genuine coming-to-be and passing-away, thus violating the Parmenidean stricture against change; further, the simpler theories that they offer are

¹The *φυσιολόγοι* mentioned explicitly in Aristotle’s works were dead by the time the Stagirite *floruit* (with the possible exception of Democritus); nevertheless, materialist schools of philosophy continued to prosper in Aristotle’s time, and he gives the impression of having been in dialogue with those who maintained the doctrines of these earlier *φυσιολόγοι*.

preferable to Aristotle's for their simplicity, needing only a few basic *ἀρχαὶ* to explain a vast array of widely varying phenomena.² Thus *φύσις*, in the important sense of complex natures irreducible to elemental principles, is just an illusion, and that what appears to be an ‘innate principle of motion and rest’ is merely the result of the workings of chance.

If the *φυσιολόγοι* can back up their assertion that the phenomena under consideration, i.e. the coming-to-be and behavior of organisms, can be explained by their basic material *ἀρχαὶ* and chance working over time, then they can plausibly claim that Aristotle's theory ought to be rejected. It would be needlessly complicated, and incorrectly claims that something is a true reality (i.e. a genuine higher *φύσις*) which is in fact merely an illusion created by chance, like a face appearing in a loaf of baked bread. Aristotle, therefore, needs to show that the kinds of phenomena that he attributes to *φύσις* (in particular, apparently purposeful but non-rational activity in the natural world) cannot in fact be explained by ‘chance,’ as the *φυσιολόγοι* claim. If chance cannot be used as an explanation for these phenomena, the materialist attack on the doctrine of *φύσις* will fail, and Aristotle can claim, with justice, that his theory is the only one that truly explains the phenomena.

I will structure this chapter in the following way. In the first section, I will describe the theory of Empedocles that Aristotle presents in *Physics*

²I will assume, for the sake of argument, that the *φυσιολόγοι* would be content with admitting the Aristotelian analysis of the *ἀρχαὶ* of matter and form, along with his analysis of the ‘ways of being’ and his explanation of motion, but restricting the application of his theory to the ambit of the ‘simple natures,’ and denying that there could be *οὐσία* of any higher order than the elements. Meyer also interprets the positions of the *φυσιολόγοι* as involving a denial of higher natures in the category of substance; cf. Meyer, “Aristotle, Teleology, and Reduction”, p. 794.

II.8, followed by an analysis of Aristotle's critique of this argument. In the second section, I will describe the objection to natural finality which views 'end-directedness' as something necessarily rational, and thus not present in non-rational beings. Again, followed by a presentation of the argument, I will show how Aristotle responds to this objection. Next, I will examine a number of issues related to finality in more complex systems, showing how Aristotle's philosophy contains resources that can explain how there can be end-directedness within systems whose parts are not, *per se*, directed towards the purpose that they in fact serve in the overall system. Finally, I will discuss the issue of whether Aristotle's theory of teleological explanation is compatible with reductionism as applied to the underlying physical processes of organic development.

4.1 Empedocles's 'evolutionary' theory

In *Physics* II.8, Aristotle introduces a competing theory, the 'theory of material necessity'³ most likely developed in its fullest form by Empedocles.⁴ This theory intends to explain the existence of apparently purposeful activity or beings in terms which do not involve purpose or 'design.' The argument begins by stating that material necessity is sufficient to explain

³Cf. Meyer, "Aristotle, Teleology, and Reduction", p. 792.

⁴While Aristotle does not make clear who is the originator of the theory he describes here, it appears most likely that it is Empedocles, and I will assume his authorship here. In regards to the basic 'theory of material necessity,' Meyer (792, note 2) states that "Empedocles is the only named opponent in Ph. ii 8, but Aristotle elsewhere attributes such affirmations of necessity to Democritus (GA 789b2-7) and to Anaxagoras (Met. 985a18-21) in contexts in which he criticizes their neglect of teleology. He attributes these positions to the phusiologoi in general at GA 778137-10; cf. PA 640134-17." On the other hand, the 'evolutionary' aspect of the theory, as described in the *Physics*, appears to be of Empedocles's own invention; cf. Mansion, *Introduction à la Physique aristotélicienne*, p. 252.

Aristotle on Higher Natures

the fact that rain falls in the summer and waters the wheat. ‘Material necessity’ here means that the natural behavior of the four elements and their interactions are sufficient to explain natural phenomena, without recourse to other such causal factors as formal or final causality.⁵

Aristotle explains Empedocles’s version of the ‘thesis of necessity’ as follows:

But there is a difficulty: what prevents nature from acting not for the sake of something nor because it is better so, but as Zeus sends the rain, not so the grain might grow, but by necessity? For what rises must cool, and the cooled coming to be water, must fall down. But, when this comes to be, growth occurs in the grain. So too, if the grain on the threshing-floor is destroyed by this, it did not rain for the sake of this, that it might be destroyed, but this just happened. So what prevents the parts in what is by nature from being like this, for example, teeth arising by necessity, the front ones sharp and fitted for cutting, the molars flat and useful for grinding food since they did not come to be for the sake of this, but they just fell together [like this]? And so too in the cases of the other parts in those in which that for the sake of which seems to belong. Wherever, then, everything

⁵Aristotle does not use the phrase ‘material necessity’ here, but merely ‘έξ ἀνάγκης.’ However, Empedocles asserts that matter (i.e. his four ‘elements’) and the moving causes of Love and Strife are *all* that are needed for explaining higher-order phenomena, such as the growth of grain in summer, or the fact that birds build nests: “Λεκτέον δὴ πρῶτον μὲν διότι ἡ φύσις τῶν ἔνεκά του αἰτίων, ἐπειτα περὶ τοῦ ἀναγκαλον, πῶς ἔχει ἐν τοῖς φυσικοῖς· εἰς γὰρ ταύτην τὴν αἰτίαν ἀνάγονται πάντες, ὅτι ἐπειδὴ τὸ θερμὸν τοιονδὶ πέφυκεν καὶ τὸ ψυχρὸν καὶ ἔκαστον δὴ τῶν τοιούτων, ταῦτι ἔξ ἀνάγκης ἐστὶ καὶ γίγνεται,” *Physics*, 198b10-b14. Thus it is clear that the necessity he is speaking of refers to things which result from the necessary action of the elements under the motive forces of Love and Strife.

Chapter 4. The Arguments for Natural Finality

came together as if it came to be for the sake of something, these were saved being suitably constituted by chance. But whatever was not of this sort was destroyed and is destroyed, as Empedocles says man-faced ox-progeny was.⁶

This argument clearly depends on the more complete theory of the origin of the cosmos developed by Empedocles, in which the current state of things (including the cycle of the seasons and rain that falls during the winter, and not during the height of summer) is a result of a larger cosmic process governed by ‘Love’ and ‘Strife’ operating on the eternally-existing elements.⁷ In the development of the cosmos, apparent ‘unities’ like the Earth and its organisms are merely by-products of the warring forces of Love and Strife, which do not have these things as their end.⁸ In this larger context, Empedocles would likely argue that such things as winter rain, which causes wheat to sprout in the spring, bear no relation of purpose to the wheat (or any other plants that might happen to sprout in the rainy sea-

⁶ *Physics*, 198b17-b34. Cited in English (Coughlin’s translation), due to the length of the quote. Cf. also fragment 61 in Diels and Kranz: “πολλὰ μὲν ἀμφιπρόσωπα καὶ ἀμφίστερνα φύεσθαι, βουγενῆ ἀνδρόπρωιρα, τὰ δ’ ἔμπαλιν ἔξανατέλλειν ἀνδροφυῆ βούκρανα, μεμειγμένα τῇ μὲν ἀπ’ ἀνδρῶν τῇ δὲ γυναικοφυῆ, σκιεροῖς ἡσκημένα γυνόις,” DK31B61. Note that Aristotle initially cites his opponents as holding that these things come about by ‘necessity’ (*ἔξ ἀνάγκης*), while the result for the sake of which the process allegedly occurs is, on the contrary, simply an accident. Cf. Meyer, “Aristotle, Teleology, and Reduction”, p. 796, “Here the opponents do claim that the result in question occurs “of necessity” (b24), but the reason they give for denying that the development is teleological is that the result is an accident (*sumpesein*, b27). Aristotle’s final statement of his opponents’ position, which generalizes the objection to apply to all the parts of animals and plants, does not even mention necessity. He states the rival to the thesis of natural teleology simply as a claim about an accidental occurrence.”

⁷ Cf. fragment 17, “δίπλ’ ἐρέω τοτὲ μὲν γὰρ ἐν ηὔξηθη μόνον εἶναι ἐκ πλεόνων...” DK31B17:1 and fragment 21, “ἀλλ’ ἄγε, τῶνδ’ δάρων προτέρων ἐπιμάρτυρα δέρκευ...” DK31B21.

⁸ Cf. fragment 20: “τοῦτο μὲν ἀν βροτέων μελέων ἀριδείκετον ὅγκον ἄλλοτε μὲν Φιλότητι συνερχόμεν’ εἰς ἐν ἄπαντα γυῖα, τὰ σῶμα λέλογχε, βίου θαλέθοντος ἐν ἀκμῆι· ἄλλοτε δ’ αὐτε κακῆισι διατμηθέντ’ Ἐριδεσσι πλάζεται ἄνδιχ’ ἔκαστα περιρρηγμῖνι βίοιο.” DK31B20.

son). The rain does not fall for the sake of the wheat, but rather it merely falls (as a result of the chance formation of the planet and the natural activities of the elements) and the wheat has developed as an organism which can take advantage of this source of nutrients. It just happens that the rain falls in the winter, and it may (also by chance) occasionally happen that the rain falls during the threshing season in the fall, thereby ruining the crops. But neither is ‘for the sake of’ the result, because there is no ‘for the sake of’ in the rain at all.⁹

Empedocles takes rain as a prime example of a regular phenomenon that obviously has no relation of purpose with things happening on the Earth, and asks why we cannot explain other phenomena of ‘coming to be’ in a similar fashion. For instance, the development of such apparently purposeful organs as the teeth of animals. Teeth, such as those of omnivores and carnivores, are differentiated in shape, and thus serve distinct purposes in the alimentation of the animal: the sharp incisors tear flesh, whereas the flatter molars grind vegetable matter or small bones. Nevertheless, assigning ‘purpose’ to teeth would be an error, in Empedocles’s theory. Through chance combinations, there arose certain animals with teeth arranged in an appropriate way, and given this fortuitous arrangement, the usefulness of these teeth followed naturally. Presumably, those organisms without appropriate teeth would die, as happened to the human-faced oxen he also mentions.¹⁰

⁹In Fragment 21, Empedocles specifically mentions rain as occurring due to the ‘war’ between Love and Strife: “ὅμβρον δ’ ἐν πᾶσι δνοφέντά τε ῥυγαλέον τε· ἐκ δ’ αἵης προρέοντι θέλυμνά τε καὶ στερεωπά. ἐν δὲ Κότωι διάμορφα καὶ ἄνδιχα πάντα πέλονται, σὺν δ’ ἔβη ἐν Φιλότητι καὶ ἀλλήλοισι ποθεῖται,” DK31B21:4-6.

¹⁰We can find evidence of this theory in several fragments of Empedocles: in fragment

4.2 Accident, chance and luck

Aristotle responds by saying “ἀδύνατον δὲ τοῦτον ἔχειν τὸν τρόπον. ταύτα μὲν γὰρ καὶ πάντα τὰ φύσει ἡ αἰεὶ οὖτω γίγνεται ἡ ὡς ἐπὶ τὸ πολύ, τῶν δ’ ἀπὸ τύχης καὶ τοῦ αὐτομάτου οὐδέν.”¹¹ This response is based on his analysis of chance (*ἀντοματόν*) and luck (*τύχη*) in chapters 4, 5 and 6 of Book II. In particular, in II.5, he delineates with great precision what things are considered to be by luck and chance, and which things are not. In order, however, to fully understand Aristotle’s doctrine of luck and chance, it is necessary to first understand his doctrine of accidental being.

4.2.1 τὸ δὲ κατὰ συμβεβηκός: Accidental being

Accidental being is one of the four senses of being that Aristotle distinguishes in *Metaphysics* V.7.¹² The distinction between being *per se* (*καθ’ αὐτό*) and being *per accidens* (*κατὰ συμβεβηκός*) is the most general and all-encompassing articulation of the senses of being, since together these two senses cover the entire range of ways of being: categorial being, being as

57, he speaks of the initial state of ‘jumbled parts’ which sprouted from the earth: “ἡ πολλὰ μὲν κόρσαι ἀναύχενες ἐβλάστησαν, γυμνοὶ δ’ ἐπλάζοντο βραχίονες εὔνιδες ὥμων, ὅμματά τ’ οὐ(α) ἐπλανᾶτο πενητεύοντα μετώπων”. In fragment 59, he states that these ‘jumbled parts’ sprout mix randomly with one another: “αὐτὰρ ἐπεὶ κατὰ κεῖσον ἐμίσγετο δαίμονι δαίμων, ταῦτά τε συμπίπτεσκον, ὅπῃ συνέκυρσεν ἔκαστα, ἄλλα τε πρὸς τοὺς πολλά διηνεκῆ ἐξεγένοντο” (following O’Brien’s reading, cited at Wright, *Empedocles: the Extant Fragments*, p. 212). In fragment 61, he posits that these ‘jumbled parts’ combined into nearly-human creatures: “πολλὰ μὲν ἀμφιτρόσωπα καὶ ἀμφίστερνα φύεσθαι, βουγενῆ ἀνδρόπρωιρα, τὰ δ’ ἐμπαλιν ἐξανατέλλειν ἀνδροφυῆ βούκρανα, μεμειγμένα τῇ μὲν ἀπ’ ἀνδρῶν τῇ μὲν γυναικοφυῆ σκιεροῖς ἡσκημένα γυνίοις.”

¹¹*Physics*, 198b35.

¹²*Metaphysics* 1017a7-23.

Aristotle on Higher Natures

true and being as potency and act are all types of being *καθ' αὐτό*.¹³

The primary distinction between being *καθ' αὐτό* and being *κατὰ συμβεβηκός* is that the former is always characterized by the possession of an essence belonging to it in virtue of its own nature, whereas the latter has no essence of its own.¹⁴ Those things which are said to be *κατὰ συμβεβηκός* have no intrinsic unity; they are called ‘one’ only via predication. For instance, there is no essential unity connecting the predicate to the subject in the predication “the musical (man) is lettered.” As Aquinas states, “nulla generatio terminatur ad hoc quod est grammaticum esse musicum; sed una ad hoc quod est grammaticum esse, alia ad hoc quod est musicum esse.”¹⁵ The ‘unity’ of musical and lettered is purely fortuitous, and close to non-being.¹⁶ It follows from this that there can be no generation or corruption of the accidental, since there is no unity towards which a generation might proceed, or from which a corruption might occur. Nor is there any determinate art or faculty which might have as its end the generation of accidental being, for all arts and faculties have as their end something which is brought about always or for the most part.¹⁷

It must be noted here that being *κατὰ συμβεβηκός*, or accidental being,

¹³Cf. Quevedo, *Ens per accidens*, pp. 23-27. Quevedo notes here that while the articulation of being as *καθ' αὐτό* vs. *κατὰ συμβεβηκός* is the most general, the most fundamental such articulation is that of being in potency and being in act, since it extends only (in analogous form) to those senses of being inscribed within the ambit of real being. *ibid.*, p. 23.

¹⁴Cf. Mansion, *Le jugement d'existence chez Aristote*, p. 220: “Aristote n’explique pas en quoi consiste l’*ὄν καθ' αὐτό*, il se contente de la définir comme la négation de l’*ὄν κατὰ συμβεβηκός*. C'est donc que la copule du jugement *καθ' αὐτό* indique plus qu'une coïncidence. Elle a le sens d’« être en vertu de sa nature »”.

¹⁵Aquinas, *In Metaphysic*. Lib. VI, lect. 2, n. 8.

¹⁶Ibid.

¹⁷*Metaphysics*, 1027a5-6.

is not to be identified with the being of the categorial accidents (what Aristotle terms *τὰ σχήματα τῆς κατηγορίας*), i.e. quality, quantity, place, time, etc. Nor is it to be identified with the logical accident amongst the ‘predicables.’ The various categorial accidents are beings *καθ’ αὐτό*; when we say that the “man is musical,” there is an essence of man and an essence of musical, which inheres (*inest*) in the man. A categorial accident has an essence which involves being in a subject. A being *κατὰ συμβεβηκός*, on the other hand, having no essence, is hardly a being at all; Aristotle states that “*ῶσπερ γὰρ ὄνομά τι μόνον τὸ συμβεβηκός ἔστιν,*”¹⁸ and “*φαίνεται γὰρ τὸ συμβεβηκός ἐγγύς τι τοῦ μὴ ὄντος.*”¹⁹

Being *κατὰ συμβεβηκός*, despite being practically a mere name, and akin to non-being, is nonetheless something. Were this not the case, all things would be of necessity (for nothing would be accidental or contingent). Aristotle argues for this point using his well-known distinction between what is necessary (i.e. that which occurs always) and that which occurs for the most part. He says of these two classes that “*αὕτη ἀρχὴ καὶ αὕτη αἰτία ἔστι τοῦ εἶναι τὸ συμβεβηκός· διὸ γὰρ ἂν οὐ μήτ’ ἀεὶ μήθ’ ὡς ἐπὶ τὸ πολύ, τοῦτο φαμεν συμβεβηκός εἶναι.*”²⁰ But that which occurs neither always nor for the most part exists, and hence so does the accidental. Hence, it becomes clear that there can be no science of the accidental, since science treats of that which occurs always or for the most part.²¹ Similarly, while Aristotle has characterized the accidental by exclusion, he cannot give a definition of being *κατὰ συμβεβηκός*.

¹⁸Metaphysics, 1026b13.

¹⁹Metaphysics, 1026b20-21.

²⁰Metaphysics, 1026b30-32.

²¹Cf. Metaphysics, 1027a20-23.

Aristotle on Higher Natures

Insofar as accidental being is not properly a being or one, it cannot be defined,²² for “*οὐ γὰρ ὄρισμὸς λόγος τίς ἔστιν εἴς καὶ οὐσίας, ὥστε ἐνός τινος δεῖ αὐτὸν εἶναι λόγον· καὶ γὰρ ἡ οὐσία ἐν τι καὶ τόδε τι σημαίνει, ὡς φαμέν.*”²³ To sum up, accidental being is an undefinable ‘something’ which must exist, despite being nearly a non-being.²⁴

We see that in *Metaphysics* V.7 and V.30 two general types of accidental being are discussed. In the first text, Aristotle gives three examples of accidental predications: “the just is musical,” “the man is musical” and “the musical is a man.”²⁵ In the first case, we have a predication of one accident of another; in the second case, the accident is predicated of the subject; and in the third case, the subject is predicated of the accident.²⁶ All of these fall under the classification of accidents in reference to being (‘quantum ad esse’²⁷), for they all refer to the being of a subject. A second type of example is given in *Metaphysics* V.30, where Aristotle discusses a man digging a hole who finds a treasure. This is an event *κατὰ συμβεβηκός*, for the man was digging a hole to set out a plant; the finding of the treasure was incidental to this purpose, and neither occurs always or for the most part. Aquinas refers to this type of accidental being as “quantum ad fieri”²⁸ (in reference to becoming), for the accident is the result of some process which did not have the accidental effect as its end.²⁹

²²Cf. Quevedo, *Ens per accidens*, p. 79.

²³*Metaphysics*, 1037b26-28.

²⁴Cf. Aquinas, *In Metaphysic*. Lib. VI, lect. 2, n. 2: “ut quod minus habet de ratione entis, primo a consideratione huius scientiae [metaphysicae] excludatur.”

²⁵Cf. *Metaphysics*, 1017a8-10.

²⁶Cf. Quevedo, *Ens per accidens*, p. 83.

²⁷Aquinas, *In Metaphysic*. Lib. V, lect. 22, n. 21

²⁸Ibid.

²⁹We will see later, in the discussion of chance and luck, that they have primarily to do

There remains to be discussed the *αἴτιον κατὰ συμβεβηκός*, which will be of particular importance in the discussion of chance and luck, which—as we will see—are accidental causes. An accidental cause occurs when there is a *καθ' αὐτό* case of efficient causation, upon whose moving cause there supervenes an accidental composition, or upon whose final cause there supervenes an incidental result.³⁰ Judson, following Ross,³¹ divides the types of accidental causation into two ‘schemas,’ as follows: In this diagram, ‘ E_i ’

Table 4.1: Judson’s schemata of accidental causes

Schema I	Schema II
E_1	$E_1 \Rightarrow E_2$
+	+
$E_2 \Rightarrow E_3$	E_3

corresponds to an event, + indicates accidental concurrence in a subject, and \Rightarrow indicates *καθ' αὐτό* causation.³² Thus, in Schema I, E_1 is the accidental cause of E_3 because it forms a being *κατὰ συμβεβηκός* with E_2 , which is the *καθ' αὐτό* cause of E_3 . On the contrary, in Schema II, E_1 is also the accidental cause of E_3 , but only because it is the *καθ' αὐτό* cause of E_2 , upon which E_3 supervenes as a being *κατὰ συμβεβηκός*.

Rossi corrects Judson and Ross in making concrete entities the components of the schemata, rather than events: “el sentido básico y general de causa que puede reconocerse en el planteo aristotélico remite a una *rela-*

with accidental being ‘quantum ad fieri.’ This is because luck and chance are among those things which could have been for an end, i.e. *ἐνεκά τον*, and finality implies ‘fieri.’

³⁰Cf. Mansion, *Introduction a la Physique aristotélicienne*, p. 295.

³¹Ross, “Commentary on the Metaphysics”, pp. 518–519. Cited in Rossi, *El azar según Aristóteles*, p. 187.

³²Judson, “Chance and ‘Always or For the Most Part’ in Aristotle”, p. 79.

ción de dependencia *entre dos entidades*, la causa y lo causado, y no necesariamente (y ni siquiera típicamente) a una relación entre dos eventos.”³³ She revises Judson’s schema to indicate that it is beings, and not events, that are the components of a relation of accidental causality (see Table 4.2, below).³⁴ Here, the symbols are slightly different. Instead of using ‘ E_i ’ to

Table 4.2: Rossi’s schemata of accidental causes

Schema 1	Schema 2
$C \Rightarrow B$	$A \Rightarrow C$
A	B

indicate an event, Rossi uses letters (A , B and C) to indicate different entities involved in a relation of accidental causality, and the vertical bar ‘|’ to indicate a relation of accidental unity among two such entities (where the bottom entity is a categorial determination of the top entity).

Aristotle gives examples corresponding to each of the two schemata. As an example of Schema 1, one can say that while Polyclitus is the sculptor of a given statue, the $\kappa\alpha\theta'$ $a\nu\tau\delta$ cause is the sculptor (or the art of sculpting), and it is accidental that the sculptor happens to be Polyclitus.³⁵ This schema of accidental causality corresponds roughly to accidental being “quantum ad esse,” for the accidentality derives from the being of the moving cause: the sculptor is indeed Polyclitus, but need not have been so.³⁶ The superven-

³³Rossi, *El azar según Aristóteles*, p. 184.

³⁴ibid., p. 187.

³⁵*Physics*, 195a33-35.

³⁶Aristotle gives a number of other examples of this sort of accidental causality, e.g. *Physics* 196b26-27 and *Metaphysics* 1026b37-1027a2, which are collected and discussed in Rossi, *El azar según Aristóteles*, p. 185.

nience of a characteristic (e.g. being Polyclitus) on a *καθ' αὐτό* cause (the sculptor or his art) is not the only note that marks a given instance of causality as being accidental; as Rossi states, “el otro factor que hace que la descripción ponga de manifiesto una causa accidental y no por sí es el hecho de que lo mencionado como causa no es lo que ‘por naturaleza’ produce lo causado.”³⁷ As discussed above, only that which is not ‘always or for the most part’ can be considered accidental.

Accidental causality which falls within Schema 2 occurs when the result attained by the moving cause is not the same as that which was intended *καθ' αὐτό*. An example of this is given at *Metaphysics* 1025a3-5, where the cook, intending to prepare a dish that was pleasing to the palate, happened fortuitously to create a dish that was also healthy, even though health is not the *καθ' αὐτό* end of the art of cooking, nor the intention of the cook. This is a case of an accidental cause which corresponds to accidental being “quatum ad fieri,” in Aquinas’s terminology, since the healthiness of the dish supervenes upon the thing which comes to be as a *καθ' αὐτό* result of the cook’s action (which was to cook a dish that was tasty). Rossi notes several other examples of this sort of accidental causality, such as the man who digs a hole to plant a tree and encounters a treasure (*Metaphysics* 1025a16-19), and the ship captain who arrived at Aegina fortuitously, having been driven there by a storm or captured by pirates, despite having set out initially and *καθ' αὐτό* for another destination (*Metaphysics* 1025a25-30).³⁸

We can draw from the above several conclusions.³⁹ First of all, we can

³⁷Rossi, *El azar según Aristóteles*, p. 188.

³⁸Cf. *ibid.*, pp. 185-86.

³⁹Following Judson, “Chance and ‘Always or For the Most Part’ in Aristotle”, p. 79, but

Aristotle on Higher Natures

now understand why Aristotle calls accidental causation *ἀδηλον* and *ἀόριστον*.⁴⁰

If we take entity *C* in Rossi's Schema 1, there are an infinite number of categorial determinations that can supervene on *C*, hence we can say that the number of causes of *B* is *ἀόριστα*. Similarly in the case of Schema 2: *A* can be considered an accidental cause of an infinite number of conditions that supervene upon *C* (i.e. any number of entities may take the place of *D*). But the infinite cannot be the object of knowledge, and hence no science can treat of accidental causes.

In the second place, we can note that while Aristotle states clearly that the accidental 'mode' of causation applies to any of the four *καθ' αὐτό* causes,⁴¹ he nevertheless holds that in cases of chance and luck, which we will analyze next, it is an accidental *efficient* cause that is involved⁴²: “τί μὲν οὖν ἔστιν τὸ αὐτόματον καὶ τί ἡ τύχη, εἴρηται, καὶ τί διαφέρουσιν ἀλλήλων. τῶν δὲ τρόπων τῆς αἰτίας ἐν τοῖς ὅθεν ἡ ἀρχὴ τῆς κινήσεως ἐκάτερον αὐτῶν.”⁴³ This is because in any description of a scenario of accidental causation, there is always a *καθ' αὐτό* instance of efficient causation to which an accidental unity attaches, either as an categorial attribute of the mover, or else as an incidental result of that which is caused.

adapting the examples to Rossi's revised schemata.

⁴⁰Cf. *Physics*, 196b27-29 and *Physics*, 197a8-14.

⁴¹*Physics*, 195a3 ff.

⁴²Judson, “Chance and 'Always or For the Most Part' in Aristotle”, pp. 79-80.

⁴³*Physics*, 198a1-3.

4.2.2 Aristotle's analysis of chance and luck

We are now in a position to understand Aristotle's analysis of chance and luck. In the first place, as Rossi notes,⁴⁴ the doctrine he develops is based almost entirely on *ἐνδοξα*, or popular opinion and prephilosophical experience. Rossi also makes it clear that there is a distinction between the kind of prephilosophical experience that the doctrine of chance is based on, and that upon which our knowledge of movement stands. In both cases we are dealing with *φαινόμενα*, but in the case of movement our knowledge stems from *ἐπαγωγή*. “En efecto, la existencia del movimiento es inmediatamente evidente a partir de la senso-percepción, pues aquél se hace presente en ella.”⁴⁵ The basis for the doctrine of chance which Aristotle will elaborate is not immediately evident in the way movement is, since chance is based on a shared opinion, something which everyone says about a given type of event.⁴⁶ This manner of proceeding in the analysis of chance is legitimate, in Rossi's view, precisely because while Aristotle maintains that chance ‘is something,’ nonetheless it is not ‘something’ in the same metaphysically strong sense that a substance would be, or the Platonic ideas were intended to be; rather, Aristotle performs a *desubstantialization* of the idea of chance: while it may be ‘something,’ it is not a being or a principle of beings. He can hold that chance is something because it is irre-

⁴⁴Cf. Rossi, *El azar según Aristóteles*, p. 151: “también ante otras tesis filosóficas, que son paradójicas para la experiencia prefilosófica generalmente compartida, Aristóteles procede dando crédito inicialmente a la segunda, rechazando así el tipo de aproximaciones ‘lógicas’ a los problemas que llevan a conclusiones reñidas con la experiencia, se trate de la experiencia senso-perceptiva o bien de las opiniones compartidas.”

⁴⁵ibid., p. 151.

⁴⁶ibid., p. 151.

Aristotle on Higher Natures

ducible... the existence of a certain type of event or thing or state of things that we say is due to chance is not eliminable by ‘analyzing it away’ as a subjective illusion that lacks any type of reality.⁴⁷

In order to define what is considered to be by ‘luck’⁴⁸ the Stagirite proceeds using his standard method of presenting genus and differentia. He begins his definition with the topmost genus of ‘things which come to be’ (*τὰ γιγνόμενα*),⁴⁹ with the first differentia distinguishing between “*τὰ μὲν ἀεὶ ὥσαύτως γιγνόμενα τὰ δὲ ὡς ἐπὶ τὸ πολύ*,” on the one hand, and all other instances of coming to be, on the other (i.e. those things which come to be ‘for the lesser part’⁵⁰). Of the two ‘species’ of *γιγνόμενα* indicated here, luck and chance are found in the latter.⁵¹

The next distinction that Aristotle makes is between those things which come to be ‘for the sake of something,’ and those which do not.⁵² He later

⁴⁷ibid., p. 152. Simplicius holds an alternative opinion about Aristotle’s argument, which relieves the Stagirite of the charge that he is holding that luck and chance are something simply because of *ἐνδοξα*. According to him, Aristotle argues that causality requires that everything that comes to be has a cause; if there are things which come to be ‘for the lesser part’, and we say that these things come to be by luck or chance, then it follows that luck and chance are something. Simplicius, *On Aristotle Physics* 2, pp. 334,1-11.

⁴⁸Despite the fact that *τὸ αὐτόματον ἐπὶ πλεῖστον ἔστι* (*Physics*, 196b10), Aristotle frequently uses ‘*τύχη*’ as a generic term for both luck and chance.

⁴⁹‘Coming to be,’ in the sense being used here, can occur in several of the categories: “*τῶν δὲ γιγνομένων ... λέγω καθ’ ἐκάστην κατηγορίαν: ἢ γὰρ τόδε ἢ ποσὸν ἢ ποιὸν ἢ πού,*” *Metaphysics*, 1032a12-16.

⁵⁰Following Coughlin’s commentary in his translation entitled *Physics, or Natural Hearing*, p. 36.

⁵¹“*πρῶτον μὲν οὖν, ἐπειδὴ ὄρῳμεν τὰ μὲν ἀεὶ ὥσαύτως γιγνόμενα τὰ δὲ ὡς ἐπὶ τὸ πολύ, φανερὸν ὅτι οὐδετέρου τούτων αἰτία ἡ τύχη λέγεται οὐδὲ τὸ ἀπὸ τύχης, οὔτε τοῦ ἔξ ἀνάγκης καὶ αἰεὶ οὔτε τοῦ ὡς ἐπὶ τὸ πολύ. ἀλλ’ ἐπειδὴ ἔστιν ἡ γύγνεται καὶ παρὰ ταῦτα, καὶ ταῦτα πάντες φασίν εἶναι ἀπὸ τύχης, φανερὸν ὅτι ἔστι τι ἡ τύχη καὶ τὸ αὐτόματον,*” *Physics*, 196b10-b16. Cf. also Rossi, *El azar según Aristóteles*, p. 152.

⁵²“*τῶν δὲ γιγνομένων τὰ μὲν ἔνεκά του γίγνεται τὰ δ’ οὐ (τούτων δὲ τὰ μὲν κατὰ προαιρεσιν, τὰ δ’ οὐ κατὰ προαιρεσιν, ἄμφω δ’ ἐν τοῖς ἔνεκά του), ὡστε δῆλον ὅτι καὶ ἐν τοῖς παρὰ τὸ ἀναγκαῖον καὶ τὸ ὡς ἐπὶ τὸ πολὺ ἔστιν ἔντα περὶ ἂνδεχεται ὑπάρχειν τὸ ἔνεκά του. ἔστι δ’ ἔνεκά του ὅσα τε ἀπὸ διανοίας ἀν πραχθείη καὶ ὅσα ἀπὸ φύσεως*” *Physics*, 196b16-b22.

explains what he means by ‘τὰ ἔνεκά του γίγνεται,’ a term which he uses in a not-so-obvious sense in this context. To be ‘ἔνεκά του,’ in the sense that Aristotle employs the term here, does not entail having an intended purpose, but rather simply being something that *could* be done by thought or by nature: “ἔστι δ’ ἔνεκά του ὅσα τε ἀπὸ διανοίας ἂν πραχθείη καὶ ὅσα ἀπὸ φύσεως.”⁵³ He gives the following example of an event that, despite not having come about for a purpose, nevertheless might have done so:

οἶν ἔνεκα τοῦ ἀπολαβεῖν τὸ ἀργύριον ἥλθεν ἂν κομιζομένου τὸν ἔρανον,
εἰ ἦδει· ἥλθε δ’ οὐ τούτου ἔνεκα, ἀλλὰ συνέβη αὐτῷ ἥλθεῖν, καὶ ποιῆσαι
τοῦτο τοῦ κομίσασθαι ἔνεκα· τοῦτο δὲ οὕθ’ ὡς ἐπὶ τὸ πολὺ φοιτῶν εἰς τὸ
χωρίον οὕτ’ ἔξ ἀνάγκης· ἔστι δὲ τὸ τέλος, ἥ κομιδή, οὐ τῶν ἐν αὐτῷ αἰτίων,
ἀλλὰ τῶν προαιρετῶν καὶ ἀπὸ διανοίας· καὶ λέγεται γε τότε ἀπὸ τύχης
ἥλθεῖν, εἰ δὲ προελόμενος καὶ τούτου ἔνεκα ἥ ἀεὶ φοιτῶν ἥ ὡς ἐπὶ τὸ πολύ
[κομιζόμενος], οὐκ ἀπὸ τύχης. δῆλον ἄρα ὅτι ἡ τύχη αἰτία κατὰ συμβεβη-
κὼς ἐν τοῖς κατὰ προαιρεσιν τῶν ἔνεκά του.⁵⁴

In this case, the man would have gone to a certain place to collect money, had he known that a debtor happened to be there. He went for another

⁵³Ibid. As Meyer notes, in a broad sense “events are ‘for something’ if they ‘admit of being for something’,” Meyer, “Aristotle, Teleology, and Reduction”, p. 808. A. Mansion expresses the same point: “[I]l range expressément le hasard dans le genre des causes efficientes; il nous apprend qu’il est cause des événements dont l’intelligence ou la nature peuvent être cause également et le sont même en fait, si l’on considère les choses à un point différent,” Mansion, *Introduction a la Physique aristotélicienne*, p. 227. As a result, the concepts of chance and luck are in fact *dependent upon* on that which is *ἔνεκά του* in a strong sense, as being the product of nature or intelligence. Cf. Rossi, *El azar según Aristóteles*, p. 154; also *Physics*, 198a5-10, “ἐπεὶ δ’ ἔστι τὸ αὐτόματον καὶ ἡ τύχη αἴτια ὃν ἢν ἦ νοῦς γένοιτο αἴτιος ἥ φύσις, ὅταν κατὰ συμβεβηκός αἴτιόν τι γένηται τούτων αὐτῶν, οὐδέν δὲ κατὰ συμβεβηκός ἔστι πρότερον τῶν καθ’ αὐτό, δῆλον ὅτι οὐδὲ τὸ κατὰ συμβεβηκός αἴτιον πρότερον τοῦ καθ’ αὐτό. ὕστερον ἄρα τὸ αὐτόματον καὶ ἡ τύχη καὶ νοῦς καὶ φύσεως.”

⁵⁴*Physics*, 196b33-197a4.

Aristotle on Higher Natures

reason, and thus collected the money ‘by chance.’ This is a kind of event that occurs ‘for the lesser part,’ certainly, and did not in fact come about as a result of a deliberate action to attain an end. Nevertheless, because it could have been done ‘by thought or nature,’ we can say that it is ‘*ἐνεκά τον*.’⁵⁵

There is another sense of *ἐνεκά τον*, which Rossi calls the ‘strong sense’ of the term, which is only applicable to those cases where there is a real final cause in operation, and where the phenomenon occurs always or for the most part.⁵⁶ Gotthelf also identifies this sense as forming the core meaning of the term *ἐνεκά τον*, and sees it as deriving from Aristotle’s developmental biology.⁵⁷ This ‘strong sense’ is *not* the sense of *ἐνεκά τον* which Aristotle employs in the Treatise on Chance (*Physics* II.4-6).⁵⁸ Within the confines of this Treatise, Rossi discerns two additional senses of the term ‘for the sake of something.’ First of all, there is the ‘broad sense,’ which Aristotle uses in the initial passages of *Physics* II.5. In this sense, *y* is ‘for the sake of

⁵⁵Presumably, there is a class of things which come to be which are *unable* to have been done by thought or nature. Aristotle does not explain exactly what this category consists in, but a likely answer would be ‘irrational’ events having no discernable (or real) connection, such as the connection between my buying a banana today, and tomorrow the stock market falling two points. Simplicius, cited in Rossi (p. 160), gives chewing one’s nails when they are already short, or picking one’s nose, as examples of activities carried out without a purpose; nonetheless, these are activities which can be carried ‘always or for the most part’ by someone, and hence are outside the realm of chance events which Aristotle is discussing. Cf. Simplicius, *On Aristotle Physics* 2, 335,12-16.

⁵⁶Rossi, *El azar según Aristóteles*, p. 161.

⁵⁷Gotthelf’s formulation of the conditions for calling a given developmental stage *ἐνεκά τον* is as follows: “A stage in development, *A*, comes to be for the sake of the mature, functioning organism which results from the development, *B*, if and only if: (1) *A* is a necessary (or ‘best possible’) stage in a continuous change resulting in *B*, and (2) this change is (in part) the actualization of a potential for *B* which is not reducible to a sum of actualisations of element-potentials whose identification does not mention the form of *B*,” Gotthelf, “Aristotle’s Conception of Final Causality”, p. 213.

⁵⁸Cf. also Simplicius, *On Aristotle Physics* 2, 335,19-25.

x' if *y* is favorable for, propitious for or a means to *x*, independently of the cause due to which *y* in fact occurred. Secondly, Rossi identifies a 'derived sense' of *ἐνεκά του* which is used in the rest of the Treatise, which is the sense which I have described above: things able to be done by thought or nature in order to achieve *x*, but where *x* was not in fact their final cause.⁵⁹

The final distinction that Aristotle enunciates is between that which comes to be 'in virtue of itself' (*καθ' αὐτό*) and that which is 'accidental' (*κατὰ συμβεβηκός*). He gives the example of the housebuilder and his art: *καθ' αὐτό* the art of the housebuilder is the cause of the house, whereas *κατὰ συμβεβηκός* the 'white' or 'musical' is.⁶⁰ Just as the 'white' or the 'musical' has absolutely no direct relation (*qua* white or *qua* musical) with the effect caused (the house that was built), the event described as 'the white built the house' is an event which, despite having really occurred, lacks any *καθ'* *αὐτό* cause. Similarly, the event described as 'the lender went to the market and collected his money from his debtor' is lacking a *καθ'* *αὐτό* cause,

⁵⁹ Rossi, *El azar según Aristóteles*, pp. 162-3. Rossi is more subtle in her drawing of distinctions than is Lennox, who simply distinguishes between a 'causal' and a 'descriptive' sense of *ἐνεκά του*, where the former corresponds to Rossi's 'strong sense,' and the latter sense includes both Rossi's 'broad sense' and 'derived sense'; cf. Lennox, "Aristotle on Chance", p. 60.

⁶⁰ Given the divisions that he has already made, Aristotle may be asserting that there can be things which occur *καθ' αὐτό*, but not always or for the most part. It is not immediately clear what kinds of things could fall into this species of events; however, given that all non-rational powers must act in the presence of the corresponding passive potency, I would venture that this category would correspond to operations of rational powers, since the possessor of these powers can choose not to exercise them. See *Metaphysics*, 1048a1-9: “ἐπεὶ δὲ τὸ δυνατὸν τὸ δυνατὸν καὶ ποτὲ καὶ πῶς καὶ ὅσα ἄλλα ἀνάγκη προσεῖναι ἐν τῷ διορισμῷ, καὶ τὰ μὲν κατὰ λόγον δύναται κινεῖν καὶ αἱ δυνάμεις αὐτῶν μετὰ λόγου, τὰ δὲ ἄλογα καὶ αἱ δυνάμεις ἄλογοι, κάκείνας μὲν ἀνάγκη ἐν ἐμψύχῳ εἶναι ταῦτα δὲ ἐν ἀμφοῖν, τὰς μὲν τοιαύτας δυνάμεις ἀνάγκη, ὅταν ὡς δύνανται τὸ ποιητικὸν καὶ τὸ παθητικὸν πλησιάζωσι, τὸ μὲν ποιεῖν τὸ δὲ πάσχειν, ἔκείνας δ' οὐκ ἀνάγκη αὗται μὲν γὰρ πᾶσαι μία ἐνὸς ποιητική, ἔκειναι δὲ τῶν ἐναντίων, ὥστε ἄμα ποιήσει τὰ ἐναντία· τοῦτο δὲ ἀδύνατον. ἀνάγκη ἄρα ἔτερόν τι ειναι τὸ κύριον λέγω δὲ τοῦτο ὅρεξιν ἢ προαιρεσιν.” Thus, a rational power can be exercised *καθ' αὐτό*, *ἐνεκά του* and 'for the lesser part,' while still not being by chance or luck.

for neither the debtor nor the lender went to the market for the purpose of collecting or paying the debt.⁶¹

At this point, Aristotle is now able to form a definition of luck and chance: “ἡ τύχη αἰτία κατὰ συμβεβηκός ἐν τοῖς κατὰ προαιρεσιν τῶν ἔνεκά του.”⁶² He thus defines *τύχη* as a *κατὰ συμβεβηκός* cause. After giving this definition, he also adds a corollary: “διὸ περὶ τὸ αὐτὸ διάνοια καὶ τύχη· ἡ γὰρ προαιρεσις οὐκ ἄνευ διανοίας.” He thus identifies an important characteristic of ‘*τύχη*’ and *τὸ αὐτόματον*: luck and chance are not synonymous with the irrational and chaotic, but rather fall within the category of things knowable and choosable, and thus *ἔνεκά του*.⁶³ Thus, despite their lacking *καθ' αὐτό* causality, the structure of accidental events is nevertheless that of something which is rational and choosable (despite not being chosen rationally).⁶⁴

⁶¹Rossi notes that causal explanations that involve a *κατὰ συμβεβηκός* cause must always be explanations of a determinate situation; lacking a *καθ' αὐτό* cause, they cannot provide explanations that apply ‘always or for the most part’: “[A diferencia de la causa por sí,] la causa accidental (y el azar por lo tanto) remite siempre a un contexto determinado, es decir: se trata de una proposición causal que involucra una descripción tal de la causa y de lo causado que resulta explicativa sólo en cierto contexto de uso. En otras palabras, se trata de una proposición que es verdadera en el caso particular, pero no siempre ni la mayoría de las veces,” Rossi, “Entre lo accidental y lo aparente”, p. 161. Simplicius, however, refines this position, noting that in the case of things which happen by luck or chance, they are both in a sense *καθ' αὐτό* and *κατὰ συμβεβηκός*: in the case of one who digs and finds a treasure, digging is the *καθ' αὐτό* cause of planting, but the *κατὰ συμβεβηκός* cause of finding the treasure; Simplicius, *On Aristotle Physics* 2, 337,21-22.

⁶²*Physics*, 197a6. While he specifically mentions ‘luck’ or *τύχη* here, it is clear that in this context he is speaking about both luck and chance. A few paragraphs earlier (196b30 ff.) he states his intention of speaking of both generically, leaving the question of how luck and chance differ until later; he takes up this question in Chapter 6, where he notes that ‘chance’ or *τὸ αὐτόματον* differs from ‘luck’ or *τύχη* as genus to species: *τύχη* is properly said of an accidental event occurring to a being (or beings) able to choose or undertake genuine action; *Physics*, 197b1.

⁶³This is even true in the case of events occurring to beings that lack reason, such as the horse that was saved because it arrived at a certain time: cf. *Physics*, 197b13-23. In such a case, we do not say that the animal ‘chose,’ but rather that the event is ‘choosable’ (*προαιρετός*).

⁶⁴Cf. Lennox, “Aristotle on Chance”, p. 58, “The suggestion I have made is that Aristotle is willing to describe chance processes as for the sake of their results provided certain

This parallelism between that which is either choosable or by nature, on the one hand, and that which is by chance, on the other, provides each of the interlocutors in the argument with ammunition for their argument. For instance, Empedocles can accuse Aristotle of falling into the trap of reading purpose into the accidental arising of complex beings, since both chance and intention produce things which are *ἐνεκά τον* in the broad sense. Aristotle, on the other hand, can accuse Empedocles of attempting to explain the results of *φύσις*, which are also *ἐνεκά τον*, through accidental causes, forgetting that that which is accidental cannot be ‘always or for the most part.’

4.3 Aristotle’s responses to Empedocles

Aristotle presents a number of distinct arguments in support of his position. The first of these intends to show that Empedocles’s position is, in fact, mistaken at a very basic level, and that ‘accident’ and ‘chance’ cannot possibly be used as explanations of regularly occurring phenomena. Other arguments have the purpose of eliminating objections to the idea of ‘natural finality.’ This section will explain Aristotle’s arguments and evaluate their success in achieving their intended aim.

conditions are met. When he says they are for the sake of something without qualification, but not for the sake of what actually results, I suggest he means this: the result was not responsible for (not an *aitia* of) the process that lead to it; nonetheless, the result was valuable for the agent, and was the sort of thing that is typically achieved by goal-directed activity.”

4.3.1 Φύσις as acting ‘always or for the most part’

In *Physics* II.8, after summarizing Empedocles’s argument, Aristotle states that “ἀδύνατον δὲ τοῦτον ἔχειν τὸν τρόπον.”⁶⁵ The reason is that the phenomena which the *φυσιολόγοι*, including Empedocles, are trying to explain via ‘*αὐτόματον*’ happen always or for the most part. As the Stagirite points out, “οὐ γὰρ ἀπὸ τύχης οὐδ’ ἀπὸ συμπτώματος δοκεῖ ὕειν πολλάκις τοῦ χερμῶνος, ἀλλ’ ἐὰν ὑπὸ κύνα.”⁶⁶ But he has already defined ‘luck’ and ‘chance’ as excluding those things which happen always or for the most part. He next states that these phenomena, such as animals having teeth, and the rain falling in the winter, must be *ἔνεκά του*, since whatever is not by luck or chance must be for the sake of something. This is an interesting step in the argument, since in II.5, Aristotle has stated that those things which come to be by luck and chance must also be *ἔνεκά του*.⁶⁷ I suggest, however, that he is contrasting here those things which come to be *ἔνεκά του* in the stronger sense, i.e. where a *καθ’ αὐτό* cause was working to produce precisely the result that came about. For the rain falls as it does *qua* rain, and teeth grow in the jaw *qua* teeth.

Having made these points, he concludes that “ἔστιν ἄρα τὸ ἔνεκά του ἐν τοῖς φύσει γιγνομένοις καὶ οὖσιν.”⁶⁸ His opponents claim that *φύσις* (in the sense of

⁶⁵*Physics*, 198b35.

⁶⁶*Physics*, 198a1-3.

⁶⁷*Physics*, 197a6.

⁶⁸*Physics*, 199a8. A. Vigo (personal conversation, June 14, 2010) has noted that it is currently the practice to distinguish between *teleonomy*, on the one hand, and *teleology* on the other. In the first of these two cases, one speaks of teleonomy where a finalistic structure is observed. Teleology, on the other hand, is reserved as a term for those types of teleonomy which come about through the use of reason. In this thesis I will generally use the term ‘teleology,’ because all of the secondary literature that I will be discussing uses the term to include both teleonomy and teleology (in Vigo’s sense). At a later point

material ἀρχῆ) implies coming to be by chance, whereas Aristotle believes he has shown that this is excluded by the fact that these things come to be always or for the most part, relying on his definition of luck and chance.⁶⁹ This is a deeper argument than it has appeared to some critics.⁷⁰ It relies on the nature of causality: while those things which genuinely come to be κατὰ συμβεβηκός lack a proper cause (for the beings involved in the coming-to-be are in different categories, e.g. ‘the white that builds’), for a thing to come to be καθ' αὐτό, there must be a cause of it doing so. But to have a proper cause involves coming-to-be for the end to which that cause is directed.

in this chapter, I will return to the question of the teleonomy/teleology distinction (cf. p. 229, n. 87).

⁶⁹David Charles suggests that Aristotle must be arguing against an opponent who has offered chance and coming to be ἐνεκά τοι as the only possible alternatives for explaining the coming to be of complex organisms (and who holds that chance is the only viable alternative); otherwise, the elimination of chance as a possible explanation would not have the effect of forcing the opponent to accept a teleological explanation as the only alternative; cf. Charles, “Teleological Causation in the *Physics*”, p. 113. Indeed, on this assumption, Aristotle is not offering a generally applicable argument to defend the presence of teleology in nature, but rather “the argument is designed to show that chance cannot play the role postulated in his opponent’s theory”; *ibid.* But it is unlikely that Aristotle has such a restricted objective in mind. For already in *Physics* II.5, he has made an exhaustive division of ‘things that come to be’ into those that come to be always or for the most part, and those which come to be ‘for the lesser part,’ the latter of which are held to occur by chance. Thus it seems clear that in *Physics* II.8 that Aristotle is not merely arguing against a particular opponent who holds to the chance/ἐνεκά τοι dichotomy, but that he is using the argument given by the unnamed opponent to make a more general point about the impossibility of organisms coming to be by chance, and the necessity to postulate teleological natural processes as the only way to explain the coming to be of those organisms always or for the most part.

⁷⁰Cf. Charlton, *Aristotle’s Physics*, p. 122 for a negative evaluation of this argument. Cooper (“Aristotle on Natural Teleology”, pp. 207-8), on the other hand, holds that this argument, based on the exclusiveness of the categories of what comes to be by chance and what comes to be always or for the most part, is more solid than it has seemed to many commentators. He notes, however, that the argument depends on the Aristotelian position of the eternity of plant and animal species. Under the Empedoclean or Democritean theories (of a great cosmic cycle, in the case of Empedocles, or an infinity of worlds, in the case of Democritus), our current universe with its plants and animals is distinctly the exception and not the rule, and hence plant and animal generation could be considered to be ‘for the lesser part’ *sub specie aeternitatis*; cf. Cooper, “Aristotle on Natural Teleology”, p. 209.

Aristotle on Higher Natures

Thus, these phenomena, such as rain in the winter, and teeth sprouting from jaws, which come to be always or for the most part, must come to be for an end.

The same conclusion can be derived from Aristotle's analysis of potency and act. For a thing to be able to come to be *καθ' αὐτό*, there must be a corresponding potency in the being to come to be in that way.⁷¹ But a potency to come to be is always a potency *to something*, i.e. to a given actuality.⁷² Thus, insofar as the rain falls, it does so for an end, since falling is the actuality of the potency which the water harbors when it is still suspended in the clouds.⁷³ Similarly, when the teeth sprout from the jaw, they do so in

⁷¹If the potency is lacking, the thing will be said to be ‘incapable,’ and unable to come to be: “ἐπι εὶ ἀδύνατον τὸ ἐστερημένον δυνάμεως, τὸ μὴ γιγνόμενον ἀδύνατον ἔσται γενέσθαι: τὸ δ’ ἀδύνατον γενέσθαι ὁ λέγων η̄ εἶναι η̄ ἔσεσθαι ψεύσεται τὸ γὰρ ἀδύνατον τοῦτο ἐσήμαινε,” *Metaphysics*, 1047a11-12.

⁷²“ἄπαν ἐπ’ ἀρχὴν βαδίζει τὸ γιγνόμενον καὶ τέλος (ἀρχὴ γὰρ τὸ οὖ ἔνεκα, τοῦ τέλους δὲ ἔνεκα η̄ γένεσις), τέλος δ’ η̄ ἐνέργεια, καὶ τούτου χάριν η̄ δύναμις λαμβάνεται,” *Metaphysics*, 1050a8-10.

⁷³It is unclear as to whether Aristotle wishes to hold that in the case of rainfall, there is a stronger kind of finality present than merely that of potency being realized as its corresponding act. On the one hand, D. Furley (“The Rainfall Example in Physics II 8”, p. 179.) argues that winter rainfall and summer heat are instances of full-blown final causality in action. Arguing from an analysis of *Physics*, 198b34-199a8, he shows that winter rainfall is held to be something which is *ἔνεκά του* (in Rossi's ‘strong sense’ of the term; cf. Rossi, *El azar según Aristóteles*, p. 161). Indeed, he holds that it is for the growth of plants brought about by suitable rainfall (Furley, “The Rainfall Example in Physics II 8”, p. 180). Wardy, on the other hand, concedes that “there is no gainsaying the conclusion that winter rain falls within the scope of *πάντα τὰ φύσει* (198b35). Rain falls (almost) always in the winter, thus neither from luck nor coincidence, so for a natural purpose,” (Wardy, “Aristotelian Rainfall or the Lore of Averages”, p. 19). Nevertheless, he holds that the purpose of rain's falling is simply for the water to return to its natural place. Teleology, he states, is limited to individual natural kinds, such as animals, plants, and the simple bodies (*ibid.*, p. 27), and that there is not plausibly present in Aristotle any kind of cosmic teleology. I hold that there is something more to Aristotle's example than the simple falling of water to its natural place; it is precisely the fact that rain falls during the winter that is of interest, for that is when crops have been planted and are in need of water. The text suggests strongly that rainfall is for the sake of crops, and indeed suggests a certain teleological cosmic order, such as that which is briefly hinted at in *Metaphysics*, 1075a12-25 (and argued for by Sedley; cf. “Is Aristotle's Teleology Anthropocentric?”, p. 184). The issue of whether Aristotle genuinely holds that there exists a true cosmic teleology, anthropocentric or not, however, lies beyond the scope of this thesis.

virtue of the potency harbored in the bones of the jaw, which are capable of forming teeth in the way that they do; indeed, they are ‘πέφυκεν ἄρα ἐνεκά τον,’ i.e. for the generation of teeth.⁷⁴

Rephrasing Empedocles in Aristotle’s terminology, we can interpret him as asserting that *all* coming to be occurs strictly within the accidental categories, and not ever within the category of substance. Thus, a certain quantity of air and water and earth and fire are mixed and brought into co-location, producing a certain kind of aggregate or ‘pseudo-substance,’ either simple (in the case of flesh, bone or iron) or complex, such as organisms. But the things that Empedocles wishes to explain, such as the coming to be of animals and humans, are things which come to be always or for the most part. A cause *κατὰ συμβεβηκός* may occasionally produce results which mimic products of art or nature, but will never produce these results regularly. For instance, a thousand monkeys banging the keys of a thousand typewriters for all eternity will eventually produce Shakespeare’s *Hamlet* *κατὰ συμβεβηκός*, but this will not occur always or for the most part. And the monkeys will definitely not follow up their prodigy by producing *Macbeth*, whereas men regularly produce men, cows regularly produce other cows, and rain regularly falls in the winter in Greece. Thus, these must all come to be *καθ’ αὐτό*, and as such, must be the result of the actualization of a potency in those beings *qua* their given kinds, and hence must also be *ἐνεκά τον*.⁷⁵

⁷⁴Cf. *Physics*, 199a10.

⁷⁵Cf. Wieland, “The Problem of Teleology”, p. 146: “the reproach Aristotle casts at [the φυσιολόγου] is simply that with their presuppositions they are unable to explain what they wish to explain, namely the visible, ordered world of appearances.”

The Empedoclean argument, reevaluated

Does Aristotle prove what he intends, with the argument from occurrences ‘for the most part’ versus ‘for the lesser part’? He has placed chance and luck within the category of events which lack a cause *καθ’ αὐτό*, and instead possess a cause which is merely *κατὰ συμβεβηκός*. He then claims that there is a strict parallel between those things which occur ‘always or for the most part’ and those things which have a cause *καθ’ αὐτό*,⁷⁶ such that it is not possible that something which has an accidental cause could come to be ‘always or for the most part.’ This being the case, it follows that since the phenomenon to be explained (the rain falling on the wheat in the winter, the teeth sprouting from the jaw, grapes from the grapevine) occur always or for the most part, there must be a *καθ’ αὐτό* cause, and this cause (since it is not *νοῦς*) must be the internal principle of change that is *φύσις*.

Nevertheless, Empedocles could respond by denying the initial premise to this argument. It is not clear that something which lacks a *καθ’ αὐτό* cause could not occur always or for the most part. The following thought experiment provides a potential counterexample. At the top of a cliff there is an oak tree, and beneath the oak tree there is a crevice which reaches to the cliff. The oak tree is so positioned that numerous acorns fall to the ground and roll into the crevice, and through the crevice they are guided to the cliff face, where they fall to the ground below. It so happens that there is a squirrel living in a tree at the bottom of the cliff, and his nest is facing the cliff, such that the squirrel sees the acorns fall past his nest, but they

⁷⁶“ταῦτα μὲν γὰρ καὶ πάντα τὰ φύσει ἡ αἰεὶ οὖτω γίγνεται ἡ ὡς ἐπὶ τὸ πολύ, τῶν δ’ ἀπὸ τύχης καὶ τοῦ αὐτομάτου οὐδέν,” *Physics*, 198b35-199a2.

never fall *into* his nest, due to the angle at which they leave the crevice. One day there is a rainstorm, and a branch washes into the crevice at the top of the cliff, at just the right angle such that, when acorns later begin to roll down the crevice, they hit the branch and bounce out the cliff face at an angle such that they nearly always fall into the squirrel's nest. The result, under one description, could be called an 'acorn delivery system.'

In this case, we have a system that produces a regular effect, but where the effect nevertheless lacks a *καθ' αὐτό* cause. The acorns fall into the squirrel's nest 'always or for the most part,' and the occurrence is *ἐνεκά τοι*, since it is something that could have been chosen (by us, or by the squirrel, if we wish to be generous about the squirrel's capacity for deliberation and choice of this kind). Nevertheless, while there is a *καθ' αὐτό* material cause of the acorns' bouncing (i.e. the branch that is wedged in the crevice provides a complete explanation for why the acorns bounce as they do); nevertheless, there is no *καθ' αὐτό* cause under the account of 'acorns falling into the squirrel's nest,' any more than there is for the fact that the lender collected his debt on going to the market.

I suggest that Empedocles would likely have responded to Aristotle's analysis of chance using a similar reasoning, arguing for the falsehood of Aristotle's absolute separation of chance events and events which occur always or for the most part. While the philosopher from Acragas was not explicit about the mechanisms for producing complex organisms on the basis of chance events (at least not in the fragments we still possess), it seems likely that he was thinking along these lines, given fragments such

Aristotle on Higher Natures

as 57, 60 and 61.⁷⁷ He could propose that isolated systems that operate ‘always or for the most part’ develop by chance, as in the example of the ‘acorn delivery system.’ Over time, under the influence of Love,⁷⁸ such systems would combine to create more complex systems, purely by accident, but which nonetheless operate ‘always or for the most part,’ despite lacking any *φύσις*. It would not be necessary that accidentally-formed systems of this sort come about frequently or for the most part, but only that, once they have formed, they produce their characteristic results ‘always or for the most part.’ Empedocles could admit that it is almost infinitely rare that, during the initial aggregation of ‘mixed parts,’ arms, legs and a torso and a head should come together in a larger aggregate. Nevertheless, he would be able to respond that *once such an aggregate has formed by chance*, its characteristic activities will nevertheless come about ‘always or for the most part’ without having a *καθ' αὐτό* cause.

Against such an argument by Empedocles—who could claim that he can explain the coming-to-be of isolated systems that operate always or for the most part in a determinate fashion—it remains the case that growth and

⁷⁷DK31B57, 60 and 61.

⁷⁸Aristotle, in his critique of Empedocles’s theory, appears to be mixing together distinct periods in Empedocles’s cosmology: the phase of the random arising of isolated body parts, which later combine into whole organisms, belongs to that period in the cosmic cycle wherein Love is dominant, and wherein a generation of men and women arise; cf. Wright, *Empedocles: the Extant Fragments*, p. 54. See also Guthrie, *A History of Greek Philosophy*, p. 205. However, we are not living in that part of the cosmic cycle, but rather in the part dominated by Strife, where the arising of human beings comes about by an entirely different mechanism; cf. fragment 62, and the discussion of this period in Wright, *Empedocles: the Extant Fragments*, pp. 215-218. The important point for Aristotle appears to be that the ‘evolutionary’ method of the period dominated by Love provides a potential alternative explanation for the arising of complex organisms, which he needs to rebut in order to show that only *φύσις* can explain the reality of biological generation and reproduction.

reproduction are inexplicable without reference to a final cause. While a system may come about, purely by chance, that functions ‘always or for the most part’ despite lacking a *καθ’ αὐτό* cause, such a system cannot produce growth, or reproduce, in the way that living organisms do. For the development of a mature specimen of, say, a dog from a newborn puppy (something that indeed happens always or for the most part), requires that in the puppy there *already* be the ‘information’ necessary to constitute the fully-developed dog (or, in Aristotle’s terminology, the full form of the dog must already *be* in potency), and the mechanisms necessary to bring the mature dog about. Similarly, in the case of reproduction, the parent(s) must act to bring about an identical essence in the offspring. If the ‘*εἶδος*’ is not somehow present in the parent, as it acts to produce an offspring capable of surviving independently from its parent, what will be produced will not be, for instance, another dog, but rather something random, like the product of the monkeys’ typing, or the patterns produced by windblown grass brushing sand. Thus, Aristotle’s criticism of Empedocles highlights the need for a ‘principle of end-directed motion’ that provides an adequate explanation for the future-oriented activities of organisms, i.e. growth and reproduction.⁷⁹

⁷⁹Cf. *Parts of Animals*, 640b20-23, Έμπεδολκῆς … ἀγνοῶν πρῶτον μὲν ὅτι δεῖ τὸ σπέρμα τὸ συνιστὰν ὑπάρχειν τοιαύτην ἔχον δύναμιν, εἰθ’ ὅτι τὸ ποιήσαν πρότερον ὑπῆρχεν οὐ μόνον τῷ λόγῳ ἀλλὰ καὶ τῷ χρόνῳ. As M. Furth points out, Aristotle criticizes Empedocles so strongly because he fails to realize that elemental mixing is vastly insufficient to explain the existence of highly complex, structured (i.e. *formed*) individuals that are able to communicate that structure to their offspring: “This fact is perhaps the most remarkable of all: ‘Human being begets human being’, as he repeatedly reflects, *never* horse or squirrel or ant; from which can be immediately gathered with great probability that there must be a *copying mechanism*, highly reliable and very accurate, guaranteeing the transmission of specific nature identical and intact from one generation to the next,” Furth, “Aristotle’s Biological Universe: An Overview”, p. 29.

A further problem with the Empedoclean position is that it postulates organisms that ‘come to be’ *frequently*, despite their lacking $\phi\upsilon\sigma\iota\varsigma$.⁸⁰ Thus, he must postulate ‘systems’ that come to be regularly in a given matter: oxen from oxen seed, fungi from decaying matter, oysters from the mud of coastal shelves, fire from dry wood.⁸¹ If a being is to come to be within a certain matter always or for the most part, it must be because the potency for that being is present in the matter. But Empedocles asserts that certain of the chance aggregates he proposes (i.e. the surviving end-products of his process of ‘evolution’) in fact frequently or always occur, while this is not possible unless the matter in which these ‘systems’ come to be is in fact in potency to come to be a system of the given type. Were the matter not in potency to the formal act which comes to be (e.g. the $\phi\upsilon\sigma\iota\varsigma$ of an oyster, in the case of the mud of coastal shelves, or that of fire in the case of dry wood) it could not come to be in act in the given way, except on the rare occasions when accidental causes intervened to produce an effect ‘for the lesser part,’ on the basis of the material nature of components united by chance.

Thus, ‘frequency’ is not merely a statistical notion in Aristotle: the high frequency of a given kind of coming-to-be rather is a sign of the being-in-potency of the nature which comes to be always or for the most part, under the correct conditions; the fact that systems like that for ‘acorn delivery’ are

⁸⁰This point was brought to my attention by Dr. Enrique Alarcón (personal conversation, Pamplona, August 9, 2007).

⁸¹Aristotle postulates spontaneous generation as responsible for the generation of certain kinds of beings, in particular certain plants and lower animals, such as insects and mollusks (cf. his discussion of the generation of these organisms in *On the Generation of Animals*, chapters 2 and 3).

infrequent is precisely due to there not being any underlying nature hosted in potency by the corresponding matter.⁸² This is the underlying reason for the strict parallel Aristotle has postulated between those things which occur ‘always or for the most part’ and those things which have a cause *καθ’ αὐτό*, and indicates that rather than proffering a valid explanation for how organisms might arise by chance, what Empedocles is in fact proposing is a fundamental impossibility.

4.3.2 End-directedness as requiring reason

A second objection that Aristotle describes in *Physics* II.8, is that operation for the sake of something requires deliberation.⁸³ In this section, I will discuss his response to this argument, tying in his discussion on how *φύσις* and art are parallel, and how *φύσις* can make mistakes, to shed further light on what it means to say that *φύσις* acts *ἐνεκά τον*.

The parallelism between *τέχνη* and *φύσις*

Aristotle responds to the objection by saying that “ἄτοπον δὲ τὸ μὴ οἴεσθαι ἐνεκά του γίγνεσθαι, ἀν μὴ ἴδωσι τὸ κινοῦν βουλευσάμενον. καίτοι καὶ ἡ τέχνη οὐ βουλεύεται.”⁸⁴ His response here depends upon his having already developed, in the preceding paragraphs, a parallelism between *τέχνη* and *φύσις*. He gives several reasons for asserting this parallelism. First, *τέχνη*, like

⁸²I am referring here to what the Scholastics termed ‘proximate potency.’

⁸³This argument is explicitly mentioned at *Physics* 199b27ff, but the entire discussion from 199a8-199b35 revolves around this and closely related issues.

⁸⁴*Physics*, 199b26-28.

Aristotle on Higher Natures

φύσις, involves an ordering of individual stages of an action in order to attain an end. He gives the example of the building of a house: “οὕνει εἰ οἰκία τῶν φύσει γιγνομένων ἦν, οὗτως ἀν ἐγίγνετο ὡς νῦν ὑπὸ τῆς τέχνης.”⁸⁵ There is a rational structure to the development of natural beings, just as there is in the production of artifacts.⁸⁶

Aristotle has already posited that all things that come to be always or for the most part must come to be ἔνεκά του; reaching the τέλος, whatever it may be, will require passing through various stages of development, each of which will bring the given potency closer to being fully in act. If these stages come to be in a different order, the final actuality will not come to be: for instance, if the tree sends out leaves before it has roots to maintain itself upright and obtain nutrients, the leaves will not be able to survive to use the nutrients in photosynthesis, an activity which can be said to be the actuality of the leaf. This mutual ordering of ‘prior and posterior’ is the same in the products both of τέχνη and φύσις. The only difference is that τέχνη is an exterior moving cause, and φύσις is an internal cause⁸⁷; both,

⁸⁵*Physics*, 199a11-a12.

⁸⁶Granger holds that for Aristotle, the parallel is broader: the structure of human action—which is rational precisely insofar as it is *for something*—mirrors the rational structure of reality; Granger, “Aristotle on the Analogy between Action and Nature”, p. 175. He bases this assertion on a text from *Metaphysics* II.2 (994b8-16), where Aristotle defends the existence of the final cause because “οἱ τὸ ἄπειρον ποιοῦντες λανθάνοντιν ἔξαιροῦντες τὴν τοῦ ἀγαθοῦ φύσιν ... οὐδὲ ἀν εἴη νοῦς ἐν τοῖς οὖσιν ἔνεκα γάρ τινος ἀεὶ πράττει ὅ γε νοῦν ἔχων, τοῦτο δέ ἐστι πέρας.” Granger asserts that the deepest parallelism in *Physics* II.8 is not that between art and nature, but that between *human action* and nature. This parallelism, in his view, is precisely left undefended by Aristotle because the rationality of nature, on the model of action, is for Aristotle an article of faith: “The lack of support Aristotle offers for the analogy between action and nature serves to reveal its strength in his thinking, and it would be only natural that it should possess such strength if action provided Aristotle with his basic model for the intelligibility of processes that yield results. If nature is intelligible, it must be like action,” ibid., p. 174.

⁸⁷Cf. *Metaphysics*, 1048b35-1049a12. David Charles parts ways here with Granger, insofar as he holds that in the *Physics*, Aristotle presents two distinct types of teleological

Chapter 4. The Arguments for Natural Finality

however, act to bring what is in potency into act via the same sequence of developmental stages.⁸⁸

causation: that where agency is present (what Vigo terms ‘teleology’, and that embodied by natural organisms, where agency is not present (‘teleonomy’ in Vigo’s terminology, and which Charles terms the ‘functional’ type, insofar as a given part or activity of a natural organism performs a function which benefits that organism). Charles sees these two types as being analogous, but without there being any priority amongst them (cf. Charles, “Teleological Causation in the *Physics*”, pp. 106-7), *pace* Granger, who holds that human action provides the basic explanatory template for all coming to be *ἐνεκά τον*. Charles goes further, however: “[I] suggest that Aristotle in *Phys.* II.8-9 did not articulate an account of teleological causation which distinguished properly between the Agency and Function model. He possessed a general strategy for vindicating claims concerning teleological causation; but he did not advance *one* determinate model of teleological causation which he aimed to vindicate. And for this reason, his notions of nature (the key concept of *Phys.* II), and of natural process (the key concept of *Phys.* III) are left, in certain important respects, ill-defined,” *ibid.*, p. 127. Granger responds that “Aristotle could acknowledge a common teleological form for both action and nature without thinking that they were identical in every teleological feature... Rather, the features of teleological sequences, which are common to action and nature, and which Aristotle may borrow from action, are perhaps those I have suggested of (a) finitude, (b) termination in a goal, (c) which is good,” Granger, “Aristotle on the Analogy between Action and Nature”, p. 174. Here Granger is opposed to any attempt to give explanatory priority to ‘teleonomy’; rather, teleology is the basic model, based on human action, and teleonomy is a restricted type of the same model, wherein discursive reason is not present, but ‘reason’ in a broader sense is, i.e. in terms of the intelligibility of the teleonomic process.

⁸⁸Granger holds that this argument is invalid: “Even if it be allowed that each stage in both sorts of series [artistic and natural] in some sense benefits each subsequent stage of the series, this admission is not sufficient for establishing that each series is equally goal-directed. The series would be goal-directed only if the *reason* for the existence of each stage in the series is that it contributes to the existence of the result of the series. The analogy has sufficient strength for establishing the goal-directed character of nature only if we have already granted its goal directed character, but this would be to beg the question.” *ibid.*, p. 169.

Granger’s argument, while correct if one constrains one’s examination to the argument as Aristotle states it at 199a9-19, nevertheless overlooks an important point. Granger’s critique is that natural series culminating in a given goal are not necessarily *goal-directed* just because the stages in the process come to be in an ordered fashion, much as they do in artistic action. He is asserting that the stages in an ordered series can come about in such a way that each stage benefits the subsequent stage, without it being the case that the *reason* for the becoming of a given stage is contributing to the existence of the result of the series. Hence, in Granger’s view, the series comes about despite not being *ἐνεκά τον* (in the strong sense, wherein a *καθ’ ἀντό* is operating to realize its proper end). But for Aristotle, this means that the series comes about by chance (following the binary opposition between possible causes that he presents in *Physics* 199a3-5). But this cannot be the case, because that which comes about always or for the most part comes about *ἐνεκά τον* (again, in the strong sense). Thus, if we follow Aristotle’s analysis of chance and luck, Granger is postulating a fundamental impossibility. And for Aristotle, this is what makes

Aristotle on Higher Natures

This parallelism of *τέχνη* and *φύσις* is sufficiently exact that art can bring about the same things that *φύσις* does, or even ‘extend’ nature, doing things which might have come about by nature, but which (due to impediment or the *φύσις* being incapable) the *φύσις* does not in fact bring about. “ὅλως δὲ ἡ τέχνη τὰ μὲν ἐπιτελεῖ ἢ ἡ φύσις ἀδυνατεῖ ἀπεργάσασθαι, τὰ δὲ μιμεῖται.”⁸⁹ For instance, the doctor can bring health to the patient, something which the *φύσις* of the patient might do on its own under different conditions. Or, the doctor can use his art to provide capacities to a person which the *φύσις* of human beings normally provides, e.g. by designing a crutch or wooden leg for someone who lacks a normal leg. *φύσις* is maximally like *τέχνη* when the same person uses his art on himself: “μάλιστα δὲ δῆλον, ὅταν τις ἰατρεύῃ αὐτὸς ἑαυτόν· τούτῳ γὰρ ἔοικεν ἡ φύσις.”⁹⁰

Aristotle concludes that “ὅτι μὲν οὖν αἰτία ἡ φύσις, καὶ οὕτως ὡς ἔνεκά του, φανερόν.”⁹¹ This is the case, because *τέχνη* itself is possible due to the relationship of potency to act. Human beings are able to learn arts, which make them able to obtain certain results and end products in the world, precisely because there exist real potencies which are themselves *ἔνεκά του*; indeed, as Aristotle has earlier said, these potencies ‘desire’ their realization.⁹² Thus, his deduction of end-directedness in *φύσις* from that which is obvious in art is not an illegitimate one; rather, art relies precisely on a prior end-directedness embedded in being itself.

it so obvious that the parallelism of *τέχνη* and *φύσις* shows the existence of final causation in the latter.

⁸⁹*Physics*, 199a16-19.

⁹⁰*Physics*, 199b32-b34.

⁹¹*Physics*, 199b34.

⁹²*Physics*, 192a15-25.

Nature as able to ‘make mistakes’

Part of Empedocles’s argument was based on the widely-observed phenomena of ‘monsters’ in nature. These are obviously not according to the normal order of things, which is one of the reasons why they were widely viewed as omens of important events in the ancient world.⁹³ Empedocles bases his cosmogony on an original proliferation of such monsters (e.g. the ‘man-faced ox-progeny’ of fragment 61⁹⁴). Aristotle points out that Empedocles’s use of such monsters as evidence for his theory is actually quite mistaken, since “καὶ ἐν ταῖς ἐξ ἀρχῆς ἄρα συστάσεοι τὰ βουγενῆ, εἰ μὴ πρός τινα ὅρον καὶ τέλος δυνατὰ ἦν ἐλθεῖν, διαφθειρομένης ἢν ἀρχῆς τινὸς ἐγίγνετο, ὥσπερ νῦν τοῦ σπέρματος.”⁹⁵ Monsters do occur ‘for the lesser part,’ precisely because there is a principle which at times fails to achieve its end, due either to an external impediment, or an impediment in the matter of the being itself.

A major lacuna in Empedocles’s theory, a difficulty which makes Aristotle’s theory far superior in its ability to explain the phenomena in question, is revealed by Aristotle’s objection here.⁹⁶ It is possible to imagine that, as a result of the great initial separation of the elements in the period of the ever-increasing universal domination of Love, that ‘monsters’ arose of the sort that Empedocles describes.⁹⁷ Nevertheless, the natural substances (i.e. organisms) that we know reproduce themselves $\eta\alpha\iota\epsilon\iota\eta\epsilon\pi\tau\circ\pi\circ\lambda\circ\lambda\circ\lambda$. The ‘man-faced ox-progeny’ might arise by a chance combination of elements in

⁹³Cf. e.g., Geers, “A Babylonian Omen Text”.

⁹⁴DK31B61.

⁹⁵*Physics*, 199b5–8.

⁹⁶We have already noted this problem above, in section 4.3.1.

⁹⁷Cf. DK31B21 and DK31B61. Cf. also p. 225, n. 78.

Aristotle on Higher Natures

aggregation, but the offspring of such a creature (if any), if it lacked a *φύσις*, would not be another ‘man-faced ox-progeny,’ but rather an aggregation resulting from the same accidental causes (i.e. co-location of elements) that produced the parent. The arising of ‘man-faced ox-progeny’ children from the parent would be an occurrence equally as rare as the arising of the parent itself.⁹⁸ Thus, at best, the reproduction of creatures resulting from chance aggregations would be ‘for the least part’; what we observe, however, is that cows and horses and men reproduce themselves *ἢ αἰεὶ ἢ ἐπὶ τὸ πολὺ*, with monsters occurring rarely. This regularity can only be explained by an inner principle that can transfer its own form to distinct matter. The reason that monsters can occur at all in the process of reproduction, as Aristotle has already pointed out, is that there is a principle which at times fails to achieve its end.

The ability of *φύσις* to ‘make mistakes’ is directly parallel to the same phenomenon in *τέχνη*. The artist, e.g. the scribe, will occasionally produce incorrect writing. This may be due to a flaw in the material (e.g. ink that runs and blotches the papyrus, papyrus that is rotten and cannot be written on, etc.) or due a lack of concentration or forgetfulness on the part of the scribe (he is sleepy, is thinking about something else, is ill). But if he has genuinely acquired the art of writing as a potency, his writing will be correct either always or for the most part. And this can only be explained by a potency which has a definite actuality as its end or *τέλος*, for if there were no determinate actuality as the *τέλος*, an infinitude of results would occur, if anything did. This occurs, for instance, with children who have

⁹⁸Cf. Cooper, “Aristotle on Natural Teleology”, pp. 210-11.

the ability to draw, but not to write per se. For drawing as a determinate potency bears within it writing as a subspecies. Thus small children who only know how to draw may occasionally produce approximations of writing ‘for the lesser part,’ in an accidental way. Writing, as a subspecies of the potency of drawing, is a determination of what is, in itself, indeterminate and indeed infinite.⁹⁹ For within the boundaries of that which is actualizable by the potency of drawing, there is an infinity of possibilities, much as there is infinite divisibility in a line or any other continuum.¹⁰⁰ The results obtained by the potency of writing can only be obtained ‘always or for the most part’ when the potency being exercised is in fact the potency of writing. If another, more generic, potency is being exercised, the *τέλος* of the more specific, determinate potency will only result for the least part. This being the case, it is not possible for a given actuality to arise ‘always or for the most part’ in the absence of a potency with that actuality as its *τέλος*.

End-directedness and reason

At this point we can return to the objection described above, which claims that acting in an end-directed way requires reason. Aristotle responds in two ways. First,¹⁰¹ he states that art also does not act via delib-

⁹⁹The infinite is said to be within potency: “λέγεται δὴ τὸ εἶναι τὸ μὲν δυνάμει τὸ δὲ ἐντελεχείᾳ, καὶ τὸ ἄπειρον ἔστι μὲν προσθέσει ἔστι δὲ καὶ διαιρέσει. τὸ δὲ μέγεθος ὅτι μὲν κατ’ ἐνέργειαν οὐκ ἔστιν ἄπειρον, εἴρηται, διαιρέσει δ’ ἔστιν οὐ γὰρ χαλεπὸν ἀνελεῖν τὰς ἀτόμους γραμμάς· λείπεται οὖν δυνάμει εἶναι τὸ ἄπειρον,” *Physics*, 206a15-18.

¹⁰⁰“ἐπεὶ δὲ τὰ αἴτια διήρηται τετραχῶς, φανερὸν ὅτι ὡς ὑλη τὸ ἄπειρον αἴτιόν ἔστι, καὶ ὅτι τὸ μὲν εἶναι αὐτῷ στέρησις, τὸ δὲ καθ’ αὐτὸν ὑποκείμενον τὸ συνεχὲς καὶ αἰσθητόν. φαίνονται δὲ πάντες καὶ οἱ ἄλλοι ὡς ὑλὴ χρώμενοι τῷ ἄπειρῳ διὸ καὶ ἀτοπὸν τὸ περιέχον ποιεῖν αὐτὸν ἀλλὰ μὴ περιεχόμενον,” *Physics*, 207b35-208a4.

¹⁰¹In the order of the text, this response comes second, but I place it first in the development of the argument, because the demonstration that art acts without deliberation

Aristotle on Higher Natures

eration. Second, he claims that it is clear that there are organisms that act for an end, without having reason, and this is possible for the same reason that art is able to act without deliberation.

At the end of *Physics* II.8, Aristotle says that

ἄτοπον δὲ τὸ μὴ οἴεσθαι ἔνεκά του γίγνεσθαι, ἂν μὴ ἴδωσι τὸ κινοῦν βουλευσάμενον. καίτοι καὶ ἡ τέχνη οὐ βουλεύεται· καὶ εἰ ἐνῆν ἐν τῷ χύλῳ ἡ ναυπηγική, ὅμοιώς ἂν τῇ φύσει ἐποίει· ὥστ' εἰ τῇ τέχνῃ ἔνεστι τὸ ἔνεκά του, καὶ ἐν τῇ φύσει. μάλιστα δὲ δῆλον, ὅταν τις ἰατρεύῃ αὐτὸς ἑαυτόν· τούτῳ γὰρ ἔοικεν ἡ φύσις. ὅτι μὲν οὖν αἰτίᾳ ἡ φύσις, καὶ οὕτως ὡς ἔνεκά του, φανερόν.¹⁰²

Aquinas comments on this passage, stating that

manifestum est quod ars agit propter aliquid; et tamen manifestum est quod ars non deliberat. Nec artifex deliberat in quantum habet artem, sed in quantum deficit a certitudine artis: unde artes certissimae non deliberant, sicut scriptor non deliberat quomodo debeat formare litteras. Et illi etiam artifices qui deliberant, postquam invenerunt certum principium artis, in exequendo non deliberant: unde citharaedus, si in tangendo quamlibet chordam deliberaret, imperitissimus videretur. Ex quo patet quod non deliberare contingit alicui agenti, non quia non agit propter finem, sed quia habet determinata media per quae agit. Unde et natura, quia habet determinata media per

makes it possible for Aristotle to sustain a claim of end-directed action in non-reasoning organisms.

¹⁰²*Physics*, 199b26-b34.

Chapter 4. The Arguments for Natural Finality

quae agit, propter hoc non deliberat.¹⁰³

Clearly, then, the exercise of art as a rational potency (in a trained artist) involves no reflection in regards to the concrete actions that must be taken in order to bring the chosen actuality from potency into act. Rather, once the sculptor has deliberated about *what* the end will be (i.e. a statue of Hermes or Apollo), the action of sculpting itself takes place without reflection (about sculpting per se), just as $\phi\nu\sigma\iota\varsigma$ operates. For while the end itself can be chosen, the achievement of the end requires no operation of reason, but simply the progressive drawing into actuality of a form that is present in the thing in potency.

We see a similar dichotomy between deliberation and end-directed action in organisms. At *Physics* 199a20, Aristotle points out that we can arrive at clear examples of organisms acting for an end, despite lacking reason. The end-directedness of the action of beings with higher types of souls is clear, for we observe animals such as cats, dogs, horses and elephants performing actions in pursuit of identifiable and reasonable goals. The spider and the ant, however, cause us to doubt; we are not sure whether to attribute $\nu\o\hat{\nu}\varsigma$ to such creatures, despite their clearly acting for ends. These doubts disappear with plants, which clearly have no capacity to deliberate, but nevertheless it is also the case that their activity is for ends. This is possible because, as we have seen, end-directedness in action is not dependent

¹⁰³Aquinas, *In Physicorum*, Lib. II, lect. 14, n. 8. Wieland follows Aquinas here: "Die Kunst ist nämlich gerade dann am meisten Kunst, wenn man sie so sehr beherrscht, daß man im konkreten Fall bereits ohne besondere Überlegung weiß, was zu tun ist. Das überlegen setzt immer erst dort ein, wo die unmittelbare Vertrautheit mit der Sache und die Hingabe an sie an irgendeiner Stelle gestört ist. Wer noch überlegen muß, beweist gerade dadurch, daß er die Sache noch nicht vollkommen beherrscht," Wieland, *Die aristotelische Physik*, p. 271.

Aristotle on Higher Natures

upon the existence of reason, but rather on the relation of potency to act: insofar as a potency exists for a determinate actuality to be realized, that actuality is the end of that potency, and the motion that realizes the potency is end-directed by necessity (indeed, if it were not end-directed, it would not be motion at all, for as Aristotle says in *Physics* VIII.2, “μεταβολὴ γὰρ ἄπασα πέφυκεν ἐκ τινος εἰς τι.”¹⁰⁴)

I suggest that there is an underlying terminological confusion that has led Aristotle's interlocutors to associate end-directedness exclusively with reason. It is clear that an artist, as a rational being, can deliberate about ends, and choose means to those ends which involve the exercise of his art. Thus, we can say that “the shipwright built the boat in order to earn money to feed his family,” or “the shipwright built the boat in order to gain honor and fame with the Athenian assembly,” each of these being a possible goal that the shipwright can seek to obtain. The shipwright's activity of boat-building can then be said to be *ἐνεκά τον*, insofar as it is undertaken for the sake of some good which constitutes a rationally chosen goal. There is also, however, an additional sense of *ἐνεκά τον* which Aristotle highlights in *Physics* II.8, which is the sense of the ‘actuality to be achieved through the actualization of a potency.’ This is the sense in which the true shipwright can be said to exercise his art without reflection—the shipwright who has to reflect on his art during the building of the boat is rather a shipwright-in-training, whereas we say of the true shipwright that he can ‘build the boat in his sleep.’ It is in this latter sense that plant growth is ‘end-directed,’ for the plant has as its goal the achievement of its fully-developed *φύσις* in act,

¹⁰⁴*Physics*, 252b8-12.

which it attains through the ordered growth processes which are required to produce the mature plant.

4.4 An issue concerning biological finality

Aristotle's resolution of the issue of natural finality leaves an important issue unresolved. He has shown that for something to come about 'always or for the most part,' there must be an existing potency determined to that thing. Thus, we can say that for teeth to sprout from a jaw, the immature jaw must possess a determinate potency to produce teeth; otherwise, teeth will only sprout in a tiny minority of cases, as happens occasionally with mutations, where humans and animals sprout teeth from other members besides the jaw.

Nevertheless, this approach will not allow us to demonstrate that the potency for teeth to sprout from the jaw is *for chewing*. It is certainly the case that teeth do, *de facto*, develop from the jaw for the purpose of grinding and tearing food. But this is not something that can be discerned from the teeth and the jaw alone, but rather only in the context of the behavior of the organism as a whole. For instance, in most birds, wings develop in order that the bird can fly. In chickens, however, they do not, since chickens cannot fly. Thus, in order to know whether there is a given purpose in the development of an organ, we must know more about the function of that organ in the life cycle of the animal. We might put this point more succinctly by stating that the organ itself does not determine its own purpose.

We can resolve this issue by following Wieland's method of 'iterative

analysis': the jaw has a certain nature of its own, considered *qua* itself, part of which includes the production of teeth of certain kinds, and this nature, *qua* itself, need not make reference to chewing. But *qua* part of the complete organism, it has that purpose. And indeed, as I have noted in Chapter 2 (page 117), the *φύσις* of an organism is what makes the matter (i.e. the part of the body) of the organism to be that organism in actuality. Thus, finality of the sort that Aristotle is referring to when he indicates that leaves grow in order to shelter the fruit¹⁰⁵ (following Aristotle's botanical theory in this point) is a finality at the level of the organism, and not the leaf nor the branch as such. The *φύσις* of a lemon tree will include branches that sprout leaves—which in turn serve, in part, to protect the fruit—but the *φύσις* of leaves as such need not bear any relation to fruit (as we see in trees that have leaves but no fruit, such as maple trees and cottonwoods).

4.5 Finality and Reductionism

There is an important corollary of the argument that has been made up to this point.¹⁰⁶ Earlier in this chapter I made the point that Aristotle believes he has demonstrated that for a thing to be able to come to be *καθ' αὐτό*, there must be a corresponding potency in the generator which is realized in the thing generated. Gotthelf points out that this potency must additionally be 'irreducible,' i.e. not replicable in a complete way by means

¹⁰⁵Cf. *Physics*, 199a25-a30.

¹⁰⁶I first encountered this corollary in Gotthelf, "Aristotle's Conception of Final Causality", although similar arguments have been made by Waterlow, *Nature, Change, and Agency* and Lennox, "Teleology, Chance and Aristotle's Theory of Spontaneous Generation".

of the potencies of the basic elements involved in the coming to be. The ‘irreducibility argument’ that Gotthelf outlines is especially prominent in the biological works, although Aristotle presents variants both in *Metaphysics* I.3 and I.7 as well as in *Physics* II.8.¹⁰⁷

In the biological context, and against the *φυσιολόγοι*, Aristotle was an unwavering advocate of the position that the development of a mature organism is the result of the actualization of a single potency which is for the sake of the form of the mature organism, and that there is no sequence of the activation of element potencies—which make no reference to the final form of the organism—which will in fact result in the organism that comes to be. Coming to be for the sake of X implies irreducibility.¹⁰⁸ Gotthelf encounters texts supporting this argument in *On the Generation of Animals* II.1, where Aristotle describes the activity of the semen in giving form to the embryo.¹⁰⁹ In reproduction, the motion of the semen must be appropriate to the production of the offspring. But since motions are named for their terminations, this means that the semen's motion must be defined in terms of the final outcome. Hence, there is no reduction to motions whose

¹⁰⁷Waterlow goes further and links ‘irreducibility’ with Aristotle’s thesis that beings endowed with natures are *per se* unities in a metaphysical sense. “For the condition for predicating *per se* unity of a complex natural being which is identical with the condition for applying teleological explanation as Aristotle understands it. This condition is that the properties and behavior of the complex being are not wholly explicable as the product of a *per accidens* combination of simpler components and their respective behaviors,” Waterlow, *Nature, Change, and Agency*, pp. 69-70.

¹⁰⁸Gotthelf, “Aristotle’s Conception of Final Causality”, pp. 212-13. Cf. also Balme, “Teleology and Necessity”, p. 281, “Aristotle did not regard automatic physical interaction as capable of producing animal tissues and organs; for when the elements act without being used by nature or soul, they do not impose limit and definition upon themselves.”

¹⁰⁹“Πῶς δέ ποτε ἔκαστον γίγνεται ἐντεῦθεν δεῖ λαβεῖν, ἀρχὴν ποιησαμένους πρῶτον μὲν ὅτι ὅσα φύσει γίγνεται η τέχνη ὑπ’ ἐνεργείᾳ ὄντος γίγνεται ἐκ τοῦ δυνάμει τοιούτου. τὸ μὲν οὖν σπέρμα τοιούτου, καὶ ἔχει κίνησιν καὶ ἀρχὴν τοιαύτην ὥστε πανομένης τῆς κινήσεως γίγνεσθαι ἔκαστον τῶν μορίων καὶ ἔμψυχον,” *Generation of Animals*, 734b20-24.

Aristotle on Higher Natures

ends make no reference to the species-outcome of the semen's motion.¹¹⁰

As Gotthelf states,

As the motions of the tools have a definition corresponding to the art, i.e., to the form in the mind of the artist, so the semen's 'motion' must have a definition corresponding to the nature, i.e., to the form, of the parent. That is to say, the semen's 'motion' must be identified by reference to the form it is transmitting... The semen's 'motion' is to be defined by its outcome: it is the fulfillment of the potential to generate an animal or a certain form or logos, qua potential; the form or logos is an inescapable part of its very definition.

If this is so, then the 'potential' which is manifested in the semen's motion also is to be identified by reference to the form being transmitted: it is, essentially, a potential for form, a potential distinct from and not reducible to any sum of qualitative and locomotive potentials. For, if it were reducible, so would the 'motion' be, and then heat and cold could, in the proper sequence of actions, produce 'the logos by which one thing is flesh and another bone'.¹¹¹

In Metaphysics I.3 and I.7, Aristotle makes an argument that is broader

¹¹⁰ "...τὸν δὲ λόγον ἢ ηδῆ τὸ μὲν σὰρξ τὸ δὲ ὁστοῦν οὐκέτι, ἀλλ’ ἡ κίνησις ἡ ἀπὸ τοῦ γεννήσαντος τοῦ ἐντελεχείᾳ ὄντος ὅ ἔστι δυνάμει ἐξ οὐ γίγνεται, ὥσπερ καὶ ἐπὶ τῶν γυγνομένων κατὰ τέχνην· σκληρὸν μὲν γὰρ καὶ μαλακὸν τὸν σιδηρὸν ποιεῖ τὸ θερμὸν καὶ τὸ ψυχρόν, ἀλλὰ ξίφος ἡ κίνησις ἡ τῶν ὀργάνων ἔχονσα λόγον [τὸν] τῆς τέχνης. ἡ γὰρ τέχνη ἀρχὴ καὶ εἶδος τοῦ γυγνομένου, ἀλλ’ ἐν ἐτέρῳ ἡ δὲ τῆς φύσεως κίνησις ἐν αὐτῷ ἀφ’ ἐτέρας οὖσα φύσεως τῆς ἔχονσης τὸ εἶδος ἐνεργείᾳ," *Generation of Animals*, 752b33-753a3.

¹¹¹ Gotthelf, "Aristotle's Conception of Final Causality", p. 217.

than that which applies to animal generation. He states that goodness and beauty cannot have their origin in elemental potencies or spontaneity and chance, but rather that there must be a process which has them essentially (and hence irreducibly) as its end, and this is what it means to come to be for the sake of something.¹¹² Gotthelf interprets the lengthy argumentation in *Physics* II.8 as fundamentally the same as that found in *Meta* I.3 and I.7: there is too much order and regularity in natural processes for them to be the results of elemental potencies.¹¹³

Waterlow (1982) makes a similar case for irreducibility, drawn from Aristotle's arguments in *Physics* II. First, she draws out the strong position of identity between the formal and final causes that Aristotle has taken in *Physics* II.1, from which “[he] concludes that nature in the sense of an inner principle of change *is* the developed form.”¹¹⁴ Following this, she notes that Aristotle's position concerning hypothetical necessity in *Physics* II.9 intends to limit the role of necessity in nature in order to make the case for teleological explanations: for “[the end] is the cause of the matter, but the matter is not cause of the end.”¹¹⁵ But Aristotle's position on material necessity implies that he holds that beings with natures are *per se* unities in a strong sense, because “the condition for predicating *per se* unity of a complex natural being is identical with the condition for applying teleological explanation as Aristotle understands it.”¹¹⁶ This condition is precisely that the behavior and structure of the complex being cannot be wholly ex-

¹¹²Gotthelf, “Aristotle's Conception of Final Causality”, pp. 221-2.

¹¹³ibid., p. 225.

¹¹⁴Waterlow, *Nature, Change, and Agency*, p. 65.

¹¹⁵*Physics*, 200a32. Cf. Waterlow, *Nature, Change, and Agency*, p. 69.

¹¹⁶ibid., p. 69.

Aristotle on Higher Natures

plained by interpreting them as a *per accidens* combination of material components and their interactions. Aristotle holds that materialist explanations do in fact fail in certain circumstances, and this means both that the complex being is something more than a mere aggregate of material parts, and that something other than its components must be invoked in order to explain its behavior.¹¹⁷ Development in pursuit of an end (*φύσις* as final cause) is precisely that ‘something more,’ which is irreducible to a natural being’s material components precisely because it is the “*only* explanation of *something additional* to the materials in the phenomenon to be explained.”¹¹⁸

Not all recent commentators are convinced by the irreducibility arguments presented by Waterlow and Gotthelf, the latter of whom notes that Sorabji (1980) and Nussbaum (1978) argue for viewing teleology in Aristotle as primarily a matter of scientific explanations, and each of whom deny irreducibility.¹¹⁹ In her 1978 article “Aristotle on Teleological Explanation,” Nussbaum highlights the immense explanatory advantages that are to be had by explaining plant and animal behavior in terms of ends: these advantages are comparable to those of a mathematical explanation over an explanation at the purely atomic level when attempting to explain why a given bronze cube of side $2r$ will not pass through a hoop of radius r .¹²⁰ In the one case you have a simple and elegant explanation in terms

¹¹⁷ibid., pp. 69-70.

¹¹⁸ibid., p. 71.

¹¹⁹Gotthelf, “Aristotle’s Conception of Final Causality”, p. 231. Waterlow adds Wieland to the list of those who hold that in Aristotle the same phenomenon can in principle be explained both mechanically and teleologically, in effect placing him in the reductionist camp; cf. Waterlow, *Nature, Change, and Agency*, 70 n. 20.

¹²⁰Nussbaum, “Aristotle on Teleological Explanation”, p. 69.

Chapter 4. The Arguments for Natural Finality

of simple geometric concepts, whereas in the other case you must list all of the atoms making up both the cube and the hoop, along with their trajectories, in order to show for one non-generalizable case why the cube will not pass. The case of animal behavior is similar; when we ask why the lion enters the sheep pen, the teleological explanation “to get meat” is far simpler, more elegant and more generalizable than any account given in terms of the constituent atoms of the lion.¹²¹

For Nussbaum, then, teleological explanation exists in Aristotle because of the elegance and explanatory power that it gives to scientists studying human and animal parts, development and behavior, and not because there is a physically-realized final cause that acts to draw a being in potency into a being in act. Her theory seeks to present an Aristotle who postulates no “mysterious, non-empirical processes and events,”¹²² for whom there are no efficient-causal gaps caused by the necessity to postulate irreducible potencies for development towards ends.¹²³ Her account is cogent and well-argued, with extensive references to key Aristotelian texts, and has the added advantage of corresponding to a well known characteristic of Aristotle, namely his concern for valid scientific explanation, which he discusses in the *Organon* and numerous other texts spread out throughout his other works.

¹²¹Nussbaum, “Aristotle on Teleological Explanation”, p. 71. But note Gotthelf, “Review: [Aristotle’s *De Motu Animalium*, by Nussbaum M.]”, p. 371, “Nussbaum cites no texts that suggest that Aristotle thought simplicity, generality, or predictive power to be criteria for explanatory superiority, and those she cites for relevance (including PA 64ob28) devalue materialist accounts for their omission of form, not for their excess baggage. And because of this omission, Aristotle insists, the materialist accounts are incomplete, not just cumbersome or inefficient. They fail to explain...”

¹²²Nussbaum, “Aristotle on Teleological Explanation”, p. 74.

¹²³ibid., p. 60.

Aristotle on Higher Natures

As a result, Nussbaum treats teleological explanations as having a place in science only because they are *superior* to the kinds of explanations given by φυσιολόγοι such as Democritus,¹²⁴ but not because they reflect a genuine aspect of physical development, whereby a potency is realized which has a given form as its goal or ‘*πέρας*.’ Indeed, she disparages the idea that Aristotle would postulate anything like “mysterious strivings in matter to realize form.”¹²⁵ Nevertheless, the fact that he is concerned in *Physics* II.8 to justify the possibility of end-directed behavior in creatures lacking reason shows that he considers teleology to be a real phenomenon.

Aristotle makes a step-by-step case for the presence of goal-directed behavior in non-rational creatures, beginning with non-human animals which act for an end without possessing reason, and proceeding to plants, whose parts come to be for the sake of the well-being of the entire plant.¹²⁶ What Aristotle is concerned to show is that the kind of indisputably end-directed behavior found in rational animals (and especially in art) is also found in non-rational natural beings: “εἰ ἐν τῇ τέχνῃ ἔνεστι τὸ ἔνεκά του, καὶ ἐν τῇ φύσει.”¹²⁷ What is most decisive about this comparison is that in the case of art, there is the form in the mind of the artist, which is realized by the sequence of actions that he carries out, until the end is achieved, with each step taken for the purpose of the end. Teleology is not merely a way of describing what the artist does in an elegant and simple way, but refers

¹²⁴Cf. ibid., pp. 92-93.

¹²⁵ibid., p. 74. Cf. also Wieland, “The Problem of Teleology”, p. 156: “For Aristotle the category of goals is an extremely valuable tool for investigation. Occult powers which strive for goals or which produce things unconsciously, have for [Aristotle] at best a metaphorical significance.”

¹²⁶*Physics*, 199a20-a30.

¹²⁷*Physics*, 199b29.

to a genuine dynamism that propels the artist to take each step in the production of the work of art.

Similarly, Aristotle wishes to defend the existence of a parallel sort of dynamism in the coming to be of non-human animals and plants:

ώστ’ εἰ φύσει τε ποιεῖ καὶ ἔνεκά του ἡ χελιδὼν τὴν νεοττιάν καὶ ὁ ἀράχνης τὸ ἀράχνιον, καὶ τὰ φυτὰ φύλλα ἔνεκα τῶν καρπῶν καὶ τὰς ρίζας οὐκ ἄνω ἀλλὰ κάτω τῆς τροφῆς, φανερὸν ὅτι ἔστιν ἡ αἰτία ἡ τοιαύτη ἐν τοῖς φύσει γιγνομένοις καὶ οὖσιν.¹²⁸

The example he gives as being most like nature is that of the physician who heals himself.¹²⁹ In the case of the physician, there is a goal in mind which informs the actions he performs upon himself (i.e. health); in nature, there is a goal for which activity takes place, which is as an actualization of a potency, i.e. that of the achievement and sustaining of the fully-developed natural being. That this is a real process, and not merely a description of behavior in the fashion of ‘as-if’ teleology, is clear from what Aristotle states next, in the concluding sentence of the chapter: “ὅτι μὲν οὖν αἰτία ἡ φύσις, καὶ οὕτως ὡς ἔνεκά του, φανερόν.”¹³⁰

To conclude this section on teleology and reductionism, I hold the position that the view Aristotle has developed on *φύσις* as a cause in *Physics* II.8 upholds Gotthelf’s and Waterlow’s view of the irreducibility of *ἔνεκά του* processes to sequences of the activations of elemental potencies. Aristotle upholds the position that from the outset of developmental processes, goals

¹²⁸ *Physics*, 199a26-a30.

¹²⁹ “μάλιστα δὲ δῆλον, ὅταν τις ιατρεύῃ αὐτὸς ἑαυτόν· τούτῳ γὰρ ἔσικεν ἡ φύσις,” *Physics*, 199b30.

¹³⁰ *Physics*, 199b31-32.

Aristotle on Higher Natures

are present towards which the development of the natural being proceeds, and these goals are precisely the forms of the mature being themselves. These goals cannot be expressed in terms of elemental potencies, but are “irreducibly the actualization of a potential for form.”¹³¹ Pace Nussbaum and Wieland, teleology does not simply involve a better framework for giving scientific explanations, but involves the real activity of *φύσις* seeking self-realization.¹³² Because *φύσις* in this sense is integrative, producing *per se* unities out of matter which may have its own nature, we can say that the reality of teleology involves also the reality of ‘higher’ *φύσις*, acting as the goal of complex processes of physical development or plant/animal activity, with this development and activity unexplainable by reference merely to the *φύσεις* of the material components making up the more complex being.

4.6 Conclusions: *φύσις* and finality

To what degree has Aristotle been able, in Book II of the *Physics*, to respond to the objections raised by his opponents (particularly Empedocles), and demonstrate that his doctrine of nature is superior to materialist positions, which are unable explain key phenomena (especially reproduction)? To what degree has he shown his theory to be not merely better, but *necessary*?

¹³¹ Gotthelf, “Aristotle’s Conception of Final Causality”, p. 229. Cf. also Gotthelf, “Review: [Aristotle’s De Motu Animalium, by Nussbaum M.]”, p. 374.

¹³² Nevertheless, as Wieland notes, Aristotle does not give any final answer to *how* nature brings it about that goal-directed developmental activities occur in it; Wieland, “The Problem of Teleology”, p. 159.

In the first section of this chapter, I first discussed Aristotle's response to Empedocles's cosmogony, in particular his attempt to show how human beings and other animals might have arisen purely by chance. However, Aristotle claims that Empedocles (along with other materialist thinkers) has not developed an explanation of what 'chance' or 'luck' really are, with the result that “εἰσὶ δέ τινες οὓς δοκεῖ εἶναι μὲν αἰτία ἡ τύχη, ἄδηλος δὲ ἀνθρωπίνη διανοίᾳ ὡς θεῖόν τι οὖσα καὶ δαιμονιώτερον.”¹³³ Thus, in order to respond adequately to their claims, he first develops a theory of *τύχη*, as that which is 'for the least part' and accidental, but nevertheless *ἐνεκά του*.

He attempts to show that phenomena which come to be 'always or for the most part' cannot, therefore, be explained as resulting from luck or chance. While an opponent of Aristotle may argue that it is, in fact, possible for things to come to be on a regular basis from chance circumstances (as in the case of the 'acorn delivery system'), this kind of mechanism is inadequate to explain the coming to be of organisms or their complex parts in reproduction, growth and self-maintenance. Coming to be *καθ' αὐτό* (i.e. within the category of substance, or else *qua* the kind of being that the thing is) depends on there being a potency to this coming-to-be. Since such a potency is a potency *to something*, it is inherently end-directed: it is either a potency *to* being a mature exemplar of the kind of being it is by nature (in the case of the category of substance) or else it is a potency *to* the realization of a kind of actuality for which the *φύσις* has the potency (e.g. growth or nutrition). Without this kind of potency for a definite actuality as *τέλος*, there will only be a potency for an infinitude of comings-to-be, i.e. those proper

¹³³*Physics*, 196b6-10.

Aristotle on Higher Natures

to an aggregate, making things like the sprouting of teeth nearly infinitely improbable.

From this, Aristotle can conclude that, in order to explain the regular coming to be (and development) of the organisms we see in the world, we must postulate a principle of growth and reproduction which is determined towards a specific end, i.e. the mature form of the organism. And this is precisely what Aristotle claims for *φύσις*, in his doctrine: a principle of motion in substances, which leads them to develop, act and reproduce in view of achieving and maintaining their mature form or *εἶδος*. Finally, we may note that the Aristotelian doctrine of potency and act excludes the possibility for a system to come to be frequently (i.e. either always or for the most part) from its corresponding matter, unless a potency for that ‘system’ (i.e. a *φύσις*) is present in that matter in potency. This means that the Empedoclean theory, which postulates regular coming-to-be of organisms despite their lacking any proper *φύσις*, falls victim to a fundamental impossibility.

In the second section of this chapter, I discussed the extensive parallelism that Aristotle developed between *τέχνη* and *φύσις*. In so doing, he demonstrates two things. First, he shows that the monsters that Empedocles postulates can only come to be as the result of a ‘mistake’ in the development of a being with a *φύσις*. While it is conceivable (though only barely so) that ‘man-faced oxen-progeny’ might have come about through the great initial cosmic coming-together into the One, under the impulse of Love, these beings could never reproduce as such, were they to lack a *φύσις* and be the result strictly of *τύχη*. Such reproduction requires a potency for the actualization of a determined form, i.e. a *φύσις*.

Chapter 4. The Arguments for Natural Finality

Secondly, he has demonstrated that end-directedness is not necessarily a phenomenon requiring reason. There is a sense of *ἐνεκά τον* which refers to an end-directedness embedded in the potency-act structure of reality, since all potency is a potency *to* something, and indeed ‘desires’ its actualization as that something. Deliberation can choose ends, but natural activity or motion does not require this deliberation, for it is simply the realization of a potency *qua* that potency. Thus, far from it being the case that end-directedness requires deliberation, we see that deliberation involves a special case of potencies, i.e. rational potencies, which require deliberation and choice precisely because they are open to opposites. Irrational potencies, being determined to one actuality, do not require deliberation or choice, but are equally end-directed.

In the third section of this chapter, I addressed a potential difficulty that was not expressly developed by Aristotle in his treatment of these issues in the work at hand, but which find solutions in the light of other aspects of Aristotle’s overall philosophy. In particular, I have offered an explanation for how there can be larger purposes in organs or parts of organisms, despite the fact that the potencies that cause these parts to develop (e.g. the teeth from the jaw) need not involve reference to these larger purposes.

Finally, in the chapter’s last section, I discussed the corollary issue of whether or not Aristotle’s teleological theory is merely a theory of optimal scientific description (as held by Sorabji, Nussbaum and Wieland), where the ‘real’ coming to be of organisms remains explainable by purely material processes (i.e. is reducible to the activity and interaction of the most basic material building blocks). I concluded that Nussbaum in particular had

Aristotle on Higher Natures

developed an attractive argument for viewing Aristotle's teleology as 'as if,' providing only elegance and explanatory power, and not a description of a real end-oriented causal process. Nonetheless, Nussbaum's theory, however, fails to take into account what Aristotle is actually trying to show in *Physics* II.8 and other texts, which is that in goal-directed organic development, there is a single irreducible potency which is actualized to generate the mature being, and that no explanation purely in terms of the material principles of the *φυσιολόγοι* is capable of explaining the generation of organisms. It is precisely Aristotle's argument that what the *φυσιολόγοι* are lacking is the causative notion of form, in its role as final cause of development.

5. Aristotle's Comprehensive Argument for Higher $\Phi\acute{\nu}\sigma\iota\varsigma$

In this chapter, I will unite the various strands of Aristotle's argumentation that I have presented in earlier chapters,¹ in order to present a holistic view of his comprehensive argument for the existence of 'higher $\phi\acute{\nu}\sigma\iota\varsigma$ ', i.e. the kinds of $\phi\acute{\nu}\sigma\iota\varsigma$ which are the source of being for natural substances of greater complexity than the 'simple natures' or elements. In the first section, I will summarize how Aristotle eliminates the various obstacles to his physical theory, showing how he refutes the erroneous analyses proposed by the $\phi\upsilon\sigma\iota\omega\lambda\acute{\gamma}\omega\iota$. In the second section, I present the various positive arguments that Aristotle makes to prove that the postulation of higher $\phi\acute{\nu}\sigma\iota\varsigma$ is necessary in order to explain the phenomena under investigation. I conclude the chapter with a short summary of what Aristotle has demonstrated through his argumentation.

5.1 The elimination of the obstacles produced by erroneous theories of nature

In this section, I will present Aristotle's arguments against the theories of nature offered by the $\phi\upsilon\sigma\iota\omega\lambda\acute{\gamma}\omega\iota$ in such a way as to provide an ordered ar-

¹In this chapter, due to its summary and synthetic character, I will omit references to texts of Aristotle and other authors in those cases where I have already discussed the issues and presented the appropriate textual citations in earlier chapters.

gument that eliminates the bases needed by the Greek materialists in order to sustain their theories. We have already encountered these arguments in earlier chapters, but I develop here a systematic presentation.²

5.1.1 The multiplicity of being

I suggest that the deepest basis for Aristotle's refutation of the *φυσιολόγοι* is found in his metaphysics, his study of what it means to 'be.' While much of the terminology related to the study of being, i.e. *ὄν* and *εἶναι* in their technical senses, was developed by the Pre-Socratics, there nonetheless reigned a deep confusion among the *φυσιολόγοι* about how to use the term 'being' in a way that corresponds to reality. Among their predecessors, Parmenides attempted to solve the 'problem of being' by rigorously reducing the sense of *ὄν* and *εἶναι* to refer to 'that which is necessarily what it is,' at the cost of entirely denying any reality to the clear phenomenon of change. The Heracliteans, on the other hand, moved in the other direction, denying all stability and identity in the world, other than that found in the '*λόγος*.' Both approaches made a genuine study of the physical world impossible, since the world in which we live is fundamentally characterized by both stability and change. The later *φυσιολόγοι*, impressed by the Parmenidean argument for being as necessary self-identity, attempted to reconcile the undeniable

²Nearly all of these arguments have been made explicitly by the Stagirite in one or another of his works, but there is a distinct advantage to presenting them in a systematic manner. In particular, recent interpretations of Aristotle's physical theory (particularly in the English language) tend to interpret Aristotle's arguments as though his natural philosophy were separate from and independent of his metaphysics. The systematic presentation I propose here has the intention of highlighting the deep dependence of his arguments against the *φυσιολόγοι* on his metaphysical doctrine.

phenomenon of change with the (apparently) equally undeniable immobility of being by proposing various kinds of unchangeable ‘elements,’ to which all physical reality is ultimately reduced.

A fundamental problem arose from the position taken by the *φυσιολόγοι*. By admitting change, they implicitly admitted that the sense of ‘being’ could not be limited to the Parmenidean sense of ‘necessary self-identity’ defended in Parmenides’s Way of Truth. Aristotle convincingly shows that *ὅν* and *εἶναι* are used in multiple senses related *πρὸς ἓν* to the central sense of ‘being,’ which is the ‘*οὐσία πρώτον*,’ i.e. self-subsistent individual being which is host to the accidental ‘categories’ of being. The theories of the *φυσιολόγοι* provide abundant evidence for their need to admit the categorial multiplicity of being, since their theories rely implicitly on the ‘being’ of quantity, quality, location and action/passion. Even Parmenides himself found himself in need of multiple senses of being in order to confront the fact of experienced change: although he identified the ‘cold’ or ‘earthen’ principle with non-being, it still remained necessary for this principle to be postulated, and in some sense to ‘be.’

Far from being an issue of minor importance, which the *φυσιολόγοι* might admit without damage to their theories, the categorial analysis of being implies a deep attack on the very foundations of their proposals. For the Pre-Socratic materialists with whom Aristotle is in dialogue, in particular Empedocles, Anaxagoras and the Atomists, Leucippus and Democritus, postulated their eternal material *ἀρχαὶ* (variously termed ‘roots,’ ‘atoms’ or ‘seeds’) precisely as a way to integrate unchangeable Parmenidean being within a framework that admits change. If being is univocal, and being

means what Parmenides says it does, then in a changing world there *must* be eternal, unchanging *ἀρχαὶ* which truly *are*; all else, in particular the apparently real beings of our experience, will be ‘non-beings’ in a rigorous analysis.

I have argued that the seemingly unavoidable conclusion of the Parmenidean argument gave the pre-Melissan *φυσιολόγοι* what appeared to be a necessary basis for their proposal of eternal ‘elements’; if this is true, and if the Parmenidean argument is untenable from the beginning, then the various theories of these *φυσιολόγοι* will lack a sufficient justification for the central claim of their theories: that the true *ἀρχαὶ* of the material world, however they are characterized, are eternal and unchangeable and uncombinable, and that therefore any claim of true coming-to-be at a higher level is illusory. Further, we have an escape from the Heraclitean position, for we have discovered how stability can coexist with change: that which is stable is the *οὐσία*, able to change from being in one way to being in another way within one or another of the categories, without ceasing to be what it is.

The underlying mistake made by Parmenides, which filtered down to his followers among the *φυσιολόγοι*, is exposed by Aristotle through his analysis of another pair of related senses of ‘being.’ While the categorial senses of being are easily derivable via a logical analysis of predication—which Aristotle carried out in his early work, the *Categories*—other senses of *ὄν* and *εἶναι* are less easily discernible. In particular, the distinction between ‘noetic’ being (or the ‘being of truth,’ as Aristotle puts it) and being as real is easily overlooked, as Parmenides demonstrated when he said “τὸ γὰρ αὐτὸ

Chapter 5. Aristotle's Comprehensive Argument for Higher Φύσις

*νοεῖν ἔστιν τε καὶ εἶναι.*³ Nevertheless, there are important differences between the ‘being’ which is said of noetic entities, in particular concepts, and the ‘being’ said of the genuinely real. ‘Being’ at the conceptual-noetic level, is characterized by precisely the notes that Parmenides brought to light in his analysis of ‘it is’: absolutely necessary self-identity, immobility, exclusion of otherness, perfection, unity. To be ‘animal’ at the noetic-conceptual level is absolutely unchangeable, for if we think ‘animal’ we must necessarily and eternally think the same thing, or else we are not thinking ‘animal.’

Nevertheless, our knowledge of the world is not limited to that which we know noetically-conceptually. It is the Principle of Non-Contradiction (PNC), of which we have an immediate grasp as a first principle both of being and of knowledge, which gives us access to knowledge of the world. For insofar as the PNC implies that a given subject cannot both be and not be in a particular manner, in the same respect and at the same time, it gives us knowledge that the subject is open to opposites, albeit not simultaneously. Hence, it gives us knowledge of the material, and knowledge of change. But, since the base of all knowledge is the PNC, we know that the presence of a given essence in a subject excludes all opposites (again, in the same respect and at the same time). Hence, the concept, by means of which we know the essence of a given thing, is self-identical, immobile and exclusive of otherness. If being is considered not as a copula in a judgment, but as a conceptualized, separated essence, as Parmenides does, then being becomes conceptualized and essentialized, and is made immobile, self-identical, exclusive of otherness, unitary and perfect, as the concept is, but

³DK28B3.

Aristotle on Higher Natures

not real being. But being is not most truthfully considered as a concept, but rather as a judgment, as Aristotle indicates when he describes noetic being as ‘being-as-truth.’

Aristotle’s discovery of the relationship between the real and noetic-conceptual senses of being has several important results. In the first place, we see that the Parmenidean insistence on the universal immobility of being is the result of an illegitimate transferral of the characteristics of noetic-conceptual being to reality. I argue that the pre-Melissan *φυσιολόγοι*, for their part, lose their warrant for postulating eternal, unchangeable elements, since this postulate was precisely a response to the apparently irrefutable Parmenidean argument against change. This is a result of applying the necessary analysis in terms of categorial being to their theories; however, Aristotle’s identification of the differences between noetic and real being also eviscerates the ability of these *φυσιολόγοι* to negate substantial change.⁴ For if ‘to be’ does not imply ‘necessary and eternal self-identity’ in the realm of the real, then we are justified in postulating that genuine change can also occur amongst those things which ‘truly are’ amongst those things which are said to be real (provided that the data require that we postulate such genuine change in a given case).

⁴Democritus’s argument, as I have stated (p. 95, n. 86), is not affected by the flaw in the Parmenidean argument; rather, Aristotle answers Democritus’s mathematically-based argument with another based on mathematical principles.

5.1.2 The *ἀρχαὶ* of mobile being

Having provided justification for holding that the Parmenidean negation of change is based on false assumptions, Aristotle now has the positive challenge of explaining how to make change and stability compatible in the real world studied by the natural philosophers. This is precisely the challenge that he takes up in the *Physics*, in particular in Book I, with the assistance of a third set of ‘senses of being,’ i.e. being as potency and being as act, which he explains in his *Metaphysics*.

In addition to the senses of being that I have indicated up to now, Aristotle notes that something can be said to be (or be said to be a being) either in potency or in act. Once we admit the reality of change, as must be done in order to study the physical world, we have to admit that there is more to being than being ‘actually.’ Act or actuality is what we refer to when we say that a being exists: it indicates a full reality, a kind of ‘doing’ that makes a thing to be what it is. It is a determination and a perfection, which makes it possible for our intellects to know it, and in a sense we can say that all that is, is in act, insofar as nothing can exist without being actual.

Nevertheless, this is not the full story. Were the cosmos immobile, actuality would be the only one of this pair of senses of being which is necessary to postulate. And indeed, the Stagirite had encountered a group of philosophers willing to assert that ‘being in act’ is the *only* such sense of being. The position held by the Megaric school of philosophers serves as a ‘straw man’ for his argument in favor of being as potency and act. He notes that if we deny the difference between potency and act, we lose our ability to escape

Aristotle on Higher Natures

the Parmenidean trap, and thus we are no longer explaining the physical world. Aristotle notes that the Megaric doctrine causes a further problem for a scientific explanation of the world. Denial of the distinction between potency and act makes it impossible to *give a cause for* the changes we in fact observe, and we must posit change in such a way as to violate causality, a violation that eliminates the scientific nature of physical inquiry, which is precisely based on giving explanations in terms of causes.

Thus, there must be a sense of ‘being’ which refers to the potential aspect of the real. While only that which is in act can exist (*ἐπάρχειν*), there ‘are’ capacities to be which are hosted by the being in actuality. The man *is* sitting in act, but he *can* get up, and indeed does so at some point. This aspect of the real is indicated by the modal verbs, such as ‘can/could,’ ‘may/might’ and ‘shall/should.’ It has to be admitted as genuine, despite the fact that potency as such is not directly knowable, since it is undetermined and indeed in some ways infinite.

A first application of the distinction between potency and act is Aristotle’s derivation of the formal and material ‘parts’ of mobile being. The development of the science of ‘physics’ (that branch of philosophy dealing with mobile being *qua* mobile) must proceed through the development of adequate notions which truthfully describe reality subject to change. When we study a being that is able to change under some account, despite remaining the same under its definition, we can identify both an aspect which is determinate, and an aspect that is indeterminate but open to determination. These two aspects, termed *εἶδος* and *ὑλή* by Aristotle, correspond to the actual and potential aspects of the mobile being. The *εἶδος*, as deter-

mining act of the being, gives it its ‘whatness’ ($\tauὸ τὸ ἥν εἶναι$) and ‘isness’ ($\nuπάρχειν$); the $\nuλή$, as potential principle, indicates the capacity to ‘be other than’ it is in act.

This analysis is necessarily applicable to the entities postulated by the $\phi\mu\sigmaιολόγοι$: whatever physical $\alpha\rho\chiαι$ they may postulate, if these $\alpha\rho\chiαι$ are to be able to undergo change at all, they must be actualities which host potencies for the given kind of change. Thus, the principles of $\epsilon\lambda\deltaοs$ and $\nuλή$ are deeper $\alpha\rho\chiαι$ even than the ‘roots’ or ‘atoms’ postulated by Aristotle’s predecessors. While Aristotle accepts a roughly Empedoclean theory of four basic elements (or ‘ $\alpha\pi\lambda\hat{\alpha} \sigma\omega\mu\alpha\tau\alpha$ ’), even these must be composed fundamentally of a formal principle (that which gives each element its ‘whatness’) and a material principle (the ‘first matter’) which underlies the formal actuality of the given element, and which makes even the elements open to passing-away and coming-to-be.

As a result of his derivation of the ultimate $\alpha\rho\chiαι$ of mobile being, Aristotle has identified that every such being must be characterized by a formal principle which makes it to be in act. This formal principle, in turn, is ‘host’ to the material aspect of the being, since the matter is contained ‘virtually’ within the being as it is in act. Thus, we can say that Aristotle has derived the necessity of a principle which is a source of the changes that the mobile being undergoes or causes, and this principle is what he calls $\phi\mu\sigmaιs$, a ‘principle of motion and rest in that which primarily exists’ (i.e. in substances).

5.1.3 The characteristics of *φύσις*

The derivation of *φύσις* as the formal principle of mobile being leads to a number of important conclusions which will be important for Aristotle's ability to justify the existence of 'higher' *φύσεις*. In the first place, *φύσις* has a close relationship to potency, as the Stagirite notes by stating that it is “ἐν ταύτῳ... γένει τῇ δυνάμει.” Insofar as a given formal act of a being determines the kinds of change that the being can undergo or cause, the formal act can be said to be a principle of potency.

The identification of *φύσις* as a principle of potency in this sense is of great importance for Aristotle in his effort to justify the existence of 'higher' *φύσις*. It is *φύσις* in its role as formal act which makes the matter of the being to be the being that it is. But formal act, as so defined, need not be restricted to being the formal act of *πρώτη οὐλή*, and thus Aristotle need not restrict true existence to just the elements, as the *φυσιολόγοι* do. Rather, the path is opened for the postulation of *φύσεις* which are the formal acts of 'matter' which is, from another perspective, endowed with its own *φύσις*. The *φύσεις* of the elements are, under another description, *οὐλή* for other *φύσεις*, such as those of the homoeomerous bodies (wood, metals, oils, flesh and bone). This 'scaffolding' of form is based on firm metaphysical principles, as well as on the derivation of the fundamental *ἀρχαί* of physical being, thereby giving Aristotle ample justification for positing true coming-to-be and passing-away at levels higher than the 'simple bodies.'

The categorial analysis of being demonstrates that the primary subjects of existence are the *οντίαι πρώτοι*, the self-subsistent individuals or 'sub-

stances' which are host to the various categories of accidental being. This implies that it is not possible to postulate universal 'laws' of motion which do not have as their cause particular existents; 'Love' and 'Strife,' if we are to follow Empedocles in postulating such universal causes of motion, must originate from some genuine existent (or existents) which can act as a genuine moving cause.⁵ Aristotle identifies an eternal First Mover which indeed plays the role of ultimate moving cause of motion, the presence of which is as the 'life of the cosmos,' insofar as it is responsible for the eternal circular motion of the heavens, and secondarily of the motion present in the sublunar realm. Nevertheless, the eternal motion of the heavens is not a complete cause of particular motions.⁶ Our universe is characterized by being composed of a multitude of particular existents, each of which is characterized by characteristic 'motions' or activities, and the postulation of an ultimate moving cause does not explain why each kind of existent has *its* particular motions.

To explain this fact, Aristotle's theory proposes very particular kinds of motion that each kind of $\phi\sigma\nu s$ gives to the kind of mobile being it brings into act. The 'simple bodies' or elements are characterized by certain 'active

⁵Vigo notes that substantial entities composed of form and matter "constituyen... las entidades básicas de las que depende la existencia de todo lo demás, dentro del conjunto de la realidad física: ni los procesos ni, mucho menos, el tiempo pueden existir por sí mismos, sino que sólo pueden hacerlo, a juicio de Ar., en conexión con los objetos sustanciales, de los cuales son, de modo inmediato o mediato, ontológicamente dependientes" "Aristóteles y la finitud extensiva del tiempo", p. 192. Universal 'physical laws,' if a natural philosopher is to postulate their existence, would have to be similarly dependent on existing particulars.

⁶Cf. *On Generation and Corruption*, 336a32-b3, and also *Meteorologica*, 346b16-31. In Aristotle's cosmology, the motion of the sun along the ecliptic is responsible for the generation and corruption of the elements and, indirectly, the cycle of death and birth that we see among organisms.

qualities' and natural motions: fire, for instance, heats and moves upward; earth, on the other hand, cools and moves downward.⁷ Similarly, other natural substances have their characteristic motions: trees grow, horses gallop, men walk (and reason, for reasoning is a kind of motion). But in order to explain the existence of characteristic motions which pertain to a given *φύσις*, it is necessary that *φύσις* be 'pluripotent,' i.e. able to be a principle of coming-to-be not only within the category of substance, but also within the other categories, in particular those of quantity, quality and place; indeed, Aristotle is clear that *φύσις* is pluripotent in this sense.

This 'pluripotency' of *φύσις* provides Aristotle with an elegant solution to the thorny issue of 'self-motion.' While he has shown that the eternal motion which is the 'life of the cosmos' must proceed from an eternal First Mover, and that no finite being can be a true producer of uncaused motion, it is also the case that the postulation of higher *φύσεις* requires that there exist characteristic motions of those *φύσεις* which are not reducible to the motions of more basic material components. Indeed, if the motions characteristic of organisms were entirely reducible to the motions of the 'simple bodies,' there would be little point to postulating genuine *φύσεις* for those organisms. The pluripotency of *φύσις*, however, makes it clear that the same *φύσις* which makes, for instance, a plant or animal to be, is also the cause of the characteristic motions of the plant or animal in question. Animals and plants are not uncaused moving causes, and thus must

⁷Higher *φύσεις* will be characterized by operations or faculties which are irreducible to the basic motions and activity of the elemental natures; the demonstration of the existence of such higher *φύσεις* will depend heavily upon showing that there exist beings whose operations are irreducible in this way.

be moved in some sense in order for their characteristic motions to come about (as Aristotle makes clear in *Physics VIII*). Nevertheless, they are not moved *qua* the motions they cause, and in this sense are genuine initiators of causal chains, and thus can be truthfully characterized as ‘self-movers.’ While I may be moved by an object of desire in picking up a stick and moving a stone (to use Aristotle’s generic example of a causal chain), I am not moved in the same way that the stick and the stone are moved, and therefore I am truly the first moving cause in the chain of locomotion that results in the movement of the stone.

A world in which there is genuine change also requires the postulation of action and passion. This is clear even in the theories proposed by the *φυσιολόγοι*; while they envision a universe where only their basic physical *ἀρχαί* genuinely exist, the simple entities that they propose have the capacity of affecting other such entities. Whether in the case of the ‘roots’ of Empedocles or the ‘atoms’ of Leucippus and Democritus, their cosmogonies and explanations of the coming-to-be and function of organisms rely heavily upon the mutual interaction of their proposed entities, particular in the case of locomotion. But this requires the postulation of two distinct types of potencies, i.e. active and passive potencies, in order that one being can ‘act’ and the other ‘react.’ In turn, this requires the postulation of what I have termed the ‘communication of form,’ which in turn requires a basic openness of being to the ‘other,’ in order that there can be true interaction, as opposed to mere ‘occasionalism.’⁸ The necessity of the ‘communication

⁸Anaxagoras postulated *νοῦς* as a first moving cause for the cosmos, but he was not an occasionalist: both Aristotle and Plato are clear that this philosopher did not use *νοῦς* as an explanation of particular motions, a lack which is said to have disillusioned Socrates

of form' also makes it clear that *φύσις* can be said to be a principle of motion in other beings as well; beings which exist 'φύσει' are not merely self-movers, but genuine movers of other beings, in accordance with the active potencies provided by their particular *φύσις*.

Aristotle holds that the majority of motions that occur in the sublunar universe are produced by living creatures: “τῶν γὰρ ἄλλων παρὰ τὴν τοῦ ὄλου κίνησιν τὰ ἔμψυχα αἴτια τῆς κινήσεως, ὅσα μὴ κινεῖται ὑπ’ ἄλλῃ-λων διὰ τὸ προσκόπτειν ἄλλήλοις.”⁹ If living creatures are to produce the majority of motion found in the universe, it must be possible that one such being can move another.¹⁰ Communication of form, in Aristotle's analysis, is fundamentally an actualization of a potency present in the patient, under the influence of the agent. Because the agent is already in act under the account in question, the agent is not said to be moved itself; rather, “ἔστιν ἡ κίνησις ἐν τῷ κινητῷ.”¹¹ It is for this reason that a natural substance can be an “αὐτὸν αὐτῷ κινοῦν” which stands at the head of a causal chain: the mover, insofar as it moves, is not moved. In *On Generation and Corruption*, he does set out some preliminary conditions for the communication of form, namely that the mover and the moved be in contact, that they be in act and potency in the same 'genus' (i.e. category), and that within that genus they be opposites. Given these conditions, it is 'necessary' that the agent act and the patient suffer. The question, then, of why two autonomous beings, each of which is being what it is through its own formal act, should be

with Anaxagoras. Cf. Plato, *Phaedo*, 97b.

⁹*On the Motion of Animals*, 700b05-13.

¹⁰I discussed the issue of what I have called the 'communication of form' in Chapters 2 and 3.

¹¹*Physics*, 202a13.

Chapter 5. Aristotle's Comprehensive Argument for Higher Φύσις

open to changing each other, comes down to the actualization of (respectively) active and passive potencies present in the two beings which affect one another, in the context of contact.

Contact is the key to the mystery of the communication of form, which in turn allows Aristotle to sustain his view of a world of independent substances which are nonetheless in constant interaction. Contact provides the necessary (and under the right circumstances, sufficient) conditions for one such independent being to affect another, because it removes any external impediment that there might have been to the action and passion. In Aristotle's view, action and passion occurs between whole beings; it is not reducible to interaction between the parts physically in contact. This is what makes it possible to say that beings which are *φύσει* truly *interact* with other beings in their environment, and that self-movers stand at the head of causal chains: things move and are moved *qua* the kinds of beings that they are, and thus the kinds of potency they possess.

A final, and very important, characteristic of *φύσις* is its inherent end-directedness. Potency is not absolute indetermination; rather, the potencies exhibited by a given kind of being are both limited and caused by the *φύσις* that makes that kind of being to be. While 'prime matter' is, in a certain sense, an absolute indeterminacy, it is potency only for generating the 'simple bodies.' Prime matter is not said to be 'in potency' to be, for instance, a statue of Hermes. Rather, it is the homoeomerous substance of bronze which is said to potentially 'contain' the Hermes; similarly, 'earth' is not said to be directly in potency to be a bow, but rather it is wood that is in potency to be a bow. This 'limitation' of potency also is the source

Aristotle on Higher Natures

of the end-directedness of $\phi\sigmaις$. For insofar as the formal act determines its matter to be some particular kind of being, it also determines the resulting potencies to certain ends. The ‘simple bodies’ are in potency not in any generic sense, but have as ‘ends’ certain particular kinds of activity, i.e. being in their natural places, and exercising their active qualities. Thus, $\phi\sigmaις$ is $\epsilon\nu\epsilon\kappa\alpha\tauou$, in the sense of being directed towards concrete kinds of activity and concrete kinds of reactivity. Insofar as higher $\phi\sigmaις$ provides irreducible ‘higher’ potencies for action and passion, it will also provide higher end-directedness, corresponding to the particular activities which correspond to its active and passive potencies.

5.2 The case for the existence of higher $\phi\sigmaις$

We are now in a position to look at Aristotle’s positive proofs for the existence of higher $\phi\sigmaις$. While many modern commentators on Aristotle attempt to interpret his arguments in a manner that prescinds from the broader context of his physical and metaphysical doctrines, I believe I have shown that these doctrines provide ample justification for showing that his positive proofs in this regard rest upon solid grounds, which make the conclusions that he draws much more plausible.

I have divided this section into three subsections. The first subsection will look at the implications for this thesis of Aristotle’s declaration—in *Physics* II.1—that any attempt to demonstrate the existence of $\phi\sigmaις$ is a ridiculous endeavor. The second subsection will discuss the various arguments that I have found in Aristotle’s texts which have as their goal the

demonstration of higher *φύσεις* irreducible to mere conglomerations of material *ἀρχαῖ*. The final subsection will address Aristotle's arguments for the existence of higher potencies or powers which cannot be explained except by adducing the existence of higher types of *φύσις* which are their hosts. Within each section, the arguments will be ordered from greater to lesser importance.

5.2.1 Demonstrating the existence of *φύσις* as ‘γελοῖον’

Prior to embarking on the discussion of Aristotle's positive proofs, it is necessary to address the fact that Aristotle clearly demonstrated a disdain for 'proving' the existence of *φύσις*.¹² He compares such an attempt to the struggles of the blind man to syllogize about colors: the fact that someone would attempt to 'demonstrate' what is obvious by means of what is less obvious is a clear indication of a failure to understand the very thing being discussed.¹³ Why did Aristotle view attempts to 'prove' the existence of *φύσις* in such a harsh light, and how does his stated opinion affect the project I am carrying out in this study?

There are a number of possible reasons for the fact that Aristotle expressed himself in such a negative way concerning the attempt to prove the existence of *φύσις*. A first such reason derives from the fact that Aristotle's surviving writings are all 'esoteric,' written for members of Aristotle's

¹²“ὦς δ' ἔστιν ἡ φύσις, πειρᾶσθαι δεικνῦναι γελοῖον,” *Physics*, 193a3.

¹³“φανερὸν γάρ ὅτι τοιαῦτα τῶν ὄντων ἔστιν πολλά. τὸ δὲ δεικνῦναι τὰ φανερὰ διὰ τῶν ἀφανῶν οὐ δυναμένου κρίνειν ἔστι τὸ δι' αὐτὸ καὶ μὴ δι' αὐτὸ γνώριμον (ὅτι δ' ἐνδέχεται τοῦτο πάσχειν, οὐκ ἄδηλον· συλλογίσατο γάρ ἂν τις ἐ γενετῆς ὧν τυφλὸς περὶ χρωμάτων), ἀστε ἀνάγκη τοῖς τοιοῦτοις περὶ τῶν δινομάτων εἶναι τὸν λόγον, νοεῖν δὲ μηδέν,” *Physics*, 193a3-9.

Aristotle on Higher Natures

own philosophical circle.¹⁴ His intended audience would have been familiar with the arguments I have discussed in the previous section of this chapter, and thus it would have been immediately obvious that a formal principle of motion and rest was a necessary postulate for a satisfactory physical science. A second reason is that it is clear from mere observation that there are beings which have within themselves a principle of motion and rest, as Aristotle points out. It is this ‘phenomenal’ observation of mobile beings that the *φυσιολόγοι* rely upon as the basic data for their reductionist theories, and thus it is a self-defeating maneuver to negate the very data that permit the development of the science they are pursuing.

All of this being the case, what purpose is there for a project such as that which I carry out in this study? Is it not, at least, clearly un-Aristotelian to attribute to Aristotle a set of positive proofs for something which he himself has clearly stated needs no proving? I believe that there are several considerations which justify my current project. In the first place, it is easy (and common) for readers of Aristotle—ancient and modern—to accuse him of falling victim to ‘folk ontology,’ i.e. of giving the status of true existent to things which are merely phenomenal: our eyes and other senses deceive us into believing that horses, houses and humans are more than mere aggregates; philosophers, however, ought to know better than to be deceived. Thus, I claim that one valid purpose of an argument for the existence of *φύσις* is to show that Aristotle’s ontology is far from being ‘folksy’; indeed, it is based on a powerful metaphysical and physical doctrine that shows the need for *φύσης* in order to explain the phenomena under investigation in

¹⁴Cf. Barnes, “Life and Works”, p. 12.

Chapter 5. Aristotle's Comprehensive Argument for Higher Φύσις

physical science. In the context of Aristotle's complete doctrine, the existence of *φύσις* is so clearly necessary that it hardly needs further proof.

Nevertheless, it is not automatically clear from Aristotle's metaphysical and physical doctrines *which* of the many beings we encounter in the world are genuine natural substances. For Aristotle distinguishes between objects which come to be by nature—and which thus exist as true unitary substances¹⁵—and those things which are one by art, and which have an accidental unity given to them by the artist.¹⁶ Indeed, many of the things which a child might naïvely believe to be 'one by nature' (such as dolls, baseballs, houses or shoes) are later discovered to be artifacts made by man, and do not in fact grow on trees or sprout from the earth.

Thus, it is not *a priori* obvious where to draw the line between that which is accidentally one (through art or through chance) and that which is substantially one. Indeed, it would appear to be possible, given Aristotle's basic metaphysical and physical doctrine, to assert that only the elements exist as true substances, and that everything else is an aggregate. A Greek materialist might conceivably admit Aristotle's doctrine of form and matter and still say, with Empedocles, “ἄλλο δέ τοι ἐρέω· φύσις οὐδενός ἔστιν ἀπάντων θυητῶν, οὐδέ τις οὐλομένου θανάτοιο τελευτή, ἀλλὰ μόνον μίξις τε διάλλαξίς τε μιγέντων ἔστι, φύσις δ' ἐπὶ τοῖς ὀνομάζεται ἀνθρώποισιν.”¹⁷ Thus, Aris-

¹⁵“οὐσία λέγεται τά τε ἀπλᾶ σώματα, οἷον γῆ καὶ πῦρ καὶ ὕδωρ καὶ ὄστα τοιαῦτα, καὶ ὅλως σώματα καὶ τὰ ἐκ τούτων συνεστῶτα ζῷά τε καὶ δαιμόνια καὶ τὰ μόρια τούτων ἄπαντα δὲ ταῦτα λέγεται οὐσία ὅτι οὐ καθ' ὑποκειμένου λέγεται ἀλλὰ κατὰ τούτων τὰ ἄλλα,” *Metaphysics*, 1017b10-15.

¹⁶“Ἐπειδὴ τὸ εἰδέναι καὶ τὸ ἐπίστασθαι συμβαίνει περὶ πάσας τὰς μεθόδους, ὃν εἰσὶν ἀρχαὶ ἡ αἴτια ἢ στοιχεῖα, ἐκ τοῦ ταῦτα γνωρίζειν (τότε γὰρ οἱ μεθαγγιστές γιγνώσκειν ἔκαστον, ὅταν τὰ αἴτια γνωρίσομεν τὰ πρῶτα καὶ τὰς ἀρχὰς τὰς πρώτας καὶ μέχρι τῶν στοιχείων), δῆλον ὅτι καὶ τῆς περὶ φύσεως ἐπιστήμης πειρατέον διορίσασθαι πρῶτον τὰ περὶ τὰς ἀρχάς,” *Physics*, 184a09-16.

¹⁷DK31B8.

Aristotle on Higher Natures

totle will have won a Pyrrhic victory, demonstrating that at the metaphysical level we must speak in terms of matter and form, potency and act, substance and accident, while the *φυσιολόγος* feels free to ignore this analysis in practice. For what does it matter to the materialist if, in some sense, there is ‘matter’ and ‘form’ in the being of an atom or a certain element, if this makes no difference to his analysis of higher beings as chance aggregates of elements?

It is for this reason that an explicit defense of ‘higher’ *φύσις* becomes necessary. For Aristotle needs to show that the theories of the *φυσιολόγοι* do not, and cannot, suffice to explain the existence and behavior of organisms. Aristotle provides a number of positive arguments intended to show that there in fact exist *φύσεις* of organisms; the rest of this chapter is dedicated to a description of these arguments.

5.2.2 Arguments for the existence of higher *φύσεις*

In this subsection, I present two arguments made by Aristotle which speak particularly to the need to posit complex natural substances in order to explain the phenomena observed in nature. In the first place, I will discuss his theory of animal self-motion, and secondly, I will discuss his brief argument for the necessity of *ψυχή* to account for the persistence of complex organisms over time.

Animal self-motion

A first line of argumentation is that which Aristotle uses to demonstrate that animals are genuine self-movers. I have discussed several of these arguments in Chapter 3. The first stage of these demonstrations involves establishing the need for causal chains to be finite, which in turn depends on the simultaneity of action and passion among the mover and the moved. If the mover and the moved move at identical times, then no matter how long the causal chain is, all the movers and mobiles in the chain move at the same time, with the result that an infinite causal chain would involve infinite motion in finite time. The simultaneity of action and passion derives from the metaphysical analysis of action and passion: if the act of the mover is in the moved itself, there cannot be a lapse of time between the action and the passion, for there would be a moment when the mover was moving and the moved was not, which would not be action at all; similarly, there would be a moment when the moved was being actualized, but the mover was not moving it, and thus the motion would be uncaused. Thus, action and passion must be simultaneous, and hence it follows that causal chains must be finite.

Having established this point, Aristotle can proceed to make other arguments which directly prove the existence of self-movers. In *Physics* VIII.5, he makes the argument that every causal chain must terminate in a self-mover, ‘ὑπὸ τοῦ αὐτὸῦ κινοῦντος κινεῖται.’ There are certain motions, particularly those of the ‘simple bodies,’ which are directly caused by the circular motion of the innermost celestial sphere, which moves along the ecliptic

Aristotle on Higher Natures

and thus is able to cause contrary motions depending on its position with respect to the moved. The motions of the simple bodies are thus responsible for the coming-to-be and passing-away of the living organisms of the world. The vast majority of the motions in the world are not reducible to the motions of the simple bodies, but must be traced to motions of animals and other living beings, which proceed from their souls, which act as unmoved movers. I suggest that there are at least two related arguments present in Aristotle's works that establish the need for this kind of genuine self-motion in animals.

In the first of these arguments, Aristotle points to the existence of certain *δυνάμεις* in the sense organs, which are not present in things without soul. Aristotle analyses sensation as a kind of alteration, but notes that unsouled things lack the potency for this kind of alteration, and are thus 'insensible.' Thus, when Aristotle speaks about the necessity that causal chains terminate in self-movers,¹⁸ we can deduce that he is speaking about the kinds of motions that are caused by an ensouled being moving due to some kind of sensory input (for he does not propose that animals move without stimulus from the environment), or else based on some internal input, such as memory or hunger. But these kinds of 'sense' experiences (internal or external) depend on a kind of alteration that is lacking in the simple bodies, and indeed is irreducible to them.¹⁹ But if nothing in the

¹⁸Indeed, in *On the Motion of Animals* Aristotle states that most motion that we encounter in the sublunar world is traceable to this kind of self-mover; cf. *On the Motion of Animals*, 700b5-13.

¹⁹Aristotle points out the absurdity of reducing 'psychic' alteration, such as learning or forgetting, to the activity of the elements: “ἄτοπον δὲ καὶ εἰ ἡ ψυχὴ ἐκ τῶν στοιχείων ηὔν τι αὐτῶν· αἱ γὰρ ἀλλοιώσεις αἱ τῆς ψυχῆς πᾶς ἔσονται, οἷον τὸ μουσικὸν εἶναι καὶ πάλιν ἄμονον, ἡ μηνήμη ἡ ληθῆ; δῆλον γὰρ ὅτι εἰ μὲν πῦρ ἡ ψυχή, τὰ πάθη ὑπάρξει αὐτῇ ὅσα πυρὶ ἢ πῦρ· εἰ δὲ μικτόν, τὰ

material makeup of the animal explains the origin of the particular kind of motion resulting from the sensory experience—for the motions characteristic of the matter do not produce the kind of motion to be accounted for—then it must be precisely the *ψυχή* of the animal, which *does* possess the *δύναμις* for sensory alteration, which is the first unmoved mover in the causal chain which the animal originates.

Despite Aristotle's clear assertions that it is the soul that moves the body, complications arise for such a simple account of self-motion. In particular, for Aristotle, animal self-movers are not absolutely unmoved sources of motion; rather, he points out that in many cases they are moved elements entering from their environment, such as food, whose digestion induces sleep and later waking. In cases where there is no direct efficient cause of a given movement, Aristotle argues that animals are moved by external final causes. To address this issue, we find a second argument for self-movers based on Aristotle's discussion of animal motion in *On the Motion of Animals*, which posits the object of desire (*όρεκτόν*) as the truly unmoved mover in the chain of motion that the animal begins. For in many cases it is not merely sensory input that causes a given motion in an animal, but sensory input which has significance *qua* the kind of thing sensed. While a fox may respond to the smell of live chickens with an automatic response of hunting, the fox does not merely attempt to enter the henhouse in any random way: he seeks a gap in the henhouse wall or in the fencing around the chicken coop which will allow him to enter (and indeed, the fox can be quite ingenious in finding ways to defeat the farmer's attempts to

σωματικά· τοῦτων δ' οὐδὲν σωματικόν," *On Generation and Corruption*, 334a10-15.

Aristotle on Higher Natures

keep him out). Similarly, large predators such as wolves and lions, which consume large amounts of energy during the hunt, do not pursue any random member of a herd of prey animals, but deliberately seek out the weakest and slowest members of the group, so as to maximize the energy gain obtained by making a kill. While this behavior is certainly instinctually based, and indeed Aristotle is clear that foxes and wolves do not possess ‘reason,’ it is nonetheless the case that these animals must be able to recognize categories of beings, precisely so that they can ‘intelligently’ differentiate between highly similar visual inputs, and desire and act upon one kind of thing rather than another. In short, animals need the *δύναμις* to interpret something as a good for them, so that it can be an *όρεκτόν*. This *δύναμις* is found only in the genus of the living, particularly animals, and is irreducible to the activity of the elements. Thus, motions which arise as the result of an object being an *όρεκτόν* under some *λόγος* of the good, must be motions which arise from the soul of the mover, and not from the material components of the mover *qua* material. It follows, then, that there must exist *φύσις* higher than that of the elements, which we can characterize as *ψυχή* capable of producing self-motion.

Hence, I see two areas where the Aristotelian arguments for self-movers and their properties impact his overall argument against the *φυσιολόγοι*. First, in *Physics VIII.4-5*, he demonstrates the existence of finite unmoved movers (i.e. animal souls). These finite unmoved movers are non-eternal principles which, not being material, are nonetheless able to direct the motion of the material components of a given body, *qua* being the *ψυχή* of that body. Insofar as we must postulate souls which move their bodies, not all

motion can be reduced to material necessity. Secondly, when he argues for the key role of intentional states (particularly *φαντασία*) in the production of self-motion, he demonstrates that the soul must have the capacity to assess a given object of sensation in terms of its benefit to the animal. What is important to recognize here is that there may be no convincing reduction to a physical or material explanation for whether a given object is a good or not, since there are goods which are only such as a result of the application of mental criteria. Hence, he has demonstrated the need for a non-reducible *δύναμις* which makes animals able to make choices based on experience and learned strategies, and makes humans able to consider objects of perception via *λογίσματα* (and for both animals and men to initiate movement based upon these considerations in the soul, as I will discuss below).

The persistence of organisms over time

Aristotle, in *On the Soul* II.4, presents a brief argument to show that the theory of Empedocles is unsatisfactory, insofar as it is unable to explain the persistence of organisms over time. He says, “πρὸς δὲ τούτοις τί τὸ συνέχον εἰς τάναντία φερόμενα τὸ πῦρ καὶ τὴν γῆν; διασπασθήσ-εται γάρ, εἰ μή τι ἔσται τὸ κωλύον· εἰ δ’ ἔσται, τοῦτ’ ἔστιν ἡ ψυχή, καὶ τὸ αἴτιον τοῦ αὐξάνεσθαι καὶ τρέφεσθαι.”²⁰ Empedocles postulates ‘Love’ as being responsible for the maintenance of unities (such as the monstrous beings which supposedly existed during the cosmic phase where Love is becoming gradually ever-more dominant).

²⁰*On the Soul*, 416a2-5.

Aristotle on Higher Natures

Aristotle completely ignores Empedocles's 'Love' in this connection, most likely because it is a blind universal force which cannot have any direct bearing upon whether a particular organism (a plant, in this case) is held together or pulled apart by Strife.²¹

The Atomists, on the other hand, postulated that certain 'atoms' had hooked shapes that were sufficient to cause the aggregates they formed to persist over time. Nevertheless, their theory is vulnerable to a modified version of the same argument used against Empedocles, regarding the 'spherical' atoms that they postulated as being responsible for soul-like activities. The spherical shapes of these atoms are sufficient to explain why the 'soul' is able to penetrate the gaps between the other kinds of atoms, and therefore be present in the entirety of the body, but their theory does not explain why the spherical atoms *remain* in the organism's body. What one should expect, instead, is that the spherical atoms should 'evaporate' from the body, quickly leaving the body soulless. Why, then, does the 'soul' remain in the body over long periods of time?

Aristotle's theory of *φύσις* provides the answer to this question. For while he admits that the 'simple bodies' are indeed present as the matter of more complex beings, it is the *ψυχή* as the act of the organism's body which makes the matter to be *one* thing, and to persist as that one thing over time. The necessity for such a formal principle becomes all the more

²¹The few extant fragments of Empedocles do not give any clear answer to this issue, although Fragments 34, 59 and 96 seem to imply the action of Love in creating and preserving particular entities. Aristotle, on the other hand, appears to assume that Empedocles's cosmic forces are insufficient to explain the persistence of organisms, presumably holding that blind universal forces did not, in fact, give any satisfactory answer to the question of the persistence of particulars. Indeed, he does not even mention Love or Strife in the text excerpted above.

Chapter 5. Aristotle's Comprehensive Argument for Higher Φύσις

evident when we note that the maintenance of an organism over time is not simply a question of resistance to degeneration. Rather, it requires that the organism be capable of integrating other kinds of beings into it, via nutrition, such that the ‘food’ which enters the organism does not remain what it was before, but as Aristotle notes, it becomes truly assimilated into the formality of the organism itself. Upon eating bread, we do not become bread, but rather the bread becomes *us*. This means that the *ψυχή* of an organism must play an active role in transforming its environment in order to maintain itself.

A second unexplained issue involves the ability of an organism to repair itself in order to maintain a state of health, a role which Aristotle explicitly assigns to *φύσις*. But in order for an organism to respond to illness by acting to return itself to the state of balance which characterizes health, there must be within that organism a ‘goal’ towards which it moves in attempting to heal itself. But the elements or atoms postulated by the *φυσιολόγοι* are explicitly postulated as working by *τυχή*, which excludes (as they explicitly point out) any goal-directed behavior on the part of the organism, which is a result of material necessity and nothing else. But organisms clearly act so as to preserve themselves against sickness and return themselves to health (a process which the doctor can aid in, but cannot produce by himself), and thus we must postulate a principle of internal activity which has as its end the preservation of the organism itself in a healthy state.

5.2.3 Non-reducible powers and potencies

In this subsection, I will look at the arguments that Aristotle adduces to prove the existence of active or passive potencies (or ‘powers’) which cannot be explained in terms of the activity of ‘elements’ or ‘atoms.’ I will begin with his discussion of natural finality. I will then look at his analysis of rational powers as ‘open to opposites,’ where non-rational powers are only open to a single actualization. I will conclude with a discussion of Aristotle’s view on the irreducibility of the senses to elemental activity.

Higher finality

An important set of arguments made by Aristotle concern the existence of the end-directedness present in organisms, a teleological character that is irreducible to explanations in terms of chance or material necessity. In Chapter 4 I examined Aristotle’s arguments for natural finality, noting that his primary argument is based on the incompatibility of the category of those things which come to be *ἀντόματον* or by *τυχή* with the category of things which come to be ‘*ἀεὶ ή ἐπὶ τὸ πολύ*.’ Precisely because chance *never* brings anything about ‘always or for the most part,’ it cannot be responsible for the activities of organisms, which do indeed act always according to their active or passive potencies, provided that nothing impedes.

I have noted that the *φυσιολόγοι* could presumably respond by giving examples of things which do in fact happen as a result of chance or luck, but which nevertheless produce their effects ‘always or for the most part.’ The ‘acorn-delivery mechanism’ I described is an instance of something that

meets this description: it regularly produces an effect describable as ‘delivering acorns to a squirrel’s nest,’ without there being any *καθ’ αντό* cause that has acorn delivery as its end. Empedocles could claim that his chance aggregations of bodily parts are similar, in that they occur very rarely in themselves, but once they occur, they bring about their characteristic activity always or for the most part.

Nevertheless, Aristotle’s argument is substantially stronger than it appears, even given this exception to his explanatory framework. For end-directedness is precisely the *only* explanation that can explain future-directed activity, such as the growth and maturation of organisms, and reproduction. In order for an immature organism to develop into a mature specimen of its species (say, for a puppy to become a mature dog), the mature *εἶδος* of the dog must be present in the puppy, along with the powers necessary to bring the perfected form into being. Thus, the mature *εἶδος* must be said to *be* in potency; it does not exist in act, for the puppy still has its immature bodily structure and powers. Nevertheless, the *εἶδος* must be present within the puppy, along with processes of development precisely directed towards the mature *εἶδος* as its end, for otherwise the process of development will produce random results, not a mature dog *ἀεὶ η̄ ἐπὶ τὸ πολὺ*.

A similar argument can be made in regards to reproduction, for the parent (or parents) of the engendered organism must implant within its matter precisely *their own* form. Here ‘form’ can be taken in the loose sense of ‘structure,’ in order to avoid assuming the very thing Aristotle needs to prove. It remains true that even under a materialist explanation that the offspring of parents of a given species must reproduce the general struc-

Aristotle on Higher Natures

ture of their parents, or else what occurs is not reproduction, but random coming-to-be. But for the parents to implant this ‘form’ in the offspring, they must possess the form as a principle that guides the parents’ activity in in-forming the material of the offspring. Otherwise, their activity will be random, and will reproduce their form only under exceptionally rare circumstances, which is directly the opposite of what indeed occurs. This formal principle must be present even if we wish to rely only upon ‘material necessity’ as the moving principle, for unless the activity of the matter (in this case, the elements or atoms proposed by the *φυσιολόγου*) is operating *in order to* reproduce the same form / structure as is present in the parent organisms, the result of material necessity will be a random product.

A confusion occurs here with respect to what it means to act *in order to* achieve something, which Aristotle clears up in the same chapter of the *Physics*. To act *ἐνεκά τον* does not require consciousness or reason, but rather end-directed activity is precisely the result of the actualization of a given potency. Aristotle makes it clear that the concept of being *ἐνεκά τον* is applied only in a derivative sense to rational activity. In the first place, even chance and luck are *ἐνεκά τον*, insofar as they are productive of results that *could have been* chosen: the lender *could have* gone to the market to collect his debt, even though that was not his real purpose in going.

Secondly, Aristotle points out that even where art is concerned, finality is only secondarily associated with reasoning. The harpist who has to think about every note before he strikes a harp string is not really a harpist, but a student learning to play. In fact, once the art in question has been learned, it is exercised in view of rational goals (for instance, playing the

harp for one's supper, or building a boat in order to sell it to the Athenian navy), but is exercised without thinking about the particular steps needed to bring about the product of the art. We say of a harpist that “his hands have learned the music,” or of the boat builder that “he can plane a board without thinking” precisely to express this fact. Ultimately, this is a result of the fact that end-directedness pertains principally to the potency that is being exercised; in the case of music or boat-building, this is a rational potency, insofar as it depends on the *λόγος* of the activity, but its exercise is the same as any non-rational potency, such as digestion or growth, in that it involves an actualization of something that is in potency. Actualization of a potency is necessarily end-directed or *ἔνεκά τον*, precisely because a particular *ἐντελέχεια* is the end of the actualization.

Having established these points, Aristotle can defend the existence of higher finalities with rigor. Again, in *Physics* II.8 he notes that plants and the parts of animals exhibit obvious finality. The leaves of plants are ‘for’ protecting the fruit, and the swallow builds its nest ‘for’ holding and protecting the eggs that it will lay. It is clear that such finalities are beyond the range of what is possible for the elemental bodies, whose activity *ἔνεκά τον* is limited to being up or down, heating or cooling, and drying or moistening.²² But there is clearly end-directedness embedded in the activities of these creatures, for in addition to the purposes served by the leaves or the nest, there is also a clear ends-means structure in the coming to be of the leaves or the nests. For the bird must proceed by choosing building materi-

²²The *φυσιολόγοι* propose similar activities for their ‘simple bodies,’ which in any case do not move or act due to any complex finality.

als adequate to the kind of nest that will be built (for instance bits of grass, wood, or mud), and must lay the foundation of the nest before building its walls, and must build the rough nest structure before weaving in lighter materials that will provide cushioning for the eggs, etc. This interrelation of the stages of coming-to-be is the same as in art, where there is a clear instance of end-directedness, and the various stages have the same purpose, which is to make possible the next stage in the activity and the production of the final product. This is a case of hypothetical necessity: if a nest is desired, certain steps must be taken to attain it, and these steps are ‘for’ the nest as final product, regardless of whether the agent is rational or not. It is not possible that these various stages always come to be in the same order by chance, since whatever happens always or for the most part excludes chance. Hence, there must be an end for which the stages are carried out, and thus the coming to be must be *ἐνεκά τοι* in the strong sense.

In order that there can come to be finality in a complex process such as those carried out by organisms, or in the construction of the body of the organism (as in the case of the teeth in the jaw of an animal) there cannot be an explanation that merely makes reference to the motion of ‘simple bodies,’ for such finality is absent from these bodies, as we have seen. Thus, there must exist a principle which, as organizer of the ‘matter’ of the organism, is able to make one part come to be ‘for’ another (*ἐνεκά τοι*). In the case of the animal’s jaw, the production of teeth is part of the finality embedded in the *φύσις* of the jaw, *qua* jaw. But the jaw, independently of its function in the totality of the organism, cannot be said to have the finality of ‘chewing.’ Rather, there must be a superior *φύσις* which has jaws as part of its

'matter,' via the 'scaffolding of form,' and which *does* have the activities of food-seeking, chewing, digesting and growth as aspects of its own finality.

To conclude this section, I suggest that Aristotle can legitimately conclude that there must exist a principle which is innate to the organism, and which is able to host in potency the *εἶδος* of the mature version of itself when it is young, which is able to reproduce that *εἶδος* in the *νλή* that will become its offspring, and which is able to be a directive principle of activity and growth for the parts which are the 'matter' of the organism. But this is precisely higher *φύσις*, considered in its triple role of formal act, moving cause and final cause.

Rational and non-rational powers

In *Metaphysics* IX.1, at the beginning of his discussion of potency and act, Aristotle makes a strong distinction between those *δυνάμεις* which are *ἄλογοι* and those which are *μετὰ λόγου*. The latter, he says, include the various theoretical and practical arts, and are characterized by being able to produce opposites. In his description of the two types of powers, he makes a contrast between those beings which are clearly unreasoning, such as fire, which can only heat, and those beings which are '*τῆς ψυχῆς ἐν τῷ λόγῳ ἔχοντι*', such as the doctor, who can both heal and cause illness. This kind of 'rational potency' is characteristic of those beings which are at the summit of the *έμψύχοι*, i.e. human beings, which in addition to possessing the active potencies characteristic of other animals, such as perception, movement, and rest in respect of place, also possess *νοῦς* or intellect.

Aristotle on Higher Natures

As Aristotle notes at *Physics* II.8, it is not always easy to tell whether animals should be deemed to have *νοῦς* or not; nevertheless, there are rational potencies which are uniquely characteristic of human beings. These include, in particular, the ability to learn arts, both theoretical and practical, by means of instruction. These arts involve learning a particular *λόγος* or account, which can be the form of the product which is to be produced, or else the description of an activity (in the case of non-practical arts such as music). While via training, the artisan or artist comes to the point of being able to perform his or her art without reflection, the art itself is put into practice due to some reasoning about goods that lead to the artist or artisan applying his knowledge.

The radical difference that exists between rational potencies of this sort, and non-rational potencies (even potencies found in other animals) is that they are open to opposites. Thus, the doctor can cure an ailment or act to cause harm, all under the same account or *λόγος*, for the same knowledge that gives him the ability to cure also indicates how he can provoke injury. Thus, rational potencies are such as to *ποιεῖν τὰ ἐναντία*, and this character indicates an irreducible difference between rational and irrational potencies. Where the latter *must* actualize when in the presence of the corresponding passive potency (as for instance fire must burn in the presence of something inflammable), the rational potencies cannot do this. Since they are open to opposites, if they were to necessarily actualize in the presence of appropriate passive potencies, they would simultaneously produce opposites, which is clearly impossible. Aristotle notes that necessity in rational beings does not come about due to exterior factors, as is the case with

irrational potencies, but rather due to desire (*ὄρεξις*), and that the rational potency is necessarily exercised *ὅταν ὀρέγηται*. But again, *ὄρεξις* is something not present in the material elements of the world (as the *φυσιολόγοι* would be quick to agree, since part of their project is precisely eliminating reference to such phenomena as purpose and desire).

This line of argument appears to be quite conclusive, for if there exist potencies which are not otherwise explainable but through reference to *νοῦς* and *ὄρεξις*, we must postulate the kinds of being which are able to have these potencies, and these are precisely those beings with a *φύσις* sufficiently high on the scale of innate powers that it can host rational potencies such as art and science. But these potencies clearly exist, for it is undeniable that there exist such potencies as the art of shipbuilding, the art of medicine and the art of playing music. Hence, it appears undeniable that the corresponding higher *φύσις* must also exist.

The irreducibility of the senses to elemental activity

In his short work *On Sense and the Sensible*, Aristotle makes a number of related arguments to show that the materialist explanation of the senses was radically insufficient. The first of these proceeds by noting there are too many senses to reduce each one to the activity of a particular element: “τοῦ δὲ σώματος ἐν οἷς ἐγγίγνεσθαι πέφυκεν αἰσθητηρίους, ἔνιοι μὲν ζητοῦσι κατὰ τὰ στοιχεῖα τῶν σωμάτων οὐκ εὐποροῦντες δὲ πρὸς τέτταρα πέντε’ οὖσας συνάγειν, γλίχονται περὶ τῆς πέμπτης.”²³ If there are four elements, as posited by Empe-

²³“De sensu et sensato”, 437a25-27.

Aristotle on Higher Natures

docles, it cannot be the case that the senses are explained as each being the activity of a given element. Presumably, at the cost of some theoretical rearrangement, a materialist might posit that there is an additional fifth element, which is to correspond to the activity of the remaining sense. But Aristotle points out that such a stratagem would be entirely mistaken, for the senses are not explainable in terms of elemental activity.

He points out, directly following the passage quoted above, that the *φυσιολόγοι* universally assigned vision to fire, even if they were not able to assign all the rest of the senses to elemental activity.²⁴ But such an assignment is mistaken for several reasons. First of all, we can show that vision is not fire by arguing from physical fact: were vision to be fire, we would in fact be able to see at night, just as a lantern is most able to cast its rays when it is dark. But the opposite is the case, hence vision is not fire.²⁵ Further, we cannot attempt to resolve the problem as Democritus does, by saying that vision is a kind of reflection, for if reflection were indeed vision, we would have to propose that vision occurred wherever reflection does, such as in standing water and shiny metal objects, which is absurd.²⁶

These arguments point to the absurdity of the reductionist position taken by the *φυσιολόγοι*, but does not explain the true difference between the senses and the activity of the elements (or other physical objects). The difference is precisely that sense involves a reception of form, in an analogous manner to what occurs when a signet ring is impressed in wax. The senses are able to receive the *λόγος* of the object sensed, without receiving the matter of

²⁴“De sensu et sensato”, 437a25-30.

²⁵“De sensu et sensato”, 437b10-20.

²⁶“De sensu et sensato”, 438a5-10.

the object itself in the sense, and abstracting from non-significant aspects of the object sensed.²⁷ But this reception of form cannot be like that which occurs with the wax, or with reflection (which is also a reception of form in a similar fashion), for we would then apply sensation to the wax and the reflecting water. Instead, the form must be abstracted, without its matter, *as intelligible*—κατὰ τὸν λόγον—as Aristotle points out in continuation, and this is something that can only be performed by something which has soul.²⁸

5.3 Conclusions

In this chapter, I have presented an integrated account of Aristotle's defense of the existence of 'higher' *φύσις*, i.e. those kinds of formal act which are responsible for the being of organisms.

In the first section of the chapter, I focused on the arguments that Aristotle makes which serve to show the defects of the arguments proposed by

²⁷*On the Soul*, 424a17-24.

²⁸*On the Soul*, 424a33-b2. One might ask why it is that only those beings with soul perceive, and not the wax nor the reflecting water, since in a sense they too 'receive form without matter,' as Aristotle points out in his comparison of the signet ring: it does not matter whether the ring is of iron or gold, the impressed form in the wax will be the same. A modern-day explanation, such as that found in Nagel, "What Is It Like To Be a Bat?", identifies 'awareness' or 'consciousness' as being the distinguishing characteristics of perception, but this does not appear to be the argument that Aristotle makes here; he argues instead to the existence of distinctive potencies. In the following paragraph of *On the Soul*, Aristotle notes that the eye (and other sensory organs) are magnitudes which maintain a special equilibrium of opposites which enable the coming-to-be of a *λόγος*, but that the sense itself is not a magnitude. While he does not make explicit here what the character of this δύναμις is, I suggest that the distinction between the wax and the sense is that the latter is precisely a δύναμις that allows the intellect to abstract the *λόγος καθ' αὐτόν*; in the case of the wax, the *λόγος* is present as accidental form, and there is no δύναμις present that enables the χωρισμός of the *λόγος* by the intellect, but rather the wax is ἀδύνατον in this way.

Aristotle on Higher Natures

the *φυσιολόγοι*, and to show the necessity of his own alternative theory of nature, which finds its deeper foundations in his metaphysical doctrine. This doctrine is particularly important in eliminating two false conceptions of the *φυσιολόγοι*, who were influenced by the Parmenidean argument against change and in favor of the unicity of being. The metaphysical doctrine of the multiple senses of ‘being’ turns out to dramatically undermine the foundations of the arguments of the ‘Eleatic pluralists’ (Empedocles, Anaxagoras and Leucippus) in favor of eternal and immutable physical *ἀρχαι*. In combination with his specific argument against Democritus, Aristotle can thereby demonstrate that physical being is necessarily characterized instead as individual substance comprised of formal and material principles; the natural substance so comprised is thus able to undergo change, both in terms of motion in the various accidental categories, and in terms of coming-to-be and passing-away in the category of substance. The formal principle which, as act of the matter of the substance, brings a given mobile being into existence, can be characterized further as its principle of motion and change, allowing Aristotle to derive the notion of *φύσις* as a necessary postulate for a satisfactory science of the physical world. The metaphysical basis that Aristotle uses to underpin his theory *περὶ φύσεως* also allows him to demonstrate the existence of a number of properties of *φύσις*, in particular its role as principle of the characteristic activities of a given kind of mobile being, its ability to act and suffer in interactions with other beings, and its being the cause of those natural substances which act as genuine self-movers.

In the second part of the chapter, I focused on the various positive ar-

Chapter 5. Aristotle's Comprehensive Argument for Higher $\Phi\sigmaις$

gments that Aristotle makes for the existence of higher $\phi\sigmaις$. The first two of these arguments show that it is necessary to postulate soul or $\psiυχή$, which can both be an unmoved mover of its body and the initiator of causal chains in the world, and which can maintain the soul-endowed entity in existence via resistance to degradation and via nutrition. The second three arguments show that there exist powers that are not reducible to elemental motion, but which on the contrary require the postulation of types of soul (or higher $\phi\sigmaις$) which are capable of hosting these powers. These ‘proofs,’ which are frequently quite short and at times even somewhat cryptic, are shown to have a much greater argumentative power in the larger context of Aristotle’s physical and metaphysical theories, and in particular in the context of his refutation of much of the foundation necessary for defending the materialist theories of his predecessors. Read in this broader context, the demonstrations adduced by Aristotle for the existence of ‘higher’ natures provide a convincing defense of his position against the proposals of the $\phiυσιολόγοι$, and in the process reveal the great depth of insight that the Stagirite had both into the science of nature itself, as well as into the theories of his predecessors (both their positive contributions and their defects).

Conclusión

Consideraciones globales

Este estudio de la noción de *φύσις* en Aristóteles fue inspirado por una lectura de la Física, libro II, capítulo 8, encaminada a entender su defensa de la finalidad natural. Al leer la literatura secundaria, sobre todo aquella escrita desde la perspectiva de la tradición filosófica del mundo angloparlante, me encontré frecuentemente con críticas a los argumentos de Aristóteles, acusándole de malentendidos básicos, de dar por sentados aspectos importantes de la argumentación, o de argumentar con falacias. Aunque en aquel entonces carecí de una base suficiente en Aristóteles que me permitiese argüir de manera convincente contra dichas posiciones, me pareció obvio que muchas de estas críticas no tomaban en cuenta la perspectiva más amplia de la doctrina aristotélica, en particular en el área de la metafísica. Esto me llevó a emprender un estudio más profundo de los argumentos de Aristóteles, dentro del marco global de su filosofía.

Para enfocar mis estudios en un conjunto manejable de temas, decidí limitar mis investigaciones a las respuestas que Aristóteles da a los *φυσιολόγοι*, aquellos filósofos presocráticos que propusieron teorías materialistas y reduccionistas en la filosofía natural, y en particular a los *φυσιολόγοι* que florecieron en las generaciones inmediatamente anteriores a Aristóteles. Estos

Conclusión

filósofos, cuyas doctrinas conoció bien Aristóteles (y están así mucho más presentes en sus escritos), fueron también los herederos de ciertos axiomas de Parménides. Estos, en efecto, les inspiraron a proponer soluciones que combinaban una inmovilidad fundamental en aquellas cosas que ‘verdaderamente son’ –o sea los ‘átomos’, ‘raíces’ o ‘semillas’, únicos existentes según sus respectivas teorías– y la apertura a admitir la realidad del cambio –que les permitía desarrollar teorías de amplio alcance sobre el desarrollo y la estructura del mundo físico.

De este modo, la acotación del objeto de estudio a una extensión manejable exigió prescindir de una investigación profunda sobre la filosofía natural propuesta por Platón, pese a su profunda influencia en Aristóteles y las correspondientes críticas del Estagirita en varios lugares de su corpus. Tampoco realicé una consideración detallada de las explicaciones *περὶ φύσεως* de Parménides y de Heráclito, salvo en cuanto éstas influyeron en los *φυσιολόγοι* posteriores. Finalmente, dejé fuera de consideración las teorías materialistas y reduccionistas de la actualidad, a pesar de su obvio interés.

Los resultados de la investigación, no obstante dichos límites, me confirmaron en mi conjetura preliminar sobre el poder probatorio de los argumentos de Aristóteles. Desde el enfoque primero, centrado en la finalidad, amplié el horizonte de este estudio para cubrir el tema general de la *φύσις* ‘superior’ y averiguar cómo Aristóteles justificó la realidad primaria de precisamente aquellos tipos de seres que los *φυσιολόγοι* quisieron tanto eliminar de sus ontologías: organismos, sobre todo animales, como verdaderas *οὐσίαι* caracterizadas por principios formales irreductibles que les

dan su ser y sus actividades características. Dicho tema, que incluía la consideración de la finalidad natural, gozaba de una envergadura cabal para profundizar en toda una variedad de aspectos de la filosofía de Aristóteles. En particular, me llevó a estudiar su teoría física global, incluyendo aspectos de su cosmología, ‘física elemental’, ‘química’, biología y psicología. Estos temas resultaron estar profundamente arraigados en su filosofía primera y, como resultado, leí una importante porción de la Metafísica. Dichos estudios dejaron muy claro que la ‘ciencia natural’ de Aristóteles no puede entenderse fuera del contexto de su metafísica, y que –una vez esclarecidos los cimientos metafísicos de su doctrina– su argumentación contra los *φυσιολόγοι* y a favor de su propia teoría era notablemente más fuerte de lo que la opinión de muchos estudiosos suele asumir.

Como he descrito en los capítulos anteriores, la teoría metafísica de Aristóteles no es meramente ‘una’ teoría acerca de cómo es el mundo, una teoría entre muchas otras: es un intento ambicioso de descubrir y explorar las características de todo ser en cuanto tal, con el resultado de que cualquier teoría física propuesta –sea por los *φυσιολόγοι*, Platón, Aristóteles mismo, o por cualquier filósofo que viniera después– debe ser interpretada a su luz. Las teorías de la mayoría de los *φυσιολόγοι* resultan basarse en errores serios de análisis metafísico, que les condujeron a proponer *ἀρχαί* básicas carentes de justificación primordial, y a proponer la inmutabilidad del ser basándose en un argumento erróneo del gran fundador de la escuela éléata. A lo largo de su corpus, y especialmente en su Física, Aristóteles deriva una teoría de la *φύσις* que puede declarar necesaria: para explicar los fenómenos encontrados por la ciencia natural, no hay alternativa a proponer

ner un principio formal de ‘movimiento’ y ‘quietud’ en las sustancias. Una vez desarrollado –a través de su teoría general de la *φύσις*– el apoyo teórico para la existencia de las *φύσεις* de los animales y las plantas, resulta explicable que no considerase necesario –por lo que sabemos– desarrollar un tratado monográfico dedicado a la argumentación positiva a favor de su existencia, a pesar de los argumentos de los *φυσιολόγοι* negando expresamente esa existencia.

Aportaciones de esta tesis

Como he mostrado en mi tesis, el Estagirita ciertamente desarrolló argumentos a favor de la existencia de naturalezas superiores, aunque estos argumentos –con la excepción de aquel a favor de la finalidad natural en *Física* II.8– típicamente se encontraron dentro de textos con una finalidad argumentativa distinta. Tal es el caso, por ejemplo, del argumento sobre los animales como motores inmóviles sublunares, que forma parte a su vez de la prueba más importante de un único y primario motor inmóvil del universo. Gracias a estas inclusiones, los argumentos no siempre se resaltan como tales, apareciendo casi como meros esbozos, carentes del esfuerzo preciso por parte de Aristóteles para desarrollarlos plenamente. Lo que he querido mostrar en esta tesis, su aportación principal, es que cuando se consideran estos argumentos a la luz de la doctrina global aristotélica sobre la *φύσις* (y su metafísica subyacente), son argumentos fuertes y probatorios contra los contrincantes de su tiempo, los *φυσιολόγοι*.

La segunda aportación del estudio es un esclarecimiento de la depen-

dencia de los *φυσιολόγοι* previos a Meliso a la argumentación de Parménides a favor de la inmovilidad, unidad y eternidad del Ser; y, por tanto, la consiguiente vulnerabilidad de sus tesis a la argumentación exitosa contra la posición fundamental del eleata. He encontrado un argumento de este tipo ‘escondido’ en la exposición aristotélica de los sentidos del ser, en particular el sentido del ser noético. Conocemos el ser a través del primer principio, el de no contradicción, pero es fácil no darse cuenta de que el ser se advierte en un juicio y fijarse sólo en el concepto del modo de ser que ‘está siendo’. Este sesgo en la consideración del ser conduce a la confusión del ser mismo con la índole del concepto y sus atributos: inmovilidad, atemporalidad, auto-identidad, unicidad, etc. Pero esta manera de considerar el ser deja olvidado el acto expresado en el juicio, y deja abierto el ‘camino de Parménides’, o sea transferir al ente real las características del ente noético-conceptual. Este argumento no se encuentra expresamente en los textos del Estagirita tal como lo he descrito aquí, pero considero que es un argumento netamente aristotélico.

Sobre la base de su epistemología relativa al ser, Aristóteles puede refutar de una vez a todos aquellos *φυσιολόγοι* (en principio, a quienes escribieron antes de Meliso, dejando aparte a Demócrito) que basaron sus teorías en la supuesta inmovilidad de lo que realmente es. El ejemplo dado por Aristóteles en su encuentro con los *φυσιολόγοι* es, por tanto, muy instructivo. Aunque ciertamente estuvo dispuesto de proporcionar argumentos positivos a favor de la existencia real de complejos seres ‘superiores’ como las plantas y los animales, su mayor empeño estuvo enfocado en la creación de una teoría física profundamente arraigada en una metafísica adecuada.

Conclusión

Establecido el marco teórico, la necesidad para una argumentación positiva, aunque todavía presente, tiene menos prioridad, pues muchos de los problemas que los argumentos positivos intentaron resolver ya tienen soluciones claras, que proceden de las teorías física y metafísica subyacentes.

Otro resultado del estudio a resaltar no es propiamente una aportación de mi tesis, sino un hallazgo de gran interés acerca de la literatura secundaria sobre Aristóteles. Es bien sabido que los estudios de su filosofía en el mundo angloparlante han sido influidos desde hace mucho tiempo por la perspectiva hermenéutica de la filosofía analítica. Por señalar sólo un ejemplo, aquel del papel de la metafísica en la comprensión de las doctrinas de Aristóteles, la influencia de la filosofía analítica ha dado lugar a interpretaciones del Estagirita que son claramente antimetafísicas, que quieren ver a Aristóteles como un filósofo del lenguaje común (B. Jones, W. Charlton, G. Ryle), por ejemplo, o como un empirista interesado en eliminar “procesos o eventos misteriosos y no empíricos” de las explicaciones de fenómenos físicos (M. Nussbaum 1978, p. 74), y para quien la forma es algo ‘material’, que principalmente tiene que ver con la organización del ente en cuestión (también Nussbaum). Incluso los que se interesan por su metafísica, como W. Sellars y R. Albritton, entienden la doctrina de la sustancia sin la ayuda de la analogía, algo típico de la filosofía analítica; leen Metafísica VI-VIII para comprender la doctrina de la sustancia, pero no toman en cuenta los demás sentidos del ente, en particular el acto y la potencia. De este modo, su entendimiento de la sustancia es enteramente en términos de la forma como estructura, y no como acto de una materia en potencia de ser la sustancia que es. Mi opinión sobre los autores de esta fase de la historia de la

hermenéutica de Aristóteles es que son analíticos en primer lugar, y sólo secundariamente intérpretes del Estagirita, por la fuerte influencia de las doctrinas interpretativas consideradas ‘aceptables’ por los analíticos. Este sesgo se hace notar más, quizá, con la filosofía analítica, dada su tendencia a querer siempre empezar ‘desde cero’, y hallar sus conclusiones sin el bagaje de interpretaciones anteriores.

Todo esto parece haber cambiado notablemente en décadas recientes, sobre todo desde los años 80, aparentemente bajo la influencia de los estudios clásicos sobre Aristóteles como filósofo. La nueva tendencia es aferrarse a los textos y ser muy cuidadosos a la hora de ofrecer interpretaciones globales de su autor. Por ejemplo, filósofos más recientes, como S. Waterlow (ahora Broadie), M. L. Gill, C. Witt, M. Furth, D. Charles y T. Scaltsas han vuelto a una interpretación de la sustancia que toma en cuenta los varios sentidos del ser, particularmente los de acto y potencia, y por tanto tienen una interpretación de la metafísica que se adecúa mucho más a la totalidad de la doctrina expuesta en la Metafísica. D. Bostock es otro ejemplo de esta corriente interpretativa más reciente que intenta representar fielmente la doctrina aristotélica aun cuando el autor no esté de acuerdo con ella. Bostock, notoriamente, considera que la noción de forma en Aristóteles padece de una absoluta incoherencia, pero argumenta mostrando un admirable manejo de los textos, especialmente los de los textos biológicos, que antes recibían poca atención. También hay hoy en día una nueva disposición a entrar en conversación con los comentaristas antiguos y medievales, tratando sus comentarios al texto con gran respeto, como de igual interés para una correcta interpretación de Aristóteles al de los mejores co-

Conclusión

mentaristas actuales. Finalmente, ha habido una expansión en la gama de textos que típicamente se leen para entender la metafísica y física aristotélicas y su filosofía de la ciencia: hoy en día es de rigor tener un conocimiento de los textos biológicos. Gotthelf y Lennox han sido pioneros en abrir esta nueva frontera, durante tantos años desconocida.

El resultado final de estas nuevas tendencias está siendo mejorar la calidad hermenéutica de los estudios sobre el Estagirita, aunque, en lo referente a la metafísica, su comprensión no alcanza todavía a la de los mejores comentaristas actuales en el continente europeo. Esto se debe, en mi opinión, a la peculiar concepción de metafísica reinante actualmente en el mundo angloparlante, en particular la influencia de la así llamada ‘metafísica de los mundos posibles’, que tiene muy poco en común con los planteamientos aristotélicos.

Direcciones para la investigación futura

Hay dos líneas de desarrollo principales para investigaciones futuras sobre los temas estudiados: las pertinentes a la filosofía antigua, y las relativas a cómo estos temas están tratados en la filosofía actual. Comenzaré con temas relacionados con la filosofía antigua, de los cuales mencionaré dos que serían de especial interés. Un área de interés sería el análisis de los posibles respuestas de los *φυσιολόγοι* a los argumentos de Aristóteles en su contra, basándonos en los fragmentos de su doctrina y la doxología tal como los tenemos hoy en día. ¿Cómo podrían haberse defendido cada uno de ellos, de acuerdo con los principios propios de cada uno? ¿Cuál habría

sido su reacción al ataque aristotélico contra Parménides basado en la aseveración de una confusión entre lo real y lo noético-conceptual? ¿Qué otros argumentos podrían haber usado cada uno para defender lo nuclear de la cosmología de cada uno: la negación absoluta de la generación y la corrupción, y por tanto de la *φύσις*? Y finalmente, ¿qué respuesta hubiera dado Parménides al ataque aristotélico a su doctrina? Una investigación de esta índole sería altamente especulativa, dada la escasez de textos que tenemos de los varios autores bajo consideración, pero también sería de gran interés averiguar los recursos ‘innatos’ de las teorías de estos presocráticos, y resaltar su capacidad de dar respuesta a retos filosóficos proveniente de una perspectiva muy distinta de la suya.

Una segunda área de interés sería el impacto que tienen las pruebas aristotélicas para naturalezas superiores sobre otros ámbitos de su filosofía, en particular la ética. Hoy en día es común, aunque no universal, defender la postura de que la ética aristotélica no depende de su metafísica, si bien son compatibles; esta postura ha sido llamado ‘coherentista’ por sostener que hay una coherencia entre ambos saberes, de tal forma que la ética no pone en cuestión doctrinas metafísicas de Aristóteles, pero tampoco necesita de ellas. ¿Hasta qué punto es necesario que un sujeto ético tenga las características de un ser con una *φύσις* superior? Por ejemplo, ¿no es necesario ser un se-moviente en un sentido fuerte para ser sujeto ético? Si no, ¿cómo se puede aseverar que es responsable de sus acciones? Y también, ¿no son necesarias las potencias racionales para la capacidad de decidir y actuar en consecuencia? Y ¿no es necesaria la existencia de teleología natural para que un hombre pueda tener la finalidad de ser feliz en

Conclusión

la contemplación del acto puro se-pensante? Me parece que estas capacidades y características son requeridas en la ética, y por tanto es necesario una ‘biología metafísica’, en las palabras de MacIntyre, para poder hacer ética como la hace Aristóteles. Tanto en su tiempo como en el nuestro, son muchos los filósofos que negarían la existencia de dichas capacidades en el ser humano, socavando así su capacidad real para ser sujeto ético.

En cuanto a investigaciones que tomarían en cuenta planteamientos y cuestiones actuales, hay varios que me parecen de especial interés. En primer lugar, como he notado en esta tesis, la argumentación aristotélica contra los *φυσιολόγοι* tiene un fuerte componente metafísico, manifiesto en sus argumentos positivos a favor de la existencia de naturalezas superiores. Pues bien, ahora que la metafísica ya no es un tema inmencionable dentro del mundo angloparlante, ¿qué será de los argumentos a favor de naturalezas superiores propuestos por Aristóteles?

La respuesta a esta pregunta dependería, por supuesto, de cuál de las muchas ‘metafísicas’ se adopte para hacer la comparación. Por ejemplo, dentro del ‘esencialismo científico’ de Kripke, Putnam y Brian Ellis, ¿por qué caben naturalezas o ‘esencias’ en el nivel de los elementos y compuestos químicos, pero en el grado de los organismos? ¿Qué tipos de causalidad existen según esta teoría? ¿Cabe una causalidad final? ¿Se admite la distinción entre acto y potencia? ¿Es hilemórfica su teoría de las sustancias físicas? Si es así, ¿se puede construir una teoría de ‘andamiaje de formas’ como se ha hecho con la ontología aristotélica? ¿Qué razones darían sus adherentes para negar esencias de un nivel más alto y con causalidad propia? Aunque falta mucho para que el ‘esencialismo científico’ llegue a ser

una verdadera metafísica en sentido aristotélico o tomista, las discusiones actuales en torno a esta teoría y otras semejantes ofrecen horizontes positivos para la aplicación de nuevas versiones de los argumentos aristotélicos a favor de naturalezas superiores.

Dentro del ámbito de la biología, hay autores, como Auletta et al., Clayton y Davis, y Murphy y Stoeger, entre otros, que defienden la existencia de una causalidad ‘arriba-abajo’. Auletta, en particular, un físico y biólogo, ha diseñado un experimento para demostrar que –en un organismo simple– condiciones de más alto nivel configuran el contexto para procesos de un nivel más bajo, un proceso que él llama ‘control de información’. Esto suena mucho a las demostraciones aristotélicas a favor de la consideración de los animales como se-movientes. ¿Hasta qué punto se puede hablar de ‘se-movientes’ desde la perspectiva de la teoría de causalidad arriba-abajo? ¿Cómo cabría la noción contemporánea de información dentro de la física y metafísica aristotélica? ¿Hay una relación entre forma e información? En los procesos de automovimiento que Aristóteles describe en *De motu animalium*, ¿qué relación hay entre un motor inmóvil que mueve por ser sentido por un animal como motivo (y que por tanto actúa como una causa final) y la noción de una ‘fuente de información’? Hay mucho terreno que explorar aquí, con semejanzas muy intrigantes entre los planteamientos contemporáneos y los aristotélicos, pero también diferencias importantes que piden ser mejor entendidas.

Estas preguntas solo son una selección mínima de aquellas que podrían hacerse acerca del tema de las naturalezas superiores hoy en día. El futuro es halagüeño, ya que cada vez son más los filósofos que acuden a Aristóte-

Conclusión

les como inspiración para afrontar los problemas de hoy, en las áreas que he abordado en mis estudios doctorales y en otras como la filosofía de la ciencia, la física, la biología, la ética y la política, etc.

Para mí, sin embargo, la cuestión de la existencia de naturalezas superiores es quizá una de las cuestiones más importantes de todas. Aunque podría parecer un área oscura y de escaso atractivo, en verdad toca un asunto que es de innegable interés para todos: ¿somos los seres humanos, al fin y al cabo, algo real con nuestra propia naturaleza que informa cómo vivimos como individuos y adónde queremos ir como sociedad, o somos, en el veredicto nihilista de Demócrito, meramente ‘átomos y vacío’? Y de ahí la importancia de Aristóteles, cuya metafísica, aplicable todavía hoy, pone los cimientos para una respuesta positiva a esta pregunta, una respuesta que no sólo es esperanzadora, sino que muestra posibilidades de ser sostenible aún en el contexto científico de nuestro tiempo.

A. Translations of Greek Texts

A.1 Aristotle

A.1.1 Categories

Translation by E. M. Edghill.

1b25-2a4

Expressions which are in no way composite signify substance, quantity, quality, relation, place, time, position, state, action, or affection. To sketch my meaning roughly, examples of substance are ‘man’ or ‘the horse’, of quantity, such terms as ‘two cubits long’ or ‘three cubits long’, of quality, such attributes as ‘white’, ‘grammatical’. ‘Double’, ‘half’, ‘greater’, fall under the category of relation; ‘in a the market place’, ‘in the Lyceum’, under that of place; ‘yesterday’, ‘last year’, under that of time. ‘Lying’, ‘sitting’, are terms indicating position, ‘shod’, ‘armed’, state; ‘to lance’, ‘to cauterize’, action; ‘to be lanced’, ‘to be cauterized’, affection.

A.1.2 On Sophistical Refutations

Translation by W. A. Pickard-Cambridge.

169a37-40

For this reason, too, this type of fallacy is to be ranked among those that depend on language; in the first place, because the deception is effected the more readily when we are inquiring into a problem in company with others than when we do so by ourselves, and the likeness arises out of the language.

A.1.3 Physics, or Natural Hearing

Translation by R. P. Hardie and R. K. Gaye.

184a9-16

When the objects of an inquiry, in any department, have principles, conditions, or elements, it is through acquaintance with these that knowledge, that is to say scientific knowledge, is attained. For we do not think that we know a thing until we are acquainted with its primary conditions or first principles, and have carried our analysis as far as its simplest elements. Plainly therefore in the science of Nature, as in other branches of study, our first task will be to try to determine what relates to its principles.

185a21-26

The most pertinent question with which to begin will be this: In what sense is it asserted that all things are one? For 'is' is used in many senses. Do they mean that all things 'are' substance or quantities or qualities? And, further, are all things one substance-one man, one horse, or one soul-or quality and that one and the same-white or hot or something of the kind? These are all very different doctrines and all impossible to maintain. For if both substance and quantity and quality are, then, whether these exist independently of each other or not, Being will be many.

184b15-22

The principles in question must be either (a) one or (b) more than one. If (a) one, it must be either (i) motionless, as Parmenides and Melissus assert, or (ii) in motion, as the physicists hold, some declaring air to be the first principle, others water. If (b) more than one, then either (i) a finite or (ii) an infinite plurality. If (i) finite (but more than one), then either two or three or four or some other number. If (ii) infinite, then either as Democritus believed one in kind, but differing in shape or form; or different in kind and even contrary.

A similar inquiry is made by those who inquire into the number of existents: for they inquire whether the ultimate constituents of existing things are one or many, and if many, whether a finite or an infinite plurality. So they too are inquiring whether the principle or element is one or many.

185a1-20

To look into whether being is one and immobile, then, is not to look into nature. For just as for the geometer there is no longer an argument with regard to one who denies the principles, but [this job belongs] either to a different science or to one common to all, so neither [with regard] to one who denies the principles [here]. For there is no longer a principle, if there is only one thing and it is one in this way. For a principle is a principle of some thing or things... It must be granted by us that either all or some natural things are moving. This is clear from induction... But since, though they do not speak about nature, difficulties about nature do still occur from their arguments, perhaps it is well to discuss them a little, for the inquiry is philosophical.

185a21-26

The most pertinent question with which to begin will be this: In what sense is it asserted that all things are one? For 'is' is used in many senses. Do they mean that all things 'are' substance or quantities or qualities?

186a21

For man is different in species from horse and [these are] contraries from each other.

186a23-25

The same kind of argument holds good against Parmenides also, besides any that may apply specially to his view: the answer to him being that 'this is not true' and 'that does not follow'. His assumption that one is used in a single sense only is false, because it is used in several.

186b1

Hence 'substance' will not be a predicate of anything else. For the subject cannot be a being, unless 'being' means several things, in such a way that each is something. But ex hypothesi 'being' means only one thing.

187a16-18

The first set make the underlying body one either one of the three or something else which is denser than fire and rarer than air then generate everything else from this, and obtain multiplicity by condensation and rarefaction.

187a20-26

The second set assert that the contrarieties are contained in the one and emerge from it by segregation, for example Anaximander and also all those who assert that 'what is' is one and many, like Empedocles and Anaxagoras; for they too produce other things from their mixture by segregation. These differ, however, from each other in that the former imagines a cycle of such changes, the latter a single series. Anaxagoras again made both his 'homeomerous' substances and his contraries infinite in multitude, whereas Empedocles posits only the so-called elements.

187b7-12

Now the infinite qua infinite is unknowable, so that what is infinite in multitude or size is unknowable in quantity, and what is infinite in variety of kind is unknowable in quality. But the principles in question are infinite both in multitude and in kind. Therefore it is impossible to know things which are composed of them; for it is when we know the nature and quantity of its components that we suppose we know a complex.

187b22-27

Further, anything may come out of anything-water by segregation from flesh and flesh from water. Hence, since every finite body is exhausted by the repeated abstraction of a finite body, it seems obviously to follow that everything cannot subsist in everything else.

188a27-32

It is clear, then, that all thinkers somehow make contraries principles. And [they say] this reasonably. For the principles must be neither from each other nor from others, and all things must be from them. But these [char-

Aristotle on Higher Natures

acteristics] belong to the first contraries: through being first things, they are not from others; through being contrary, they are not from each other.

188a32-b6

Our first presupposition must be that in nature nothing acts on, or is acted on by, any other thing at random, nor may anything come from anything else, unless we mean that it does so in virtue of a concomitant attribute. For how could 'white' come from 'musical', unless 'musical' happened to be an attribute of the not-white or of the black? No, 'white' comes from 'not-white'-and not from any 'not-white', but from black or some intermediate colour. Similarly, 'musical' comes to be from 'not-musical', but not from any thing other than musical, but from 'unmusical' or any intermediate state there may be.

Nor again do things pass into the first chance thing; 'white' does not pass into 'musical' (except, it may be, in virtue of a concomitant attribute), but into 'not-white'-and not into any chance thing which is not white, but into black or an intermediate colour; 'musical' passes into 'not-musical'-and not into any chance thing other than musical, but into 'unmusical' or any intermediate state there may be.

189a11-18

The next thing would be to say whether [the principles] are two or three or more. They cannot be one, because the contraries are not one. Nor can they be infinite, because being would not be understandable, and in every one genus there is one contrariety, and substance is one certain genus, and because [whatever] can be from finite [principles] is better from finite things, as Empedocles says than from infinite things.

189a27-34

Other objections to the view that it is not necessary to assume a third principle as a substratum may be added. we hold that a substance is not contrary to another substance. How then can substance be derived from what are not substances? Or how can non-substances be prior to substance?

189b12-b17

Indeed this doctrine too (that the One and excess and defect are the principles of things) would appear to be of old standing, though in different forms; for the early thinkers made the two the active and the one the passive principle, whereas some of the more recent maintain the reverse. To suppose then that the elements are three in number would seem, from these and similar considerations, a plausible view, as I said before.

190b17-28

Plainly then, if there are conditions and principles which constitute natural objects and from which they primarily are or have come to be-have come to be, I mean, what each is said to be in its essential nature, not what each is in respect of a concomitant attribute-plainly, I say, everything comes to be from both subject and form. For 'musical man' is composed (in a way) of 'man' and 'musical': you can analyse it into the definitions of its elements. It is clear then that what comes to be will come to be from these elements.

Now the subject is one numerically, though it is two in form. (For it is the man, the gold-the 'matter' generally-that is counted, for it is more of the nature of a 'this', and what comes to be does not come from it in virtue of a concomitant attribute; the privation, on the other hand, and the contrary are incidental in the process.) And the positive form is one-the order, the acquired art of music, or any similar predicate.

190b30-33

Whence, it must be said that, in a way, there are two principles, but in a way, three. And they are, in a way, the contraries, as though someone said that the musical and the unmusical or the hot and the cold or the consonant and the dissonant [are principles], but in a way, not. For it is impossible that the contraries suffer by each other.

191a7-a15

The underlying nature, however, is scientifically knowable according to proportion analogy. For as bronze is to statue or as timber is to bed or as material and the formless before it takes on form is to whatever else has

Aristotle on Higher Natures

form, so is this underlying nature to a substance and "this something" and a being. This, then, is one principle, though it is not one or being as a "this something", and one is the [principle] which is the account; and, moreover, [one principle is] what is contrary to this, the privation.

191a23-25

We will now proceed to show that the difficulty of the early thinkers, as well as our own, is solved in this way alone. The first of those who studied science were misled in their search for truth and the nature of things by their inexperience...

191b13-b15

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

191b28-30

This then is one way of solving the difficulty. Another consists in pointing out that the same things can be explained in terms of potentiality and actuality.

192a15-25

For admitting with them that there is something divine, good, and desirable, we hold that there are two other principles, the one contrary to it, the other such as of its own nature to desire and yearn for it. But the consequence of their view is that the contrary desires its extinction. Yet the form cannot desire itself, for it is not defective; nor can the contrary desire it, for contraries are mutually destructive. The truth is that what desires the form is matter, as the female desires the male and the ugly the beautiful-only the ugly or the female not per se but per accidens.

192b8-16

Of things which are, some are by nature and some through other causes. The animals and their parts and the plants and the simple bodies, such as earth, fire, air, and water, are by nature. For we say these and such things are by nature. But all these things clearly differ from things not constituted by nature. For each of these has in itself a principle of motion and standing, some according to place, some according to growth and diminution, and some according to alteration.

192b16-23

A bed and a cloak, however, and anything else of this kind, insofar as they are subject to each predicate [mentioned] and inasmuch as they are from art, do not have any inborn impulse for change at all. But insofar as they happen to be of rock or earth or a mixture of these, they do have one, and just to that extent, as nature is a certain principle and cause of moving and of resting in that in which it is, primarily, in virtue of itself, and not accidentally.

192b22

...nature is a certain principle and cause of motion and of resting in that in which it is, primarily, in virtue of itself, and not accidentally.

193a3-9

But to try to show that nature exists is laughable. For it is apparent that among beings there are many such things. Showing the manifest through the unmanifest is not being able to discern what is known through itself and what is not known through itself. That it is possible to suffer this is not unclear. For someone blind from birth might syllogize about colors. Whence, it is necessary that, for such people, the argument is about names and is without understanding.

193b2-7

Whence, in another way, nature would be the form and species of things which have in themselves a principle of motion, [which species is] not sep-

Aristotle on Higher Natures

arable except according to account. What is from these is not nature, but by nature, e.g., man. And this form is more nature than the material. For each thing is named [by its name] when it is in actuality, rather than when it is in potency.

193b19

'Form' and 'nature', it should be added, are said in two senses. For the privation too is in a way form. But whether in unqualified coming to be there is privation, i.e. a contrary to what comes to be, we must consider later.

193b25-35

But since the number of ways in which nature is said has been determined, after this one must consider in what the mathematician differs from the student of nature. For natural bodies also have surfaces and solids and lengths and points, which are what the mathematician looks into... The mathematician, then, is also concerned with these things, but not as each is a limit of natural body, nor does he consider their accidents insofar as they occur in such beings. Whence, he also separates [his objects]. For they are separable from motion in thought. And this makes no difference, nor, separating, do they become false.

194a20-22

If we look at the ancients, physics would be concerned with the matter. (It was only very slightly that Empedocles and Democritus touched on the forms and the essence.)

194b29-32

Again the primary source of the change or coming to rest; e.g. the man who gave advice is a cause, the father is cause of the child, and generally what makes of what is made and what causes change of what is changed.

196a25-28

There are some too who ascribe this heavenly sphere and all the worlds to spontaneity. They say that the vortex arose spontaneously, i.e. the motion that separated and arranged in its present order all that exists.

196b6-b10

There are some to whom luck seems to be a cause, yet unclear to human thought, as being something divine and rather godlike. Whence, one must look into what each is, and whether chance and luck are the same or different, and how they fall among the causes determined.

196b10-b16

First, then, since we see that some things always come to be in the same way, but some do so for the most part, it is apparent that luck is called the cause of neither of these; nor are these by luck, either what is by necessity and always, or what is for the most part. But since there are things which come to be besides these and everyone says these are by luck, it is apparent that luck and chance are something.

196b16-b23

Of things which come to be, some come to be for the sake of something and some do not. Of the former, some [come to be] according to choice, and some not according to choice; but both sorts are among those which are for the sake of something. Whence, it is clear that, even in those which are beyond the necessary and what is for the most part, there are some about which "that for the sake of which" can be present. Whatever could be done by thought or by nature is for the sake of something. Such things, then, when they come to be accidentally, we say are by luck. For just as what is exists either in virtue of itself or accidentally, so also can it be a cause. For example, the art of house-building is the cause of the house in virtue of itself, but accidentally, white or musical is. What is a cause in virtue of itself, then, is determinate, but what is so accidentally is indeterminate, for infinite things may happen to be in one thing.

196b30-197a8

As was said, then, when this comes to be among things which are for the sake of something, then it is said to be by chance and by luck. The difference between these must be determined later. But now let this be apparent, that both are among things which are for the sake of something. For example, a man caring for a common fund would have gone [to a certain place] for the sake of recovering a debt, if he had known. But he did not go there for the sake of this; it happened to him to go and to do this for the sake of getting the money. [He did] this, however, neither going to the spot for the most part nor by necessity. The end, collecting the money, is not among the causes in him, but is among things which are chosen and are by thought. And then he is said to have gone by luck; but if he had chosen and gone for the sake of this, or if he always or for the most part went there to collect money, [he would] not [be said to have gone] by luck.

197a6-08

So it is clear that luck is an accidental cause in things which are for the lesser part, for the sake of something, [and] according to choice. Whence, thought and luck concern the same thing. For choice is not without thought.

197b1

For luck and what is by luck are in those to which being fortunate and, generally, action can belong.

197b14-b23

But chance is in the other animals and in many unsouled things. For example, we say the horse came by chance, because, coming, it was saved, but it did not come for the sake of being saved. And the tripod fell by chance, for it stood for the sake of being sat upon, but did not fall for the sake of being sat upon. Whence, it is apparent that in things which come to be for the sake of something simply, when things whose cause is outside come to be not for the sake of what happens, then we say [they come to be] by chance. But, of these, we say that whatever choosables come to be by chance in those which have choice, come to be by luck.

198a1-3

We have now explained what chance is and what spontaneity is, and in what they differ from each other. Both belong to the mode of causation ‘source of change’, for either some natural or some intelligent agent is always the cause; but in this sort of causation the number of possible causes is infinite.

198a25-27

The last three often coincide; for the ‘what’ and ‘that for the sake of which’ are one, while the primary source of motion is the same in species as these (for man generates man).

198b10-b17

We must explain then (1) that Nature belongs to the class of causes which act for the sake of something; (2) about the necessary and its place in physical problems, for all writers ascribe things to this cause, arguing that since the hot and the cold, etc., are of such and such a kind, therefore certain things necessarily are and come to be-and if they mention any other cause (one his ‘friendship and strife’, another his ‘mind’), it is only to touch on it, and then good-bye to it.

198b17-b34

But there is a difficulty: what prevents nature from acting not for the sake of something nor because it is better so, but as Zeus sends the rain, not so the grain might grow, but by necessity? For what rises must cool, and the cooled coming to be water, must fall down. But, when this comes to be, growth occurs in the grain. So too, if the grain on the threshing-floor is destroyed by this, it did not rain for the sake of this, that it might be destroyed, but this just happened. So what prevents the parts in what is by nature from being like this, for example, teeth arising by necessity, the front ones sharp and fitted for cutting, the molars flat and useful for grinding food since they did not come to be for the sake of this, but they just fell together [like this]? And so too in the cases of the other parts in those in which that for the sake of which seems to belong. Wherever, then, everything came together as if it came to be for the sake of something, these were saved being suitably constituted by chance. But whatever was not of

Aristotle on Higher Natures

this sort was destroyed and is destroyed, as Empedocles says man-faced ox-progeny was. This, then, and any other of this sort, is the argument due to which someone might be at a loss.

198b35-199a8

But it is impossible that this is the way things are. For these and all things which are by nature come to be in a certain way either always or for the most part, but none of the things which are by luck and chance do this. For to rain much during winter does not seem to be by luck or by a coincidence, but during the dog-days; nor for there to be burning heat during the dog-days, but if during the winter. If, then, these things seem to be either by coincidence or for the sake of something, and if these things are not able to be by coincidence nor by chance, they must be for the sake of something. But indeed, all such things are by nature, as even those saying these things admit. So there is "that for the sake of which" in things which are and which come to be by nature.

199a8-15

Further, where a series has a completion, all the preceding steps are for the sake of that. Now surely as in intelligent action, so in nature; and as in nature, so it is in each action, if nothing interferes. Now intelligent action is for the sake of an end; therefore the nature of things also is so. Thus if a house, e.g. had been a thing made by nature, it would have been made in the same way as it is now by art; and if things made by nature were made also by art, they would come to be in the same way as by nature. Each step then in the series is for the sake of the next.

199b5-8

Thus in the original combinations the 'ox-progeny' if they failed to reach a determinate end must have arisen through the corruption of some principle corresponding to what is now the seed. Further, seed must have come into being first, and not straightway the animals: the words 'whole-natured first...' must have meant seed.

199b15-b26

The one who speaks thus [defending purely material necessity] wholly does away both with the things which are by nature and with nature. For those things are by nature which, continuously being moved from some principle in themselves, reach some end. But the same end is not reached from each principle in each case, nor any chance end: rather, each thing always reaches the same end, unless something impedes it. But that for the sake of which and what is for the sake of this can come to be by luck, as we say that the stranger came by luck, and, having freed the captive, went away, when, coming, he acted as if for the sake of this, though he did not come for the sake of this. And this is accidental, for luck is among accidental causes, as we said earlier. But when this comes to be always or for the most part, it is not accidental nor by luck. Yet in natural things it is always thus, unless something impedes it.

199b26-b34

It is strange not to believe that something comes to be for the sake of something just because the mover is not seen deliberating. For even art does not deliberate. If the ship-building art were in the timber, it would act by nature in the same way. Whence, if that for the sake of which is in art, it is also in nature. This is most clear when someone cures himself. For nature is like this.

200b12-13

Nature has been defined as a 'principle of motion and change', and it is the subject of our inquiry. We must therefore see that we understand the meaning of 'motion'; for if it were unknown, the meaning of 'nature' too would be unknown.

200b33-35

Again, there is no such thing as motion over and above the things. It is always with respect to substance or to quantity or to quality or to place that what changes changes. But it is impossible, as we assert, to find anything common to these which is neither 'this' nor quantum nor quale nor any of the other predicates. Hence neither will motion and change have reference

Aristotle on Higher Natures

to something over and above the things mentioned, for there is nothing over and above them.

201a10-19

Having distinguished according to each genus, between what is in actuality and what is in potency, the actuality of what exists in potency, as such, is motion. For example, [the actuality] of the alterable, as alterable, is alteration; of the growable and of its opposite, the decreasable (for there is no name common to both), growth and diminution; of what can come to be and of the destructible, coming to be and destruction; of what can be borne, locomotion. Examples will elucidate this definition of motion. When the buildable, in so far as it is just that, is fully real, it is being built, and this is building. Similarly, learning, doctoring, rolling, leaping, ripening, aging.

The same thing, if it is of a certain kind, can be both potential and fully real, not indeed at the same time or not in the same respect, but e.g. potentially hot and actually cold. Hence at once such things will act and be acted on by one another in many ways: each of them will be capable at the same time of causing alteration and of being altered.

202a8-202a12

This occurs by the touch of what is motive: whence, the latter suffers at the same time. The mover will always bear some species, either a "this" or a quality or an amount which will be a principle and cause of motion, when it moves [another]. For example, the man in actuality makes man from what is man in potency.

202a13-18

And [the solution of] the difficulty is apparent, that motion is in the mobile. For the actuality is of this and from what is motive. And the act of what is motive is not other. For there must be an actuality of both. For it is a motive thing by being able; but it is a mover by being in act at work. But the motive thing causes the act of the mobile; whence, the act of both alike is one, just as the interval from one to two and from two to one is the same, and what is uphill and / what is downhill. For these are one, though the account is not one. So too in the case of the mover and the moved.

203a33-35

Democritus, for his part, asserts the contrary, namely that no element arises from another element. Nevertheless for him the common body is a source of all things, differing from part to part in size and in shape.

203b2-14

It is clear then from these considerations that the inquiry concerns the physicist. Nor is it without reason that they all make it a principle or source. We cannot say that the infinite has no effect, and the only effectiveness which we can ascribe to it is that of a principle. Everything is either a source or derived from a source. But there cannot be a source of the infinite or limitless, for that would be a limit of it. Further, as it is a beginning, it is both uncreatable and indestructible. For there must be a point at which what has come to be reaches completion, and also a termination of all passing away. That is why, as we say, there is no principle of this, but it is this which is held to be the principle of other things, and to encompass all and to steer all, as those assert who do not recognize, alongside the infinite, other causes, such as Mind or Friendship. Further they identify it with the Divine, for it is ‘deathless and imperishable’ as Anaximander says, with the majority of the physicists.

204a23-29

But it is impossible that the infinite be a being in actuality; for it is necessary that it be some amount. The infinite, then, exists accidentally. But if so, it was said that one cannot call it a principle, a: but that in which it happens to be, the air or the even, [is a principle].

206a15-18

Both what is in potency and what is in actuality, then, are said to be. And the one infinite is by addition, another by division. Now, it was said that magnitude is not infinite according to act; but by division, it is. For it is not difficult to refute the indivisible lines. It remains, then, that the infinite is in potency.

207a28

For the matter is part of the whole, as the bronze is of the bronze statue.

207b21-26

The infinite is not the same in magnitude and movement and time, in the sense of a single nature, but the posterior depends on the prior, e.g. movement is called infinite in virtue of the magnitude covered by the movement (or alteration or growth), and time because of the movement.

207b35-208a4

Since, however, the causes were divided in a four-fold way, it is apparent that the infinite is a cause as material, and that to be infinite is a privation; what underlies [the infinite] in virtue of itself is the continuous and sensible. All other thinkers clearly use the infinite as material. Whence, it is also strange to make it not what is contained, but what contains.

209a5-07

True, but even if we suppose its existence settled, the question of its nature presents difficulty-whether it is some sort of 'bulk' of body or some entity other than that, for we must first determine its genus. Now it has three dimensions, length, breadth, depth, the dimensions by which all body also is bounded. But the place cannot be body; for if it were there would be two bodies in the same place.

211a18-24

Again, when we say a thing is 'moved', the predicate either (1) belongs to it actually, in virtue of its own nature, or (2) in virtue of something conjoined with it. In the latter case it may be either (a) something which by its own nature is capable of being moved, e.g. the parts of the body or the nail in the ship, or (b) something which is not in itself capable of being moved, but is always moved through its conjunction with something else, as 'whiteness' or 'science'. These have changed their place only because the subjects to which they belong do so.

224b1-b10

For what is first moved and that to which and from which it is moved are different, e.g., the timber and the hot and the cold. Of these, then, one is that which, one that to which, and one that from which. It is clear, then, that the motion is in the timber, not in the species. For the species or the place or the amount do not move and are not moved, but the mover [moves] what is moved and to that into which it is moved. For the change is named more from that to which than from that from which. Whence also, destruction is change to non-being. Nevertheless, what is destroyed also changes from being. And coming to be is to being; nevertheless, it is also from non-being.

226b1-b9

Change in the same species with regard to more and less is alteration. For motion is from a contrary or to a contrary, either simply or in a certain way. For, in the case of the less, this will be said to change in going to the contrary; in the case of the more, as from the contrary to this same thing. It makes no difference whether it change in some way or simply, except that the contraries must be present in some way or simply, except that the contraries must be present in some way; the more and less, however, are more or less of the contrary being present or not. From these [considerations], then, it is clear that these three alone are motions.

227b22-228a3

The motion one in substance and in number is simply one. What such a motion is is clear by dividing. For there are according to number three things about which we speak in regard to motion: that which, that in which, and when. I mean that it is necessary that there be something moving, as man or gold and that this is moving in something, such as in place or passion, and at some time, for everything moves in time. Of these, however, to be one in genus or in species is in the thing in which the mobile is moving, and to be contiguous was in time, but to be simply one motion is [being one] in all these. For that in which must be one and indivisible, i.e., a species; and the when, i.e., the time, must be one and must not be interrupted. And what is moving must be one not accidentally, as the white blackens and Coriscus walks (Coriscus and white are one, but accidentally), nor according to something common. For two men may become well at the same time

Aristotle on Higher Natures

according to the same health, e.g., from inflammation of the eye, but this is not one motion, but one in species.

231a21-29

If, however, the continuous and what is touching and what is in succession are as determined before, the continuous being that of which the extremes are one, what is touching, that of which [the extremes] are together, and what is in succession, what has nothing of the same kind between, it is impossible that something continuous be [made] from indivisibles, as a line from points, if, indeed, the line is continuous, but the point indivisible. For neither are the extremes of points one (for there is not, on the one hand an extreme, and on the other, some other part of the indivisible); nor are the extremes together (for there is no extreme of the partless, for the extreme and that of which it is the extreme are different).

242a17-b17

Since, however, what is moving is moved by something, it is also necessary that everything moving in place be moved by another. And therefore the mover [is moved] by something different, when it itself is also moving, and this again by something different. They will not then, go on to infinity, but [the series] will come to a stand somewhere, and there will be something which will be primarily the cause of moving. For if not, but the movers do go on to infinity, let A, something moved, be moved by B, B by C, C by D; and, then, in this way, let them go on to infinity. Since, then, the mover and the thing [moved] are moving at the same time, it is clear that both A and B will be moving at the same time. For A will be moved when B is moving; and B, then, when C, and C when D. The motion of A and B, will therefore be at the same time, and of C, and of each of the remaining ones. We will be able to take each of these, therefore. For even if each is moved by each, the motion of each is no less one in number, and is not infinite in its extremes, since, indeed, everything moving moves from something to something. For motion happens to be the same either in number, or in genus, or in species. I call that motion same in number, then, which is from the same in number to the same in number in a time same in number, e.g., from this white, which is one in number, to this black, according to this time, which is one in number. For if [the motion is] according to another time, the motion will no longer be one in number, but in species. That motion is the same in genus which is in the same attribute predicate, category, of substance or of

Appendix A. Translations of Greek Texts

[another] genus, in species, the one from the same in species to the same in species, as from white to black or from good to bad. (These thIngs were also said in the prior discussions.) Let the motion of A, therefore, be taken, and let it be E, and of B, Z, and of CD, IT, and the time in which A moves, K. The motion of A, then, being determined, the time will be determined and K will not be infinite. But both A and B and each of the remaining ones were movIng in the same time. It therefore happens that the motion EZIT, being infinite, is moving in the determined time K. For in that in which A was moving, all the ones in succession to A, being infinite, were also moving. Whence, they are movIng in the same time. For either the motion of A will be equal to that of B, or greater. However, it makes no difference. For in every way an infinite motion happens to be moving in a finite time; and this is impossible.

244b26-245a26

For in a way even the senses undergo alteration, since the active sense is a motion through the body in the course of which the sense is affected in a certain way. We see, then, that the animate is capable of every kind of alteration of which the inanimate is capable: but the inanimate is not capable of every kind of alteration of which the animate is capable, since it is not capable of alteration in respect of the senses: moreover the inanimate is unconscious of being affected by alteration, whereas the animate is conscious of it, though there is nothing to prevent the animate also being unconscious of it when the process of the alteration does not concern the senses. Since, then, the alteration of that which undergoes alteration is caused by sensible things, in every case of such alteration it is evident that the respective extremities of that which causes and that which undergoes alteration are adjacent. Thus the air is continuous with that which causes the alteration, and the body that undergoes alteration is continuous with the air. Again, the color is continuous with the light and the light with the sight. And the same is true of hearing and smelling: for the primary movent in respect to the moved is the air. Similarly, in the case of tasting, the flavor is adjacent to the sense of taste. And it is just the same in the case of things that are inanimate and incapable of sense-perception.

250b26-251a5

...or in the manner described by Empedocles, according to whom the universe is alternately in motion and at rest-in motion, when Love is making

Aristotle on Higher Natures

the one out of many, or Strife is making many out of one, and at rest in the intermediate periods of time-his account being as follows:

'Since One hath learned to spring from Manifold,
And One disjoined makes manifold arise,
Thus they Become, nor stable is their life:
But since their motion must alternate be,
Thus have they ever Rest upon their round':

for we must suppose that he means by this that they alternate from the one motion to the other.

252b8-12

First, it may be said that no process of change is eternal: for the nature of all change is such that it proceeds from something to something, so that every process of change must be bounded by the contraries that mark its course, and no motion can go on to infinity.

255a5-a20

For it is impossible to say [the elements] are moved by themselves. For this is vital and proper to ensouled things. And they would be able to bring themselves to a stand. I mean, e.g., if a thing is the *Ie* cause of walking for itself, it is also the cause of not walking. Whence, if it is in its own power for fire to be borne up, it is clear that to be borne down is also in its own power. It is unreasonable, however, [for them] to be moved by themselves according to one motion alone, if in fact they move themselves. Moreover, how can something continuous and naturally one move itself? For insofar as it is one and continuous, not by touch, a thing is impassible but insofar as a thing is separated [into parts], one [part] is naturally apt to act, the other to suffer. So not one of these moves itself, for they are naturally one, nor does any other continuous thing move itself. but it is necessary that in each thing the mover be divided in relation to what is moved as we see in the case of unsouled things when something among ensouled things moves [them].

255b32-256a4

If then the motion of all things that are in motion is either natural or unnatural and violent, and all things whose motion is violent and unnatural are moved by something, and something other than themselves, and again all things whose motion is natural are moved by something-both those that are moved by themselves and those that are not moved by themselves (e.g. light things and heavy things, which are moved either by that which brought the thing into existence as such and made it light and heavy, or by that which released what was hindering and preventing it); then all things that are in motion must be moved by something.

256a25-b1

If, then, something moved moves [another], it is necessary to come to a stand and not to go on to infinity. For if the stick moves by being moved by the hand, the hand moves the stick, but if another also moves the hand, this different thing will be what is moving the hand. Whenever, then, a different thing always moves [another] by something, it is necessary that a self-mover be prior. If, then, this [mover] is moving, but there is nothing moving it, it is necessary that it move itself. Whence, according to this argument also, either what is moved is directly moved by a self-mover, or at some time one comes to this sort of thing.

257a9-10

...we do no more than if we had said at the outset that that which is causing locomotion is in process of locomotion, and that one who is teaching is in process of being taught.

257a27-28

Consequently the first thing that is in motion will derive its motion either from something that is at rest or from itself.

257b2-b10

Now everything that is in motion must be infinitely divisible, for it has been shown already in our general course on Physics, that everything that is es-

Aristotle on Higher Natures

sentially in motion is continuous. It is impossible, then, for what is moving itself to move itself as a whole. For as a whole it would be borne and bear according to the same locomotion, being one and undivided in species; and it would be altered and alter, so that it would be teaching and learning at the same time, and be healing and being healed according to the same health. Moreover, it was determined that it is the mobile that is moved and this is a thing moved in potency, not in actuality; what is in potency, however, goes into actuality; and motion is the imperfect actuality of the mobile. The mover, however, is already in act, as the hot heats and generally, the thing having the species generates. Whence, the same thing will be hot and not hot in the same way.

258a22-27

it is clear that it is not through some part of the whole being of such a nature as to be capable of moving itself that the whole moves itself: it moves itself as a whole, both being moved and imparting motion through containing a part that imparts motion and a part that is moved. It does not impart motion as a whole nor is it moved as a whole: it is A alone that imparts motion and B alone that is moved.

258b28-259a7

The eternity and continuity of the process cannot be caused either by any one of them singly or by the sum of them, because this causal relation must be eternal and necessary, whereas the sum of these movents is infinite and they do not all exist together. It is clear, then, that though there may be countless instances of the perishing of some principles that are unmoved but impart motion, and though many things that move themselves perish and are succeeded by others that come into being, and though one thing that is unmoved moves one thing while another moves another, nevertheless there is something that comprehends them all, and that as something apart from each one of them, and this it is that is the cause of the fact that some things are and others are not and of the continuous process of change: and this causes the motion of the other movents, while they are the causes of the motion of other things.

259a4-7

...[N]evertheless there is something that comprehends them all, and that as something apart from each one of them, and this it is that is the cause of the fact that some things are and others are not and of the continuous process of change: and this causes the motion of the other movents, while they are the causes of the motion of other things.

259b3

We manifestly see, however, such beings which move themselves, like the genus of the ensouled and of animals.

259b4-b20

These things, then, suggest the opinion that perhaps motion, not being at all [at some time], can have come to be, because of our seeing this happen in these things. For though they are sometimes immobile, they are moved again; as it seems. One must grasp, then, that they move themselves according to one motion, and according to this motion not properly. For the cause is not from the animal, but other natural motions are present in animals, motions which they do not move cause through themselves, like growth, diminution, and respiration, according to which each of the animals is moving, [even when] it is resting and not moving according to a motion from itself. The cause of this is its environment and many of the things which go in, as food goes in. For, digesting, they sleep; [the food] being distributed, however, they awake and move themselves, the first principle being from outside. Whence, they are not always moving continuously by themselves; for the mover is other, itself moving and changing in relation to each of the self-movers. In all of these things, however, the first mover and cause of its moving itself is moved, though accidentally. For the body changes place, so that what is in the body and moves itself by leverage also [changes place].

A.1.4 On the Heavens

Translation by J. L. Stocks.

269b14-16

On all these grounds, therefore, we may infer with confidence that there is something beyond the bodies that are about us on this earth, different and separate from them; and that the superior glory of its nature is proportionate to its distance from this world of ours.

275b30-34

If the whole is not continuous, but exists, as Democritus and Leucippus think, in the form of parts separated by void, there must necessarily be one movement of all the multitude. They are distinguished, we are told, from one another by their figures; but their nature is one, like many pieces of gold separated from one another.

281b17-b22

But if a thing has for infinite time more than one capacity, another time is impossible and the times must coincide. Thus if a thing which exists for infinite time is destructible, it will have the capacity of not being. Now if it exists for infinite time let this capacity be actualized; and it will be in actuality at once existent and non-existent.

302b13-14

We begin with the view of Anaxagoras that all the homoeomerous bodies are elements. Any one who adopts this view misapprehends the meaning of element.

302b20-30

But even taking ‘element’ as they do, they need not assert an infinity of elements, since the hypothesis of a finite number will give identical results. Indeed even two or three such bodies serve the purpose as well, as Empedocles’ attempt shows. Again, even on their view it turns out that all things are not composed of homocomerous bodies. They do not pretend that a face is composed of faces, or that any other natural conformation is composed of parts like itself. Obviously then it would be better to assume a finite number of principles. They should, in fact, be as few as possible, consistently

Appendix A. Translations of Greek Texts

with proving what has to be proved. This is the common demand of mathematicians, who always assume as principles things finite either in kind or in number.

307b17-24

From what has been said it is clear that the difference of the elements does not depend upon their shape. Now their most important differences are those of property, function, and power; for every natural body has, we maintain, its own functions, properties, and powers. Our first business, then, will be to speak of these, and that inquiry will enable us to explain the differences of each from each.

311b14-19

The following account will make it plain that there are absolutely light and absolutely heavy things. And by absolutely light I mean one which of its own nature always moves upward, by absolutely heavy one which of its own nature always moves downward, if no obstacle is in the way.

312a4-08

But since that which sinks to the bottom of all things moves to the centre, necessarily that which rises to the surface moves to the extremity of the region in which the movement of these bodies takes place. For the centre is opposed as contrary to the extremity, as that which sinks is opposed to that which rises to the surface. This also gives a reasonable ground for the duality of heavy and light in the spatial duality centre and extremity.

A.1.5 On Generation and Corruption

Translation by H. H. Joachim.

314b1-13

Those, then, who construct all things out of a single element, must maintain that coming-to-be and passing-away are ‘alteration’. For they must affirm that the underlying something always remains identical and one; and

Aristotle on Higher Natures

change of such a substratum is what we call ‘altering’ Those, on the other hand, who make the ultimate kinds of things more than one, must maintain that ‘alteration’ is distinct from coming-to-be: for coming-to-be and passing-away result from the consilience and the dissolution of the many kinds. That is why Empedocles too uses language to this effect, when he says ‘There is no coming-to-be of anything, but only a mingling and a divorce of what has been mingled’. Thus it is clear (i) that to describe coming-to-be and passing-away in these terms is in accordance with their fundamental assumption, and (ii) that they do in fact so describe them: nevertheless, they too must recognize ‘alteration’ as a fact distinct from coming to-be, though it is impossible for them to do so consistently with what they say.

314b14-315a2

That we are right in this criticism is easy to perceive. For ‘alteration’ is a fact of observation. While the substance of the thing remains unchanged, we see it ‘altering’ just as we see in it the changes of magnitude called ‘growth’ and ‘diminution’. Nevertheless, the statements of those who posit more ‘original reals’ than one make ‘alteration’ impossible. For ‘alteration, as we assert, takes place in respect to certain qualities: and these qualities (I mean, e.g. hot-cold, white-black, dry-moist, soft-hard, and so forth) are, all of them, differences characterizing the ‘elements’. The actual words of Empedocles may be quoted in illustration:

The sun everywhere bright to see, and hot,
The rain everywhere dark and cold;

and he distinctively characterizes his remaining elements in a similar manner. Since, therefore, it is not possible for Fire to become Water, or Water to become Earth, neither will it be possible for anything white to become black, or anything soft to become hard; and the same argument applies to all the other qualities. Yet this is what ‘alteration’ essentially is.

315b33-35

A similar criticism applies to all our predecessors with the single exception of Democritus. Not one of them penetrated below the surface or made a

Appendix A. Translations of Greek Texts

thorough examination of a single one of the problems. Democritus, however, does seem not only to have thought carefully about all the problems, but also to be distinguished from the outset by his method.

322a9-16

In what way, then, has the food been modified by the growing thing? Perhaps we should say that it has been 'mixed' with it, as if one were to pour water into wine and the wine were able to convert the new ingredient into wine. And as fire lays hold of the inflammable, so the active principle of growth, dwelling in the growing thing that which is actually flesh), lays hold of an acceding food which is potentially flesh and converts it into actual flesh. The acceding food, therefore, must be together with the growing thing: for if it were apart from it, the change would be a coming-to-be. For it is possible to produce fire by piling logs on to the already burning fire. That is 'growth'. But when the logs themselves are set on fire, that is 'coming-to-be'.

322a17-28

'Quantum-in-general' does not come-to-be any more than 'animal' which is neither man nor any other of the specific forms of animal: what 'animal-in-general' is in coming-to-be, that 'quantum-in-general' is in growth. But what does come-to-be in growth is flesh or bone-or a hand or arm (i.e. the tissues of these organic parts). Such things come-to-be, then, by the accession not of quantified-flesh but of a quantified-something. In so far as this acceding food is potentially the double result e.g. is potentially so-much-flesh-it produces growth: for it is bound to become actually both so-much and flesh.

323b10-15

But Democritus dissented from all the other thinkers and maintained a theory peculiar to himself. He asserts that agent and patient are identical, i.e. 'like'. It is not possible (he says) that 'others', i.e. 'differents', should suffer action from one another: on the contrary, even if two things, being 'others', do act in some way on one another, this happens to them not qua 'others' but qua possessing an identical property.

322b17-27

Such, then, are the traditional theories, and it looks as if the statements of their advocates were in manifest conflict. But the reason of this conflict is that each group is in fact stating a part, whereas they ought to have taken a comprehensive view of the subject as a whole. For the same consequence follows if A and B are absolutely 'other', i.e. in no respect identical.

323b30-35

But since only those things which either involve a 'contrariety' or are 'contraries'- and not any things selected at random-are such as to suffer action and to act, agent and patient must be 'like' (i.e. identical) in kind and yet 'unlike' (i.e. contrary) in species. (For it is a law of nature that body is affected by body, flavour by flavour, colour by colour, and so in general what belongs to any kind by a member of the same kind-the reason being that 'contraries' are in every case within a single identical kind, and it is 'contraries' which reciprocally act and suffer action.)

325a23-35

But Leucippus thought he had a theory which would agree with the sense and would not abolish coming-to-be or destruction or motion or the plurality of existing things. So much he conceded to the phenomena, whereas to the proponents of unity he granted that there could not be movement without void, that the void was 'not being', and nothing of what is is not being; what, strictly speaking, is, is completely full. But such being, he claimed, is not a unity. It consists of a plurality of things infinite in number and too small to be seen. They move in the void (for there is void), and their combination causes coming-to-be, their separation dissolution. They act and are acted upon as they happen to touch (for in this way they are not one) and generate by coming together and interlocking. A true unity can never give rise to multiplicity, nor a true plurality produce unity. That is impossible, but as Empedocles and others say that things are acted upon by means of pores, so he claimed that alteration and every form of being-acted-on takes place in this way: dissolution and destruction occur by means of the void, as also does growth when solid bodies slip in [sc. to fill empty spaces].

326b22-29

As a general criticism we must urge that to postulate pores is superfluous. For if the agent produces no effect by touching the patient, neither will it produce any by passing through its pores. On the other hand, if it acts by contact, then—even without pores—some things will ‘suffer action’ and others will ‘act’, provided they are by nature adapted for reciprocal action and passion. Our arguments have shown that it is either false or futile to advocate pores in the sense in which some thinkers conceive them. But since bodies are divisible through and through, the postulate of pores is ridiculous: for, qua divisible, a body can fall into separate parts.

326b3-7

Again, what is it which sets them moving? For if their ‘mover’ is other than themselves, they are such as to ‘suffer action’. If, on the other hand, each of them sets itself in motion, either (a) it will be divisible (‘imparting motion’ qua this, ‘being moved’ qua that), or (b) contrary properties will attach to it in the same respect—i.e. ‘matter’ will be identical in-potentiality as well as numerically-identical.

327a1-6

So long, indeed, as any body is naturally united and one, it is insusceptible. So, too, bodies are insusceptible so long as they are not in contact either with one another or with other bodies which are by nature such as to act and suffer action.

327a10-14

Since, however, (ii) this is false, i.e. since every body is divisible, there is no difference between ‘having been divided into parts which remain in contact’ and ‘being divisible’. For if a body ‘can be separated at the contacts’ (as some thinkers express it), then, even though it has not yet been divided, it will be in a state of dividedness—since, as it can be divided, nothing inconceivable results.

328a24-32

Now when there is a certain equilibrium between their ‘powers of action’, then each of them changes out of its own nature towards the dominant: yet neither becomes the other, but both become an intermediate with properties common to both.

330a30-b5

The elements are four, and any four terms can be combined in six couples. Contraries, however, refuse to be coupled; for it is impossible for the same thing to be hot and cold, or moist and dry. Hence it is evident that the couplings of the elements will be four: hot with dry and moist with hot, and again cold with dry and cold with moist. And these four couples have attached themselves to the apparently simple bodies (Fire, Air, Water, and Earth) in a manner consonant with theory. For Fire is hot and dry, whereas Air is hot and moist (Air being a sort of vapour); and Water is cold and moist, while Earth is cold and dry.

334a10-15

An additional paradox is that the soul should consist of the ‘elements’, or that it should be one of them. How are the soul’s ‘alterations’ to take Place? How, e.g. is the change from being musical to being unmusical, or how is memory or forgetting, to occur? For clearly, if the soul be Fire, only such modifications will happen to it as characterize Fire qua Fire: while if it be compounded out of the elements, only the corporeal modifications will occur in it. But the changes we have mentioned are none of them corporeal.

336b25-35

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

Appendix A. Translations of Greek Texts

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

336a32-b3

This explains why it is not the primary motion that causes coming-to-be and passing-away, but the motion along the inclined circle; for this motion not only possesses the necessary continuity, but includes a duality of movements as well. For if coming-to-be and passing-away are always to be continuous, there must be some body always being moved (in order that these changes may not fail) and moved with a duality of movements (in order that both changes, not one only, may result).

A.1.6 Meteorologia

Translation by E. W. Webster.

384b15-19

Wood consists of earth and air and is therefore combustible but cannot be melted or softened by heat. (For the same reason it floats in water-all except ebony. This does not, for other kinds of wood contain a preponderance of air, but in black ebony the air has escaped and so earth preponderates in it.)

A.1.7 On Dreams

Translation by J. I. Beare.

459a25-b3

What happens in these cases may be compared with what happens in the case of projectiles moving in space. For in the case of these the movement continues even when that which set up the movement is no longer in contact [with the things that are moved]. For that which set them in motion moves a certain portion of air, and this, in turn, being moved excites motion in another portion; and so, accordingly, it is in this way that [the bodies],

whether in air or in liquids, continue moving, until they come to a standstill.

A.1.8 On Sense and the Sensible

Translation by J. I. Beare.

437a3-12

Of the two last mentioned, seeing, regarded as a supply for the primary wants of life, and in its direct effects, is the superior sense; but for developing intelligence, and in its indirect consequences, hearing takes the precedence. The faculty of seeing, thanks to the fact that all bodies are coloured, brings tidings of multitudes of distinctive qualities of all sorts; whence it is through this sense especially that we perceive the common sensibles, viz. figure, magnitude, motion, number: while hearing announces only the distinctive qualities of sound, and, to some few animals, those also of voice. indirectly, however, it is hearing that contributes most to the growth of intelligence. For rational discourse is a cause of instruction in virtue of its being audible, which it is, not directly, but indirectly; since it is composed of words, and each word is a thought-symbol. Accordingly, of persons destitute from birth of either sense, the blind are more intelligent than the deaf and dumb.

437a25-30

But as to the nature of the sensory organs, or parts of the body in which each of the senses is naturally implanted, inquirers now usually take as their guide the fundamental elements of bodies. Not, however, finding it easy to coordinate five senses with four elements, they are at a loss respecting the fifth sense. But they hold the organ of sight to consist of fire, being prompted to this view by a certain sensory affection of whose true cause they are ignorant. This is that, when the eye is pressed or moved, fire appears to flash from it. This naturally takes place in darkness, or when the eyelids are closed, for then, too, darkness is produced.

437b10-20

If the visual organ proper really were fire, which is the doctrine of Empedocles, a doctrine taught also in the Timaeus, and if vision were the result of light issuing from the eye as from a lantern, why should the eye not have had the power of seeing even in the dark? It is totally idle to say, as the Timaeus does, that the visual ray coming forth in the darkness is quenched.

438a5-10

Democritus, on the other hand, is right in his opinion that the eye is of water; not, however, when he goes on to explain seeing as mere mirroring. The mirroring that takes place in an eye is due to the fact that the eye is smooth, and it really has its seat not in the eye which is seen, but in that which sees. For the case is merely one of reflexion. But it would seem that even in his time there was no scientific knowledge of the general subject of the formation of images and the phenomena of reflexion. It is strange too, that it never occurred to him to ask why, if his theory be true, the eye alone sees, while none of the other things in which images are reflected do so.

A.1.9 De Anima

Translation by J. A. Smith.

412a16-35

But since it is also a body of such and such a kind, viz. having life, the body cannot be soul; the body is the subject or matter, not what is attributed to it. Hence the soul must be a substance in the sense of the form of a natural body having life potentially within it. But substance is actuality, and thus soul is the actuality of a body as above characterized. Now the word actuality has two senses corresponding respectively to the possession of knowledge and the actual exercise of knowledge. It is obvious that the soul is actuality in the first sense, viz. that of knowledge as possessed, for both sleeping and waking presuppose the existence of soul, and of these waking corresponds to actual knowing, sleeping to knowledge possessed but not employed, and, in the history of the individual, knowledge comes before its employment or exercise.

Aristotle on Higher Natures

412a17-21

But since it is also a body of such and such a kind, viz. having life, the body cannot be soul; the body is the subject or matter, not what is attributed to it. Hence the soul must be a substance in the sense of the form of a natural body having life potentially within it. But substance is actuality, and thus soul is the actuality of a body as above characterized.

412b8-9

That is why we can wholly dismiss as unnecessary the question whether the soul and the body are one: it is as meaningless as to ask whether the wax and the shape given to it by the stamp are one, or generally the matter of a thing and that of which it is the matter. Unity has many senses (as many as 'is' has), but the most proper and fundamental sense of both is the relation of an actuality to that of which it is the actuality.

412b10-12

We have now given an answer to the question, "What is soul?—an answer which applies to it in its full extent. It is substance in the sense which corresponds to the definitive formula of a thing's essence.

413a20-25

We say, then, making a beginning of our inquiry, that that which has soul is distinguished from that which has not by life. But life is so spoken of in many ways, and we say that a thing lives if but one of the following is present-intellect, perception, movement, and rest in respect of place, and furthermore the movement involved in nutrition, and both decay and growth.

414a25-28

Reflection confirms the observed fact; the actuality of any given thing can only be realized in what is already potentially that thing, i.e. in a matter of its own appropriate to it. From all this it follows that soul is an actuality or formulable essence of something that possesses a potentiality of being besouled.

414a32-b20

Of the psychic powers above enumerated some kinds of living things, as we have said, possess all, some less than all, others one only. Those we have mentioned are the nutritive, the appetitive, the sensory, the locomotive, and the power of thinking. Plants have none but the first, the nutritive, while another order of living things has this plus the sensory. If any order of living things has the sensory, it must also have the appetitive; for appetite is the genus of which desire, passion, and wish are the species; now all animals have one sense at least, viz. touch, and whatever has a sense has the capacity for pleasure and pain and therefore has pleasant and painful objects present to it, and wherever these are present, there is desire, for desire is just appetition of what is pleasant. Further, all animals have the sense for food (for touch is the sense for food); the food of all living things consists of what is dry, moist, hot, cold, and these are the qualities apprehended by touch; all other sensible qualities are apprehended by touch only indirectly. Sounds, colours, and odours contribute nothing to nutriment; flavours fall within the field of tangible qualities. Hunger and thirst are forms of desire, hunger a desire for what is dry and hot, thirst a desire for what is cold and moist; flavour is a sort of seasoning added to both. We must later clear up these points, but at present it may be enough to say that all animals that possess the sense of touch have also appetition. The case of imagination is obscure; we must examine it later. Certain kinds of animals possess in addition the power of locomotion, and still another order of animate beings, i.e. man and possibly another order like man or superior to him, the power of thinking, i.e. mind.

415b20

We must maintain, further, that the soul is also the cause of the living body as the original source of local movement.

415b21-27

The power of locomotion is not found, however, in all living things. But change of quality and change of quantity are also due to the soul. Sensation is held to be a qualitative alteration, and nothing except what has soul in it is capable of sensation. The same holds of the quantitative changes which constitute growth and decay; nothing grows or decays naturally except what feeds itself, and nothing feeds itself except what has a share of

soul in it.

414b28-415a7

The cases of figure and soul are exactly parallel; for the particulars subsumed under the common name in both cases—figures and living beings—constitute a series, each successive term of which potentially contains its predecessor, e.g. the square the triangle, the sensory power the self-nutritive. Hence we must ask in the case of each order of living things, What is its soul, i.e. What is the soul of plant, animal, man? Why the terms are related in this serial way must form the subject of later examination. But the facts are that the power of perception is never found apart from the power of self-nutrition, while—in plants—the latter is found isolated from the former. Again, no sense is found apart from that of touch, while touch is found by itself; many animals have neither sight, hearing, nor smell.

415b9-b27

The soul is the cause or source of the living body. The terms cause and source have many senses. But the soul is the cause of its body alike in all three senses which we explicitly recognize. It is (a) the source or origin of movement, it is (b) the end, it is (c) the essence of the whole living body.

That it is the last, is clear; for in everything the essence is identical with the ground of its being, and here, in the case of living things, their being is to live, and of their being and their living the soul in them is the cause or source. Further, the actuality of whatever is potential is identical with its formulable essence.

It is manifest that the soul is also the final cause of its body. For Nature, like mind, always does whatever it does for the sake of something, which something is its end. To that something corresponds in the case of animals the soul and in this it follows the order of nature; all natural bodies are organs of the soul. This is true of those that enter into the constitution of plants as well as of those which enter into that of animals. This shows that that the sake of which they are is soul. We must here recall the two senses of 'that for the sake of which', viz. (a) the end to achieve which, and (b) the being in whose interest, anything is or is done.

We must maintain, further, that the soul is also the cause of the living body

Appendix A. Translations of Greek Texts

as the original source of local movement. The power of locomotion is not found, however, in all living things. But change of quality and change of quantity are also due to the soul. Sensation is held to be a qualitative alteration, and nothing except what has soul in it is capable of sensation. The same holds of the quantitative changes which constitute growth and decay; nothing grows or decays naturally except what feeds itself, and nothing feeds itself except what has a share of soul in it.

416a2-5

Further, we must ask what is the force that holds together the earth and the fire which tend to travel in contrary directions; if there is no counteracting force, they will be torn asunder; if there is, this must be the soul and the cause of nutrition and growth.

424a17-24

By a ‘sense’ is meant what has the power of receiving into itself the sensible forms of things without the matter. This must be conceived of as taking place in the way in which a piece of wax takes on the impress of a signet-ring without the iron or gold; we say that what produces the impression is a signet of bronze or gold, but its particular metallic constitution makes no difference: in a similar way the sense is affected by what is coloured or flavoured or sounding, but it is indifferent what in each case the substance is; what alone matters is what quality it has, i.e. in what ratio its constituents are combined.

424a33-b2

This explains also why plants cannot perceive. in spite of their having a portion of soul in them and obviously being affected by tangible objects themselves; for undoubtedly their temperature can be lowered or raised. The explanation is that they have no mean of contrary qualities, and so no principle in them capable of taking on the forms of sensible objects without their matter; in the case of plants the affection is an affection by form-and-matter together.

429a14-19

If thinking is like perceiving, it must be either a process in which the soul is acted upon by what is capable of being thought, or a process different from but analogous to that. The thinking part of the soul must therefore be, while impossible, capable of receiving the form of an object; that is, must be potentially identical in character with its object without being the object. Mind must be related to what is thinkable, as sense is to what is sensible.

A.1.10 On the Parts of Animals

Translation by William Ogle.

641b24-31

Again, whenever there is plainly some final end, to which a motion tends should nothing stand in the way, we always say that such final end is the aim or purpose of the motion; and from this it is evident that there must be a something or other really existing, corresponding to what we call by the name of Nature. For a given germ does not give rise to any chance living being, nor spring from any chance one; but each germ springs from a definite parent and gives rise to a definite progeny. And thus it is the germ that is the ruling influence and fabricator of the offspring. For these it is by nature, the offspring being at any rate that which in nature will spring from it.

642a17-25

For primary cause constitutes the nature of an animal much more than does its matter. There are indeed passages in which even Empedocles hits upon this, and following the guidance of fact, finds himself constrained to speak of the ratio (*olugos*) as constituting the essence and real nature of things. Such, for instance, is the case when he explains what is a bone. For he does not merely describe its material, and say it is this one element, or those two or three elements, or a compound of all the elements, but states the ratio (*olugos*) of their combination. As with a bone, so manifestly is it with the flesh and all other similar parts.

642a32-b5

Of the method itself the following is an example. In dealing with respiration we must show that it takes place for such or such a final object; and we must also show that this and that part of the process is necessitated by this and that other stage of it. By necessity we shall sometimes mean hypothetical necessity, the necessity, that is, that the requisite antecedents shall be there, if the final end is to be reached; and sometimes absolute necessity, such necessity as that which connects substances and their inherent properties and characters. For the alternate discharge and re-entrance of heat and the inflow of air are necessary if we are to live. Here we have at once a necessity in the former of the two senses. But the alternation of heat and refrigeration produces of necessity an alternate admission and discharge of the outer air, and this is a necessity of the second kind.

663b12-35

Deer are the only animals in which the horns are solid throughout, and are also the only animals that cast them. This casting is not simply advantageous to the deer from the increased lightness which it produces, but, seeing how heavy the horns are, is a matter of actual necessity... Let us now consider the character of the material nature whose necessary results have been made available by rational nature for a final cause.

A.1.11 Motion of Animals

Translation by A. S. L. Farquharson.

698a7-11

Now we have already determined (when we were discussing whether eternal motion exists or not, and its definition, if it does exist) that the origin of all other motions is that which moves itself, and that the origin of this is the immovable, and that the prime mover must of necessity be immovable.

700b5-13

Since all lifeless things are moved by something else, and since we have set forth in our work on first philosophy our views concerning how the first

Aristotle on Higher Natures

and eternally moved is moved, and how the first mover imparts motion, it remains for us to consider how the soul moves the body, and what is the origin of an animal's motion. For if we exclude the motion of the universe, living creatures are responsible for the motion of everything else, except such things as are moved by each other striking against each other.

701b1-07

The movement of animals is like that of automatic puppets, which are set moving when a small motion occurs: the cables are released and the pegs strike against one another; and like that of the little cart.

702a18-20

The organic parts are suitably prepared by the affections, these again by desire, and desire by imagination. Imagination in its turn depends either upon conception or sense-perception.

A.1.12 On the Generation of Animals

Translation by Arthur Platt.

729a17-21

It is plain then that it is not necessary that anything at all should come away from the male, and if anything does come away it does not follow that this gives rise to the embryo as being in the embryo, but only as that which imparts the motion and as the form; so the medical art cures the patient.

730b20-30

In like manner, in the male of those animals which emit semen Nature uses the semen as a tool and as possessing motion in actuality, just as tools are used in the products of any art, for in them lies in a certain sense the motion of the art. Such, then, is the way in which these males contribute to generation.

742b17-22

But they do not say well nor do they assign a necessary cause who say simply that ‘it always happens so’, and imagine that this is a first principle in these cases. Thus Democritus of Abdera says that ‘there is no beginning of the infinite; now the cause is a beginning, and the eternal is infinite; in consequence, to ask the cause of anything of this kind is to seek for a beginning of the infinite’.

767b13-15

And the monstrosity, though not necessary in regard of a final cause and an end, yet is necessary accidentally.

776a16-b10

WE must now investigate the qualities by which the parts of animals differ. I mean such qualities of the parts as blueness and blackness in the eyes, height and depth of pitch in the voice, and differences in colour whether of the skin or of hair and feathers... Now we must no longer suppose that the cause of these and all such phenomena is the same. For whenever things are not the product of Nature working upon the animal kingdom as a whole, nor yet characteristic of each separate kind, then none of these things is such as it is or is so developed for any final cause. The eye for instance exists for a final cause, but it is not blue for a final cause unless this condition be characteristic of the kind of animal. In fact in some cases this condition has no connexion with the essence of the animal’s being, but we must refer the causes to the material and the motive principle or efficient cause, on the view that these things come into being by Necessity. For, as was said originally in the outset of our discussion, when we are dealing with definite and ordered products of Nature, we must not say that each is of a certain quality because it becomes so, but rather that they become so and so because they are so and so, for the process of Becoming or development attends upon Being and is for the sake of Being, not vice versa.

789b15-19

We have thus spoken of the teeth, saying why some are shed and grow again, and others not, and generally for what cause they are formed. And

Aristotle on Higher Natures

we have spoken of the other affections of the parts which are found to occur not for any final end but of necessity and on account of the motive or efficient cause.

A.1.13 Metaphysics

Translation by W. D. Ross.

984b10-22

When these men and the principles of this kind had had their day, as the latter were found inadequate to generate the nature of things men were again forced by the truth itself, as we said, to inquire into the next kind of cause. For 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 entrust so great a matter to spontaneity and chance. When one man said, then, that reason was present-as in animals, so throughout nature-as the cause of order and of all arrangement, he seemed like a sober man in contrast with the random talk of his predecessors. We know that Anaxagoras certainly adopted these views, but Hermotimus of Clazomenae is credited with expressing them earlier. Those who thought thus stated that there is a principle of things which is at the same time the cause of beauty, and that sort of cause from which things acquire movement.

985a19-22

For Anaxagoras uses reason as a deus ex machina for the making of the world, and when he is at a loss to tell from what cause something necessarily is, then he drags reason in, but in all other cases ascribes events to anything rather than to reason.

986b19

Yet this much is germane to the present inquiry: Parmenides seems to fasten on that which is one in definition...

Appendix A. Translations of Greek Texts

986b26-35

...Parmenides seems in places to speak with more insight. For, claiming that, besides the existent, nothing non-existent exists, he thinks that of necessity one thing exists, viz. the existent and nothing else (on this we have spoken more clearly in our work on nature), but being forced to follow the observed facts, and supposing the existence of that which is one in definition, but more than one according to our sensations, he now posits two causes and two principles, calling them hot and cold, i.e. fire and earth; and of these he ranges the hot with the existent, and the other with the non-existent.

991a15-20

...they might be thought to be causes, as white causes whiteness in a white object by entering into its composition. But this argument, which first Anaxagoras and later Eudoxus and certain others used, is very easily upset; for it is not difficult to collect many insuperable objections to such a view.

994b8-16

...but those who maintain the infinite series eliminate the Good without knowing it (yet no one would try to do anything if he were not going to come to a limit); nor would there be reason in the world; the reasonable man, at least, always acts for a purpose, and this is a limit; for the end is a limit.

1001b19-23

But even if one supposes the case to be such that, as some say, number proceeds from unity-itself and something else which is not one, none the less we must inquire why and how the product will be sometimes a number and sometimes a magnitude, if the not-one was inequality and was the same principle in either case.

1005b20-24

Clearly, then, it is a principle of this kind that is the most certain of all principles. Let us next state what this principle is. "It is impossible for

Aristotle on Higher Natures

the same attribute at once to belong and not to belong to the same thing and in the same relation"; and we must add any further qualifications that may be necessary to meet logical objections. This is the most certain of all principles, since it possesses the required definition; for it is impossible for anyone to suppose that the same thing is and is not, as some imagine that Heraclitus says—for what a man says does not necessarily represent what he believes.

1014b16-1015a13

'Nature' means (1) the genesis of growing things—the meaning which would be suggested if one were to pronounce the 'u' in *phusis* long. (2) That immanent part of a growing thing, from which its growth first proceeds. (3) The source from which the primary movement in each natural object is present in it in virtue of its own essence. Those things are said to grow which derive increase from something else by contact and either by organic unity, or by organic adhesion as in the case of embryos. Organic unity differs from contact; for in the latter case there need not be anything besides the contact, but in organic unities there is something identical in both parts, which makes them grow together instead of merely touching, and be one in respect of continuity and quantity, though not of quality.

(4) 'Nature' means the primary material of which any natural object consists or out of which it is made, which is relatively unshaped and cannot be changed from its own potency, as e.g. bronze is said to be the nature of a statue and of bronze utensils, and wood the nature of wooden things; and so in all other cases; for when a product is made out of these materials, the first matter is preserved throughout. For it is in this way that people call the elements of natural objects also their nature, some naming fire, others earth, others air, others water, others something else of the sort, and some naming more than one of these, and others all of them. (5) 'Nature' means the essence of natural objects, as with those who say the nature is the primary mode of composition, or as Empedocles says:

Nothing that is has a nature,
But only mixing and parting of the mixed,
And nature is but a name given them by men.

Hence as regards the things that are or come to be by nature, though that from which they naturally come to be or are is already present, we say they

Appendix A. Translations of Greek Texts

have not their nature yet, unless they have their form or shape. That which comprises both of these exists by nature, e.g. the animals and their parts; and not only is the first matter nature (and this in two senses, either the first, counting from the thing, or the first in general; e.g. in the case of works in bronze, bronze is first with reference to them, but in general perhaps water is first, if all things that can be melted are water), but also the form or essence, which is the end of the process of becoming. (6) By an extension of meaning from this sense of ‘nature’ every essence in general has come to be called a ‘nature’, because the nature of a thing is one kind of essence.

1015a13-19

From what has been said, then, it is plain that nature in the primary and strict sense is the essence of things which have in themselves, as such, a source of movement; for the matter is called the nature because it is qualified to receive this, and processes of becoming and growing are called nature because they are movements proceeding from this. And nature in this sense is the source of the movement of natural objects, being present in them somehow, either potentially or in complete reality.

1015b15-25

‘One’ means (1) that which is one by accident, (2) that which is one by its own nature. (1) Instances of the accidentally one are ‘Coriscus and what is musical’, and ‘musical Coriscus’ (for it is the same thing to say ‘Coriscus and what is musical’, and ‘musical Coriscus’), and ‘what is musical and what is just’, and ‘musical Coriscus and just Coriscus’. For all of these are called one by virtue of an accident, ‘what is just and what is musical’ because they are accidents of one substance, ‘what is musical and Coriscus’ because the one is an accident of the other; and similarly in a sense ‘musical Coriscus’ is one with ‘Coriscus’ because one of the parts of the phrase is an accident of the other, i.e. ‘musical’ is an accident of Coriscus; and ‘musical Coriscus’ is one with ‘just Coriscus’ because one part of each is an accident of one and the same subject.

1015b35-1016a3

Of things that are called one in virtue of their own nature some (a) are so called because they are continuous, e.g. a bundle is made one by a band, and pieces of wood are made one by glue; and a line, even if it is bent, is called one if it is continuous, as each part of the body is, e.g. the leg or the arm. Of these themselves, the continuous by nature are more one than the continuous by art.

1016a18-24

Things are called one in another sense because their substratum does not differ in kind; it does not differ in the case of things whose kind is indivisible to sense. The substratum meant is either the nearest to, or the farthest from, the final state. For, one the one hand, wine is said to be one and water is said to be one, qua indivisible in kind; and, on the other hand, all juices, e.g. oil and wine, are said to be one, and so are all things that can be melted, because the ultimate substratum of all is the same; for all of these are water or air.

1016a30-b1

Two things are called one, when the definition which states the essence of one is indivisible from another definition which shows us the other (though in itself every definition is divisible). Thus even that which has increased or is diminishing is one, because its definition is one, as, in the case of plane figures, is the definition of their form.

1016b12-16

While in a sense we call anything one if it is a quantity and continuous, in a sense we do not unless it is a whole, i.e. unless it has unity of form; e.g. if we saw the parts of a shoe put together anyhow we should not call them one all the same (unless because of their continuity); we do this only if they are put together so as to be a shoe and to have already a certain single form. This is why the circle is of all lines most truly one, because it is whole and complete.

1016b30-1017a2

Again, some things are one in number, others in species, others in genus, others by analogy; in number those whose matter is one, in species those whose definition is one, in genus those to which the same figure of predication applies, by analogy those which are related as a third thing is to a fourth. The latter kinds of unity are always found when the former are; e.g. things that are one in number are also one in species, while things that are one in species are not all one in number; but things that are one in species are all one in genus, while things that are so in genus are not all one in species but are all one by analogy; while things that are one by analogy are not all one in genus.

1017a9-b9

Things are said to be (1) in an accidental sense, (2) by their own nature. (1) In an accidental sense, e.g., we say the just is musical, and the man is musical and the musical is a man, just as we say the musical builds, because the builder happens to be musical or the musical happens to be a builder; for here 'one thing is another' means 'one is an accident of another'...

(2) Those things are said in their own right to be that are indicated by the figures of predication; for the senses of 'being' are just as many as these figures. Since some predicates indicate what the subject is, others its quality, others quantity, others relation, others activity or passivity, others its place, others its time, 'being' has a meaning answering to each of these...

(3) 'Being' and 'is' mean that a statement is true, 'not being' that it is not true but false,-and this alike in affirmation and negation; e.g. 'Socrates is musical' means that this is true, or 'Socrates is not-white' means that this is true; but 'the diagonal of the square is not commensurate with the side' means that it is false to say it is.

(4) Again, 'being' and 'that which is', in these cases we have mentioned, sometimes mean being potentially, and sometimes being actually. For we say both of that which sees potentially and of that which sees actually, that it is seeing, and both of that which can use knowledge and of that which is using it, that it knows, and both of that to which rest is already present and of that which can rest, that it rests. And similarly in the case of substances we say the Hermes is in the stone, and the half of the line is in the line, and

Aristotle on Higher Natures

we say of that which is not yet ripe that it is corn. When a thing is potential and when it is not yet potential must be explained elsewhere.

1017b10-25

We call substances (1) the simple bodies, i.e. earth and fire and water and everything of the sort, and in general bodies and the things composed of them, both animals and divine beings, and the parts of these. All these are called substance because they are not predicated of a subject but everything else is predicated of them. (2) That which, being present in such things as are not predicated of a subject, is the cause of their being, as the soul is of the being of animals.

(3) The parts which are present in such things, limiting them and marking them as individuals, and by whose destruction the whole is destroyed, as the body is by the destruction of the plane, as some say, and the plane by the destruction of the line; and in general number is thought by some to be of this nature; for if it is destroyed, they say, nothing exists, and it limits all things.

(4) The essence, the formula of which is a definition, is also called the substance of each thing. It follows, then, that substance has two senses, (a) the ultimate substratum, which is no longer predicated of anything else, and (b) that which is a 'this' and separable-and of this nature is the shape or form of each thing.

1025b28-1026a5

Now, we must not fail to notice the mode of being of the essence and of its definition, for, without this, inquiry is but idle. Of things defined, i.e. of 'whats', some are like 'snub', and some like 'concave'. And these differ because 'snub' is bound up with matter (for what is snub is a concave nose), while concavity is independent of perceptible matter. If then all natural things are analogous to the snub in their nature; e.g. nose, eye, face, flesh, bone, and, in general, animal; leaf, root, bark, and, in general, plant (for none of these can be defined without reference to movement-they always have matter), it is clear how we must seek and define the 'what' in the case of natural objects, and also that it belongs to the student of nature to study even soul in a certain sense, i.e. so much of it as is not independent of matter.

1026a31-b3

But since the unqualified term ‘being’ has several meanings, of which one was seen’ to be the accidental, and another the true (‘non-being’ being the false), while besides these there are the figures of predication (e.g. the ‘what’, quality, quantity, place, time, and any similar meanings which ‘being’ may have), and again besides all these there is that which ‘is’ potentially or actually:-since ‘being’ has many meanings, we must say regarding the accidental, that there can be no scientific treatment of it.

1026b13-21

...for the accidental is practically a mere name... the accidental is obviously akin to non-being.

1026b30-32

...this is the principle and this the cause of the existence of the accidental ; for that which is neither always nor for the most part, we call accidental.

1027b28-1028a5

This being so, we must consider later what has to be discussed with regard to that which is or is not in this sense. But since the combination and the separation are in thought and not in the things, and that which is in this sense is a different sort of ‘being’ from the things that are in the full sense (for the thought attaches or removes either the subject’s ‘what’ or its having a certain quality or quantity or something else), that which is accidentally and that which is in the sense of being true must be dismissed. For the cause of the former is indeterminate, and that of the latter is some affection of the thought, and both are related to the remaining genus of being, and do not indicate the existence of any separate class of being. Therefore let these be dismissed, and let us consider the causes and the principles of being itself, qua being. (It was clear in our discussion of the various meanings of terms, that ‘being’ has several meanings.)

1030a17-25

Or perhaps "definition," like the "what," has more than one sense. For the "what" in one sense means the substance and the individual, and in another each one of the categories: quantity, quality, etc. Just as "is" applies to everything, although not in the same way, but primarily to one thing and secondarily to others; so "what it is" applies in an unqualified sense to substance, and to other things in a qualified sense. For we might ask also what quality "is," so that quality also is a "what it is"; not however without qualification, but just as in the case of not-being some say by a verbal quibble that not-being "is"—not in an unqualified sense, but "is" not-being—so too with quality.

1031a1-15

Clearly, then, there is definition of substance alone. If there were definition of the other categories also, it would have to involve an added determinant, as in the case of the qualitative; and of the odd, for this cannot be defined apart from number; nor can "female" apart from "animal." By "involving an added determinant" I mean descriptions which involve a tautology, as in the above examples. Now if this is true, there will be no definition of compound expressions either; e.g., "odd number." We fail to realize this because our terms are not used accurately. If on the other hand there are definitions of these too, either they are defined in a different way, or, as we have said, "definition" and "essence" must be used in more than one sense; thus in one sense there will be no definition of anything, and nothing will have an essence, except substances; and in another those other things will have a definition and essence. It is obvious, then, that the definition is the formula of the essence, and that the essence belongs either only to substances, or especially and primarily and simply.

1031a15-31

We must inquire whether the essence is the same as the particular thing, or different. This is useful for our inquiry about substance; because a particular thing is considered to be nothing other than its own substance, and the essence is called the substance of the thing. In accidental predication, indeed, the thing itself would seem to be different from its essence; e.g., "white man" is different from "essence of white man." If it were the same, "essence of man" and "essence of white man" would be the same. For "man"

Appendix A. Translations of Greek Texts

and "white man" are the same, they say, and therefore "essence of white man" is the same as "essence of man." But perhaps it is not necessarily true that the essence of accidental combinations is the same as that of the simple terms; because the extremes of the syllogism are not identical with the middle term in the same way. Perhaps it might be thought to follow that the accidental extremes are identical; e.g. "essence of white" and "essence of cultured"; but this is not admitted.

1031b19-23

That each individual thing is one and the same with its essence, and not merely accidentally so, is apparent, not only from the foregoing considerations, but because to have knowledge of the individual is to have knowledge of its essence; so that by setting out examples it is evident that both must be identical.

1031b30-1032a6

Yet why should not some things be identified with their essence from the outset, if essence is substance? Indeed not only are the thing and its essence one, but their formula is the same, as is clear from what we have just stated; for it is not by accident that the essence of "one," and "the one," are one. Moreover, if they are different, there will be an infinite series; for the essence of "one" and "the one" will both exist; so that in that case too the same principle will apply. Clearly, then, in the case of primary and self-subsistent terms, the individual thing and its essence are one and the same.

1032a12-16

Of things which are generated, some are generated naturally, others artificially, and others spontaneously; but everything which is generated is generated by something and from something and becomes something. When I say "becomes something" I mean in any of the categories; it may come to be either a particular thing or of some quantity or quality or in some place.

1032a12-35

Natural generation is the generation of things whose generation is by nature. That from which they are generated is what we call matter; that by

Aristotle on Higher Natures

which, is something which exists naturally; and that which they become is a man or a plant or something else of this kind, which we call substance in the highest degree. All things which are generated naturally or artificially have matter; for it is possible for each one of them both to be and not to be, and this possibility is the matter in each individual thing. And in general both that from which and that in accordance with which they are generated, is nature; for the thing generated, e.g. plant or animal, has a nature. And that by which they are generated is the so-called "formal" nature, which has the same form as the thing generated (although it is in something else); for man begets man.

1032b1-02

...by "form" I mean the essence of each thing, and its primary substance.

1036a8-09

But matter is unknowable in itself.

1037b26-28

...for the definition is a single formula and a formula of substance, so that it must be a formula of some one thing; for substance means a one and a this, as we maintain.

1039b20-30

Since substance is of two kinds, the concrete thing and the formula (I mean that one kind of substance is the formula taken with the matter, while another kind is the formula in its generality), substances in the former sense are capable of destruction (for they are capable also of generation), but there is no destruction of the formula in the sense that it is ever in course of being destroyed (for there is no generation of it either; the being of house is not generated, but only the being of this house), but without generation and destruction formulae are and are not; for it has been shown that no one begets nor makes these.

1044a4-9

And the number must be something in virtue of which it is one, and this these thinkers cannot state, what makes it one, if it is one (for either it is not one but a sort of heap, or if it is, we ought to say what it is that makes one out of many); and the definition is one, but similarly they cannot say what makes it one. And this is a natural result; for the same reason is applicable, and substance is one in the sense which we have explained, and not, as some say, by being a sort of unit or point; each is a complete reality and a definite nature.

1045b32-1046a4

And since ‘being’ is in one way divided into individual thing, quality, and quantity, and is in another way distinguished in respect of potency and complete reality, and of function, let us now add a discussion of potency and complete reality. And first let us explain potency in the strictest sense, which is, however, not the most useful for our present purpose. For potency and actuality extend beyond the cases that involve a reference to motion. But when we have spoken of this first kind, we shall in our discussions of actuality’ explain the other kinds of potency as well.

1046a9-18

But all potentialities that conform to the same type are starting points, and are called potentialities in reference to one primary kind, which is a starting-point of change in another thing or in the thing itself qua other. For one kind is a potentiality for being acted on, i.e. the principle in the very thing acted on, which makes it capable of being changed and acted on by another thing or by itself regarded as other; and another kind is a state of insusceptibility to change for the worse and to destruction by another thing or by the thing itself qua other, i.e. by a principle of change. In all these definitions is contained the formula of potentiality in the primary sense. And again these so-called potentialities are potentialities either of acting merely or of being acted on, or of acting or being acted on well, so that even in the formulae of the latter the formulae of the prior kinds of potentiality are somehow contained.

1046a19-29

Obviously, then, in a sense the potency of acting and of being acted on is one (for a thing may be ‘capable’ either because it can itself be acted on or because something else can be acted on by it), but in a sense the potencies are different. For the one is in the thing acted on; it is because it contains a certain originative source, and because even the matter is an originative source, that the thing acted on is acted on, and one thing by one, another by another; for that which is oily can be burnt, and that which yields in a particular way can be crushed; and similarly in all other cases. But the other potency is in the agent, e.g. heat and the art of building are present, one in that which can produce heat and the other in the man who can build. And so, in so far as a thing is an organic unity, it cannot be acted on by itself; for it is one and not two different things.

1046a20-30

Obviously, then, in a sense the potentiality of acting and of being acted on is one (for a thing may be capable either because it can be acted on or because something else can be acted on by it), but in a sense the potentialities are different. For the one is in the thing acted on; it is because it contains a certain motive principle, and because even the matter is a motive principle, that the thing acted on is acted on, one thing by one, another by another; for that which is oily is inflammable, and that which yields in a particular way can be crushed; and similarly in all other cases. But the other potentiality is in the agent, e.g. heat and the art of building are present, one in that which can produce heat and the other in the man who can build. And so in so far as a thing is an organic unity, it cannot be acted on by itself; for it is one and not two different things.

1046a33-b15

Since some such originative sources are present in soulless things, and others in things possessed of soul, and in soul, and in the rational part of the soul, clearly some potencies will, be non-rational and some will be non-rational and some will be accompanied by a rational formula. This is why all arts, i.e. all productive forms of knowledge, are potencies; they are originative sources of change in another thing or in the artist himself considered as other. And each of those which are accompanied by a rational formula is alike capable of contrary effects, but one non-rational power produces

Appendix A. Translations of Greek Texts

one effect; e.g. the hot is capable only of heating, but the medical art can produce both disease and health.

The reason is that science is a rational formula, and the same rational formula explains a thing and its privation, only not in the same way; and in a sense it applies to both, but in a sense it applies rather to the positive fact. Therefore such sciences must deal with contraries, but with one in virtue of their own nature and with the other not in virtue of their nature; for the rational formula applies to one object in virtue of that object's nature, and to the other, in a sense, accidentally. For it is by denial and removal that it exhibits the contrary; for the contrary is the primary privation, and this is the removal of the positive term... And so the things whose potency is according to a rational formula act contrariwise to the things whose potency is non-rational; for the products of the former are included under one originative source, the rational formula.

1046b15-24

Now since contraries do not occur in the same thing, but science is a potency which depends on the possession of a rational formula, and the soul possesses an originative source of movement; therefore, while the wholesome produces only health and the calorific only heat and the frigorific only cold, the scientific man produces both the contrary effects. For the rational formula is one which applies to both, though not in the same way, and it is in a soul which possesses an originative source of movement; so that the soul will start both processes from the same originative source, having linked them up with the same thing. And so the things whose potency is according to a rational formula act contrariwise to the things whose potency is non-rational; for the products of the former are included under one originative source, the rational formula.

1046b29-b4

There are some who say, as the Megaric school does, that a thing 'can' act only when it is acting, and when it is not acting it 'cannot' act, e.g. that he who is not building cannot build, but only he who is building, when he is building; and so in all other cases. It is not hard to see the absurdities that attend this view. For it is clear that on this view a man will not be a builder unless he is building (for to be a builder is to be able to build), and so with the other arts. If, then, it is impossible to have such arts if one has not at

Aristotle on Higher Natures

some time learnt and acquired them, and it is then impossible not to have them if one has not sometime lost them (either by forgetfulness or by some accident or by time; for it cannot be by the destruction of the object, for that lasts for ever), a man will not have the art when he has ceased to use it, and yet he may immediately build again; how then will he have got the art?

1047a10-29

Again, if that which is deprived of potency is incapable, that which is not happening will be incapable of happening; but he who says of that which is incapable of happening either that it is or that it will be will say what is untrue; for this is what incapacity meant. Therefore these views do away with both movement and becoming. For that which stands will always stand, and that which sits will always sit, since if it is sitting it will not get up; for that which, as we are told, cannot get up will be incapable of getting up. But we cannot say this, so that evidently potency and actuality are different (but these views make potency and actuality the same, and so it is no small thing they are seeking to annihilate), so that it is possible that a thing may be capable of being and not he, and capable of not being and yet he, and similarly with the other kinds of predicate; it may be capable of walking and yet not walk, or capable of not walking and yet walk. And a thing is capable of doing something if there will be nothing impossible in its having the actuality of that of which it is said to have the capacity. I mean, for instance, if a thing is capable of sitting and it is open to it to sit, there will be nothing impossible in its actually sitting; and similarly if it is capable of being moved or moving, or of standing or making to stand, or of being or coming to be, or of not being or not coming to be.

1047a30-b3

The word 'actuality', which we connect with fulfillment, has, strictly speaking, been extended from movements to other things; for actuality in the strict sense is identified with movement. And so people do not assign movement to non-existent things, though they do assign some other predicates. E.g. they say that non-existent things are objects of thought and desire, but not that they are moved; and this because, while they do not actually exist, they would have to exist actually if they were moved. For of non-existent things some exist potentially; but they do not exist, because they do not exist in fulfillment.

1048a1-9

Since that which is capable is capable of something and at some time and in some way-with all the other qualifications which must be present in the definition-, and since some things can work according to a rational formula and their potentialities involve a formula, while other things are non-rational and their potentialities are non-rational, and the former potentialities must be in a living thing, while the latter can be both in the living and in the lifeless; as regards potentialities of the latter kind, when the agent and the patient meet in the way appropriate to the potentiality in question, the one must act and the other be acted on, but with the former kind this is not necessary. For the non-rational potentialities are all productive of one effect each, but the rational produce contrary effects, so that they would produce contrary effects at the same time; but this is impossible. That which decides, then, must be something else; I mean by this, desire or choice.

1048a13-24

Therefore every thing which has a rational potentiality, when it desires that for which it has a potentiality and in the circumstances in which it has it, must do this. And it has the potentiality in question when the passive object is present and is in a certain state; if not it will not be able to act. To add the qualification 'if nothing external prevents it' is not further necessary; for it has the potentiality in so far as this is a potentiality of acting, and it is this not in all circumstances but on certain conditions, among which will be the exclusion of external hindrances; for these are barred by some of the positive qualifications. And so even if one has a rational wish, or an appetite, to do two things or contrary things at the same time, one cannot do them; for it is not on these terms that one has the potentiality for them, nor is it a potentiality for doing both at the same time, since one will do just the things which it is a potentiality for doing.

1048b20-24

E.g. a casket is not 'earthen' nor 'earth', but 'wooden'; for this is potentially a casket and this is the matter of a casket, wood in general of a casket in general, and this particular wood of this particular casket.

1048a25-b9

Since we have treated of the kind of potentiality which is related to movement, let us discuss actuality, what and what sort of thing it is. In the course of our analysis it will also become clear, with regard to the potential, that we not only ascribe potentiality to that whose nature it is to move something else, either without qualification or in some particular way, but also use the word in another sense, in the pursuit of which we have discussed these previous senses. Actuality means the existence of the thing, not in the way which we express by 'potentially'; we say that potentially, for instance, a statue of Hermes is in the block of wood and the half-line is in the whole, because it might be separated out, and even the man who is not studying we call a man of science, if he is capable of studying. Otherwise, actually. Our meaning can be seen in the particular cases by induction, and we must not seek a definition of everything but be content to grasp the analogy,- that as that which is building is to that which is capable of building, so is the waking to the sleeping, and that which is seeing to that which has its eyes shut but has sight, and that which is shaped out of the matter to the matter, and that which has been wrought to the unwrought. Let actuality be defined by one member of this antithesis, and the potential by the other. But all things are not said in the same sense to exist actually, but only by analogy-as A is in B or to B, C is in D or to D; for some are as movement to potentiality, and the others as substance to some sort of matter.

1048b35-1049a12

[W]e must distinguish when a thing is potentially and when it is not; for it is not at any and every time. E.g. is earth potentially a man? No--but rather when it has already become seed, and perhaps not even then, as not everything can be healed by the medical art or by chance, but there is a certain kind of thing which is capable of it, and only this is potentially healthy... Similarly there is potentially a house, if nothing in the thing acted on-i.e. in the matter-prevents it) from becoming a house, and if there is nothing which must be added or taken away or changed; this is potentially a house, and the same is true of all other things for which the source of their becoming is external.

1049b4-10

We have distinguished the various senses of 'prior', and it is clear that actuality is prior to potentiality. And I mean by potentiality not only that definite kind which is said to be a principle of change in another thing or in the thing itself regarded as other, but in general every principle of movement or of rest. For nature also is in the same genus as potentiality; for it is a principle of movement-not, however, in something else but in the thing itself qua itself. To all such potentiality, then, actuality is prior both in formula and in substance; and in time it is prior in one sense, and in another not.

1049b12-17

Clearly it is prior in formula; for that which is in the primary sense potential is potential because it is possible for it to become actual, e.g. I mean by 'capable of building' that which can build, and by 'capable of seeing' that which can see, and by 'visible' that which can be seen. And the same account applies to all other cases, so that the formula and the knowledge of the one must precede the knowledge of the other

1049b24-28

For from the potentially existing the actually existing is always produced by an actually existing thing, e.g. man from man, musician by musician; there is always a first mover, and the mover already exists actually. We have said in our account of substance that everything that is produced is something produced from something and by something, and that the same in species as it.

1050a5-10

But it is also prior in substantiality; firstly, because things which are posterior in generation are prior in form and substantiality; e.g., adult is prior to child, and man to semen, because the one already possesses the form, but the other does not; and secondly, because everything which is generated moves towards a principle, i.e. its end. For the object of a thing is its principle; and generation has as its object the end. And the actuality is the end, and it is for the sake of this that the potentiality is acquired.

1050a15-24

Further, matter exists potentially, because it may attain to the form; but when it exists actually, it is then in the form. The same applies in all other cases, including those where the end is motion. Hence, just as teachers think that they have achieved their end when they have exhibited their pupil performing, so it is with nature. For if this is not so, it will be another case of "Pauson's Hermes"; it will be impossible to say whether the knowledge is in the pupil or outside him, as in the case of the Hermes. For the activity is the end, and the actuality is the activity; hence the term "actuality" is derived from "activity," and tends to have the meaning of "complete reality."

1050a30-1050b5

Thus in all cases where the result is something other than the exercise of the faculty, the actuality resides in the thing produced; e.g. the act of building in the thing built, the act of weaving in the thing woven, and so on; and in general the motion resides in the thing moved. But where there is no other result besides the actualization, the actualization resides in the subject; e.g. seeing in the seer, and speculation in the speculator, and life in the soul (and hence also happiness, since happiness is a particular kind of life). Evidently, therefore, substance or form is actuality. Thus it is obvious by this argument that actuality is prior in substantiality to potentiality; and that in point of time, as we have said, one actuality presupposes another right back to that of the prime mover in each case.

1060a25-32

Further, if there is a substance or principle of such a nature as that which we are now seeking, and if this is one for all things, and the same for eternal and for perishable things, it is hard to say why in the world, if there is the same principle, some of the things that fall under the principle are eternal, and others are not eternal; this is paradoxical. But if there is one principle of perishable and another of eternal things, we shall be in a like difficulty if the principle of perishable things, as well as that of eternal, is eternal; for why, if the principle is eternal, are not the things that fall under the principle also eternal? But if it is perishable another principle is involved to account for it, and another to account for that, and this will go on to infinity.

A.1.14 Nicomachean Ethics

Translation by W. D. Ross.

1098a5-18

Now if the function of man is an activity of soul which follows or implies a rational principle, and if we say ‘so-and-so-and ‘a good so-and-so’ have a function which is the same in kind, e.g. a lyre, and a good lyre-player, and so without qualification in all cases, eminence in respect of goodness being added to the name of the function (for the function of a lyre-player is to play the lyre, and that of a good lyre-player is to do so well): if this is the case, and we state the function of man to be a certain kind of life, and this to be an activity or actions of the soul implying a rational principle, and the function of a good man to be the good and noble performance of these, and if any action is well performed when it is performed in accordance with the appropriate excellence: if this is the case, human good turns out to be activity of soul in accordance with virtue, and if there are more than one virtue, in accordance with the best and most complete.

A.1.15 Rhetoric

Translation by W. Rhys Roberts.

1368b34-36

Of those [actions] not due to himself some are due to chance, the others to necessity; of these latter, again, some are due to compulsion, the others to nature.

A.2 Diels, H.

A.2.1 Die Fragmente der Vorsokratiker

All German translations are by H. Diels and W. Kranz.

Aristotle on Higher Natures

12B1

Anfang und Ursprung der seienden Dinge ist das Apeiron...

21B1, 7

...kaltes Wasser ist da, süßes, lauteres.

21B1, 16

...denn dies *zu erbitten*, ist ja das Gemäßere (das uns näher Angehende).

21B22

Beim Feuer ziemt solch Gespräch zur Winterszeit, wenn man auf weichem Lager gesättigt daliegt...

22B1, 6-8

Denn geschieht auch alles nach diesem Sinn, so gleichen sie doch Unerprobten, so oft sie sich erproben an solchen Worten und Werken, wie ich sie erörtere, nach seiner Natur ein jegliches zerlegend und erklärend, wie es sich verhält.

22B112

Gesund Denken ist die größte Vollkommenheit, und die Weisheit besteht darin, die Wahrheit zu sagen und zu handeln nach der Natur, auf sie hin-hörend.

30B7, 3

Denn die frühere Gestaltung geht nicht unter und die nicht vorhandene entsteht nicht.

Appendix A. Translations of Greek Texts

44B2, 2

Notwendig müssen die vorhandenen *Dinge* alle entweder grenzebildend oder grenzenlos <oder nur genzebildend> können sie wohl nicht sein.

44B22, 9-11

Und diese, obwohl der Vergänglichkeit unterworfen, bewahren doch ihre Eigentümlichkeiten und Gestalten und bringen auf dem Wege der Zeugung wiederum dieselbe Gestalt hervor wie sie der Vater und Demiurg geschaffen...

47B1, 10

Denn sie beschäftigen sich mit den beiden verschwisterten Urgestalten des Seienden.

55B33

Die Natur und die Erziehung sind etwas Ähnliches. Denn die Erziehung formt zwar den Menschen um, aber durch diese Umformung schafft sie Natur.

59A66

Anaxagoras... [proposed] an unclear cause due to human reasoning: for it involves necessity, fate, choice, luck and chance. [My translation]

59B3

...denn es ist unmöglich, daß das Seiende zu sein aufhöre.

59B12

Das Übrige hat Anteil an allem, Geist aber ist etwas nicht durch Grenze bestimmtes und Selbstherrliches und ist vermischt mit keinem Ding...

59B13

Und als der Geist die Bewegung begann, sonderte er sich ab von allem, was da in Bewegung gesetzt wurden und soviel der Geist in Bewegung setzte, das wurde alles voneinander geschieden. Während der Bewegung und Scheidung aber bewirkte die Umdrehung eine noch viel stärkere Scheidung voneinander.

59B14

Aber der Geist, der ewig ist, ist fürwahr auch jetzt, wo auch das andere alles ist, in der umgebenden Vielheit und in dem, was sich daran durch Scheidung ansetzte, und in dem *bereits* Abgeschiedenen.

59B17

Denn kein Ding entsteht oder vergeht, sonder aus verhandenen Dingen mischt es sich und es scheidet sich wieder. Und so würden sie demnach richtig das Entstehen Mischung und das Vergehen Scheidung nennen.

68A1, 44

The sun and the moon are aggregated from smooth and spherical masses of this sort, and similarly the soul, which is the same thing as mind [translation is mine].

68A1, 45

Everything happens according to necessity, for the cause of the coming-into-being of all things is the whirl, which he calls necessity [translation by Kirk/Raven]

68A1, 47

Qualities are by convention, but by nature they are atoms and void. [translation by Kirk/Raven]

Appendix A. Translations of Greek Texts

68B9

By convention are sweetness, bitterness, hotness, coldness and color; what is real are the atoms and motion... [My translation]

68B299

I covered more territory than any man in my time, making the most extensive investigations, and saw more climes and countries and listened to more famous men. [translation by Kirk/Raven]

82B11a, 1-2

The legal accusation, the defense [and the] decision do not come about for the purpose of death: for it is clear that nature has decreed death with its vote concerning all those who are dying... [My translation]

88B9

Durch Übung sind mehr Leute tüchtig als von Natur

A.3 Empedocles

A.3.1 “On Nature,” translated by W. E. Leonard

Cited in *Die Fragmente der Vorsokratiker*.

31B6

And first the fourfold root of all things hear!—
White gleaming Zeus, life-bringing Hera, Dis,
And Nestis whose tears bedew mortality.

31B8

More will I tell thee too: there is no birth
Of all things mortal, nor end in ruinous death;
But mingling only and interchange of mixed

Aristotle on Higher Natures

There is, and birth is but its name with men.

31B9

But when in man, wild beast, or bird, or bush,
These elements commingle and arrive
The realms of light, the thoughtless deem it "birth";
When they dispart, 'tis "doom of death;" and though
Not this the Law, I too assent to use.

31B11

Fools! for their thoughts are briefly brooded o'er.
Who trust that what is not can e'er become,
Or aught that is can wholly die away.

31B12

From what-is-not what-is can ne'er become;
So that what-is should e'er be all destroyed,
No force could compass and no ear hath heard—
For there 'twill be forever where 'tis set.

31B13-14

The All hath neither Void nor Overflow.
But with the All there is no Void, so whence
Could aught of more come nigh?

31B17, 1-9

I will report a twofold truth. Now grows
The One from Many into being, now
Even from the One disparting come the Many.
Twofold the birth, twofold the death of things
For, now, the meeting of the Many brings
To birth and death; and, now, whatever grew
From out their sundering, flies apart and dies.

Appendix A. Translations of Greek Texts

And this long interchange shall never end.

31B17, 27-35

Behold those elements own equal strength
And equal origin; each rules its task;
And unto each its primal mode; and each
Prevailing conquers with revolving time.
And more than these there is no birth nor end;
For were they wasted ever and evermore,
They were no longer, and the great All were then
How to be plenished and from what far coast?
And how, besides, might they to ruin come,
Since nothing lives that empty is of them?—
No, these are all, and, as they course along
Through one another, now this, now that is born—
And so forever down Eternity.

31B20

The world-wide warfare of the eternal Two
Well in the mass of human limbs is shown:
Whiles into one do they through Love unite,
And mortal members take the body's form,
And life doth flower at the prime; and whiles,
Again dissevered by the Hates perverse,
They wander far and wide and up and down
The surf-swept beaches and drear shores of life.

31B21

But come, and to my words foresaid look well,
If their wide witness anywhere forgot
Aught that behooves the elemental forms:
Behold the Sun, the warm, the bright-diffused;
Behold the eternal Stars, forever steeped
In liquid heat and glowing radiance; see
Also the Rain, obscure and cold and dark,
And how from Earth streams forth the Green and Firm.

Aristotle on Higher Natures

And all through Wrath are split to shapes diverse;
And each through Love draws near and yearns for each.
For from these elements hath budded all
That was or is or evermore shall be—
All trees, and men and women, beasts and birds,
And fishes nourished in deep waters, aye,
The long-lived gods, in honors excellent.
For these are all, and, as they course along
Through one another, they take new faces all,
By varied mingling and enduring change.

31B57

Ihr (der Erde) entsprochen viele Kinnbacken ohne Hälse, nackte Arme irrten hin und her sonder Schultern, und Augen allein schweiften umher bar der Stirnen.

31B59

Doch als in größerem Maße handgemein wurde der eine Daimon mit dem anderen (die Liebe mit dem Streite), da fiel dieses zusammen, wie gerade die einzelnen Glieder zusammentrafen, und auch anderes vieles entsproßte außerdem sich aneinander reihend.

31B61

Many were born with twofold brow and breast,
Some with the face of man on bovine stock,
Some with man's form beneath a bovine head,
Mixed shapes of being with shadowed secret parts,
Sometimes like men, and sometimes woman-growths.

31B65

Into clean wombs the seeds are poured, and when
Therein they meet with Cold, the birth is girls;
And boys, when contrariwise they meet with Warm.

31B84

As when a man, about to sally forth,
Prepares a light and kindles him a blaze
Of flaming fire against the wintry night,
In horny lantern shielding from all winds;
Though it protect from breath of blowing winds,
Its beam darts outward, as more fine and thin,
And with untiring rays lights up the sky:
Just so the Fire primeval once lay hid
In the round pupil of the eye, enclosed
In films and gauzy veils, which through and through
Were pierced with pores divinely fashioned,
And thus kept off the watery deeps around,
Whilst Fire burst outward, as more fine and thin.

31B85

The gentle flame of eye did chance to get
Only a little of the earthen part.

31B90

Thus Sweet seized Sweet, Bitter on Bitter flew,
Sour sprung for Sour, and upon Hot rode hot.

31B91

Water to wine more nearly is allied, But will not mix with oil.

A.4 Parmenides

A.4.1 On Nature

Translation by J. Burnet.

Cited in *Die Fragmente der Vorsokratiker*.

28B2

Come now, I will tell thee - and do thou hearken to my saying and carry it away - the only two ways of search that can be thought of. The first, namely, that It is, and that it is impossible for anything not to be, is the way of conviction, for truth is its companion. The other, namely, that It is not, and that something must needs not be, - that, I tell thee, is a wholly untrustworthy path. For you cannot know what is not - that is impossible - nor utter it;

28B3

For it is the same thing that can be thought and that can be.

28B7

For this shall never be proved, that the things that are not are; and do thou restrain thy thought from this way of inquiry. Nor let habit force thee to cast a wandering eye upon this devious track, or to turn thither thy resounding ear or thy tongue; but do thou judge the subtle refutation of their discourse uttered by me.

28B8

One path only is left for us to speak of, namely, that It is. In it are very many tokens that what is, is uncreated and indestructible, alone, complete, immovable and without end. Nor was it ever, nor will it be; for

(5) now it is, all at once, a continuous one. For what kind of origin for it. will you look for? In what way and from what source could it have drawn its increase? I shall not let thee say nor think that it came from what is not; for it can neither be thought nor uttered that what is not is. And, if it came from

(10) nothing, what need could have made it arise later rather than sooner? Therefore must it either be altogether or be not at

Appendix A. Translations of Greek Texts

all. Nor will the force of truth suffer aught to arise besides itself from that which in any way is. Wherefore, Justice does not loose her fetters and let anything come into being or pass

(15) away, but holds it fast.

"Is it or is it not?" Surely it is adjudged, as it needs must be, that we are to set aside the one way as unthinkable and nameless (for it is no true way), and that the other path is real and true. How, then, can what is be going to be in the

(20) future? Or how could it come into being? If it came into being, it is not; nor is it if it is going to be in the future. Thus is becoming extinguished and passing away not to be heard of. Nor is it divisible, since it is all alike, and there is no more of it in one place than in another, to hinder it from holding together, nor less of it, but everything is full of what is.

A.5 Plato

A.5.1 Laws

Translation by R.G. Bury.

782a-c

Athenian: Let us, then, revert again to our first statements. Thus much at least every man ought to understand,—that either the human race never had a beginning at all, [782a] and will never have an end, but always was and always will be, or else it must have been in existence an incalculable length of time from the date when it first began.

Clinias: Undoubtedly.

Athenian: Well then, do we not suppose that all the world over and in all sorts of ways there have been risings and fallings of States, and institutions of every variety of order and disorder, and appetites for food—both meats and drinks—of every kind, and all sorts of variations in the seasons, during which it is probable that the animals underwent [782b] innumerable changes?

Aristotle on Higher Natures

Clinias: Certainly.

Athenian: Are we to believe, then, that vines, not previously existing, appeared at a certain stage; and olives, likewise, and the gifts of Demeter and Kore? And that some Triptolemus was the minister of such fruits? And during the period that these fruits were as yet non-existent, must we not suppose that the animals turned, as they do now, to feeding on one another.

889a4-d2

I will explain it more clearly. Fire and water and earth and air, they say, all exist by nature and chance, and none of them by art; and by means of these, which are wholly inanimate, the bodies which come next—those, namely, of the earth, sun, moon and stars—have been brought into existence. It is by chance all these elements move, by the interplay of their respective forces, and according as they meet together and combine fittingly,—hot with cold, dry with moist, soft with hard, and all such necessary mixtures as result from the chance combination of these opposites,—in this way and by those means they have brought into being the whole Heaven and all that is in the Heaven, and all animals, too, and plants—after that all the seasons had arisen from these elements; and all this, as they assert, not owing to reason, nor to any god or art, but owing, as we have said, to nature and chance.

A.5.2 Meno

Translation by Arthur Fairbanks.

76c

Do you say, with Empedokles, that there are certain effluences from things?
- Certainly.

And pores, into which and through which the effluences go? - Yes indeed.

And that some of the effluences match certain of the pores, and others are smaller or larger? - It is true.

And there is such a thing as vision? - Yes.

And . . . colour is the effluence of forms in agreement with vision and perceptible by that sense? - It is.

A.5.3 Theatetus

Translation by Harold North Fowler.

183e3

Parmenides seems to me to be, in Homer's words, "one to be venerated" and also "awful." For I met him when I was very young and he was very old, and he appeared to me to possess an absolutely noble depth of mind.

A.6 Simplicius

A.6.1 On Aristotle's Physics

6r37-45 [184b15]

Among those who sustain that the one is moved and unlimited, Anaximander, son of Praxiados of Milesus, who became his successor and student, said that the principle and element of beings was the unlimited, first being the first to give this name to the principle. He said that this was not water nor anything else of those things called elements, but that the unlimited was of another nature, from which all things come to be in the heavens and in the cosmos beneath them: "it is from these things that there is coming-to-be for beings, and passing-away is into these things, according to 'debt'. For they repay justice amongst themselves for injustice done, according to the ordering of time"--he stated these things thusly through invented names. But it is clear that, in regards to the mutual intertransformation of the four elements, this philosopher did not want to make any one of them a subject of these, but that [the substratum] is something other than them. This thinker did not posit coming to be as a changing of the element, but rather separating the opposites through eternal change. The opposites were hot, cold, dry, wet, and the others.

A.6.2 On Aristotle's Physics

Translation by B. Fleet.

1038.7

For, in fact, in the case of animals, the animal is seen moving as a whole, but it is agreed that the body is moved by the soul (which, because the body is moving, is moving along with it). This is why, even if [the soul] is not apparent, we say that the body is moved by it.

1039.27

This too seems puzzling to me: In what way has ACB been assumed to be moving? For if it [has been assumed to be moving] only as a body, what in it would be the mover? But if [it has been assumed to be moving] as an animal, with CB moving only, on the grounds that it is a body, and with AC assigned to the animal's soul and for this reason simultaneously imparting motion and moving, how is it claimed that the whole is moving in its own right and primarily, since AC, that is, the soul, is moving incidentally because it is in the moving body? How could AC be moving at all if CB is at rest, since the soul is unmoved in its own right but moves because it is in a moving thing, [namely,] the body? Consequently, AB could not even be claimed to be moving in virtue of a part on the grounds that AC in it is moving, for if CB (assigned to the body) is at rest, then AC (employed for the soul) would be at rest too.

1040.16-21, 1041.28

Maybe, then, Aristotle, having proposed to prove that that which is moving in its own right and primarily, being the body, does not have its source of being from itself but is moved by something, proves this after having assumed in advance that anything which is at rest because some "other thing has ceased moving" is being moved "by something" and does not have the motion due to itself and also does not move itself... Also, in reply to my puzzle, I claim that the moving thing AB is a body, which indeed he proved was not moving due to itself on grounds of its partitioned and the whole's being at rest when it has been hypothesized that a part in it is at rest.

Bibliography

Primary Sources

- Aquinas, Thomas. *In duodecim libros Metaphysicorum Aristotelis expositio*. Ed. by M. R. Cathala and R. M. Spiazzi. Taurini-Romae: Marietti, 1950.
- *In octo libros Physicorum Aristotelis expositio*. Ed. by P. M. Maggiòlo. Rome: Marietti, 1965.
- Aristotle. “De sensu et sensato”. In: *Parva naturalia*. Ed. by W. D. Ross. Oxford Classical Texts. Oxford: Oxford University Press, 1955.
- “On Breathing”. In: *Parva naturalia*. Ed. by W. D. Ross. Oxford Classical Texts. Oxford: Clarendon Press, 1955.
- “On Dreams”. In: *Parva naturalia*. Ed. by W. D. Ross. Oxford Classical Texts. Oxford: Clarendon Press, 1955.
- *Aristotelis De anima*. Ed. by W. D. Ross. Oxford Classical Texts. Oxford: Clarendon Press, 1959.
- *Aristotle's Physics: A Revised Text with Introduction and Commentary*. Ed. by W. D. Ross. Oxford Classical Texts. Oxford: Clarendon Press, 1960.

Aristotle on Higher Natures

- Aristotle. *On the Heavens (Greek text with translation)*. Ed. and trans. by W. K. C. Guthrie. Loeb Classical Library, Vol. 338. Cambridge, Massachusetts: Harvard University Press, 1960.
- *Aristotelis Ethica Nicomachea*. Ed. by I. Bywater. Oxford Classical Texts. Oxford: Clarendon Press, 1962.
 - *Meteorologica (Greek text with translation)*. Ed. and trans. by H.D.P. Lee. Loeb Classical Library. Cambridge, Massachusetts: Harvard University Press, 1962.
 - *Aristotelis De generatione animalium*. Ed. by H.J. Drossaart Lulofs. Oxford Classical Texts. Oxford: Clarendon Press, 1965.
 - *On Coming-To-Be and Passing-Away (Greek text with translation)*. Ed. and trans. by E. S. Forster. Loeb Classical Library, Vol. 400. Cambridge, Massachusetts: Harvard University Press, 1965.
 - *Aristotelis Categoriae et Liber de Interpretatione*. Ed. by L. Minio-Paluello. Oxford: Clarendon Press, 1966.
 - *Aristotle's Metaphysics: A Revised Text with Introduction and Commentary*. Ed. by W. D. Ross. Oxford: Clarendon Press, 1966.
 - *Parts of Animals (Greek text with translation)*. Loeb Classical Library, Vol. 323. London: Heinemann, 1966.
 - *Aristotle's De motu animalium, Text with Translation, Commentary and Interpretative Essays*. Ed. and trans. by M. Nussbaum. Princeton: Princeton University Press, 1978.
 - “Physics VII, α and β versions”. In: *The Chain of Change: A Study of Aristotle's Physics VII*. Ed. and trans. by R Wardy. Cambridge: Cambridge University Press, 1990, pp. 1–68.

Bibliography

Plato. *Meno*. Ed. by J. Burnet. Platonis Opera. Oxford: Oxford University Press, 1903.

- *Phaedo*. Ed. by J. Burnet. Platonis Opera. Oxford: Oxford University Press, 1903.
- *Phaedrus*. Ed. by J. Burnet. Platonis Opera. Oxford: Oxford University Press, 1903.
- *Theatetus*. Ed. by J. Burnet. Platonis Opera. Oxford: Oxford University Press, 1903.

Simplicius. *Simplicii in Aristotelis Physicorum libros quattuor posteriores*. Ed. by H. Diels. Vol. 10. Commentaria in Aristotelem Graeca. Berlin: G. Reimeri, 1895.

Translations

Aquinas, Thomas. *Commentary on Aristotle's Physics*. Ed. by Richard J. Blackwell, Richard J. Spath, and W. Edmund Thirlkel. Notre Dame, IN: Dumb Ox Books, 1999.

Aristotle. *On the Heavens*. Ed. by J. L. Stocks. The Works of Aristotle Translated into English, Vol. 2. Oxford: Clarendon Press, 1922.

- *Physics*. Ed. by W. D. Ross. Trans. by R. P. Hardie and R. K. Gaye. The Works of Aristotle Translated into English, Vol. 2. Clarendon Press, 1922.
- *On Generation and Corruption*. Ed. by W. D. Ross. Trans. by H. Joachim. The Works of Aristotle Translated into English, Vol. 2. Oxford: Oxford University Press, 1930.

Aristotle on Higher Natures

Aristotle. *Nicomachean Ethics*. Ed. by W. D. Ross. Trans. by George Stock.

The Works of Aristotle Translated into English, Vol. 9. Clarendon Press, 1940.

- *Categories*. Ed. by W. D. Ross. Trans. by E. M. Edghill. The Works of Aristotle Translated into English, Vol. 1. Oxford: Clarendon Press, 1941.
- *On the Soul*. Ed. by W. D. Ross. Trans. by J. A. Smith. The Works of Aristotle Translated into English, Vol. 11. Oxford: Clarendon Press, 1963.
- *On the Generation of Animals*. Ed. by W. D. Ross. Trans. by Arthur Platt. The Works of Aristotle Translated into English, Vol. 5. Oxford: Clarendon Press, 1965.
- *On the Parts of Animals*. Ed. by W. D. Ross. Trans. by W. Ogle. The Works of Aristotle Translated into English, Vol. 5. Oxford: Clarendon Press, 1965.
- *Metaphysics*. Ed. by W. D. Ross. The Works of Aristotle Translated into English, Vol 8. Oxford: Clarendon Press, 1966.
- *Physics, or Natural Hearing*. Ed. and trans. by Glen Coughlin. South Bend: St. Augustine's Press, 2005.

Charlton, W. *Aristotle's Physics, Books I and II (translated with commentary)*. Oxford: Oxford University Press, 1970.

Simplicius. *On Aristotle Physics 2*. Ed. by Barry Fleet. London: Duckworth, 1997.

Sorabji, R. “Introduction”. In: *On Aristotle Physics 7*. Ed. by Barry Fleet. London: Duckworth, 1997.

Bibliography

Secondary Sources

- Ackrill, J. L. "Aristotle's Definitions of 'Psuche'". In: *Proceedings of the Aristotelian Society* 73 (1973), pp. 119–133.
- Albritton, R. "Forms of Particular Substances in Aristotle's *Metaphysics*". In: *Journal of Philosophy* LIV.22 (1957), pp. 699–708.
- Alfieri, V. E. *Atomos Idea. L'origine del concetto dell'atomo nel pensiero greco*. 2nd edition. Galatina: Congedo Editore, 1979.
- Annas, J. "Aristotle on inefficient causes". In: *Philosophical Quarterly* 32 (1982), pp. 311–26.
- Anscombe, G. E. M. and P. T. Geach. *Three Philosophers*. Oxford: Basil Blackwell, 1973.
- Balme, D. M. "Teleology and Necessity". In: *Philosophical Issues in Aristotle's Biology*. Ed. by A. Gotthelf and J. G. Lennox. Cambridge: Cambridge University Press., 1987, pp. 275–85.
- Barnes, Jonathan. "Life and Works". In: *The Cambridge Companion to Aristotle*. Ed. by Jonathan Barnes. Cambridge: Cambridge University Press, 1995, pp. 1–26.
- ed. *The Cambridge Companion to Aristotle*. Cambridge: Cambridge University Press, 1995.
- Berti, Enrico. "L'essere e le sue regioni da Parmenide ad Aristotele". In: *Nuovi studi aristotelici. II, Fisica, antropologia e metafisica*. Brescia: Morcelliana, 2005, pp. 345–363.

Aristotle on Higher Natures

- Boeri, Marcelo D. “Aristóteles contra Parménides: el problema del cambio y la posibilidad de una ciencia física”. In: *Tópicos* 30.bis (2006), pp. 45–68.
- Bolzán, Juan Enrique. *Física, química y filosofía natural en Aristóteles*. Pamplona: EUNSA, 2005.
- Bostock, D. “Aristotle on the Principles of Change in Physics I”. In: *Space, Time, Matter, and Form: Essays on Aristotle's Physics*. Oxford: Oxford University Press, 2006, pp. 1–18.
- Brenner, William. “Prime Matter and Barrington Jones”. In: *The New Scholasticism* 50.2 (1972), pp. 223–28.
- Brentano, F. *On the Several Senses of Being in Aristotle*. Ed. and trans. by Rolf George. Berkeley and Los Angeles: University of California Press, 1975.
- Burnet, J. *Early Greek Philosophy*. London: A. and C. Black, 1908.
— *Greek Philosophy: Thales to Plato*. London: Macmillan, 1960.
- Calvo Martínez, T. “La noción de *physis* en los orígenes de la filosofía griega”. In: *Δαιμόν, Revista de Filosofía* 21 (2000), pp. 21–38.
- Charles, D. “Teleological Causation in the *Physics*”. In: *Aristotle's Physics: A Collection of Essays*. Ed. by L. Judson. Oxford: Clarendon Press, 1991, pp. 101–128.
- Charles, David. “Matter and Form: Unity, Persistence and Identity”. In: *Unity, Identity and Explanation in Aristotle's Metaphysics*. Ed. by T. Scaltsas, D. Charles, and M. L. Gill. Oxford: Clarendon Press, 1994, pp. 75–105.

Bibliography

- Cherniss, Harold F. *La crítica aristotélica a la filosofía presocrática*. Trans. by Loretta Brass de Eggers et al. México, D. F.: Instituto de Investigaciones Filosóficas, 1991.
- Chung-Hwan, Chen. "The Relation between the Terms *ἐνέργεια* and *ἐντελέχεια* in the Philosophy of Aristotle". In: *The Classical Quarterly* 8.1/2 (1958), pp. 12–17.
- Cleary, John J. "On the Terminology of 'Abstraction' in Aristotle". In: *Phronesis: A Journal for Ancient Philosophy* 30 (1985), pp. 13–45.
- Code, A. "The Persistence of Aristotelian Matter". In: *Philosophical Studies* 29 (1976), pp. 357–67.
- Collingwood, R. G. *The Idea of Nature*. Oxford: Clarendon Press, 1945.
- Cooper, J. M. "Aristotle on Natural Teleology". In: *Language and Logos: Studies in Ancient Greek Philosophy Presented to G.E.L. Owen*. Ed. by M. Schofield and M. Nussbaum. Cambridge: Cambridge University Press, 1982, pp. 197–222.
- Crubellier, M. "On Generation and Corruption I.9". In: *Aristotle's On Generation and Corruption I*. Ed. by F. J. de Haas and J. Mansfeld. Symposium Aristotelicum. Oxford: Clarendon Press, 2004, pp. 267–288.
- Curd, P. *The Legacy of Parmenides. Eleatic Monism and Later Presocratic Thought*. Princeton: Princeton University Press, 1998.
- Curd, P. and D. W. Graham, eds. *The Oxford Handbook of Presocratic Philosophy*. Oxford: Oxford University Press, 2008.
- De Garay, Jesús. *Los sentidos de la forma en Aristóteles*. Pamplona: EUNSA, 1987.

Aristotle on Higher Natures

- Diels, H. and W. Kranz, eds. *Die Fragmente der Vorsokratiker*. Berlin: Weidmann, 1954.
- Everson, S. "Psychology". In: *The Cambridge Companion to Aristotle*. Ed. by Jonathan Barnes. Cambridge: Cambridge University Press, 1995, pp. 168–194.
- Fine, G. "Forms as Causes: Plato and Aristotle". In: *Mathematics and Metaphysics in Aristotle*. Ed. by A. Graeser. Bern, 1987, pp. 69–112.
- Frede, M. "Aristotle's Notion of Potentiality in *Metaphysics Θ*". in: *Unity, Identity and Explanation in Aristotle's Metaphysics*. Ed. by T. Scaltsas, D. Charles, and M. L. Gill. Oxford: Clarendon Press, 1994, pp. 173–193.
- Freeland, C. A. "Aristotle on Perception, Appetition and Self-Motion". In: *Self-motion: from Aristotle to Newton*. Ed. by M. L. Gill and J. G. Lennox. Princeton, N.J.: Princeton University Press, 1994, pp. 35–63.
- Furley, D. "Self-Movers". In: *Self-Motion: From Aristotle to Newton*. Ed. by M. L. Gill and J. G. Lennox. Princeton, N.J.: Princeton University Press, 1994, pp. 3–14.
- Furley, D. J. "The Rainfall Example in Physics II 8". In: *Aristotle on Nature and Living Things*. Ed. by A. Gotthelf. Pittsburgh, 1985, pp. 177–182.
- Furth, M. "Aristotle's Biological Universe: An Overview". In: *Philosophical Issues in Aristotle's Biology*. Ed. by A. Gotthelf and J. G. Lennox. Cambridge: Cambridge University Press., 1987, pp. 21–52.
- Furth, Montgomery. "Aristotle on the Unity of Form". In: *Aristotle Today: Essays on the Ideal of Science*. Ed. by M. E. Matthen. Edmonton, Alberta: Academic Printing and Publishing, 1987, pp. 77–102.

Bibliography

- *Substance, Form, and Psyche: An Aristotelian Metaphysics*. Cambridge: Cambridge University Press, 1988.
- “Elements of Eleatic Ontology”. In: *The Pre-Socratics. A Collection of Critical Essays*. Ed. by Alexander P. D. Mourelatos. Princeton: Princeton University Press, 1993, pp. 241–270.
- Geers, F. W. “A Babylonian Omen Text”. In: *The American Journal of Semitic Languages and Literatures* 43.1 (1926), pp. 22–41. ISSN: 1062-0516.
- Gershenson, Daniel E. and Daniel A. Greenberg. “Aristotle Confronts the Eleatics: Two Arguments on 'The One'”. In: *Phronesis* 7.2 (1962), pp. 137–151.
- Gill, M. L. “Aristotle on Self-Motion”. In: *Self-motion : from Aristotle to Newton*. Ed. by M. L. Gill and J. G. Lennox. Princeton, N.J.: Princeton University Press, 1994, pp. 15–34.
- Gill, M. L. and J. G. Lennox, eds. *Self-Motion: From Aristotle to Newton*. Princeton, N.J.: Princeton University Press, 1994.
- Gill, Mary Louise. *Aristotle on Substance: The Paradox of Unity*. Princeton: Princeton University Press, 1989.
- Gotthelf, A. “Review: [Aristotle's De Motu Animalium, by Nussbaum M.]” In: *The Journal of Philosophy* 77.6 (1980), pp. 365–378.
- “Aristotle's Conception of Final Causality”. In: *Philosophical Issues in Aristotle's Biology*. Ed. by A. Gotthelf and J. G. Lennox. Cambridge: Cambridge University Press., 1987, pp. 204–242.
- Gotthelf, A. and J. G. Lennox, eds. *Philosophical Issues in Aristotle's Biology*. Cambridge: Cambridge University Press., 1987.

Aristotle on Higher Natures

- Graham, D. W. "Leucippus's Atomism". In: *The Oxford Handbook of Pre-socratic Philosophy*. Ed. by P. Curd and D. W. Graham. Oxford: Oxford University Press, 2008, pp. 333–352.
- Granger, H. "Aristotle on the Analogy between Action and Nature". In: *The Classical Quarterly, New Series* 43.1 (1993), pp. 168–176.
- Guiu, I. "La lectura de Parménides en la *Física* de Aristóteles". In: *Agora* 20 (2007), pp. 27–53.
- Guthrie, W.K.C. "Introduction". In: *On the Heavens (Greek text with translation)*. Ed. and trans. by W. K. C. Guthrie. Loeb Classical Library, Vol. 338. Cambridge, Massachusetts: Harvard University Press, 1960, pp. i–xxxvi.
- *A History of Greek Philosophy*. Vol. II: The Presocratic Tradition from Parmenides to Democritus. Cambridge: Cambridge University Press, 1965.
 - *A History of Greek Philosophy*. Vol. I: The Earlier Presocratics and the Pythagoreans. Cambridge: Cambridge University Press, 1971.
- Homer. *The Odyssey*. Trans. by A. T. Murray. Vol. 104. Loeb Classical Library. Cambridge, MA: Harvard University Press, 1995.
- Jaeger, W. *Aristoteles: Grundlegung einer Geschichte seiner Entwicklung*. 2nd edition. Berlin: Weidmann, 1955.
- Jones, B. "Aristotle's Introduction of Matter". In: *The Philosophical Review* 83.4 (1974), pp. 474–500.
- Judson, L., ed. *Aristotle's Physics: A Collection of Essays*. Oxford: Clarendon Press, 1991.

Bibliography

- “Chance and 'Always or For the Most Part' in Aristotle”. In: *Aristotle's Physics*. Ed. by L. Judson. Oxford: Clarendon Press, 1991.
- Kahn, C. “The Thesis of Parmenides”. In: *Review of Metaphysics* 22.4 (1969), pp. 700–724.
- *Anaximander and the Origins of Greek Cosmology*. Indianapolis: Hackett Publishing, 1994.
- *The Verb 'Be' in Ancient Greek*. Indianapolis: Hackett, 2003.
- Kirk, G. S. *Heraclitus: The Cosmic Fragments*. Cambridge: Cambridge University Press, 1962.
- Kirk, G. S. and J. E. Raven. *The Presocratic Philosophers*. Cambridge: Cambridge University Press, 1964.
- Kosman, L. A. “Aristotle's Definition of Motion”. In: *Phronesis* 14 (1969), pp. 40–62.
- “Animals and Other Beings in Aristotle”. In: *Philosophical Issues in Aristotle's Biology*. Ed. by A. Gotthelf and J. G. Lennox. Cambridge: Cambridge University Press., 1987, pp. 360–391.
- “The Activity of Being in Aristotle's *Metaphysics*”. In: *Unity, Identity and Explanation in Aristotle's Metaphysics*. Ed. by T. Scaltsas, D. Charles, and M. L. Gill. Oxford: Clarendon Press, 1994, pp. 195–213.
- Lan, Conrado Eggers and Victoria E. Julia, eds. *Los filósofos presocráticos*. Madrid: Gredos, 1981.
- Lear, J. *Aristotle: The Desire to Understand*. Cambridge: Cambridge University Press, 1995.

Aristotle on Higher Natures

- Lennox, J. "Teleology, Chance and Aristotle's Theory of Spontaneous Generation". In: *Journal of the History of Philosophy* XX (1982), pp. 219–38.
- "Aristotle on Chance". In: *Archiv für Geschichte der Philosophie* 66 (1984), pp. 52–60.
- Leszl, W. "Aristotle on the Unity of Presocratic Philosophy. A Contribution to the Reconstruction of the Early Retrospective View of Presocratic Philosophy". In: *La costruzione del discorso filosofico nell'età dei Presocratici*. Ed. by Maria Michela Sassi. Pisa: Edizioni della Normale, 2006, pp. 355–380.
- Lewis, F. A. "Aristotle on the Relation between a Thing and its Matter". In: *Unity, Identity and Explanation in Aristotle's Metaphysics*. Ed. by T. Scaltsas, D. Charles, and M. L. Gill. Oxford: Clarendon Press, 1994, pp. 247–277.
- Liddell, H. G. and R. Scott, eds. *An Intermediate Greek-English Lexicon*. Oxford: Oxford University Press, 1889.
- Loux, M. J. "Aristotle and Parmenides: An Interpretation of Physics A8". In: *Proceedings of the Boston Area Colloquium in Ancient Philosophy*. Vol. 8. Lanham: University Press of America, 1992.
- Luria, Salomo, ed. *Democrito. Raccolta dei frammenti, interpretazione e commentario di Salomon Luria*. Trans. by A. Krivushina. Il pensiero occidentale. Milan: Bompiani, 2007.
- Mansion, A. *Introduction à la Physique aristotélicienne*. Paris: Vrin, 1945.
- Mansion, S. *Le jugement d'existence chez Aristote*. Louvain: Éditions de l'Institut Supérieur de Philosophie, 1976.

Bibliography

- Meehan, F. X. *Efficient Causality in Aristotle and St. Thomas: a Dissertation*. Philosophical Studies, Vol. LVI. Washington, D.C.: The Catholic University of America Press, 1940.
- Meyer, S. S. "Aristotle, Teleology, and Reduction". In: *The Philosophical Review* 101.4 (1992), pp. 791–825.
- Moravcsik, J. M. "Aristotle on Adequate Explanations". In: *Synthese* 28 (1974), p. 9.
- Morison, B. "Self-Motion in Physics VIII". In: *Aristote et le mouvement des animaux*. Villeneuve d'Ascq: Presses Universitaires du Septentrion, 2004, pp. 67–79.
- Naddaf, Gerard. *The Greek Concept of Nature*. Albany: State University of New York Press, 2005.
- Nagel, Thomas. "What Is It Like To Be a Bat?" In: *Philosophical Review* 83.4 (1974), pp. 435–50.
- Nussbaum, M. "Aristotle on Teleological Explanation". In: *Aristotle's De motu animalium, Text with Translation, Commentary and Interpretative Essays*. Ed. and trans. by M. Nussbaum. Princeton: Princeton University Press, 1978, pp. 59–99.
- "The Role of *Phantasia* in Aristotle's Explanation of Action". In: *Aristotle's De motu animalium, Text with Translation, Commentary and Interpretative Essays*. Ed. and trans. by M. Nussbaum. Princeton: Princeton University Press, 1978, pp. 221–269.
- Olszewsky, T. M. "Self-Movers and Unmoved Movers in Aristotle's Physics VII". In: *The Classical Quarterly* 45.2 (1995), pp. 389–406.

Aristotle on Higher Natures

Owens, Joseph. *The Doctrine of Being in the Aristotelian 'Metaphysics': A Study in the Greek Background of Medieval Thought*. Toronto: Pontifical Institute of Mediaeval Studies, 1963.

Philoponus. *On Aristotle Physics 1.4-9*. Ed. and trans. by C. Osborne. Ancient Commentators on Aristotle. London: Duckworth, 2009.

Pickett, Joseph P. et al., ed. *The American Heritage® Dictionary of the English Language*. Fourth Edition. Boston: Houghton Mifflin, 2000.

Quevedo, A. "Ens per accidens". *Contingencia y determinación en Aristóteles*. Pamplona: EUNSA, 1989.

Reale, G. *Il concetto di filosofia prima e l'unità della Metafísica di Aristotele*. Milan: Vita e Pensiero, 1961.

Ross, W. D. *Aristotle*. Fifth Edition. London, 1949.

- “Commentary on Aristotle's Physics”. In: *Aristotle's Physics: A Revised Text with Introduction and Commentary*. Ed. by W. D. Ross. Oxford Classical Texts. Oxford: Clarendon Press, 1960.
- “Introduction”. In: *Aristotle's Physics: A Revised Text with Introduction and Commentary*. Ed. by W. D. Ross. Oxford Classical Texts. Oxford: Clarendon Press, 1960. Chap. Introduction.
- “Commentary”. In: *Aristotle's Metaphysics: A Revised Text with Introduction and Commentary*. Ed. by W. D. Ross. Oxford: Clarendon Press, 1966, pp. 114–365.

Rossi, G. “Entre lo accidental y lo aparente: La peculiar constelación causal del azar en Aristóteles”. In: *Tópicos* 30.bis (2006), pp. 147–170.

Bibliography

- *El azar según Aristóteles. Estructura de la causalidad accidental en los procesos naturales y en la acción.* International Aristotle Studies 7. Sankt Agustin: Academia Verlag, 2011.
- Ryle, Gilbert. “Categories”. In: *Logic and Language*. Ed. by Antony Flew. Vol. II. Oxford: Basil Blackwell, 1966, pp. 65–81.
- Sanford, Jonathan J. “Categories and Metaphysics: Aristotle's Science of Being”. In: *Categories. Historical and Systematic Essays*. Ed. by Michael Gorman and Jonathan J. Sanford. Studies in Philosophy and the History of Philosophy, Vol. 41. Washington, D.C.: Catholic University of America Press, 2004, pp. 3–20.
- Sauvé Meyer, S. “Self-Movement and External Causation”. In: *Self-motion: from Aristotle to Newton*. Ed. by M. L. Gill and J. G. Lennox. Princeton, N.J.: Princeton University Press, 1994, pp. 65–80.
- Scaltsas, T. “Substantial Holism”. In: *Unity, Identity and Explanation in Aristotle's Metaphysics*. Ed. by T. Scaltsas, D. Charles, and M. L. Gill. Oxford: Clarendon Press, 1994, pp. 107–128.
- Scaltsas, T., D. Charles, and M. L. Gill, eds. *Unity, Identity and Explanation in Aristotle's Metaphysics*. Oxford: Clarendon Press, 1994.
- Sedley, D. “Is Aristotle's Teleology Anthropocentric?” In: *Phronesis* 36 (1991), pp. 179–96.
- “*On Generation and Corruption I.2*”. In: *Aristotle's On Generation and Corruption I*. Ed. by F. J. de Haas and J. Mansfeld. Symposium Aristotelicum. Oxford: Clarendon Press, 2004, pp. 65–89.

Aristotle on Higher Natures

- Sedley, D. "Atomism's Eleatic Roots". In: *The Oxford Handbook of Presocractic Philosophy*. Ed. by P. Curd and D. W. Graham. Oxford: Oxford University Press, 2008, pp. 305–332.
- Sellars, Wilfred. "Substance and Form in Aristotle". In: *Journal of Philosophy* 54 (1957), pp. 688–708.
- Sorabji, R. *Necessity, Cause and Blame*. London, 1980.
- Tarán, L. *Parmenides, A Text with Translation, Commentary and Critical Essays*. Princeton: Princeton University Press, 1965.
- Trendelenburg, A. *Geschichte der Kategorienlehre*. Hildesheim: Georg Olms, 1979.
- Verbeke, G. "The Meaning of Potency in Aristotle". In: *Graceful Reason*. Ed. by L. Gerson. Toronto: Pontifical Institute of Medieval Studies, 1983.
- Vigo, A. "Aristóteles y la finitud extensiva del tiempo". In: *Tópicos* 30.bis (2006), pp. 171–205.
- Vigo, Alejandro. "Prioridad ontológica y prioridad lógica". In: *Estudios aristotélicos*. Pamplona: EUNSA, 2006, pp. 23–85.
- Wardy, R. *The Chain of Change: A Study of Aristotle's Physics VII*. Cambridge: Cambridge University Press, 1990.
- Wardy, R. "Aristotelian Rainfall or the Lore of Averages". In: *Phronesis* 38 (1993), pp. 18–30.
- Wardy, Robert. "Eleatic Pluralism". In: *Archiv für Geschichte der Philosophie* 70 (1988), pp. 125–46.
- Waterlow, S. *Nature, Change, and Agency in Aristotle's Physics*. Oxford: Clarendon Press, 1984.

Bibliography

- Watson, G. “Φαντασία in Aristotle, De Anima 3.3”. In: *The Classical Quarterly, New Series* 32.1 (1982), pp. 100–113.
- Watson, John. “The Metaphysic of Aristotle, II: The First Principles of Knowledge”. In: *The Philosophical Review* 7.2 (1898), pp. 113–134.
- Wedin, M. V. *Aristotle's Theory of Substance. The Categories and Metaphysics Zeta*. Oxford: Oxford University Press, 2000.
- Wieland, W. *Die aristotelische Physik*. Göttingen: Vandenhoeck and Ruprecht, 1962.
- “The Problem of Teleology”. In: *Articles on Aristotle*. Ed. by J. Barnes, M. Schofield, and R. Sorabji. Vol. i: Science. London: Duckworth, 1975.
- Witt, Charlotte. “The Priority of Actuality in Aristotle”. In: *Unity, Identity and Explanation in Aristotle's Metaphysics*. Ed. by T. Scaltsas, D. Charles, and M. L. Gill. Oxford: Clarendon Press, 1994, pp. 215–228.
- *Ways of Being. Potentiality and Actuality in Aristotle's Metaphysics*. Ithaca (New York): Cornell University Press, 2003.
- Wolfson, Harry A. “The Plurality of Immovable Movers in Aristotle and Averroës”. In: *Harvard Studies in Classical Philology* 63 (1958), pp. 233–253.
- Wright, M. R. *Empedocles: the Extant Fragments*. New Haven: Yale University Press, 1981.
- Yepes, R. “Los sentidos del acto en Aristóteles”. In: *Anuario Filosófico* XXV.3 (1992), pp. 493–512.