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ARISTOTLE

METAPHYSICS BOOK Λ

TRANSLATED WITH AN INTRODUCTION AND COMMENTARY BY

LINDSAY JUDSON

GENERAL EDITOR LINDSAY JUDSON

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Metaphysics

Book Λ

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with an Introduction and Commentary
by

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To
my parents
John and Hazel Judson

PREFACE

Many colleagues and friends have helped in the writing of this book. I have profited from comments by audiences in Austin, Boulder, Cambridge, Oxford, Padua, Princeton, Stanford, and especially at the Scuola Normale Superiore in Pisa, where I gave two series of seminars on *Metaphysics* Λ at the invitation of Francesco del Punta, whose kindness and hospitality I shall always remember. In Oxford, Michael Frede and I gave a graduate seminar on the first half of Λ, and we had many conversations about Aristotle's metaphysics and much else besides; the *De Anima* Reading Group lead by David Charles and Michael Frede belied its name for the first time and read through Λ in a series of illuminating sessions in Oriel College. Stefan Alexandru generously made available his collations of the MSS C and M in advance of the publication of his edition of Λ, and Joseph De Filippo gave me a copy of his thesis 'Theology and First Philosophy in Aristotle's *Metaphysics*'. Jonathan Beere, Enrico Berti, Lesley Brown, Dougal Blyth, Myles Burnyeat, Joseph De Filippo, Ana Laura Edelhoff, Gail Fine, Gabriele Galluzzo, Verity Harte, Edward Hussey, Terence Irwin, Geoffrey Lloyd, Mario Mignucci, Benjamin Morison, Carlo Natali, Michael Peramatzis, Diana Quarantotto, Christof Rapp, David Sedley, and Christian Wildberg all gave me expert comments and asked rewardingly difficult questions. István Bodnár, Laura Castelli, David Charles, Silvia Fazzo, Christopher Shields, and an anonymous reader for OUP read earlier versions of various parts of the book, and very generously gave me detailed comments too numerous to acknowledge individually in the text. My greatest academic debt is to John Ackrill. Much of what I have learnt about how to do ancient philosophy came from him, first as my doctoral supervisor and then as colleague, co-editor of the Clarendon Aristotle Series, and good friend. He first suggested that I write this volume, read early drafts, and gave me meticulous and challenging comments. Other debts are as wide as they are deep: to my parents, to whom this book is dedicated, for setting me on the path of inquiry with love, encouragement, and support; and to Jenny, Anna, and Ellen, *sine quîs non*.

CONTENTS

ABBREVIATIONS

ARISTOTLE

An. Post.	*Posterior Analytics*
An. Pr.	*Prior Analytics*
Cael.	*De Caelo*
Cat.	*Categories*
De An.	*De Anima*
EE	*Eudemian Ethics*
EN	*Nicomachean Ethics*
GA	*Generation of Animals*
GC	*De Generatione et Corruptione*
HA	*Historia Animalium*
IA	*De Incessu Animalium*
Int.	*De Interpretatione*
MA	*De Motu Animalium*
Mem.	*De Memoria*
Met.	*Metaphysics*
Meteor.	*Meteorologica*
PA	*Parts of Animals*
Phys.	*Physics*
Poet.	*Poetics*
Pol.	*Politics*
Sens.	*De Sensu*
Soph. El.	*Sophistici Elenchi*
Top.	*Topics*

Books of the *Metaphysics* are referred to by Greek letters, as follows:

A	α	B	Γ	Δ	E	Z	H	Θ	I	K	Λ	M	N
I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII	XIII	XIV

I refer to books of the *Metaphysics* by their Greek letter alone, without '*Met.*', except where this might lead to some unclarity. References by chapter number and/or Bekker lines without a book number/letter are references to Λ.

OTHER ABBREVIATIONS

Editions of the *Metaphysics* or of Book Λ:

Alexandru	Alexandru 2014
Bonitz	Bonitz 1848–9
Christ	Christ 1895
Fazzo	Fazzo 2012
Jaeger	Jaeger 1957
Ross	Ross 1924, volume II

Works by other ancient authors:

[Alexander]	Commentary on *Met.* Λ in Alexander of Aphrodisias's *Commentary on Aristotle's* Metaphysics (Hayduck (ed.) 1891) NB: although the author of the Λ commentary is referred to as 'Alexander' in Ross and Jaeger, he is now generally taken to be the twelfth-century Byzantine commentator, Michael of Ephesus.
Philoponus *in Phys.*	Philoponus, *Commentary on Aristotle's* Physics (Vitelli (ed.) 1887/8)
Simplicius *in Cael.*	Simplicius, *Commentary on Aristotle's* De Caelo (Heiberg (ed.) 1893)
Theophrastus, *Met.*	Theophrastus, *Metaphysics* (Ross and Fobes (eds) 1929/82)

Translations are mine unless otherwise stated.

INTRODUCTION

1. *Metaphysics* Λ

In many ways quite unlike anything else in Aristotle's surviving work, *Metaphysics* Λ is perhaps the most exciting book of the *Metaphysics*. If, with John Ackrill, we think of the *Metaphysics* as 'the Mount Everest of Aristotle's treatises',[1] then the part which has been most studied over the last fifty years, book Z, is like a highly demanding technical climb up a near-vertical ice-fall, with the summit towering above, some distance off;[2] Λ, by contrast, offers an ascent at exhilarating speed—more like a helicopter ride than an arduous climb—from the start of the ice-fall right to the summit. For Aristotle, this summit is the culminating part of metaphysics—or, more accurately (since he does not himself use the term 'metaphysics'), of what he calls 'first philosophy', the inquiry into the principles and causes of all things. But it also affords a view from the top of the world, so to speak, of Aristotle's cosmos as a whole and of the way in which the cosmos depends on the highest principle, the prime unmoved mover.[3]

After an introductory chapter, the first half of Λ (chapters 2–5) investigates the principles of perceptible and changeable substances—the paradigmatic examples of these, for Aristotle, are natural organisms such as human beings and horses. At the heart of this account is Aristotle's *hylomorphism*, the view that such organisms are compounds of matter and form: this view pervades Aristotle's natural philosophy and his metaphysics, and is one of the guiding ideas of the discussions in Z. But Aristotle's notion of a principle here extends more widely: he identifies two further sorts of principles, privation (the condition of lacking

[1] Ackrill 1995, p. xi.

[2] Myles Burnyeat compares Z itself to Everest (2001, p. 1). For the idea that Aristotle takes the summit to lie beyond Z (and beyond H and Θ), see section 2 below.

[3] What follows ignores many controversies about the *Metaphysics* and Λ's role in it; some of these are discussed later in the Introduction (for further discussion, see Judson 2018a).

the form on the part of things which are able to possess it), and efficient cause; he claims that the primary efficient cause of the generation of a natural substance is another such substance which is the same in form, and on this basis argues that form is in some sense prior to the other principles. Chapters 4 and 5 discuss the principles of the attributes and other features of perceptible substances, and they argue that these have principles which are analogues of those of substances. So, he thinks, it is both true that 'different things have different principles' and that, in a way, the principles of all things are the same. The notion of 'principle' in play here is somewhat elusive. One strand in it seems to be the idea of the fundamental terms in which perceptible substances have to understood—and this seems to be what is at work in the discussion of principles in *Phys.* I on which Λ draws for its account of matter, form, and privation as principles. There Aristotle argues that a substance can only change if it is a hylomorphic compound whose matter makes possible the transition from privation to form. Another strand seems to be the idea of things on which other things depend[4]—for example, the specific form a human being possesses.[5] At any rate, at the end of chapter 4 Aristotle mentions another way in which all things have the same principles: they all depend on 'the first mover' (1070b34–5).

This famous idea is taken up in the second half of Λ (chapters 6–10). Aristotle begins by rehearsing arguments which he elaborated in *Phys.* VIII that the changes which natural substances undergo are all caused in some way by one or more unchanging substances. He goes on to examine the character of these substances and their eternal, unvarying activity of thinking. He regards these substances as gods and identifies the highest of them as 'the principle on which depend the heavens and nature' (1072b13–14). At this stage the Everest metaphor gives out. Instead of an ever-thinner atmosphere and the climbers' sense of narrowing focus as the final summit is approached, the second

[4] Aristotle appeals to a variety of types of dependence in Λ, and to various kinds of relations of priority, without doing very much to analyse them: see section 4 and the notes on 1 1069a19–26.

[5] This duality is discussed further in section 5 below, and section 2 of the Prologue to chapters 4–5.

half of Λ is more like the richly orchestrated climax of an otherwise austerely scored symphony: Aristotle's metaphysical argument now brings into play a dazzling array of material from foundational natural philosophy, psychology, cutting-edge cosmology, and mathematical astronomy.

The reason for Λ's breathtaking pace is that it is an outline or plan for a much more extensive work which (as far as we know) Aristotle never wrote; in fact it offers the only glimpse we have of how he conceived of anything like a complete working out of first philosophy. For this reason—and in particular because it is the fullest exposition there is of Aristotle's extraordinary and difficult conception of his supreme god, its goodness, and its activity of thinking—Λ was hugely influential throughout the Middle Ages among philosophers and theologians writing in Arabic and Latin. The cosmology and astronomy set out here (principally in chapter 8) remained influential until the time of Galileo and Kepler—the beginning of the seventeenth century.[6] In more recent times Λ has suffered relative neglect: in the early part of the twentieth century, Werner Jaeger and others argued that Λ was an immature work which lacked proper unity,[7] while more recently Myles Burnyeat has made the not entirely serious speculation that, far from its being an early work, Aristotle wrote Λ on his death-bed.[8] Although I think that we cannot answer the question of when Λ was written (see section 2), my own guess that the truth lies somewhere in between Jaeger's view and Burnyeat's conjecture. In the twenty-first century interest in Λ has increased, with publications including two collections of essays and two critical editions of the text.[9]

Why is the study of Λ valuable now? I think there at least four reasons. Aristotle's metaphysics, especially the 'general metaphysics'[10] pursued in chapters 1–5 and in Γ and the so-called 'central books (ZHΘ), remains challenging both to ancient

[6] The value and importance of Aristotle's theory is discussed in Judson 2015.
[7] Jaeger 1923/48; for discussion see the rest of this Introduction, and section 1 of the Prologue to chapter 8.
[8] Burnyeat 2001, pp. 147–9.
[9] Frede and Charles (eds) 2000; Horn (ed.) 2016; Fazzo; Alexandru.
[10] For this label, see section 4.

philosophers and to contemporary metaphysicians.[11] The question of how the general approach and particular arguments of Λ relate to those of other parts of the *Metaphysics*, especially to Γ, E, and the central books, is highly controversial: studying Λ has the potential to show these other works in a new light. What I called the dazzling array of diverse material in the second half of the book offers the only, or the best, material we have on some aspects of Aristotle's thought (this is true for his astronomy and his theology), or makes an important contribution to the corpus of texts relating to such an aspect (this is true for Aristotle's cosmology and psychology, and his conception of teleology). As the plan for a much more extensive project, Λ as a whole shows us Aristotle's mind at work, not only on particular problems, but also on a grand scale.

2. The Name 'Metaphysics' and the Book *Metaphysics*

The term 'Metaphysics' (*ta meta ta phusika*) means 'the <studies> which come after the physical <studies>'—that is, Aristotle's works on natural philosophy (*Physics, De Caelo, Meteorologica, De Anima, The Parts of Animals*, and so on). It was probably first applied to the work we know as the *Metaphysics* a century or two after Aristotle's death, and probably because it was thought to be what one should study (only) after studying the physical works.[12] Aristotle's own favoured term for the project or projects in which he engages in the *Metaphysics* is 'first philosophy'.[13]

[11] For interactions with contemporary metaphysics, see especially Kit Fine 1992, 1994, and 1995; Charles 2004 and 2008/9; Peramatzis 2011, chs 8–14; Koslicki 2013 and 2014; Skrzypek 2017.

[12] The term could also mean 'the things which are beyond the natural things [i.e. beyond the natural world]': this reading is defended in Menn forthcoming, Iα5.

[13] *Phys.* I.9 192a34–6, II.2 194b12; *Cael.* I.8 277b9–12; *MA* 6 700b8–9; *Met.* E.1 1026a15–16, 24, and 30 (the last of these is discussed below); cf. 'first philosopher' at *De An.* I.2 403b9–16. Z.11 1037a14–16 describes natural philosophy as 'second philosophy' (cf. Γ.3 1005b1–2: 'physics is a form of wisdom, but not the first'). Γ.2 1004a2–4 may refer to the same idea, but its meaning is disputed: see Judson 2018a, pp. 246–7, n. 72.

Aristotle's *Metaphysics* is not a unified treatise, but a collection or compilation of smaller studies, themselves not by any means in finished form; most of them have the appearance of research papers written for Aristotle's own use, and/or for close colleagues, rather than for more general publication.[14] In this respect it resembles a number of Aristotle's other 'works'—most notably the *Physics* and the *Eudemian* and *Nicomachean Ethics*. It is controversial when, how, and by whom the present *Metaphysics* was put together, though the lead candidate for putting it into something like its present shape is Aristotle himself; it is even more controversial exactly what its individual components are and what degree of unity they exhibit.[15]

Despite its position towards the end of the *Metaphysics*, Λ sketches, in an extremely compressed way, a whole treatise—or the major part of a treatise—on 'first philosophy'. As we shall see, it is a well-structured and self-contained work which does not form a continuation of the books which immediately precede it (Z, H, Θ, I, and K)—nor (since the position and/or status of I and K are disputed) even of the 'central books', ZHΘ. It is highly plausible that Λ is a separate piece of writing which was placed where it is now in the compilation because it includes an outline of Aristotle's views on immaterial substances, a subject promised but never reached in the central books (Z.11 1037a13–17; cf. Z.17 1041a6–9).

Though other scholars had put forward the idea that the *Metaphysics* is an amalgam of disparate material, it became common currency through the work of Werner Jaeger (1912 and 1923/48). He argued that Aristotle's writings as a whole revealed a clear pattern of development, beginning with highly Platonic ideas and

[14] One small-scale but nonetheless quite telling sign of this in Λ is the two occurrences in chapter 3 of the abrupt phrase 'After these things <say> that . . .' (1069b35 and 1070a4).

[15] There are many passages which in my view constitute evidence that the *Metaphysics* is a collection of this sort—to name but a few, the opening of Z.1; Z.7–9; the repetitions of material across A, Λ, and MN; α. (K may be a special case, since it may well not have been written by Aristotle.) For discussion see, inter alia, Ross 1924, vol. I, pp. xiii–xxxi; Frede and Patzig 1988, I, Introduction, sections 3–4; Bostock 1994, pp. ix–x; Menn 1995a and forthcoming; Barnes 1997; Judson 2000; Burnyeat 2001, especially chs 3 and 6. Menn's largely unitarian view is discussed in section 4. Undoubtedly the clearest evidence for this 'compilation' view is book Λ itself: see below.

gradually becoming more distant from Plato's views (and hence, to Jaeger's mind, more empirical). Different parts of the *Metaphysics* belonged, in his view, to different stages of this development, with the bulk of Λ being a relatively early work. The particularities of Jaeger's views were immensely influential in the first half of the twentieth century, but came under increasing fire thereafter and are now largely rejected. The fundamental ideas underlying them have nonetheless remained very plausible: that Aristotle's works as a whole may not represent a single grand system, that some works are compilations rather than simple unities, and that his writings, like his thoughts on a given subject, were always liable to revision. Although Jaeger also inspired a great deal of work on the dating of Aristotle's writings (in both absolute and relative terms), the evidence of revisions has led to some scepticism about the idea that there must be such a thing as *the* time when a given work, or book, or section was composed;[16] and important work has been done, principally by Burnyeat, to show that cross-references in Aristotle which direct us to another topic as discussed 'earlier' or 'later' more often reflect his conception of the proper order in which things should be considered rather than the chronological order in which he has written or will write about them.[17] All this makes questions about the date of Λ, and whether it was written before or after some other book of the *Metaphysics,* all the harder to answer (it is in fact very hard to find a good argument for any particular date, early or late, for Λ's composition)—and raises the possibility that there may not actually be determinate answers, even in principle, to questions put in these terms.

I do not propose to go into any of the controversies about this here:[18] what I shall say about the relation of Λ to other books, and about Aristotle's conception(s) of first philosophy, does not require any particular answers to developmental or chronological questions, and I shall as far as possible remain neutral on such issues. It is clear that in writing Λ Aristotle presupposes familiarity with material which we find in *Physics* and *De*

[16] See Barnes 1995, pp. 18–22; Burnyeat 2001, pp. 112–25; Menn forthcoming, Iα5.

[17] Burnyeat 2001, ch.3, 2004a, 2004b.

[18] For discussion of two particular issues, see the Prologue to chapter 8, section 1; and the Epilogue to chapter 9, section 3.

Anima: parts of chapters 1–2, 6–7, and 9 would be barely intelligible without such a familiarity. Although Λ.4–10, in particular, contain material which appears nowhere else in the *Metaphysics*, there are also close links of some sort with other books of the *Metaphysics*: Λ contains material which overlaps with, or is closely related to, material in A, B, Γ, Z, H, and Θ, and to some extent with material in MN. It is usually much less clear, however, what the relationship is: is one based on the other, and if so which is based on which?—or do both derive from some now lost piece of writing? This problem is especially severe in the case of the connections with the central books, and once again I shall remain largely neutral on questions of this sort.[19] In the Prologues to each chapter or pair of chapters, I set out the background to Aristotle's argument, where possible without appealing to material from ZHΘ.

3. The Structure of Λ and its Independence from its Location in the *Metaphysics*[20]

As I have said (and as most commentators agree), as a piece of writing Λ is an independent treatise in the sense that it is presented as a single enterprise with a unified plan and structure, and that it is not tied to its location in the *Metaphysics* as we have it. Λ's beginning is, admittedly, abrupt: 'The investigation concerns substance; for it is of substances that we are seeking the principles and causes' (1069a18–19). The subsequent appeal to the idea that substances are primary, however, suggests a methodological argument which makes Λ's project clear:

> our investigation concerns substances because it concerns the principles and causes of substances; it is concerned with these because <we are investigating the principles and causes of *all* things, and the way to

[19] Menn argues, unconvincingly in my view, that a cross-reference at Λ.6 1072a3–4 shows that Λ is after all a part of the same work as Θ (2009, p. 260; cf. Menn forthcoming, Iα1); for discussion, see the notes *ad loc*. and Judson 2018a, Appendix I.

[20] For a more detailed discussion of the topics in this section and the next, see Judson 2018a.

> investigate these is to investigate the principles and causes of the primary entities, and> substances are the primary entities.[21]

Investigating the causes and principles of all things is an Aristotelian project with which we are familiar from other parts of the *Metaphysics* (see A.2 and Γ.2 1003b15–19); engaging in first philosophy by focusing in some way on substances is also a familiar strategy, found in Γ and ZH. Having thus announced the project, Aristotle sets up what is on the face of it a simple, clear, and unified structure for proceeding. He distinguishes three kinds of substances, and divides them into two classes, natural and unchanging ones. He examines the principles of substances in the first class (chapters 2–5), and then turns to substances comprising the second class (chapters 6–10). At the start of Λ.6 he explicitly refers back to this programme: 'since there were three kinds of substance, two natural and one unchanging, concerning this last kind [i.e. unchanging substances] it must be said . . .' (1071b3–4). The final part of Λ.10 (1075a25–1076a4) looks back at the rest of the book as a whole, and explains how, to Aristotle's mind, his account avoids problems which beset his predecessors' theories. Although it is stylistically disjointed, and has all the appearance of a series of rapidly jotted-down notes, this final section is plainly meant as the outline of an elaborate and emphatic conclusion, and itself concludes with a memorable quotation from the *Iliad*: 'to have many rulers is not good: let there be one ruler.' (1076a4). Λ thus has a beginning, a middle, and an end which are integral parts of one inquiry. It is also clear from Aristotle's presentation of the structure of Λ that chapters 1–5 are just as integral to the project as chapters 6–10: he introduces the study of changeable substances as a part of the enterprise co-ordinate with the study of unchanging ones. I shall return to this point in section 3.

Λ is not the continuation of A–K, or of A–I, or of A–Θ.[22] Although Λ has very close connections with some of the material in Z, H, and Θ, and despite the fact that it offers an outline

[21] See Frede 2000b, pp. 54–61; my notes *ad loc*., and section 1 of the Prologue to chapters 4–5.

[22] Cf. Burnyeat 2001, pp. 132–4; Judson 2018a, pp. 231–6.

account of immaterial substances—a subject to which, as I have said, Z explicitly looks forward—it should not be seen as a continuation of these books. Λ starts in something like the same way as Z, with claims about the priority of substance and a list of items taken to be substances by others, but then pursues a very different path. It focuses not only on matter and form, as Z does, but also—as Z does not—on privation and efficient cause as principles coordinate with matter and form; and it focuses on a question only in the background in the central books, the question of the principles of *all things* (chapters 4–5). (Conversely, Λ shows no interest in the problems of the unity and definability of substances, and of their (non-)identity with their essences, over which Aristotle agonizes in ZH.) Chapters 2–5 are not any sort of summing up of the central books, nor do they build on any of the complex discussions of these problems in Z.4–6 and 10–17.

Although it is in this sense independent and self-contained, it must be stressed that Λ is not a *complete* work. (i) It is, as I have said, highly compressed, and reads like a plan or a sketch for a much longer treatment. This compression is principally apparent at the level of content—this is evident throughout the book—but also sometimes at the level of style—for instance the abbreviated expressions mentioned in n. 14 above, the harsh syntax at 3 1070a19 and at various places in the otherwise relatively expansive chapters 4–5,[23] and the inelegant, shopping-list style of the coda in chapter 10.[24] This suggests that Λ was never properly revised (and possibly even written in some haste), and this is perhaps confirmed by the apparently hasty nature of some of the claims to which Aristotle seems to commit himself about the metaphysical status of substantial privations,[25] and of one or two of the astronomical claims in chapter 8.[26] (ii) On one interpretation of Aristotle's argument in Γ—but not on a number of others—Λ

[23] 4 1070b19–21 and 1070b26–9; 5 1071a8–10.

[24] See also section 1 of the Prologue to chapter 8.

[25] See 1070b22–6 (substantial privations are among the elements (i.e. internal principles) of substances) and 1071a3–17 (substantial privations are actualities), and the notes *ad loc*.

[26] Most notably the reduplication of the work of the outermost heavenly spheres in each of the planetary systems at 1073b39–1074a14, and (if the text is right) the error in counting the spheres at 1074a13–14: see notes *ad loc*.

could be seen as continuing the project of that book and its near neighbour, E: see Judson 2018a, pp. 248–52.[27]

4. Problems for the Unity of Λ

There is, however, a problem with the unity of Λ: the two halves of the book appear to engage in inquiries of two quite different types.[28] Chapters 2–5 seem to be an inquiry of the most general kind into *principles and causes*—the principles and causes of natural substances, and of all natural things. These chapters display no interest in the particular character of any of these substances; instead they investigate the general features, elements, and causes which they all share.[29] Chapters 6–10, by contrast, engage in what I shall call a departmental study: by this I mean an inquiry which not only focuses on some subset of substances or of beings (chapters 2–5 also do that), but which aims to give a full account of what they are like. These chapters seek to demonstrate the existence of substances of a certain kind—unchanging and separate ones—and to explore their specific nature: how they are related to other substances (chapters 6–7 and 10), the character of the activity they engage in (chapters 7 and 9), how many there are (chapter 8), and so on. This second half of the book displays little or no explicit interest in investigating the principles of such substances—if there are such principles.

To gain a sense of the contrast, imagine a piece of 'general theology'[30]—let us call it *Metaphysics* λ—in which Aristotle applies to the metaphysics of unchanging substance the sort of approach he uses in connection with the metaphysics of natural

[27] Menn has argued that there are very close connections between Λ and some of the key metaphysical problems (*aporiai*) set out in B (2009 and forthcoming, Iβ2c and IIIβ). This is very persuasive, but nothing follows for the question of whether Aristotle wrote Λ as a continuation of B, especially given the absence in Λ of cross-references back to that book.

[28] See Frede 2000a, p. 6, who speaks of what might 'seem like a strange anomaly, or lack of parallelism, between the two main parts of Λ'); cf. Patzig 1979, pp. 43–4, and Shields 2012, p. 362.

[29] I take it that the heavenly bodies' 'topical matter' is relatively straightforwardly a kind of matter (for discussion, see Charles 2000, pp. 89–106; Frede 2000a, pp. 14–17; section 4 of the Prologue to chapter 2).

[30] The terminology is Frede's (1987e, p. 94).

substances in Λ.2–5. *Metaphysics* λ might, like chapters 6–10, begin with an argument to establish the existence of immaterial substances, but would then concern itself with questions such as the following. In what terms do these unchanging substances have to be understood? Are they essences, or do they rather have essences? Given Aristotle's close association of essence and form,[31] are they forms (or do they have forms), or is the term 'form' inappropriate in their case, and if so why? How are these unchanging substances individuated if they lack matter? Are the terms in which these substances are to be understood elements or causes of these substances, and are these items themselves substances? Are there things which these substances all are, or have, and if so are these things the same only by analogy or in some stronger way? Are there any relations of priority and posteriority among these items, and/or among these unchanging substances? How, if at all, is the role of being an unmoved mover of a heavenly body related to what it is to be an immaterial substance? The difference between λ and Λ.6–10 makes it look as though Λ does not, after all, have a unified strategy or purpose.

There is a strikingly similar situation in Γ-Θ. It is a familiar fact that Γ and E, in particular, appear to present two very different conceptions of first philosophy. Γ.1 1003a21–32 distinguishes first philosophy from the other sciences not because it has a distinct field of inquiry, but because of its level of generality: it ranges over all types of thing, is the most general inquiry possible. This task is described as 'investigating being as being'.[32] In E.1, on the other hand, Aristotle presents a departmental division by types of subject matter: physics deals with things which are subject to change, mathematics with things which are not subject to change

[31] Z.7 1032b1–2; cf. 7 1032b14, 10 1035b32; H.4 1044a36. For discussion of the question whether Aristotle thinks that immaterial substances are forms, see the notes on 7 1074a31–8.

[32] There is controversy over just what 'studying being as being' amounts to. I take it to be engaging in the sorts of inquiries in which Aristotle engages in the central books and in Λ.2–5 (as well as the other investigations which Γ claims that it is part of studying being as being to consider—the treatment of sameness and contrariety (which is carried out in I) and the validation of the 'common axioms'—most notably, the principle of non-contradiction—which is discussed in the rest of Γ). See also section 1 of the Prologue to chapters 4–5 and Judson 2018a, pp. 248–9 and 254–5.

but which are not separate, and theology with things which are not subject to change and which are separate. As the science of the primary substances, theology is called 'first philosophy'. What is most striking about this characterization of first philosophy is that Aristotle explicitly conjoins it with the conception found in Γ:

> If there is an unchanging substance, <the science of> this must be prior <to physics> and must be first philosophy, and <it is> universal in this way, because it is first. And it will belong to this to investigate being as being—both what it is and the things which belong to it as being. (E.1 1026a23–32)

Here Aristotle emphatically claims that in some way general metaphysics (as it is often called) and theology form a single conception.[33] How they do this is not at all clear: as we shall see, the expression 'and universal in this way, because it is first' is sometimes taken to mean that the science of unchanging substances will, somehow, constitute the universal science of being.[34] But the claim that follows, 'and it will belong to this to investigate being as being—both what it is and the things which belong to it as being', more naturally suggests that the study of being as being is an enterprise to some degree *distinct* from the science of unchanging substances, which it is for the practitioner of that latter science to undertake.

How is this relevant to Λ? Although Λ.2–5 do not use these terms, these chapters are fairly characterized as a general investigation of the features and causes which natural substances have as being substances of that kind. In this respect (however different it may be in others) the inquiry here resembles the general inquiries into being which we find characterized in Γ and undertaken in ZHΘ. In contrast to this general inquiry, Λ.6–10 look like a sketch of the sort of departmental theology envisaged in E. In both ΓE and Λ, therefore, Aristotle treats a general inquiry into the principles of substances and the departmental study of

[33] There is (disputed) evidence that he conjoins them in Γ as well: see Γ.2 1004a2–9 and 3 1005a33–5. For discussion, see Ross 1924, I, *ad loc.*; Irwin 1988, p. 545, n. 49; Kirwan 1993, *ad loc.*; Judson 2018a, pp. 246–7, n. 72.

[34] See Patzig 1979; Frede 1987e; De Filippo 1988.

theology either as, in some way, the *same* metaphysical project, or as in some way parts of the same project. If the two problems are as close as this, the natural explanation is that they are essentially the same problem with the same solution.

Here are some of the many interpretations which offer a response to the problem of Λ's unity. Each of them has something in its favour, but none, I think, is satisfactory. The first tries to find unity in Λ by taking it simply to be a treatise on (the various kinds of) substance.[35] This view clearly captures an important aspect of the structure of Λ, but it seems just to push the problem back a step: if the two halves are simply parts of a single treatment of substance, why do they take such different lines of approach to their subject matter? On this reading we would expect them to proceed in the same way: either both will be 'departmental' inquiries, or (preferably) both will be general-metaphysical ones. This interpretation also underplays quite seriously the scope of Λ's project. As we saw, Aristotle's reason for investigating substances is that it is the way in to a wider and even more fundamental issue, the principles of all things; this is borne out by chapters 4–5's discussion of precisely this issue. If Aristotle is simply concerned to discuss substance, much of the first part of Λ has to be taken as a digression.

According to the second interpretation, the whole of Λ is concerned with the principles of natural substances. On this view, Aristotle first discusses *certain* principles of natural substances—matter, form, and so on—and then turns to *other* principles of natural substances, namely the unchanging and separate substances on which natural ones all depend.[36] Once again, there is an important element of truth in this interpretation; but it fits badly with the overall structure of the book. Λ does not proceed by

[35] This is Helen Lang's view: 'Aristotle announces the subject of the *logos* immediately and unambiguously: an investigation of substance. He then divides it into two parts, sensible substance and unmoved substance, and examines them in order' (1993, p. 258; cf. Kahn 1985a).

[36] This view is endorsed by Frede (2000a; cf. Devereux 1988, p. 180). Frede argues that only this view can explain why, despite the programme announced at the outset of investigating the principles of substances, Λ.6–10 show little interest in the principles of unchanging substance (pp. 6–7); I suggest another explanation in section 5.

distinguishing the types of principles which natural substances have and investigating them in turn, but, as we have seen, by distinguishing types of *substance* (including unchanging ones) and then investigating *them* in turn. This reading is also hard to square with Aristotle's usage of the term 'substance' in chapter 1. In his opening remark about Λ's programme at 1069a18–19 (quoted above), Aristotle must, on this view, mean to refer only to *natural* substance, not to substance in general. This is quite implausible in itself, and is even harder to square with the undeniably wider usage of 'substance' in the next programmatic remark, at 1069a30, that there are three kinds of substance, of which one kind is unchanging substance.

The third interpretation is Stephen Menn's (forthcoming, Iα5): both halves of Λ are attempts to find the highest cause(s) of all things—the first half supposedly revealing a dead end, the second, 'positive', half successfully leading to these highest causes, the unmoving substances, and to the highest one of these. This interpretation is part of a much wider reading of the *Metaphysics* which sees an orderly and unified project in the twelve books ΑΒΓΔΕΖΗΘΙΜΝΛ (in that order). The unifying idea is the search for the very highest principle of all things, which Menn sees signalled in A as the goal of 'wisdom'—a goal which is, he thinks, both refined and pursued in various ways through the subsequent books until the highest principle is finally found in Λ.6–10. The prospect of this degree of unification is very attractive, but I am unpersuaded, both in general and in relation to Λ. As far as Λ goes, Menn's view faces a similar difficulty to one I outlined in the previous paragraph: Aristotle does not begin by saying, 'since we seek the highest principles, let us look at certain types of principles of natural substance to see if they will lead us there, and then at some other type of principle to see if it does,' but rather 'since it is of *substances* that we are seeking the causes and principles, let us investigate the various kinds of substance in turn.' It also misrepresents how chapters 2–5 proceed. Far from having a negative conclusion about the principles of natural substance, Aristotle presents Λ.2–5 as *finding* these principles—form, matter, and so on—and as showing that, suitably understood, these are the principles of all things. There is indeed an argument in Λ.3 that the Platonic Forms are not needed as principles and causes—and so, perhaps, that sort of highest

cause is ruled out. But this is on the grounds that Aristotelian form *will suffice*.[37]

Finally there is a group of interpretations which see chapters 2–5 (and, in some cases, ZHΘ as well) as merely preliminary to the 'true' first philosophy, namely theology—the study of immaterial substances. These interpretations are quite diverse but are united by the idea that theology *constitutes* first philosophy—either by being the essential core of a wider, universal science of being,[38] or by being the only part of it which does not really belong to physics,[39] or by being in a very strong sense the goal of the study of being as being.[40] These views face a variety of other difficulties which I cannot go into here,[41] but they plainly also face an objection in relation to Λ similar to ones raised in the previous paragraphs: Λ presents the discussion of (the principles of) natural substances as a part of the investigation which is coordinate with the discussion of immaterial substances, not as something preliminary or preparatory.

5. The Unity of Λ

In some way Λ is both an investigation of the different kinds of substance and an account of the principles of substance. As we have seen, this involves three separate but related difficulties. (i) The general-metaphysical inquiry into the principles of substance is not presented as continuing beyond chapter 5; (ii) that inquiry appears to concern only *natural* substances rather than all substances; (iii) the inquiry into the third kind of substance—unchanging substance—seems to have a departmental character quite different from that of the inquiry into the first two kinds. The challenge is to show how all of these can be true of a single, coherent project.

[37] A similar point can be made against Menn's reading of ZH as also negative as regards finding the relevant principles.

[38] Patzig 1979; Frede 1987e.

[39] Jaeger 1923/48, pp. 220–2; Ross 1924, II, 346, and Introduction, p. xxviii. For a variant of their view, see Devereux 1988, pp. 175–6 and 180–1.

[40] Burnyeat 2001, pp. 59–68, 127–30, and 132–4.

[41] See Judson 2018a, Appendix II; Judson 2019; the notes on 1 1069a36–b2.

We can resolve the first problem by resolving the second. The principles which chapters 2–5 discuss—form, matter, privation, moving cause, essence, actuality, and potentiality—are indeed introduced by means of an inquiry into natural substances;[42] but for all that has been said so far they may also be the principles of *all* substances. These things are the principles of natural substances in a double sense: first, it is in terms of them that substances of this kind have to be explained and understood—for example, that they are produced by efficient causes which are the same in form, or that they can change because they possess various privations—second, the metaphysical analysis of any such substance will reveal that it is and/or has an appropriate relationship to beings of at least some of these types.[43] In these senses they are also the principles of unchanging substances. It is not, of course, that these substances have matter, privation, or potentiality; but it is in terms of the same principles that they have to be explained and understood, and each of them will be a being of at least two of these types (i.e. at least, essence and actuality[44]). And it need hardly be said that the discussion of the nature of divine substances in chapters 6–10 appeals to matter, moving cause, potentiality and actuality, and essence in explaining what sort of entities they must be.

The opening of Λ strongly suggests that this is Aristotle's line of thought, since it indicates that Aristotle's interest is in the principles of *all* substances: 'our investigation concerns substance; for it is of substances that we are seeking the principles and causes' (1069a18–19). As I have said, the natural way to take this, and indeed the whole of the opening down to 'there are three kinds of substance' at 1069a30, is as concerned with substance in general, and not with natural substance alone; the argument at 1069a19–21 that substance is the primary part of the totality of

[42] Note the final sentence of chapter 5 (1071b1–2): 'we have said, then, what the principles of perceptible things are, and how many, and in what way they are the same and in what way they are different.'

[43] For discussion of what I shall call the schematic and concrete conceptions of principles reflected in these two senses, see section 2 of the Prologue to chapters 4–5.

[44] It is controversial whether the notion of form applies to these substances: see the notes on 8 1074a31–8. Aristotle refers to the Prime Mover as 'the first essence' at Λ.8 1074a35–6.

things, with its reference to Speusippus' metaphysics (see notes *ad loc.*), confirms this. Thus at the outset Aristotle envisages an inquiry into the principles of *all* substances. It is very plausible to imagine that Aristotle takes the first half of Λ to have investigated the principles of all substances, because in arriving at the principles of natural substances he has arrived at the principles of all. In this way we can give due weight to the generality of the opening of Λ.1 *and* to the focus on the principles of natural substances in chapters 2–5.

If this view of Λ is right, then we have resolved the first and second difficulties, and have shown how the general investigation of the principles of substances, as conducted in Λ, is an integral part of first philosophy. I suggest that what holds for Λ holds also, at a relatively general level, for ΓEZHΘ. General metaphysics as Aristotle pursues it in all of these books is an inquiry in its own right: although perceptible substances are not the only substances, examining their principles *as* natural substances yields the resources—the framework of form/matter, essence/accident, actuality/potentiality, etc.—for a metaphysical understanding of *all* substances, including separate ones. Thus the science of natural substances provides the basis for an understanding of immaterial substances too.

The problem now is that this general investigation might seem to constitute more or less the *whole* of first philosophy (together, that is, with Γ's and I's investigations of the common axioms and of oneness, sameness, and so on). Why do we need chapters 6–10 at all, and why do they have the character they do? These questions represent the third difficulty I outlined at the start of the section. What is needed is an understanding of general metaphysics and theology on which the latter makes an essential contribution to general metaphysics, without either being reduced to the other.

Aristotle's general metaphysics is not only concerned with the items that figure in it—form, matter, and so on—but also with how these items are related to each other, and in particular with their relations of priority and posteriority. These priority relations are clearly fundamental to Aristotle's metaphysics: questions about priority, and in particular about the priority of form and actuality over matter and potentiality, are central to the way in which first philosophy proceeds in ZHΘ, and the same concern

with priority and posteriority is evident in the first half of Λ.[45] Chapter 1, as I have said, appeals to the priority of substances over other things, and the principal concern of chapter 3 is the priority of form, which is identified both as the essence and as the final cause (see section 1 of the Prologue to chapter 3). The same concern with questions of priority is evident from time to time in chapters 4–5, especially at 1070b30–5 and 1071a1–17. Implicit in the appeal to analogy in these chapters is the idea that substantial form, matter, etc., are prior in understanding to the form, matter, etc., of things in other categories; chapter 5 also makes the separate point that the principles of substances will be prior because other things depend on substances. Thus in various ways the general metaphysics of chapters 2–5 focuses—albeit in the highly compressed way that is characteristic of these chapters—on the priority relations of the general-metaphysical items it has identified. Chapters 2 and 5 also introduce a new set of terms in which principles can be understood: actuality and potentiality.[46] It is clear that form is to be associated with actuality and matter with potentiality—and we would expect the inference to be that actuality is prior to potentiality in corresponding ways.[47] So not only are Λ.1–5 directly concerned with various issues to do with priority, but they also present the basic materials for an account of the way or ways in which actuality is prior to potentiality—an account of the sort that we find worked out in detail in Θ.

I think that we can solve the third problem if we take one of the central concerns of the second half of Λ to be to establish a further key way in which actuality is prior to potentiality. It aims to establish that everything else depends on one or more beings which are actualities which lack any potentiality, and that they

[45] It has to be noted that, although he distinguishes various forms of priority elsewhere in the metaphysical corpus (see especially Δ.11, Z.1, and Θ), he does not spell out the kind(s) of priority which are in question in Λ: see the notes on 1 1069a19–26.

[46] Chapter 5 also introduces the idea of a first mover of all things. It does not, however, put these two things together: that is the work of the second half of Λ.

[47] The question of the priority of actuality over potentiality is not explicitly introduced until chapter 6; but it has been implicit in the discussions in chapter 3 and chapters 4–5, and I think that this lack of explicitness there is simply a product of the highly compressed nature of Λ.

depend on these beings *because* they are actualities of this sort. This is argued for directly at 6 1071b12–22, where Aristotle claims that actuality is prior because everything causally depends on one or more beings which are active and whose substance is actuality (this means that their activity is neither the exercise of, nor in any other way grounded in, a potentiality).[48] The highest of these beings, at least—often referred to as the Prime Mover—Aristotle calls 'God' (1072b25 and 28–30). Later in the chapter (1071b25) Aristotle claims that without such an actuality, 'none of the things which are will be.'[49] That everything else depends on one or more beings whose substance is actuality is (for Aristotle) a fundamental fact for the philosopher concerned at the most general level with actuality and potentiality and their relations of priority and posteriority—that is, for the general metaphysician—though it is not of course the *only* fact of this kind with which the general metaphysician is concerned.

Why, then, one might ask, does Λ not end with this demonstration—for example, with the grand claim 'on such a principle, then, depend the heavens and nature' at 7 1072b13–14? To some extent, what follows this spells out how it is possible for there to be immaterial things whose substance is activity; but there is still a theological 'residue'—the argument for the number of divine substances in chapter 8 and the arguments about the content of divine thinking in chapters 7 and 9. Aristotle includes these discussions because they are essential parts of departmental theology, and it is departmental theology which establishes the causal dependence of all things on substances which are actualities.

To sum up: general metaphysics is concerned not only with identifying the principles of all things but with their priority relations to each other and to the things of which they are the principles. The general inquiry of chapters 2–5 achieves the first task, but only a part of the second: departmental theology is required to complete it.

[48] For discussion, see the notes *ad loc*. and Judson 2016.

[49] This priority is of a quite different sort from the types of priority at issue in chapters 1–5, and cannot be reduced to any of them (nor any of them to it). This is because none of those types of priority depends on the idea of a being whose substance is actuality.

Can this answer to the problem of Λ also explain the claim in E.1 that theology is 'universal because it is first'? The standard interpretation, as I have said, is that it means 'theology *constitutes* the universal science of being because it is first.' It should be clear that this answer will not work for Λ. I think that the claim is rather that theology is universal in the sense of contributing a part of the universal science. It is 'universal because it is first' in the sense that the priority it is concerned with is precisely the priority of the primary beings over everything else: to establish this priority, as I have said, requires a departmental inquiry into the nature of unchanging substances and their relation to the rest of the world.[50]

How does Aristotle's discussion of goodness, with which he concludes the theological part of Λ,[51] fit into this picture? A.2 tells us, albeit in a highly preliminary way, that 'wisdom' (I take it that this is first philosophy) is 'a science which investigates the first principles and causes [sc. of all things]' and that 'the good is one of these causes'; it also says that god, too, 'is thought by all to be among the first causes and to be a sort of principle.'[52] We should take these remarks seriously.[53] The opening section of Λ.10 (together with parts of chapters 6–7) explains the way in which the cosmos is an orderly whole depending ultimately on a single divine principle, by explaining the way in which the goodness of its parts reflects that of the Prime Mover. The explanation is compressed and cryptic, even by the standards of most of the rest of Λ (for discussion, see sections 1 and 2 of the Prologue to chapter 10 and the notes *ad loc*.) If A.2 is anything to go by, however, this account, too, is a part of general metaphysics—the

[50] For other views of 'universal because first', see Broadie 2012, p. 61; Shields 2012, pp. 362–6; Menn, forthcoming, Iα5. I discuss these in Judson 2018a, p. 265, n. 116.

[51] 10 1075a11–25. As I said earlier, the rest of chapter 10 is a coda to the book as a whole, which list the difficulties which (supposedly) only Aristotle's metaphysics can resolve.

[52] 982b9–10 and 983b8–9. Two sharply contrasting accounts of the significance of A.1–2 for our understanding of first philosophy are given in Broadie 2012 and Menn forthcoming, Iα1–3.

[53] Though we should not, in my view, take A.2 as committing Aristotle to the belief that the *only* object of wisdom is this highest, divine cause. For a sustained defence of the idea that this *is* Aristotle's belief, see Menn forthcoming.

science of the causes and principles of all things—and if Λ is anything to go by, it also relies to some extent on departmental theology. This is another instance of the way in which the complex structure of first philosophy and its components, general metaphysics and theology, is exemplified in the structure of *Metaphysics* Λ.

TRANSLATION[1]

CHAPTER 1

1069a18 The investigation concerns substance; for it is of substances that we are seeking the principles and causes. For if the totality of
20 things is something whole, substance is its primary part; and even if it is through being in succession, in this way too substance is[2] primary, and after it quality or[3] quantity. At the same time, neither are these things, so to speak, beings without qualification, but[4] qualities and processes; otherwise even the not-pale and the not-straight <would be beings without qualification> (we certainly say that these things too are—for example not-pale is).
25 Further, none of the rest is separate. Our predecessors too in effect bear witness [to the primacy of substance]; for it was of substance that they sought the principles and elements and causes. Some, our contemporaries, take *universals* to be substances (for the genera are universal, and it is these, rather, that they say are principles and substances—because of their abstract method of inquiry), while earlier thinkers took *particulars* to be substances—
30 for example, fire and earth, but not what is common, body.

There are three kinds of substance. One is perceptible, of which one is eternal and one (which is acknowledged by everyone) perishable—e.g. plants and animals. Of this we must grasp the elements, asking whether they are one or many.[5] Another kind is unchanging—and some say that this is separate (some of them
35 dividing it into two, some taking the forms and the mathematicals to have a single nature, and some taking it to comprise the

[1] All divergences from Jaeger's *Oxford Classical Text* (1957) except for minor differences in punctuation are indicated in the footnotes, which also indicate some of my decisions to accept Jaeger's text in particular cases. The sign * at the end of a footnote means that there is a discussion in the Notes on the Text.

[2] Reading *καὶ* instead of *κἂν* at 1069a20.

[3] Reading *εἶτα τὸ ποιόν ἢ ποσόν* instead of *εἶτα τὸ ποιόν, εἶτα τὸ ποσόν* at 1069a21.*

[4] Reading *ἀλλὰ* instead of *οἷον* at 1069a22.*

[5] Reading the same wording as Jaeger's text at 1069a30–3, but with different punctuation, and without *ἡ δ' ἀΐδιος* (which Jaeger marks for deletion) at a32.*

mathematicals alone of these). The former kinds of substance, then, are the subject of natural science (for they involve change), but the **1069b**
latter of another science, if there is no principle common to them all.[6]

Perceptible substance is subject to change. If change is from things which are set against each other or from what is intermediate, and not from all things which are set against each other (for voice is not pale),[7] but from the *opposite*, it is necessary for there 5
to be something which underlies, which is what changes into the opposite condition; for it is not the opposites that change.

CHAPTER 2

Further, while something remains, the opposite does not remain. There is therefore a third thing besides the opposites—the matter.

If, then, the kinds of change are four—in respect of what <something is>, or in respect of quality, or of quantity, or of 10
place—and change in respect of *this* is coming to be and ceasing to be without qualification, change in respect of quantity is growth and diminution, change in respect of attribute is alteration, and change in respect of place is locomotion—then the changes will be into opposite conditions of each kind.

It is necessary, then, for the matter which changes to be able to be in both states; and since what is is twofold, everything changes 15
from being potentially to being in actuality (e.g. from potentially pale to actually pale, and similarly in the case of growth and diminution as well). Consequently not only is it possible for something to come to be incidentally from what is not, but also everything comes to be from what is—but what is potentially, and 20
from what is not in actuality. And this is Anaxagoras' One; for better than 'all things together'—and Empedocles' and Anaximander's mixture, and what Democritus says—is 'all things were together, potentially but not actually.'[8] Thus they would seem to have had some grasp of matter.

Everything that changes has matter, but the matter is different. 25
And of eternal things, those which, though not generable, are

[6] Reading *κοινή* with Jaeger at 1069b2.*
[7] Omitting Jaeger's *καί* before *ἡ φωνή* at 1069b5.*
[8] Retaining Jaeger's text at 1069b21–4.*

movable by locomotion <have matter>—but not generable matter, but matter for whence and whither. (Someone might raise the problem, from what sort of not-being does coming to be take place? For that which is not is threefold.) Now if something is potentially, nonetheless its potentiality is not for just anything, but different things come to be from different things. Nor is it sufficient to say that all things were together; for they differ in their matter, since why did unlimited things come to be instead of one thing? For the Intellect is one, so that if the matter were also one, that which the matter was potentially would have come to be in actuality.

There are, therefore, three causes and three principles: two are the pair of opposites—of which one is the formula and form, one the privation—and the third is the matter.

CHAPTER 3

After these things <say> that neither the matter nor the form comes to be—I mean the last ones. For in every case of change, *something* changes, is changed *by* something, and changes *into* something: by what: the first mover; what: the matter; into what: the form. They will go to infinity, then, if not only the bronze comes to be spherical, but also the spherical or the bronze comes to be; hence there must be a stop.

After these things <say> that each substance comes to be from a synonym (for the things which are by nature are substances, and so are the others). For they come to be either by art or by nature or by luck or by chance; now art is a principle in something else, whereas nature is a principle in the thing (for human being begets human being), while the other causes [i.e. luck and chance] are privations of these.

There are three substances: the matter which is a this something through appearing[9] (for what touches and does not have a natural unity is matter and what underlies); the thing's nature, which is a this something and a certain state-towards-which; and then the third substance is the particular from these—e.g. Socrates or Kallias. Now in the case of some things the this something does

[9] Retaining (with Jaeger's printed text) the MSS reading at 1070a10, *τόδε τι οὖσα τῷ φαίνεσθαι*. For discussion, see the commentary.

not exist over and above the composite substance (e.g. the form of a house does not—unless the art does—nor is there coming to be and ceasing to be of these, but in another way the house without matter, and health, and everything in accordance with art, are and are not), but if <the this something exists over and above the composite> at all, it is only in the case of things which are by nature. This is why Plato did not speak badly when he said that there are as many Forms as there are natural things (if indeed there are Forms other than these, for example fire, flesh, head;[10] for they are all matter, and the last <matter is the matter> of what is substance especially).

The causes which initiate change <are causes> inasmuch as they have come to be previously, while the things which are causes in the sense of formula exist simultaneously. For it is when the human being is healthy that health also exists, and the shape of the bronze sphere exists at the same time as the bronze sphere. (Whether something remains afterwards too has to be considered, since in some cases nothing prevents it; for example whether the soul is of such a sort—not all soul but intellect; for perhaps it is impossible for all soul to remain.)

Thus it is clear that there is no necessity, on these grounds at any rate, for the Ideas to exist: for human being begets human being—the particular some particular human being. And similarly in the case of the arts as well: for the medical art is the formula of health.

CHAPTER 4

The causes and the principles are in a way different for different things, and in a way—if one were to speak universally and analogically—the same for all things. For someone might raise the problem whether the principles and elements of substances and relatives were different or the same, and similarly in respect of each of the categories. But it is absurd if they are the same for all; for relatives and substances[11] will be from the same things. What then will this be? For there is nothing common over and **1070b**

[10] Reading *ἄλλα τούτων* instead of *ἀλλ' οὐ τούτων* at 1070a19.*
[11] Reading *οὐσίαι* instead of *ἡ οὐσία* at 1070a36.*

above substance and the other things which are predicated, but the element is prior to the things of which it is an element. Yet neither is substance an element of relatives, nor is any of these an element of substance. Further, how can all things have the same elements? For none of the elements can be the same thing as that which is composed of elements—e.g. B or A as BA. Nor, for that matter, can <any> of the intelligible elements—e.g. being or unity. For these belong to each of the composites as well;[12] none of them will be a substance or relative, then—but they must be. So all things do not have the same elements.

Or rather, as we say, in a way they do, and in a way they do not. For example, perhaps <the elements> of perceptible bodies are as form the hot and in another way the cold—the privation—and as matter the primary thing which is in itself potentially these; but substances are these and the things which are from them, of which these are principles, or anything which comes to be one from hot and cold—e.g. flesh or bone. For what comes to be must be different from them. Of these things, then, the elements and principles are the same (though different for different things); but the elements and principles of *all* things cannot be said to be the same in this way, but only by analogy, as one might say that there are three principles: form, privation, and matter—yet each of these is different for each genus; for example in colour,[13] pale, dark, visible surface, light, darkness, air, and from these day and night. But since not only the things which are present in a thing are causes, but also some of the things outside it (e.g. the mover), it is clear that principle and element are different; both are causes—and principle is divided into these—and that which is <a cause> as a mover or a cause of rest is a principle and a substance.[14] Consequently elements are—analogically—three, while causes and principles are four; but they are different in different things, and the first cause-as-a-mover is different in different things. Health, disease, body: the mover medical art.

[12] Reading *στοιχείων* instead of *στοιχεῖον* at 1070b7.*

[13] Reading *χρώματι* instead of *χρώμασι* at 1070b20.*

[14] Reading *ἀρχὴ καὶ στοιχεῖον· αἴτια δ' ἄμφω, καὶ εἰς ταῦτα διαιρεῖται ἡ ἀρχή, τὸ δ' ὡς κινοῦν ἢ ἱστὰν ἀρχή τις καὶ οὐσία* instead of Jaeger's *ἀρχὴ καὶ στοιχεῖον, αἴτια δ' ἄμφω [καὶ εἰς ταῦτα διαιρεῖται ἡ ἀρχὴ] τὸ δ' ὡς κινοῦν ἢ ἱστὰν ἀρχή τις οὖσα* at 1070b23–5.*

Form, *this* lack of arrangement, bricks: the mover the art of building {and principle is divided into these}.[15] Since the mover is, in natural things,[16] human being for human beings,[17] while in the things which result from thought it is the form or the opposite, in a way there are three causes, though in *this* way there are four: for medical art is in a way health, and the art of building is the form of a house, and human being begets human being. Again, in addition to these things there is that which as first of all things moves all things.

CHAPTER 5

Since some things are separate and some are not separate, it is the former that are substances. And it is for this reason that the causes **1071a** of all things are the same[18]—because without substances there are no attributes and processes. Then soul, perhaps, and body, or intellect and desire and body, will be these. Again, there is another way in which, by analogy, the principles are the same, namely actuality and potentiality. But these too are different in different cases, and in different ways. For in some cases, the same thing is in actuality at one time and is potentially at another, e.g. wine or flesh or a human being. (These too fall under the aforementioned causes. For the form is in actuality, if it is separate, and that which is from both, and privation (e.g. darkness or <the> ill); the matter, however, is potentially, since it is this which is able to become both.) But it is in a different way that things which do not have the same matter differ in actuality and potentiality—things[19] which do not have the same form, but a different one—as a cause of a human being is the elements, fire and earth as matter and the proper form, and, further, something

[15] The sentence in {} at 1070b29–30 is in most MSS (it is not in A^b or in one Arabic translation: Walzer 1958, p. 224), but is probably not part of the original text.

[16] Omitting Jaeger's supplement <τὸ ὁμοειδὲς οἷον> at 1070b30–1.

[17] Reading ἀνθρώποις ἄνθρωπος instead of Jaeger's ἀνθρώπῳ ἄνθρωπος at 1070b31.*

[18] Reading ταὐτά with Jaeger at 1071a1.*

[19] With Jaeger, I omit Ross's supplement ἐνίων at 1071a12: for discussion, see the Commentary.

else outside, for example the father, and besides these the sun and the oblique circle, which are neither matter nor form nor privation nor the same in form, but which are *movers*.

Again, it must be seen that some can be said universally and some not. Now the *this* which is first in actuality and something else which is potentially are first principles of all things. *Those* universals, then, are not; for it is the particular that is a principle of particulars. For human being of human being universally—but there is no <universal human being>, but Peleus of Achilles, and your father of you, and *this* B of *this* BA, though in general B of BA without qualification. And then the forms of substances.[20] But there are *different* causes and elements for different things, as has been said—for things which are not in the same genus (colours, sounds, substances, quantity)—except by analogy. And the causes and elements for things which are in the same form are different, not in form, but because there is a different one for different particulars: your matter and the form and the mover, and mine, <are different>; but they are the same in the universal formula.

If we inquire what the principles or elements of substances and relatives and qualities are, and whether they are the same or different, it is clear that when the causes and elements are said in many ways, they are indeed <the same> for each, but when they have been differentiated, they are not the same but different, except in this way: and in this way the causes of all things *are* the same—by analogy,[21] because they are matter, form, privation, the mover. And in *this* way the causes of substances <may be spoken of> as causes of all things, because all things are destroyed when they are destroyed. Further, the first thing in actuality. But in *this* way there are different first <causes>: all the opposites which are neither said as genera nor said[22] in many ways—and further the matters.

We have said, then, what the principles of perceptible things are, and how many, and in what way they are the same and in what way they are different.

[20] Reading *ἔπειτα τὰ εἴδη τὰ τῶν οὐσιῶν. ἄλλα δέ ἄλλων* . . . instead of Jaeger's *ἔπειτα ἤδη τὰ τῶν οὐσιῶν* (*ἄλλα δέ ἄλλων*) at 1071a24.*

[21] Reading *πλὴν ὡδί. καὶ πάντων ὡδὶ μὲν ταὐτὰ τῷ ἀνάλογον* (with Jaeger) at 1071a33, rather than Ross's *πλὴν ὡδὶ καὶ πάντων, ὡδὶ μὲν ταὐτὰ ἢ τὸ ἀνάλογον.*

[22] Retaining the MSS' second *λέγεται* (deleted by Jaeger) at 1070a37–b1.

CHAPTER 6

Since there were three kinds of substance, two natural and one unchanging, concerning this last kind it must be said that it is necessary that there be some eternal substance which is unchanging. For substances are the first of the things that are; and if every substance is perishable, everything is perishable. But it is impossible for change either to come to be or to cease to be (for it was shown to exist always); nor can time, since there cannot be earlier or later if time does not exist.[23] Change, then, is continuous in the way in which time is; for it is either the same as change or an attribute of it. No change is continuous except for change in respect of place, and of this only that which is circular. Yet if there is something which can cause change or act upon things, but is not active in some way, there will be no change; for that which has a potentiality can fail to be active. Nor will it help, then, even if we posit substances which are eternal—as do those who posit the Forms—unless there is some principle in them which is able to cause change. Yet not even this will be sufficient, nor will another substance besides the Forms; for unless it is active there will be no change. Again, it will not be sufficient if it is active but its substance is potentiality; for there will not be eternal change, since that which is potentially can fail to be. There must, therefore, be a principle of this sort, whose substance is activity. Moreover, these substances must be without matter; for they must be eternal, at any rate if anything else is eternal. Activity, then.

But there is a difficulty: for everything which is active seems to have a potentiality, but not everything which has a potentiality is active—so that potentiality is prior. But if this is the case, none of the things that are will be; for it is possible for a thing to be able <to be> but not to be. Yet if things are as those writers about the gods say who generate <everything> from night, or as the natural scientists say who talk of 'all things together', the same impossibility will arise. For how will it be changed, unless there will be some cause which is in activity? For at any rate, the timber will not itself change itself, but carpentry will; nor will the menstrual

[23] Understanding a semicolon rather than Jaeger's's period after *χρόνον* at 1071b7; correspondingly I understand a period rather than a semicolon after *χρόνου* at b8–9: see the commentary.

fluids nor the earth change themselves, but rather the seeds and the semen.

This is why some posit perpetual activity (e.g. Leucippus and Plato); for they say that there is always change. But why there is and what it is they do not say, nor the cause of its taking place in
35 *this* way rather than in *this*. For nothing is changed just as it happens, but there must always be something present—as things are, something changes in this way by nature, and in that way by force or through the agency of intellect or of something else. And then what sort of change is primary?—for that makes an incal-
1072a culable difference. Nor, again, was Plato, at any rate, able to say that it is what he sometimes thinks the principle is—that which moves itself by itself. For the soul is later, and simultaneous with the heavens, as he says.

Thinking that potentiality is prior to activity, then, is in a way
5 right and in a way not—we have said how. Witnesses that activity is prior are Anaxagoras, since Intellect is in activity,[24] and Empedocles with Love and Strife, and those who say that there is always change, such as Leucippus.

Consequently there was no chaos or night for an infinite time, but the same things always, either cyclically or in another way—if
10 activity is prior to potentiality. If, then, the same thing is always cyclically, something must always remain, being active in the same way. And if there is to be coming to be and ceasing to be, there must be something else which is active in different ways.[25] It is necessary, therefore, for it to be active in *this* way in virtue of itself, and in *that* way in virtue of something else—and so in virtue either of a different [third] thing or of the first. Hence it is necessary that it be in virtue of this one; for that would again be a
15 cause for the second *and* the third. Thus it is better to say that it is the first thing. For that was the cause of what is always in the same way, and something else is the cause of what is in different ways; and it is clear that both are the cause of what is always different. In this way, therefore, the changes are as well. Why, then, should we seek other principles?

[24] Reading ἐνεργείᾳ instead of Jaeger's ἐνέργεια at 1072a5–6.*

[25] Reading ἄλλο δεῖ ἐνεργοῦν εἶναι instead of Jaeger's ἄλλο δεῖ εἶναι ἀεὶ ἐνεργοῦν at 1072a11–12.*

CHAPTER 7

Since it is possible for things to be thus, and if they are not thus, <everything> will be from night and from all things together and from what is not, these things would be resolved; and there is something which is always being moved in an unceasing motion, and this motion is in a circle. This is clear not only through argument but in fact. Consequently the first heaven must be eternal. There is also, therefore, something which causes its motion; and since that which is moved and causes motion is an intermediate, there is a mover which causes motion without being moved,[26] being eternal, and substance, and activity.

This is how the objects of desire and of intellect cause motion; they cause motion without being moved. The primary objects of these are the same. For what appears to be good is an object of appetite, while that which *is* good is the primary object of wish. And it is rather that we desire something because it seems good, than that it seems good because we desire it; for thinking is a principle. And the intellect is moved by the object of thought, and one of the two columns of opposites is in itself an object of thought; and in this column substance is first, and of substance that which is simple and exists in activity is first. (Being one and being simple are not the same thing; for 'one' signifies a measure, while 'simple' signifies how the thing is.) But both the good and that which is in itself an object of choice are in the same column; and the first thing is always best or analogous to the best. That the *for the sake of which* is among the things which are unmoved is made clear by the distinction: the for the sake of which is *for* something and *of* something,[27] and of these the one is moved and the other is not.

It causes motion as something beloved, while it is by means of a moving thing that it causes motion in the rest.[28] Now if something is moved, it can also be otherwise than it is, so that the primary motion is indeed in actuality,[29] in that it is moved; but in this way

[26] Reading *ἐπεὶ δὲ τὸ κινούμενον καὶ κινοῦν μέσον, κινοῦν ἔστι* instead of Jaeger's *ἐπεὶ δὲ τὸ κινούμενον καὶ κινοῦν καὶ μέσον . . . τοίνυν ἔστι* at 1072a24–5.*

[27] Retaining Jaeger's *<καὶ> τινός.* at 1072b2–3.*

[28] Retaining Jaeger's *κινουμένῳ δὲ τἆλλα κινεῖ* at 1072b4.*

[29] Reading *ὥσθ' ἡ φορὰ ἡ πρώτη καὶ ἐνεργείᾳ ἐστιν ᾗ κινεῖται· ταύτῃ δὲ ἐνδέχεται* instead of Jaeger's *ὥσθ' ἡ φορὰ ἡ πρώτη εἰ καὶ ἐνεργείᾳ ἐστιν, ᾗ κινεῖται. ταύτῃ γε ἐνδέχεται* at 1072b5.*

it can be otherwise—i.e. in respect of place—even though it cannot be otherwise in respect of substance. But since there is something which causes motion but is itself unmoved, and which exists in actuality, this thing cannot in any way be otherwise. For locomotion is the first of the kinds of change, and of this the first kind is locomotion in a circle; and this is the motion which this [the first mover] causes. It exists, then, of necessity; and inasmuch as it exists of necessity, it does so well, and in this way it is a principle. (For the necessary is spoken of in this number of ways: that which is by force, because it is contrary to impulse; that without which things are not good; that which cannot be otherwise, but is necessary without qualification.) On such a principle, then, depend the heavens and nature.

It is a way of life of a kind which is the best possible, if for a short time, for us (for it is thus always, whereas for us that is impossible), since its activity is also pleasure—and this is why waking, perception, and thinking are most pleasant, and expectations and memories because of these.

And thinking in itself is of what is best in itself, and the highest kind of thinking is of the highest kind of what is best. And it is itself which the intellect thinks, by sharing in the object of thought; for <intellect> comes to be an object of thought in touching and thinking <it>, so that the intellect and the object of thought are the same. For that which is receptive of the object of thought, i.e. of the substance, is intellect, and it is active when it possesses <the object of thought>; consequently it is the former rather than the latter[30] which seems to be what is divine about the intellect, and contemplation is the most pleasant and best thing. If, then, God is always, as we are sometimes, in this good state, that is wondrous; and if its state is better, that is still more wondrous. And God is in this state. Life too belongs <to it>; for the activity of the intellect is life, and <its> activity is that.[31] Its activity, which is activity in itself, is a life best and eternal; hence we say that God is a living being eternal and best, so that life and lifetime, continuous and eternal, belong to God; for *this* is God.

[30] Reading *ὥστε ἐκεῖνο μᾶλλον τούτου* instead of Jaeger's *ὥστ' ἐκείνου μᾶλλον τοῦτο* at 1072b23.*

[31] Reading *ἐκεῖνο* instead of Jaeger's *ἐκεῖνος* at 1072b27.*

Those who suppose, as the Pythagoreans and Speusippus do, that what is finest and best is not to be found in a starting-point, because in the case of both plants and animals the starting-points are causes, whereas what is fine and perfect is in the things which come from these, are in error. For seed comes from other things, which are prior and perfect, and what is primary is not seed but what is perfect: e.g. one would say that a human being is prior to seed—not the human being who came to be from this, but another one from whom the seed came.

That there is a substance which is eternal and unmoved and separate from perceptible things is clear from what has been said.

And it has also been proved that this same substance can have no magnitude, but is partless and indivisible. For it causes motion for an infinite time, and nothing finite can have an infinite power. Now every magnitude is either infinite or finite; but it could not have a finite magnitude for this reason, nor an infinite one because there is no infinite magnitude of any sort. But also that it is impassive and not subject to alteration; for the other changes are posterior to that in respect of place. These things, then, are clear—as to why it is thus.

CHAPTER 8

But the question whether we suppose one substance of this kind or more than one—and how many—must not be overlooked. And we must also recall, in respect of the statements of the others, that they have said nothing which can even be clearly stated concerning the number of such substances. For the theory of the Ideas has no special discussion of this question; for those who say that there are Ideas say that the Ideas are numbers, but concerning the numbers they sometimes speak of them as infinite and sometimes as limited by the number 10; but as to the reason why this is the number of the numbers, nothing is said with demonstrative rigour.

We, however, must speak on the basis of the things which have been laid down and the distinctions which have been made. For the principle and the first of the things that are is unmoved both in itself and incidentally, but is the cause of the first, eternal, and single motion. Since what is moved must be moved by something,

and the first mover must be unmoved in itself, and the eternal motion must be caused by something eternal, and the single motion must be caused by a single thing, and since we see, in addition to the simple motion of the universe, which we say the primary and unmoved substance causes, *other* motions—the eternal motions of the planets (for the body which moves in a circle is eternal and unresting; the proof for this has been given in the works on nature)—each of these motions must be caused by a substance which is unmoved in itself and eternal. For the nature of the stars[32] is eternal, being a substance of some kind, and the mover must be eternal and prior to what is moved; and what is prior to a substance must be a substance. It is clear therefore that there must be just as many substances <as there are eternal circular motions>, in their nature eternal and unmoved in themselves, and without magnitude for the reason given earlier.

That they are substances, then, and that of them one is first and another second in accordance with the same ordering as the motions of the stars, is clear. But as for the number of the motions, this is already something which must be investigated on the basis of the mathematical science which is most akin to philosophy, astronomy. For this studies substance which is perceptible but eternal, while the others—e.g. the one concerned with numbers, and geometry—do not study any substances. That the motions are more in number than the things which move, is clear even to those who have engaged in the subject to a moderate extent; for each of the wandering stars is moved in respect of more than one motion. But as to how many these substances actually are, we now first say what some of the mathematicians say, to help our thinking, so that we may have some definite number to grasp in thought. But then for the rest, we must in part inquire

[32] As I explain in section 1 of the Prologue to chapters 6–7, Aristotle uses the term 'stars' to refer not only to what we normally call the stars (Aristotle calls these the 'unwandering stars'), but also to what most Greeks thought of as the seven 'wandering stars', or planets—the moon, the sun, Mercury, Venus, Mars, Jupiter, and Saturn (but not the Earth, since it is supposed not to move). I shall follow Aristotle's usage. Aristotle of course uses the names of Greek gods in referring to individual planets: Hermes (Mercury), Aphrodite (Venus), Zeus (Jupiter), and Kronos (Saturn), and the terminology (found also in Plato) of 'the <star> of Zeus', 'the <star> of Kronos', etc. I use the Greek names in the translation, but use the conventional Roman names in the commentary.

ourselves, in part learn from the inquirers: and if those who make this study their business have a view at odds with the views now stated, we must love both parties, but believe the more accurate.

Eudoxus, then, ascribed the motion of each of the sun and moon to three spheres, of which the first is that of the unwandering stars, the second moves along the <circle> through the middle of the constellations of the zodiac,[33] and the third moves along the <circle> slanted across the breadth of the constellations of the zodiac; but <the circle> along which the moon is carried is slanted across a greater breadth than that along which the sun is carried. The motion of each of the wandering stars, however, he ascribed to four spheres. Of these the first and second are the same as those mentioned above—for he says that the sphere of the unwandering stars is the one which carries all the stars, and that the one which is set under this one and whose motion is along the circle through the middle of the constellations of the zodiac is common to all. He says that the poles of the third sphere in every case are on the <circle> which goes through the middle of the constellations of the zodiac, and the motion of the fourth sphere is along the circle which is slanted in relation to the middle <circle> of this; for the rest of the planets, the poles of the third sphere are all different, but those of Aphrodite and Hermes[34] are the same. Callippus supposed the same setting of the spheres as Eudoxus [this is the arrangement of the distances], but as for their number, while he gave the same number of spheres as him to the star of Zeus and to the star of Kronos, he thought that two more spheres had to be added to the sun and to the moon if one were going to give the phenomena, and to the rest of the planets one more each.

But it is necessary, if all the spheres *put together* are going to give the phenomena, that for each of the wandering stars there should be other spheres, less in number by one, which wind back and in every case restore to the same setting the first sphere of the star which is arranged below it. For only in this way is it possible for them all to produce the motion of the planets. Since, then, the spheres in which the planets are carried are eight and twenty-five,

[33] More literally, perhaps, but more obscurely, 'the second moves in accordance with [*kata*] the <circle> through the middles [*ta mesa*] of the constellations of the zodiac'. My thanks to István Bodnár on this point.

[34] Venus and Mercury: see note 32.

and of these only those in which the <planet> arranged lowest is carried do not need to be wound back, those which wind back the spheres of the first two planets will be six, while those for the subsequent four will be sixteen. Hence the number of all <the spheres>, both those which move <the planets> and those which wind back these spheres, will be fifty-five; but if one were not to add to the moon and the sun the motions which I have mentioned, all the spheres will be forty-seven.[35]

Let the number of the spheres, then, be this many; so that to suppose there are just as many substances and principles which are unmoved {and perceptible}[36] is reasonable—for let *necessity* be left for more powerful thinkers to speak of.

But if it is necessary to think that there could be no motion which is not bound up with the motion of a star, and further that every nature and every substance which is unaffected and which has in virtue of itself attained the best is an end,[37] there would be no other nature beyond these, but rather it would be necessary that this be the number of the substances. For if there are others, they would cause motion as being an end of motion; but it is impossible for there to be other motions beyond the ones stated. And it is reasonable to suppose this from the things that are being moved. For if everything that moves something is naturally for the sake of what is moved and every motion is of something which is moved, no motion could be for the sake of itself or of another motion, but it must be for the sake of the stars. For if there is to be a motion for the sake of a motion, then the latter too will have to be for the sake of something else; consequently, since it cannot go on to infinity, the end of every motion will be one of the divine bodies which are being carried in the heavens.

That there is *one* heaven is evident. For if there is more than one heaven, as there are human beings, the principle relating to each will be one in form but many in number. But things which are many in number have matter; for there is one and the same account for many things, e.g. for human being, but Socrates is *one*. But the first essence does not have matter; for it is actuality. The first mover, then,

[35] Retaining the MSS reading ἑπτά, which Jaeger obelizes, at 1074a13.*

[36] These words at 1074a16 are probably a mistaken gloss: see the commentary on 1074a14–17.

[37] Reading τέλος with Jaeger at 1074a20.*

being unmoved, is one both in account and in number; and so then is that which is moved always and continuously, one alone.[38] There is, then, only one heaven.

Things surviving in the form of a myth have been handed down **1074b**
to their posterity from those of long ago and of the most ancient times—that these are gods, and that the divine encloses the whole of nature. Now the rest has been added mythically for the persuasion of the many and for the benefit of the laws and the 5
common advantage; for they say that these have human form and are like some of the other animals, and they say other things which follow from or are similar to what has been said. But if one were to separate the primary thing from these and take it alone—that they thought that the primary substances were gods—one would think that they had spoken divinely, and that while, in all 10
likelihood, each craft and <branch of> philosophy has been many times discovered as far as possible and again lost, these beliefs too of those people have survived destruction, like ruins, down to the present time. Only to this extent are our ancestral beliefs and those from the first people evident to us.

CHAPTER 9

But <questions> relating to its intellect present certain difficul- 15
ties. For while it seems to be <the> most divine of the phenomena, <the question> in what condition it would be to be such a thing presents certain problems. For if it thinks[39] nothing, why would it be the object of reverence?—its condition would be like that of one who sleeps. Or if it thinks, but something else is what

[38] Reading *συνεχῶς ἓν μόνον* instead of Jaeger's *συνεχῶς* at 1074a38.*

[39] For the meaning and the translation of *nous* ('intellect'), *noein* ('thinking'), and *noēsis* (usually 'thinking'; in one place 'grasping in thought', to preserve an explicit contrast with *to noein*) see sections 1 and 3 of the Prologue to chapter 9. Every occurrence of *noēsis* is flagged by the addition of the transliterated word or phrase immediately afterwards, in various inflected forms, and with the definite article (translated as 'the' or as 'its') where this occurs. Where 'think', etc., appear in the translation of this chapter without a transliterated word immediately following, they translate the verb *noein*; in three instances *to/tou noein* (this is the definite article plus the active infinitive) is also added afterwards for the sake of clarity; the four instances of the passive participle in the second half of the chapter are also given in transliteration: these are discussed in the commentary.

determines this, then (since it is not this which is its substance,
20 namely thinking [*noēsis*], but rather potentiality) it would not be the best substance; for it is because of its thinking [*tou noein*] that honour belongs to it. Further, whether intellect is its substance or thinking [*noēsis*] is, what does it think? For <it thinks> either itself or something else; and if something else, either always the same thing or different things. Does it, then, make a difference or not whether its thinking [*to noein*] is of what is fine or just
25 anything? Or is its reflecting on some things absurd? It is clear, therefore, that it thinks what is most divine and most worthy of honour, and does not change; for the change <would be> for the worse, and such a thing <is> already a motion.

First, then, if it is not thinking [*noēsis*] but potentiality, it is reasonable <to suppose> that the continuity of its thinking [*tēs*
30 *noēseōs*] is burdensome to it. Second, it is clear that something else would be more honourable than its intellect, namely what is thought. For both thinking [*to noein*] and grasping in thought [*noēsis*] will belong even to the one who is thinking the worst thing; so that if this is to be avoided (for even not seeing some things is better than seeing), its thinking [*hē noēsis*] would not be the best thing. *Itself*, therefore, is what it thinks, seeing that it is the greatest thing, and its thinking is a thinking of thinking [*hē noēsis noēseōs noēsis*].[40]

35 But knowledge, perception, opinion, and reflection always appear to be of something else, and <to be> of themselves only by the way. Further, if thinking and being thought are different, in respect of which of them does the good belong to it?—for neither is <what it is> to be the same for thinking [*noēsei*] and for being thought [*nooumenōi*]. Or is it that in some cases
1075a the knowledge is the thing?—in the case of the productive <sciences>, the substance and the essence without matter <are the thing>, while in the case of the theoretical <sciences>, the account and the thinking [*hē noēsis*] <are> the thing. Since what is thought [*tou nooumenou*] and the intellect are not, then, different, in respect of things which have no matter, <they> will be the same

[40] This phrase can be construed either as 'its thinking is a thinking about thinking', or as 'its thinking is *thinking's* thinking': see the commentary.

thing; and its thinking [*hē noēsis*] <will be> one with what is thought [*tōi nooumenōi*].

A yet further difficulty remains, if what is thought [*to nooumenon*] is composite: for it would change in the parts of the whole. Or is everything which has no matter indivisible?—as human intellect, or at least <the intellect> of composites, is in <this> condition in some period of time (for it does not have the good in this or in that, but <has> the best in some whole, being something other <than itself>), so its thinking [*hē noēsis*] is in this condition, being itself of itself, throughout all time.

CHAPTER 10

We must also consider in what way the nature of the whole possesses the good and the best—whether this is something separate and itself by itself or is its arrangement. Or is it in both ways, like an army? For its being well is in the arrangement and is the general, and especially him. For he is not because of the arrangement, but the arrangement is because of him. Everything is arranged together in some way, but not in the same way—fishes and birds and plants as well. And they are not in such a condition as to have no relationship to each other, but there is some relationship. For everything is arranged together in relation to one thing, but as in a household those who are free are least able to do whatever chances, but all or most things are arranged, whereas slaves and beasts are able to do a little towards what is common, but for the most part to do whatever chances; for nature is this sort of principle for each of them.[41] I mean, for example, that it is necessary that all things come to be dissolved, at least; and there are in this way other things in which all things participate towards the whole.

It must not be forgotten how many impossible or absurd consequences there are for those who say otherwise, and what sort of things are said by those who speak more cleverly, and in what sorts of things there are fewest difficulties. For everyone makes everything from opposites; but they are not correct to say

[41] Reading *ἑκάστου ἀρχή* instead of Jaeger's *ἀρχὴ ἑκάστου* at 1075a22–3.*

'everything' nor to say 'from opposites', nor in the case of things to which the opposites belong do they say how they will be from opposites, since the opposites cannot be acted upon by each other. For us, however, this problem is solved in a way which is reasonable, through the existence of a third thing. But they make one of the opposites matter, e.g. those who make the unequal matter for the equal, or the many for the one. This too is solved in the same way; for the one matter is not opposite to anything.[42] Moreover everything outside the one will share in the bad; for the bad itself is one of the pair of elements. The others do not make the good and the bad principles; yet in all things the good is especially a principle. They were right to say that this is a principle, but they do not say in what way the good is a principle—whether as an end or as a mover or as a form. Empedocles also speaks absurdly; for he makes Love the good, and this is a principle both as a mover, since it brings things together, and as matter, since it is part of the mixture. Indeed, even if it falls to the same thing to be both a principle as matter and a principle as mover, nonetheless the being of these is not the same; in respect of which of these, then, is Love a principle? And it is also absurd that Strife should be imperishable; this, for him, is the nature of what is bad. Anaxagoras makes the good a principle as mover: for Intellect causes motion; but it causes motion for the sake of something, so that something else <is the principle>, except on our account, since medicine is, in a way, health. It is absurd <for Anaxagoras> not to make an opposite to the good and to Intellect as well. But everyone who speaks about opposites fails to use the opposites, unless someone puts <their accounts> into proper shape.

Why some things are perishable and some imperishable, no one says; for they make everything that is from the same principles. Moreover, some make the things that are from what is not, while others—so as not to be compelled to do this—make all things one. Moreover, why there will always be coming to be and what the cause of coming to be is no one says. And for those who make two principles, there must be another superior principle; and for those who make the Forms principles still another

[42] Reading *ἡ γὰρ ὕλη ἡ μία οὐδενὶ ἐναντίον* instead of Jaeger's *ἡ γὰρ ὕλη ἡμῖν οὐδενὶ ἐναντίον* at 1075a34.*

superior principle[43]—for why did things participate or why do they participate?

And for the others there must be something opposite to wisdom and the most honoured knowledge—but not for us. For there is nothing opposite to the first thing, since all the opposites have matter, and these things are in potentiality. And error, which is the opposite <state>, is into the opposite;[44] but nothing is opposite to the first thing.

Moreover, unless there are, in addition to the things which are perceptible, other things, there will not be a principle, or order, or coming to be, or what is in the heavens, but there will always be a principle of the principle, as for all the writers about the gods and the natural scientists. If the forms or numbers will be principles, they will be causes of nothing; or if not, at least they will not be causes of motion.

Moreover, how will there be magnitude and what is continuous from things without magnitude? For number will not act upon things so as to produce what is continuous—neither as mover nor as form. In fact not one of the opposites will also be essentially able to act upon things and able to cause motion; for it would be able not to be. In fact acting upon things is posterior to potentiality. Therefore the things which are will not be eternal. But they are. Therefore one of these must be eliminated: it has been said how this is to be done.

Moreover, as to what makes the numbers one, or soul and body, or in general the form and the thing, no one says anything; nor can anything be said—unless they say as we do, that the mover makes them one. Those who say that the mathematical number is the first and that in this way there is always another substance in succession, and different principles for each <substance>, make the substance of the totality of things a series of episodes (for one contributes nothing to another, whether by being or not being), and they make many principles. But the things that are do not want to be governed badly: 'To have many rulers is not good: let there be one ruler.'[45]

[43] Reading ἔτι ἄλλη ἀρχὴ instead of Jaeger's ὅτι ἄλλη ἀρχὴ at 1075b19.*

[44] Retaining εἰς at 1075b23 with the MSS, Ross, Fazzo, and Alexandru; Jaeger obelizes it.

[45] Reading εἷς κοίρανος with Jaeger rather than εἷς κοίρανος ἔστω at 1076a4.*

COMMENTARY

CHAPTER 1 (1069a18–b2)

PROLOGUE

1. Substance: A Very General Account

'Substance' is the traditional translation of the Greek word *ousia*. It is a rather misleading translation, since 'substance' now ordinarily means the same as 'stuff' (e.g. water, iron, flesh): we speak of poisonous substances, for instance. This is not the primary meaning of *ousia*, nor is it the traditional meaning of 'substance' as a technical philosophical term. A full account of what *ousia* means for Aristotle is inextricably linked with his detailed metaphysical doctrines, which will be touched on in the Prologues to and notes on later chapters; in this Prologue I shall only outline a rough notion of what an *ousia* is—one which might be accepted by his predecessors and contemporaries as well, whatever their specific views on substance—and give a very minimal account of the way in which this notion is deployed in Aristotle's *Categories*.

Ousia is a noun formed from the participle of the verb 'to be' (*einai*: see notes on 1069a21–4). The basic notion of an *ousia* is of a thing which is ontologically fundamental—which does not depend on other things for its existence, but on which in some way or other the existence of other things depends, or in terms of which their existence can be explained. Thus, for instance, there is a sense in which the existence of a group of people is dependent on that of its members; and we can accept this whether or not we think that the group and its various properties can be *reduced* to the individual members and their properties. In a similar way, Aristotle can quite reasonably maintain that the Presocratics were inquiring into substance when they inquired into what the element(s) of the physical world are: he took them to accept the rather natural thought that a material object owes its existence to the elements of which it is composed, while the reverse is not true (though Aristotle himself held a more complex view). At the other

end of the spectrum (see notes on 1069a26–30, and for a caveat, see below), one reason which Plato has for regarding his Forms as substances is that he thinks that (e.g.) a just action could not exist unless there were a Form of Justice, but not *vice versa*. It is controversial whether in the more developed accounts of Aristotle and/or Plato the key notion is being as existence or as *being what a essentially thing is*: see below and the notes on 1069a24.

This account of *ousia* is indeterminate for at least two reasons. (i) Nothing has so far been said about what sort of dependence is in question. One form of dependence is (in our sense) causal: *A* owes its existence to *B* if *B* brings *A* into existence. But, as the examples of the group and the elements of an object show, there are other forms of dependence; in due course we shall encounter some which are more important for Aristotle's notion of substance than this form of causal dependence. (ii) Nothing has been said as to whether the independence of substances is an all-or-nothing matter, or whether it admits of degrees. (Thus, for instance, when Descartes took over the Greek notion of substance, he argued that, strictly speaking, only God is a substance because things which are in all other relevant respects independent nonetheless owe their existence to God: so other substances are only substances in a derivative way.) The question of Aristotle's attitude to this issue, and his claim that some substances can be prior to other substances, will reappear in chapters 2, 3, and 7.

A further strand in the idea of *ousia* which I have not yet touched upon is the notion of the *ousia of* something. The *ousia* of a thing is what is, metaphysically speaking, most important about it—even what that thing really is. Thus some Greek philosophers argued from the claim that a table or a lion owes its existence to its elements (or that a just action owes its existence to the Form of Justice) to the stronger claim that what a table *really is* is a collection of elements (or that a thing is only real insofar as it instantiates a Form). I shall return to Aristotle's interest in the idea of the *ousia* of a thing at the end of section 3.

2. The Doctrine of the Categories: The *Categories* Account

It is against the backdrop of these extremely general notions of substance that Aristotle developed his own highly distinctive

conception of *ousia*. This conception itself underwent a complex process of development and refinement; the best starting-point is what is probably his earliest set-piece discussion, in the work known as the *Categories*, in which he sketches an account of fundamentally different types of entities.[1] The discussion is brief and not always lucid. Difficulties of interpretation include: (i) a characteristic lack of interest in the use/mention distinction: Aristotle readily shifts back and forth between talking in terms of things and talking in terms of the words that stand for them; (ii) an uncharacteristic paucity of explanation of the *grounds* for some of the views advanced; (iii) an absence of discussion of the question of the completeness of the list of types of being; and (iv) very little discussion of difficult cases. *Cat*. 4 1b25–2a4 presents the basic doctrine:

> Of things said without any combination, each signifies either substance or quantity or qualification or a relative or a where or when or being-in-a-position or having or doing or being-affected. To give a rough idea, examples of substance are man, horse; of quantity: four-foot, five-foot; of qualification: white, grammatical; of a relative: double, half, larger; of where: in the Lyceum, in the market-place; of when: yesterday, last-year; of being-in-a-position: is-lying, is-sitting; of having: has-shoes-on, has-armour on; of doing: cutting, burning; of being-affected: being-cut, being-burned. (translation Ackrill 1963)

This is often referred to as Aristotle's 'doctrine of the categories'; but while the Greek word *kategoria* means 'predicate' and 'predication', Aristotle's concern here is not only with predicates and predications, but with ontology at an extremely general level.[2] I shall follow conventional usage and speak of the 'categories' of substance, quantity, quality, etc., and of substances, qualities, etc., as items in these various categories. The ontological claim of the *Categories* is that substances, quantities, qualities, etc., are irreducibly different types of entity: there is no full explanation of what it is for something to be an item in one category in terms

[1] This claim is controversial: some commentators take the *Categories* to be concerned with dialectic and hence with terms, not ontology. See, e.g., Menn 1995b; Burnyeat 2001, pp. 107–8.

[2] The question of how this doctrine relates to his views about predication is a tangled one: for further discussion, see the commentary on *Cat*. 4 in Ackrill 1963 and Frede 1987b.

of items in other categories. Aristotle subdivides substances themselves into primary substances—his examples are individual members of biological kinds, such as human beings and horses—and secondary ones, namely the species and genera of primary substances. Aristotle claims that various things are distinctive of or peculiar to substances. These include: being 'able to receive opposites [such as pale and dark, heavy and light]', and by implication being able to undergo change while remaining the same thing; being an '*ultimate subject*' (discussed below); and signifying a 'this something' (*tode ti*), discussed in the Prologue to chapter 3, section 2.

Aristotle combines the idea that there are irreducibly different types of entity with the claim that his ontology is nonetheless *structured* in the following way: substances are ontologically basic, and items in the other categories are ontologically dependent on them.[3] The traditional view of the priority of substances in the *Categories* is that it rests (at least in part) on an *existence asymmetry*. This asymmetry is thought to be expressed at *Cat*. 5 2b6, where Aristotle says 'If the primary substances were not it would be impossible for any of the other things to be.'[4] The implication is taken to be that the reverse does not hold, and that Aristotle is expressing a claim of existential asymmetry. There are two difficulties with this view. First, on this interpretation 2b6 is what introduces us to the asymmetry, yet Aristotle does not state the essential point that the reverse does not hold. Second, as many commentators have recognized, it is far from evident how the asymmetry is supposed to arise: if qualities (e.g. colours and character traits), cannot exist without subjects such as individual human beings, it seems equally true that individual humans cannot exist without such qualities. Someone might respond by saying that there is nonetheless an asymmetry here: if you destroy *X*'s suntan, *X* may survive (depending on how you do it), but not vice versa—just as you can have the cat without

[3] There is a structure within the category of substance, moreover—revealed by the division into primary and secondary substances.

[4] Aristotle also discusses various forms of priority (and appeals to various asymmetries) later in the *Categories* (7 7b15–8a12 and chapters 12–13): for discussion see, e.g., Ackrill 1963, *ad loc.*; Makin 2006, p. 192; Beere 2009, pp. 298–9; Peramatzis 2011, pp. 234–5; Judson 2016, p. 147, n. 16.

the smile, but cannot have the smile without the cat. There are two problems with this. (i) The asymmetry still fails to hold for 'determinables'—properties such as having some colour or other, or having a size—since although a human being may survive without having this particular size, he or she cannot exist without having some size or other. (ii) The argument yields the wrong result for species and genera, since it leads to the conclusion that they are more basic than individual species-members: this horse can be destroyed without destroying the species, but not *vice versa*. And this is clearly not Aristotle's view in the *Categories*, where species-members are primary substances and species themselves merely secondary ones.

The claim at 2b6 is argued for (at 2a34–2b6) on the basis of the earlier claim that primary substances are ultimate subjects.[5] The argument relies on certain claims about being in and being said of a subject which could hardly be justified unless the idea that primary substances are ultimate subjects already included or presupposed some notion of ontological priority—in particular, the idea that what it is for an item in a non-substantial category to exist is for one or more substances to be modified in a certain way, whereas what it is for a substance to exist is not for anything further to be modified in a certain way. The idea is that what it is for a given shade of blue to exist is for a substance to be blue; what it is for time to exist is for changes of a certain sort to be taking place, and what it is for changes of that sort to be taking place is for one or more substances to be exercising certain capacities it/they have; and so on for the other categories. This asymmetry might be thought to follow from the claim that substances possess what is termed *priority in being what a thing essentially is* over non-substances—that substances are what they essentially are independently of non-substances being essentially what they are, but not vice versa: see notes on 1069a24, Spellman 1995, ch. 5, and for a full discussion in relation to what in Δ.11 Aristotle calls 'priority in nature and substance'—which is also relevant to chapter 6 1071b22–4—see Peramatzis 2011 and Judson 2016,

[5] Primary substances are defined as the things which are not predicated of anything else, while everything else is predicated of something; secondary substances are 'said of' primary substances, and items in the other categories are 'in' substances, and thus are predicated of them in another way.

pp. 144–9. So it may be that at 2b6 Aristotle does not intend to introduce a new existence asymmetry, but rather is stating a consequence of this notion of priority which is already to some extent in play—the consequence that non-substances depend for their existence on substances, since they are ontologically posterior to substances in the sense explained above. The crucial thing about this form of ontological dependence, to Aristotle's way of thinking, is that it introduces (at least) two different types of existence: that available to substances, and the secondary type available to items in the other categories. Aristotle also seems to think that there is a distinct 'secondary' mode of existence for each category: see the discussion of the homonymy of being in the Prologue to chapters 4–5, section 1.

Aristotle's account in the *Categories* is far from definitive: he seems to be starting from a firm though rather vague idea of substances as the basic elements of reality and to be trying to work out just what this amounts to. For more sophisticated thinking on this we have to look to his later work in the *Metaphysics*. For our purposes it is enough to say that we cannot get anything more out of the idea of an ontological asymmetry here than is provided by the idea of an asymmetry in ways of existing; this asymmetry comes to the surface in Λ with the claims in chapter 1 that only substances are beings without qualification, and in chapters 1 and 5 that (only) they are 'separate': see the notes on 1 1069a24 and 5 1070b36–1071a18.

3. Further Developments

In the *Categories* Aristotle's examples of primary substances are, as I have said, members of biological species—individual horses and human beings—and these are clearly regarded there as the central or paradigm cases of substances. Aristotle does not discuss the claims of other things such as artefacts, inorganic compounds, or the four elements; nor (with the exception of a tangled discussion of the differentia of a species) does he discuss the status of items which do not appear to fall neatly within the list of categories—e.g. parts and groups of substances. The Prologue to chapter 3, section 3, discusses both of these issues. He describes primary substances as 'indivisibles' (*atoma*: *Cat*. 5 3b10–13): it is

not clear whether this means that they are genuine individuals—that is, that, unlike secondary substances (species and genera), they do not have *members* (or, more generally, are not in some way constituted by things which are themselves substances), or whether he means that they cannot be given any further metaphysical analysis. In any case, he certainly offers no further analysis of primary substances: it is characteristic of his later discussions of substance to focus on the idea developed in *Phys*. I's discussion of 'the principles of the things that are by nature' that substances of this kind are composites of matter and form: this is discussed further in the Prologue to chapter 2. This idea puts considerable pressure on the view that individual species members are the most fundamental substances. Are matter and form more basic than the substances which are composites of them? Can composite substances be ultimate subjects if they are composed of matter and form? Do matter and/or form have the features claimed in the *Categories* to be distinctive of substances? Indeed, does any one type of item bear all these marks of substance, or are the honours to be in some way divided—and if so, does the understanding of what it is to be a substance require revision? Some of these questions underlie the discussion in chapter 3, which has a close but far from straightforward relation to some of the material in Z and H; exactly how these questions evolve in Z and H is highly controversial (see Prologue to chapter 3, sections 1 and 2). Aristotle's later accounts of substance also take up the idea (mentioned in section 1) of the *ousia of* a thing; indeed, Z and H are largely concerned with things which are the *ousiai* of other substances, the prime candidate for such things being *substantial forms*. Although the language of 'the *ousia* of *X*' does not occur in Λ.1–5, Λ.3 in particular displays an interest in substantial form, as we shall see. Such language does occur in Λ.6 (1071b17–20), where a concept of 'the *ousia* of *X*' is clearly assumed to be well understood; but this passage seems more closely connected to a different usage from that deployed in ZH, one which is found in Θ.8 (for discussion, see the notes on 1071b12–21 and Judson 2016, pp. 148–9). Λ.1 and 3 also make appeals to the notions of being separate and being a this something, but do not subject them to any scrutiny in the way characteristic of Z.

COMMENTARY

1069a18–b2 is a statement of the programme for the whole book: a18–19 tells us that it will be an investigation of substances and their principles and causes; a19–26 explains why substances are prior to entities of all other types; a26–30 outlines the two main approaches to the nature of substances—as universals and as particulars—adopted by other philosophers. At a30–6 Aristotle distinguishes three types of substance: perceptible and perishable, perceptible and eternal, and imperceptible, and at a36–b2 raises the question as to which science or discipline the study of these various kinds belongs. The first two types are grouped together because substances of both these types are subject to change; they are dealt with in chapters 1–5. Chapters 6–10 deal with the third type of substance, which is not subject to any change. The Renaissance chapter division comes at an inappropriate place, since Aristotle's introduction to Λ ends at b2, while b3–7 begins a new section, the discussion of the principles of changing substances, which carries on to the end of chapter 2.

1069a18–19

The opening of the chapter is very abrupt, and whatever Aristotle's line of thought is, he expresses it only elliptically. One possible interpretation is: 'The investigation concerns substances—for it concerns the principles and causes of substances—because substances are the primary beings <and the investigation just is the inquiry into the primary beings>.' If we suppose (as I think that we should: see Introduction, section 2) that Λ is an exercise in 'first philosophy', Aristotle on this interpretation appears to be restricting the scope of first philosophy to the study of (the principles of) the primary entities, substances, alone. Kahn 1985a endorses this view of the purpose of Λ. There are at least two problems with this interpretation. (i) It gives a very weak sense to the second sentence ('for it is of substances that we are seeking the principles and causes'); (ii) chapters 4–5 are concerned with the principles and causes of *all* things, and not only of substances. As I said in the Introduction, it seems better to interpret the sentence as follows:

> The investigation concerns substances because it concerns the principles and causes of substances; it is concerned with these because <we are investigating the principles and causes of all things, and the way to investigate these is to investigate the principles and causes of the primary entities, and> substances are the primary entities.

This gives the second sentence more weight, and makes the discussion in chapters 4–5 an integral part of the investigation in a very straightforward way; it also brings Aristotle's conception of first philosophy here into line with that in *Met.* Γ, where a similar argument is deployed (cf. also A.2 for the idea that first philosophy studies the principles of all things). a18–19 gives us little guidance as to how to construe the idea that the way to investigate the principles of all things is to investigate the principles and causes of substances. The focus on substances in Λ (as in Z), however, suggests that it is not that the study of substances is merely the first part of the inquiry, to be followed up by further, distinct inquiries into the principles of qualities, etc., but rather that it in some way presents us with the key to the whole account of the principles of all things; what this means is discussed further in the Prologue to chapters 4–5 (see also the notes on a36–b2 below). Note that both Γ.1 and H.1 say that the inquiry concerns the principles and causes of substances, whereas Z.1 says that the fundamental question is 'what is substance?': it is controversial how significant this difference is. The priority of substance is stressed in Γ.1 and Z.1, but not mentioned in H.1. As we have seen, the natural way to take a18–19, and indeed the whole of the opening, down to 'there are three kinds of substance' at 1069a30, is as concerned with substance in general, and not with natural substance alone: the argument which most plausibly underpins the opening of the chapter appeals to the fact that we are seeking the principles of *all* things (see also sections 3 and 4 of the Introduction). Thus at the outset Aristotle envisages an inquiry into the principles of all substances.

1069a19–26

Four arguments for the priority of substance.

a19–21: The first argument. Aristotle mentions two views of 'the totality of things' (*to pan*: often translated 'the universe'),

and claims that on either view substances are primary. The structure of his argument makes it clear that these two views are meant to be exhaustive alternatives, and the first would seem to represent his own view (see the end of this note); but it is unclear exactly what the views are or why substances are primary on either view. The way in which the second alternative is expressed—'if [the totality of things is] through being in succession'—is echoed at Λ.10 1075b37–1076a4: 'those who say that . . . in this way there is always another substance in succession, and different principles for each <substance>, make the substance of the totality of things a series of episodes.' This in turn is echoed at N.3 1090b13–20: 'nature is not a mere series of episodes, like a bad tragedy.' Since in these two passages Aristotle is criticizing the view of Speusippus (Plato's successor as head of the Academy), it is natural to take Aristotle to be referring to Speusippus in Λ.1 as well. If so—and if the two alternatives are meant to be exhaustive—Aristotle must here be referring to Speusippus' view only as representative of a certain sort of position. Despite the analogy with a bad tragedy, the notion of 'being in succession [*ephexēs*]' is not primarily temporal, but rather indicates a significant lack of connectedness of some sort.[6] The main problem is whether the connectedness at issue is (in our terms) metaphysical, logical, or causal.

It might be natural to suppose that it is metaphysical because the reference to Speusippus relates to his metaphysics. Aristotle explains Speusippus's view most clearly at Z.2 1028b21–4: 'Speusippus made still more kinds of substance, beginning with the One, and making principles for each kind of substance, one for numbers, another for spatial magnitudes, and then another for the soul' (see notes on 1075b37–1076a4). If Speusippus's view is the paradigm example of the 'being in succession' position, then it would be natural to take the connectedness in question to be metaphysical: different types of substance have (radically) different principles, in the sense that *no* general account of the

[6] Cf. its usage at E.4 1027b23–5, where considering the elements of a proposition 'in succession' is considering them merely in juxtaposition, rather than as combined to make an assertion or denial. At Γ.2 1004a6–9, however, he uses 'in succession' non-pejoratively, to characterize the relationship of different 'parts' of philosophy.

principles of substance can be given. This certainly contrasts with Aristotle's own view (see section 4 of the Introduction and the notes on chapters 4–5). If we take the passage in this way, however, the result seems flat-footed: 'substances are primary if their principles are (as I think) connected, and also primary if (as Speusippans think) they are not'—no *argument* for the primacy of substance appears to emerge. We can, of course, supply an argument for the metaphysical priority of substance over the other Aristotelian categories (see Prologue, section 2, and the notes on a21–4 and 1071b3–8 below); but since Aristotle's next argument (a21–4) appeals to just this priority, this should not be what he has in mind here. Another possibility is that the connectedness is logical; on this view the natural alternatives, from Aristotle's perspective, are that non-substantial categories are defined in terms of substance, and that they are defined independently of substance. The same problem arises, however: there is no hint of argument for the primacy of substance on the 'Speusippan' alternative.

The third possibility is causal connectedness. The way in which the first alternative is expressed—'if the totality of things is something whole'—perhaps suggests this. On this interpretation, this first alternative anticipates Aristotle's own conception of the cosmos as exhibiting an ordered causal dependence on God, the Prime unmoved mover (see chapters 6–7 and section 2 of the Epilogue to chapter 9). There are two ways of understanding the argument.

(A) (i) If the totality of things is a connected whole, it will depend on a single, ultimate principle—God. (ii) God is a substance. (iii) So a substance is primary.
(B) (i) If the totality of things is a connected whole, it will depend on a single, ultimate principle. (ii) This ultimate principle will be such in virtue of possessing features which are (or are the principal ones among those which are) what makes something a substance. (iii) So substance is primary.

In essence, the two arguments differ in the following way: (A) proceeds in terms of (one of) the things which are substances, and (B) in terms of what it is to be a substance. It is a general feature of Aristotle's various claims about the priority of substance in this chapter that he does not sharply distinguish these approaches: he does not make it clear whether a given priority

claim is supposed to follow from the nature of what it is to be a substance (regardless of the *extension* of the term), or whether it is supposed to follow from this together with further features of the things which are substances.[7] Section 2 of the Prologue to chapter 10 discusses Aristotle's reasons for believing premisses (A)(i) and B(i); his conviction that B(i) is true is reflected in his criticism of Speusippus at 10 1075b37–1076a4. Λ.6 will yield arguments for (A)(ii) and B(ii). (A)(iii) perhaps does better justice to the phrase 'primary *part*' than (B)(iii); but (A) concludes that a *particular* substance is the primary part of the totality of things, not that substances in general are primary, so that if we take Aristotle to have argument (A) in mind, he might seem guilty of a simple fallacy—but perhaps Aristotle does not mean to extract the stronger conclusion from this argument. In any case, however, argument (B) seems preferable. It derives the stronger conclusion (B)(iii) from the idea that the features in virtue of which something could be the ultimate principle are those (or the principal ones among those) in virtue of which something is a substance. The argument would be that the essential features of substances—that is, 'the principles and causes of substances'—are the primary features of the totality of things, since everything depends on (an instance of) them.

If Aristotle has causal connectedness in mind, the second alternative—'if [the totality of things] is through being in succession'—is presumably meant to be equivalent to 'if the totality of things does *not* form a causally connected whole'. Aristotle's idea must be that if things do not exhibit an orderly dependence on a single principle, then at some level, at least, they will be no more than a set of juxtaposed substances and/or processes which lack genuine interconnectedness. This would still include Speusippus' theory, as Aristotle understands it, but he would also, for quite different reasons, take it to include the theories of Anaxagoras, the atomists, and others. If the totality of things were such a set of juxtapositions, Aristotle implies at a21, substances would still be primary by being prior to all other kinds of being, such as qualities and quantities. As I said above, Aristotle should not

[7] See also the discussion of the 'concrete' and 'schematic' conceptions of principles in section 2 of the Prologue to chapters 4–5.

simply be appealing to his view that items in the other categories are in some way ontologically dependent on substances, since this view will form the basis of the next argument. Perhaps he is thinking instead about the way in which the objects of scientific understanding would be ordered in an 'unconnected' world. This thought might take either of two forms. (i) Aristotle might suppose that even in such a world the natural sciences would still have an Aristotelian form. As Aristotle conceives of natural science, its primary objects are substances—principally (the forms of) members of animal and plant species. (ii) He might be supposing that in *whatever* science it is which held the field in this 'successive' totality of things, the primary entities of this science would turn out to fulfil the general conditions of being a substance (or, at least, do so as well as anything could in such a world: it is far from obvious, in Aristotle's view, that being a fundamental entity of physics is a sufficient rather than a necessary condition of being a substance: see the Prologue to chapter 3, section 3). So even in this type of world, the primary objects of understanding will be the things which have most title to being counted as substances: thus if atomism, for example, were the favoured theory, the atoms would count as substances.

Ross's text (in particular reading *eita* instead of *ē* at a21) introduces an *ordering* among non-substantial items—which is both surprising in this context and not paralleled elsewhere in Aristotle: see the Note on the Text.

I said that the idea that the totality of things 'is something whole' seems to be Aristotle's own view. (On Ross's text, but not on the one I prefer, there is a suggestion of this in the sentence itself: reading *kan* instead of *kai* at a20 yields the sense 'in this case too substance *would be* primary' rather than 'is primary'.) Two challenges might be made to this view, both of which appeal to the tripartition of substances which Aristotle himself makes at a30–2. (i) Aristotle's totality consists of substances of two fundamentally different sorts: natural things, subject to change and each possessed of a nature, and unchanging substances—the unmoved movers to which we are introduced in chapters 6–10. (ii) Even within the natural world, it might be argued, the eternal substances it contains (the heavenly bodies and the spheres which carry them) are fundamentally different types of being from the substances of the sublunary world, which are subject to coming

to be and ceasing to be. For replies to these challenges see the Prologue to chapter 2, section 5, the Prologue to chapter 10, section 2, and the notes on 10 1075b37–1076a4. Even if we grant the premiss of (i) and (ii), the challenger's conclusion does not seem to follow, however we construe the idea of connectedness. Aristotle's totality exhibits strong causal connectedness, both from the heavenly spheres to the sublunary world and from the unmoved movers to both. As for metaphysical (and in consequence logical) connectedness, Aristotle argues in chapters 4–5 that there is a sense in which all natural substances can be said to have the same principles; and I think that this can be extended to the unmoved movers as well (see section 4 of the Introduction and section 2 of the Epilogue to chapter 9). Note in any case that Aristotle's language—'something whole'—is suitably cautious: he makes no claims here as to the specific nature of this whole.

a21–4: The second argument for the priority of substance: only substances are beings without qualification. The phrase 'these things' at a21 refers back to the previous sentence, and either means 'quantities and qualities' or 'non-substantial items (of which quantities and qualities are representative examples)'; in either case, the point must be meant to apply to all non-substantial items. 'Beings' translates '*onta*', the neuter plural of the participle of the verb *einai*, 'to be'; so '*onta*' literally means 'things that are'. Greek philosophical uses of 'to be' (*einai*) are fraught with difficulty (see, e.g., Kahn 1973/2003, Brown 1986 and 1994). In particular, we often face the choice of taking '*x* is' and cognate phrases as being syntactically complete or as elliptical for an incomplete usage (i.e. as elliptical for '*x* is *F*', where '*F*' is a placeholder for any predicate or for some range of predicates indicated by the context). Although it is perhaps misleading to regard the complete usage as involving a distinct *sense* of 'is', this complete usage is often best understood as a way of indicating '*x* exists'.[8] In the present sentence only the complete usage understood in this way gives a plausible sense: Aristotle is invoking his view that what it is for an item in another category to

[8] Even then, in Brown's view, it may be related to '*x* is *F*' (for some value of *F*), as 'Jane teaches' is related to 'Jane teaches something (e.g. French).'

exist is for one or more substance(s) to be a certain way; by contrast, there is no account, he thinks, of what it is for substances themselves to exist in terms of items in other categories being a certain way.[9] This ontological asymmetry yields one sense in which substances are prior to other things; on the question of the relationship of this asymmetry to the 'separateness' of substances, see the notes on a24. The distinction between being with and without qualification licences the claim that 'being' has two senses (cf. Z.4 1030a17–27 discussed below); Aristotle elsewhere maintains that being has as many senses as the categories (e.g. Δ.7, Z.1), a claim that seems connected to the idea of 'what it is to be an item in a given category' rather than 'what it is for an item in a given category to exist': for discussion, see Bostock 1994, pp. 45–52; Berti 2002; Charles 2002; the Prologue to chapters 4–5.

The rest of the sentence ('but qualities . . . not-pale is') presents some difficulty. One interpretation would be:

> It is proper to say of substances that they *are*, without qualification; but when you say that an item *X* in a non-substantial category *is*, this must be filled out as "*X* is *a quality*", or "is *a quantity*", or . . . . Otherwise it would be proper to say that some non-existent thing *is*, without this having to be filled out as "the thing is (a) *non-existent*."

This argument relies on a confusion between uses of complete and incomplete occurrences of *einai* which is analogous to a confusion between the existential and copulative uses of 'is' in English. The statements which must be of the form '*X* is a quality', etc., are not existential ones; instead they say what basic kind of entity *X* is, and statements saying what type of entity a substance such as a human being or a horse is must equally be of the form '*X* is a substance.' Bostock detects precisely this confusion in a passage in Z.4 (1030a17–27; Bostock 1994, p. 93); but I think that passage can be read differently: see section 1 of the Prologue to chapters 4–5. We can certainly acquit Aristotle of this confusion in the present passage by taking his point about 'what is not' differently. His idea could be that if we make

[9] See the Prologues to this chapter and to chapters 4–5. This view bears some relation to the *Categories* doctrine that substances are neither 'in' nor 'said of' other things (though the correspondence may not be exact): see *Cat.* 2–5.

no distinction at all between qualified and unqualified ways of existing, then we shall be unable to say that the existence of anything is in virtue of something else being a certain way; hence we shall have to treat even the existence of negative states of affairs as just as fundamental, ontologically, as the existence of everything else. This is a more respectable argument, but it does depend on the assumption (which Aristotle clearly makes) that it is only in virtue of some existing thing's failing to be *F* that the not-*F* exists; so it may not suffice to persuade those who object to Aristotle's doctrine of the ontological priority of substances, since they may reject this assumption and find nothing objectionable in the idea that the existence of negative states of affairs is on a par with that of substances. On this interpretation we should understand the phrase 'but qualities and processes' as elliptical for 'but qualities, processes, etc., *of substances*' (cf. Z.1 1028a16–20).

a24: The third argument: only substances are separate. At Z.3 1029a27–30 Aristotle says that being separate and being a 'this something' (*tode ti*: see Prologue to chapter 3, section 2) are two key characteristics of being a substance, and that for this reason form and the compound of form and matter have a better claim to be substance than matter (see notes on chapter 3 1070a9–13). It is controversial whether Aristotle means that it is a mark of a substance to satisfy at least one of these conditions, or both—and if the latter, precisely how the two conditions are related.[10] But Aristotle frequently says that only substances are separate (Δ.8 1017b23–6, E.1 1025b18–1026a32, Z.1 1028a22–34, 3 1029a27–30; cf. *Cat*. 5 3b10–23), and usually seems to imply that all substances are. What being separate involves is also controversial.[11] It is sometimes taken to be properly expressed by a one-place predicate; the most obvious candidate for this would be 'capable of existing independently of everything else'. Although there are some other contexts in which Aristotle might seem to use 'separate' in this way (*De An*. III.5; Z.2 1028b27–32), he cannot mean that substances in general can exist independently in this way (though the highest

[10] See Frede and Patzig 1988 and Bostock 1994, *ad loc*.; Wedin 2000, pp. 210–19.

[11] For discussion of separateness, see Fine 1984/2003 and 1985; Morrison 1985; Lear 1988, pp. 292–3; Bostock 1994, pp. 57–60 and 82–3; Spellman 1995; Corcilius and Gregoric 2010; Peramatzis 2011; Katz 2017.

substance(s) may do so: see the Z.2 passage just cited, and the discussion of Θ.8 in section 3 of the Prologue to chapters 6 and 7). Being separate as a characteristic of substances in general is more plausibly a two-place relation. '*X* is separate from *Y*' could thus mean:

'*X* can exist without *Y* existing' (separateness in existence)
'*X* can be defined without referring to *Y*' (separateness in definition)
'what it is to be *X* does not depend on *Y*' (separateness in being)

The idea that separateness is a characteristic of substance, or that only substances are separate, suggests that Aristotle always has in mind an asymmetrical relationship: that substances are separate from non-substantial items, but not vice versa. Just as the claim at a21–4 that only substances are beings without qualification bears some relation to the claim in the *Categories* that substances are neither 'in' nor 'said of' other things, so too it is natural to take separability here as corresponding to some degree to the other priority claim in the *Categories*, that non-substances require substances for their being or existence in a way in which substances do not require non-substances (*Cat.* 5 2b6, discussed in section 2 of the Prologue; note that the asymmetry is at best implicit there, and is not accepted by all commentators). This linkage favours separability in existence or in being over separability in definition; H.1, by contrast, says that forms are 'separate in account (*logos*)', and distinguishes this from being separate 'without qualification' (1042a26–31), which characterizes compound substances, but at most only some, or even no, substantial forms. This might suggest that the separateness which characterizes substances in general is separateness in definition; but the H.1 passage is obscure and the meaning of 'being separate without qualification' is disputed.[12] In any case we might reasonably expect that separateness in definition would be grounded in a metaphysical relation, such as separateness in being. I shall take it that Aristotle's usual view

[12] See Gill 1989, pp. 34–8; Bostock 1994, *ad loc.*; Spellman 1995, ch. 5; Wedin 2000, pp. 210–19; Peramatzis 2011, pp. 262–5.

is that the separateness of substances is concerned with existence or with being, and that the H.1 passage can (despite appearances) be interpreted in conformity with this. The view that substances are separate in existence involves familiar philosophical difficulties, parallel to those facing the view that Aristotle's 'priority in nature and substance' is likewise a matter of asymmetrical existential independence: see Prologue, section 2. This makes the idea that separateness is separateness in being attractive. If this is what Aristotle has in mind, however, it is hard to see any difference between this argument and the previous one, since they seem both to rely on the same asymmetry, namely that of qualified and unqualified being. Being separate reappears in chapter 3 (1070a13–18), at the start of chapter 5, and in chapter 7 (1073a3–5).

a24–5: The fourth argument: this presents an ambiguity of a type which we encountered in the notes on a19–21: does Aristotle wish to say that his predecessors were concerned with the elements of things which are in fact (plausible candidates for) substances, or is he saying that the investigation into the basic structure of reality just *is*, by definition, the investigation of substance? The former seems preferable as the latter gives him no argument at all, and gives no force to the qualification 'in effect' (*ergōi*). His idea must be that those thinkers who have been engaged in a general investigation of everything that exists can be seen to have been concerned with the elements of things which are (plausible candidates for) substances rather than processes, qualities, etc. (cf. the lists of such candidates at Z.2 1028b8–13 and H.1 1042a6–11). Aristotle frequently seeks to demonstrate an essential continuity between the views and approaches of his philosophical predecessors and his own (sometimes at the expense of historical accuracy): see Γ.1 1003a26–32 and Z.1 1028b2–7, the discussion of principles (*archai*) in *Phys.* I, and *Met.* A.3–10.

Nowhere in Λ does Aristotle address the question (as he does in Z.1, where he distinguishes priority in definition, in knowledge, and 'in time') as to what type(s) of priority for substance these four arguments demonstrate; nor does he discuss directly the way in which this priority justifies making substances the centre of attention in the inquiry into the principles and causes of all things: see the notes on a18–19 and section 1 of the Prologue to chapters 4–5.

1069a26–30

Aristotle outlines two alternative approaches to the fundamental elements of reality which he detects in other philosophers: the Presocratics tended to associate being ontologically fundamental with being *particular*, while Plato and the Academy ('our contemporaries') associate it with being *universal* (*mallon*, which I have translated 'rather', could also mean 'more <than particulars>'). How is this radical divergence possible? As I said in the Prologue, there is a connection between the notion of substance and that of 'what a thing really is'. One way to answer the question, 'what is *X*, really?', is to specify its constituents: to go on to ask what each of these constituents really is, is to start a quest for the basic material elements (for which fire and earth were two candidates in Presocratic philosophy, at least as Aristotle understands it). Another way to answer the question is to specify the kind of thing *X* is: it is a human being or a tiger. To go on to ask in the same spirit what kind of thing a human being is ('an animal'), is to start a quest for the most general kinds of things. In a related fashion, there is a connection between the notion of being a substance and being (in however vague a sense) something independent on which other things depend. One way to cash this out is to be impressed by the thought that *X*'s existence, or the way *X* is, depends on its constituents, or on the way they are—but not vice versa. Another way is to be impressed by the thought that *X*'s being *F* depends on *F*-ness, but not vice versa. These lines of thought are briefly explored in B.3. Characteristically, Aristotle will attempt to steer a middle course between these two approaches, though exactly how he thinks he can is highly controversial.

'Because of their abstract method of inquiry' (*dia to logikōs zētein*): Aristotle frequently contrasts arguments which proceed *logikōs* (usually translated 'logically') with those which proceed in some other way. In the *De Caelo* the contrast is between relatively general arguments and ones which proceed 'physically' (*phusikōs*)—that is, which appeal to specific properties of the cosmos and/or the natural bodies concerned. In Z the other side of the contrast is left implicit: what seems to be involved is the idea of being either more neutral or less neutral between competing metaphysical views (for discussion, see

Burnyeat 2001, especially pp. 19–25; Lewis 2013). In neither context is 'arguing *logikōs*' a term of criticism, and in general Aristotle takes 'logical' and non-'logical' arguments to be in some way complementary. Here, however, Aristotle may be hinting that the Platonists do not give sufficient metaphysical status to the things in the sensible world.[13]

1069a30–6

With these lines compare Z.2. The present passage is a key one for understanding the structure of Λ. Having stated at the very start of chapter 1 that he intends to inquire into (the principles and causes of) substance, Aristotle here distinguishes three kinds of substances, which fall into two classes. In chapters 2–5 he will examine the principles of substances in the first class, and in chapters 6–10 he will turn to substance(s) comprising the second class, explicitly referring back to his programme at the start of Λ.6: 'Since there were three kinds of substance, two of them natural and one unchanging, concerning this last kind it must be said . . . ' (1071b3–4). Thus the initial programme and the way in which Λ as a whole actually follows the programme make it plain that Aristotle sees himself as undertaking a single, unified project in Λ: see the Introduction.

The text at a30–2 is very awkward (see Note on the Text), but on the most plausible readings the general sense is the same. Aristotle wishes to distinguish (i) substances which are perceptible and eternal (such as the heavenly bodies), and (ii) those which are perceptible and not eternal (e.g. animals and plants: for a more wide-ranging list of candidates for this category, see Z.2 and H.1; and for discussion of Aristotle's own views, see Prologue to chapter 3, section 3). The phrase 'which is acknowledged by everyone' probably applies to perishable perceptible substance.[14]

[13] The phrase 'inquiring logically' *is* used pejoratively of Plato's physics at *GC* I.2 316a5–14; cf. the complaint at *Cael.* III.7 306a1–17 that Plato's geometrical physics privileges theoretical elegance over the empirical appearances, and the similar complaint against the Pythagoreans at *Cael.* II.13 293a23–30.

[14] It might seem to be an exaggeration: not only will Platonists refuse to regard animals and plants as central cases of substance (see notes on a26–30), but Plato himself seems to deny that *ousia* can be properly applied to anything

In the next sentence Aristotle further distinguishes (iii) unchanging substances. He seems to be assuming here that perceptibility and changeability imply each other (see the notes on b3); but it is worth noting that the heavenly spheres which carry round the stars and planets are not even in principle perceptible, so 'perceptible and eternal' is an over-hasty way of characterizing the substances Aristotle is interested in. In any case, as a36–b2 makes clear, Aristotle's primary interest is actually in the distinction between changeable and unchanging substance, rather than in that between perceptible and imperceptible (see also the notes on 1069b3). In a33–6 'separate' is to be understood as 'separate from perceptible substances'. a33–4 implies that some thinkers believed in unchanging substance which was not separate in this way: perhaps Aristotle has in mind some Presocratics who identified or came close to identifying God with the physical world or with its primary element (e.g. Anaximenes, perhaps Heraclitus, and Xenophanes as Aristotle seems to have understood him). The thinkers who say that unchanging substance is 'separate' are the Platonists; although Aristotle will insist that the unchanging substance(s) for which he will argue are separate, he regards it as the major flaw in Platonism that it tries to maintain that *its* candidates for this sort of substance (universal Forms) are separate. In a34–6 (echoed at M.1 1076a19–22) Aristotle refers to a variety of Platonist positions. According to Aristotle, the 'mathematicals' were introduced to serve as the objects of thoughts about (e.g.) the addition of two units or the intersection of two geometrical circles; they were held to be abstract, unchanging objects of knowledge, like the Platonic Forms, but to comprise a plurality of instances of the mathematical Forms (see Annas 1975, pp. 19–21). At Z.2 1028b19 Aristotle ascribes the first of the views he notes here to Plato himself, though some scholars do not believe this ascription; the second view is that of Xenocrates (the third head of the Academy), while the third is that of Speusippus.[15] 'Of this we must grasp the elements' (a32–3): normally Aristotle reserves the term 'element' for the material constituents of natural substances.

perceptible; yet at 1028b20–1 Aristotle explicitly ascribes to Plato the view that it can be so applied.

[15] For discussion, see Annas 1975, pp. 73–6; Burnyeat 1987, pp. 213–16 and 237–8; Λ.10 1075a25–1076a4.

He may intend that meaning here, or he may be using it in a wider sense to refer to the 'internal' principles of matter, form, and privation (see notes on chapter 4, 1070a36–b4 and b22–35). In either case, we should not infer that the only principles are internal ones, nor that only natural substances have principles.

1069a36–b2

Jaeger takes 'the former [two] kinds of substance, then, are the subject of natural science' to mean that *any* inquiry into natural substance belongs to physics and not to first philosophy—including the sort of study of natural substances which Aristotle undertakes in Λ.2–5 and in Z–Θ (1923/48, pp. 220–2). This is a hard enough conclusion to accept for Z–Θ; but it seems even harder to square with the way Aristotle explicitly incorporates the inquiry into the principles of natural substance into the structure of Book Λ (see the Introduction and the notes on a30–6 above). How could Aristotle mean to relegate this inquiry to physics when at the very same time he identifies it, and treats it, as a part of the metaphysical inquiry into the principles of substance in general? Frede suggests a variant of Jaeger's view: he takes the passage to reflect *indecision* on Aristotle's part as to the appropriate place for the sort of inquiry we get in Λ.2–5 (1987e, p. 86); but again, Aristotle's programme for Λ reflects no such indecision. We should rather take Aristotle to mean that the extended study of the specific features of these substances belongs exclusively to physics, while the study of their features at the most general level belongs here—to first philosophy—as well (cf. Z.11 1037a10–17). Since Aristotle also discusses the principles of changing substances in a work self-identified as *physics* (*Phys.* I), this interpretation requires Aristotle to be willing to regard this material as at home in both sciences: although in the *Posterior Analytics* Aristotle appears to deny the legitimacy of sharing across different sciences, he actually engages in such sharing throughout the corpus (not least in Λ.8): see Judson 2019.

The conditional 'if there is no principle common to them all' presents a problem: surely there *are* principles common to changing and unchanging substance (see the Introduction, section 4, and the Prologue to chapters 4–5), and yet Aristotle does take the

latter to be the subject of another science. There is, of course, no formal contradiction here; but it is still unclear why Aristotle should put the conclusion in this conditional form if he believed the antecedent to be false. It seems easiest to suppose that 'if there is no principle common to them all' means 'if unchanging substance does not share a *specifically* identical principle with the other kinds of substance'. A specifically identical principle—as opposed to one which is identical 'by analogy'—would be something like air or fire: see Prologue to chapters 4 and 5, section 1. On this interpretation, Aristotle means 'unchanging substances will be the subject of a different science if they are not simply further natural bodies like the changing ones.' (For a different view with developmental implications, see Berti 2016.) Some manuscripts present a different reading at b2 which avoids the problem altogether: the alternative reading would mean 'if they have no principle of change', or perhaps 'if none <of them> is a principle of change for them [the former kinds of substance]': see Note on the Text. But (i) Aristotle is very interested in Λ in the question whether the principles of all things are the same (see the commentary on chapters 4 and 5); (ii) on the first translation of the alternative manuscript reading Aristotle will be making a completely nugatory point, while on the second he would appear to be suggesting that unchanging substances are the subject of physics, since they do include a principle of motion for perceptible substances.[16]

[16] For further discussion of this passage, see Judson 2018a, Appendix II.

CHAPTER 1 (1069b3–7) AND CHAPTER 2

PROLOGUE

I shall use 'Λ.2' as a convenient label for this whole section (1069b3–34), including 1069b3–7. Aristotle's presentation clearly presupposes that the reader is well acquainted with the discussion of principles in *Phys.* I, and it draws heavily on that discussion. As with much of Λ, the presentation is extremely compressed, omitting much of the detail given in *Phys.* I; at the same time it introduces material on matter and potentiality which is not to be found there. Aristotle arrives at the same basic conclusion in both discussions—that there are three principles, namely *matter, form*, and *privation*; in *Phys.* I these are characterized as 'the causes and principles of things that are by nature' (190b17–18). This rests on the idea that every change involves something's coming to possess a 'form' where previously there was an absence, or privation, of that form, and that there must be something which 'underlies', or undergoes, the change. Sections 1–3 of this Prologue present an outline of the *Phys.* I account as I understand it. *Phys.* I has given rise to very different interpretations (mine owes most to those of Bostock 1982/2006 and Gill 1989, ch. 3); most importantly, while everyone agrees that there are connections of some sort between Aristotle's idea of *matter* as a principle and the ideas of a thing's material constituents (at the limit, of material stuff) and of potentiality, it is controversial whether it is primarily connected with the former (see, e.g., Bostock 2001/6) or with the latter, as I shall maintain in section 4. Two controversies are postponed until section 5: it is controversial whether (as I think) Λ.2's account of principles is straightforwardly the same as that of *Phys.* I; and there is a debate as to whether the way in which Aristotle appeals to change in arriving at his principles in Λ is distinctively different from the way he appeals to it elsewhere, and especially in Z. In particular, I shall discuss two views: Burnyeat (2001) sees a profound difference between the principles of *Phys.* I and those of both Λ.2 and Z, while Charles (2000) sees Z as taking over the principles of *Phys.* I, but argues for a sharp discontinuity between their approach and that of Λ.2.

For further discussion of *Phys.* I, see the essays in Quarantotto (ed.) 2018, and Judson 2020.

1. Context and Purpose

The question of principles arises in *Phys.* I because knowledge of nature involves grasping the relevant principles (184a14–16). We might expect a direct discussion of the question of what sort of principles *are* relevant, but Aristotle seems to take it for granted that they are principles connected in some way with *change*, and are either (i) things which themselves are the subjects of change (in which case it would be natural to take them to be the basic physical elements: Aristotle cites Presocratic views that the principle is water or air), or (ii) things which are somehow involved when or because other things change (Aristotle also cites the full and the empty in the atomists' theory). Aristotle does not in fact distinguish very sharply between (i) and (ii), but his own target will turn out to be a version of (ii): he arrives at his principles by looking for the items which provide the most basic terms in which any change is to be understood (see section 5 for a clarification of this idea). Why does Aristotle focus on change? His discussion of the Eleatic denial of the existence of change (*Phys.* I.2–3) makes his view of this clear. It is of the essence of natural objects that they can and do undergo change; his definition of a 'nature' (*phusis*) in *Phys.* II.1 is 'a principle and cause of motion or rest in that to which it belongs' (192b21–3). Hence an understanding of natural things must begin with an understanding of what it is about changing things in general which makes them able to change (see the notes on 1069b32–4 for further discussion). This all leaves room for controversy as to just what the principles are principles *of*: see section 5.

2. 'Opposites'

As in Λ, Aristotle's starting-point in *Phys.* I is the view held, to his mind, by all earlier natural philosophers—that is, the non-Eleatic

Presocratics and Plato—that underlying all change in the world are changes between *opposites* (*enantia*: often translated 'contraries': see the notes on 1069b3–9) or 'what is intermediate [between opposites]'. Examples of opposites taken to be fundamental by one early natural philosopher or another are hot/cold, dense/rare, full/empty; many, but not all, of these pairs are thought of as mutually-excluding extremes on some scale or spectrum, and as involving (perhaps even as being) opposed causal powers. 'What is intermediate' invokes the idea of intermediate positions on these scales (188b21–6; see 1069b4–5 and notes).

Perhaps the most important fact about Aristotle's use of this 'opposites' analysis is that, whereas the Presocratics had invoked their favoured set(s) of opposites in fundamental physical explanations, Aristotle extends it to all types of change whatsoever. This throws into question the very terms of the analysis.[1] Aristotle thinks that there are four basic types of change—the coming to be or ceasing to be of a new substance ('substantial generation/destruction'), and change in respect of quality, quantity, and place (see 1069b9–14). The notion of change being between opposites or what is intermediate might be made (with the help of some further conceptual resources) to cover all cases of change in quality, but it simply will not fit changes of the other types. Changes in quantity and place do involve passing through intermediate points or stages on a continuum, but these continua do not have extremes or end-points other than those defined by the nature of particular changes; nor are different points on them associated with opposed causal powers/properties in the way that many Presocratics took their opposites to be. Aristotle in fact denies that quantities have opposites at *Cat.* 6 5b11ff. The end-state of substantial generation, or the starting-point of substantial destruction, moreover, is a substance, and Aristotle insists in *Phys.* I and elsewhere that a substance has no opposite (*Cat.* 5 3b24–32; *Phys.* I.6 189a27–34). Without acknowledging any break with the opposites analysis (indeed, he repeatedly insists on that analysis in *Phys.* I), Aristotle eventually substitutes *form* and *privation* (*eidos* and *stērēsis*) for the opposites: change

[1] On this point, see Bostock 1982/2006 and Judson 2018b.

involves the acquisition of a 'form' which was previously lacking (see *Phys.* I.5). Since Aristotle takes his analysis to apply to *any* change, however, the notion of 'form' here must cover any property which can be acquired in a change; hence its extension goes far beyond that of traditional opposites. We can see this shift in a crucial passage in *Phys.* I.5 (188a34–b21), in which Aristotle moves without comment from talk about change between a pair of traditional opposites (dark/pale), via talk of change between other qualities which can be made to seem to have the same structure (cultured/uncultured) to talk of substantial generations: in these cases the change is between 'united and disunited, shape [one of Aristotle's terms for form] and shapelessness'. These are manifestly not opposites in the traditional sense, nor are they even *enantia* in Aristotle's own technical sense. For further discussion, see Judson 2018b.

This unacknowledged shift leads to a problem with Aristotle's starting-point in the *Physics* passage—the claim that 'nothing whatever is by nature such as to do or undergo any chance thing through the agency of any chance thing, nor does anything come to be out of just anything, except incidentally' (188a32–4). The restriction placed on changes here looks quite substantial in the context of Presocratic opposites: what makes (fundamental) changes orderly and intelligible is that each product of change arises from its opposite. But with Aristotle's extension of the analysis the restriction threatens to become completely vacuous: if—as Aristotle certainly seems to say at 191a5–7 (cf. 192a3–5)—privation is simply the absence of the form, the danger is that the analysis merely says that a thing can only come to be *F* from being not-*F*. Perhaps no interpretation will save Aristotle from the charge of some degree of confusion over the relationship between the idea that Presocratic opposites are principles and the idea that form and privation are (see Judson 2018b, pp. 131–3 and 141–52); if there is a sensible position available to him, it needs to rely on a notion of what change is 'from' which is broader than that of a traditional opposite, and yet is not so broad that it leads to this vacuity. What seems to serve this purpose in Aristotle's developed theory is the thought that possessing a privation involves a *potentiality*—a key Aristotelian idea which is prominent in Λ.2 and in ZHΘ, though not in *Phys.* I: see section 4 below, and notes on 1069b15–18 and 28–32.

3. 'Something which Underlies'

Aristotle offers a number of arguments in *Phys*. I.6 to show that there must be a principle additional to the 'opposites': (i) opposites cannot act on each other; (ii) opposites do not seem to be the substance *of* anything; (iii) substances do not have opposites—so opposites are not substances, and hence if there were no other principle, substances would be composed of non-substances and would be posterior to them. However Aristotle himself intends these arguments, they have more force as arguments for the inadequacy of traditional opposites as a complete set of principles than as arguments for the inadequacy of form and privation (see Bostock 1982/2006, pp. 10–12), and I shall not discuss them. In any case, Aristotle offers more general considerations in favour of the need for an additional principle in I.7.[2]

His basic idea is that every changing thing is in some sense a *compound*: one 'ingredient' of the compound disappears in the change and is replaced by the new 'form', but the other does not disappear (see, e.g., 190b10–17). His example is that of a human being who becomes cultured. In this case, we can identify the changing thing as a compound of human being + uncultured; what results from the change is (same)human being + cultured. Involved in the change there is a privation (the absence of culturedness), a form (culturedness), and something which is the subject, first of the privation and subsequently of the form. It is important to note that both the subject of the privation *and* the compound of the subject and the privation can be said to be the thing which comes to be *F*, or, if we like, the subject of the change. Aristotle talks first as if the underlying thing is the *compound*, the uncultured human being:

> [what underlies], if it is one in number, is nonetheless not one in form (i.e. in account). For being for a human and being for what is cultured are not the same; and the one remains, while the other does not remain'. (190a15–18)

But later (190b14) he says 'by what underlies I mean the human being—that is, the *subject* of the privation—and this seems more

[2] There is an excellent discussion of this chapter in Charles 2018. See also Judson 2020.

likely to be his more considered view, for two reasons. First, 'what underlies' is Aristotle's standard term elsewhere for the subject of predication, so it is more likely to be chosen as the term for the subject of the privation than for the compound of subject and privation (even if his idea of a subject here is not precisely that of a subject of predication: see section 4). Second, Aristotle is seeking the principles involved in change: form, privation, and subject are more basic than form, privation, and the compound of privation and subject. Later on we shall see that matter is yet more basic than the underlying subject. To summarize: Aristotle holds that, in addition to the form and its absence, in every change there is something which 'underlies'. This is the subject of the privation (the human being in his example)—though, as we have seen, Aristotle is also willing to use 'what underlies' to refer to the compound of the subject and the privation (that is, the uncultured human being).

There are two important points to note about Aristotle's example of the uncultured human being becoming cultured. First, in this case the underlying thing *persists through* the change: this raises the question whether this is a necessary—or even an essential or defining—feature of 'what underlies', or whether there are cases in which Aristotle thinks that the subject of the original privation does not persist through the change. This will lead to the more general question of what it is to be something which underlies. Second, the underlying thing in this example is an Aristotelian substance (a human being), and the acquired form is a non-essential property of that substance; how can Aristotle possibly derive his conclusion that the third principle is *matter*? I shall discuss the first of these questions in the rest of this section, and the second in section 4.

Does Aristotle think that the subject of the privation always persists through the change? This question arises most sharply in connection with substantial generation, since, at least at first view, it is precisely *not* a case, like that of the uncultured human being, of a persisting substance acquiring a new form, but rather of a new substance coming into existence. It is over this question that there is most interpretative controversy. Aristotle has been seen as holding that in substantial generation nothing persists (Jones 1974), and that something other than the substance persists (Code 1976; Gill 1989, ch. 3; Charles 2018); and as failing to see

the problem clearly enough to present any explicit doctrine (Charlton 1970). Aristotle's procedure perhaps encourages this disagreement. He says first, at 190a14–21, that in every change something underlies, and that the underlying thing persists; then that while it is plain that something underlies in the case of other types of change, it is not so obvious in the case of substantial generation (190a33–4); and he responds to this by saying '[when we consider carefully we see that] there is always something which underlies, out of which the thing comes to be, as plants and animals come to be out of seed' (190b3–5). This response seems to justify the claim that there is in these cases something pre-existing which can be called the subject of the change, but may seem to imply a retreat from the claim that 'what underlies' in these cases *persists* through the generation—at least it may seem to leave it open whether it does. In the face of his initial claim that in all cases something persists, why have some commentators taken him to draw back from this in the case of substantial generation? The term 'seed' here is often taken to indicate a *particular item*, such as an acorn; and this does not persist in the coming to be of an oak tree. But Aristotle could have in mind *something about* the acorn—something which underlies *it*—which might persist. We should bear in mind that Aristotle has been prepared to use the term 'what underlies' for the *compound* of subject and privation as well as the subject itself (at 190a15–18: see above). If we take this to be his usage here, the fact that the seed, regarded as the compound of subject and the absence of the future substance's form, does not persist could be on a par with the fact that the uncultured human being does not persist. Another issue which may motivate doubts about persistence here concerns animal generation. If Aristotle does think that something persists through the change in this case, it is the material provided by the mother, not the seed provided by the father that does so. But Aristotle is also prepared to describe the material provided by the mother as 'seed'.[3] Once again there might be something about this which persists. I think that we should be reluctant to dismiss Aristotle's claim, in the context of speaking of substantial generation, that the underlying thing

[3] See *GA* 1.2 716a5–14 and Connell 2016, pp. 101ff.

persists (190a9–10), as a loose generalization. This interpretation requires, of course, that Aristotle can identify a subject within the (compound) seed—for example, the acorn—which does persist: see section 4 below.

Note that neither here nor anywhere else does Aristotle explain why he thinks that in every change something persists (unless his response to Parmenides constitutes such an explanation: see below). Perhaps the most likely reason for this is that he took it as self-evident that without something persisting we would not have a case of genuine *change* at all, but only of the replacement of one entity by another. If so, he will have to avoid thinking of what stays the same through the change as simply a feature or property of the object; for otherwise he would not have shown that the supposed change was not the mere replacement of an [*F*+not-*G*] entity by a new [*F*+*G*] one. I shall return to this point later.

What is the essential notion of 'something underlying' in *Phys.* I? Is it the subject of the original privation or what persists through the change? This question is crucial even if these two coincide; for we need to try to understand how Aristotle moves from 'what underlies' to matter. The view that what underlies is to be understood as 'what persists through the change' is defended by Charles (2018): on this view it is not a discovery, or even a substantial claim, that what underlies persists. Here I shall defend the other view, that what underlies is to be understood as the subject of the change. As we have seen, Aristotle's focus throughout the discussion is on the starting-point of the change: he begins with the compound of subject and privation, and the point that the subject persists, once made, is not pursued, except to relate it to what the change is said to be *from* (190a21–31). Again, when he argues that something underlies even in the problematic case of substantial generation, he is content to point out that there is an antecedent item. So, although Aristotle is firmly committed to the persistence of what underlies, the notion of the antecedent or starting-point of the change seems to be primary.

This is confirmed by Aristotle's response to Parmenides in chapter 8. The general form of Parmenides' argument against the reality of change was dilemmatic: any given change is either from what is, or from what is not; but (for reasons that are not fully recoverable) neither of these alternatives is coherent. Interpreters often take Aristotle's understanding of the problem here

to be as follows (see, e.g., Waterlow 1982a, ch. 3; Gill 1989, ch. 3). If change to (say) red is from what is red, it looks as if everything has stayed the same; if it is from what is not-red, there is still no *change*, but only the passing away of one entity (the not-red thing) and the emergence of a new one (the red thing)—and this sort of genesis *ex nihilo* is impossible. Aristotle's solution, on this interpretation, is to seek a characteristic middle way through the dilemma. His principles of change enable him to show (i) that change does involve something passing away and something else coming to be—so the world is *different* after a change has occurred—and (ii) that change involves something *persisting*—so change is not the mere replacement of one entity by another. Change does involve the replacement of a privation by a form. But neither the privation nor the form is a self-standing entity: they have a subject, and this persists through the change.

As we saw above, Aristotle probably does rely on this argument at another point in his theory, as the basis of his belief that in every change something persists. But I do not think it is the response he gives to Parmenides in I.8. Although his account of how to disarm Parmenides' challenge is obscure, it does not focus on persistence through the change, but on the status of the starting-point of change. The reply is based on the idea that in characterizing the possible starting-points of change, Parmenides construed 'what is' and 'what is not' too restrictively. He construed 'what is not' as equivalent to 'nothing': thus change from what is not would be *ex nihilo*. And he construed 'what is' as 'what is *F* [where being *F* is the property supposedly acquired in the change]': thus 'change from what is' would in fact be absence of change. Aristotle argues that in fact the starting-point of the change can be described both as what is and as what is not without either of these damaging implications. That his interest is with the starting-point of the change is also shown by the fact that he refers to another way to show Parmenides' error, in terms of actuality and potentiality. We are given a clear account of this in Λ.2 (1069b18–20): *X* comes to be *F* from *what is not* in the sense that it is from an antecedent which is not actually *F*; but it comes to be from *what is* in that it is from an antecedent which is potentially *F*.

So although the underlying thing persists through the change, such persistence is not (in my view) what makes it the underlying

thing: that is, rather, being the starting-point of the change. But, as I have said, this does not mean that what underlies is the *compound* of subject and privation; rather it is the item revealed by reflection on the fact that the antecedent is a compound and not merely the relevant 'opposite' (the privation). What underlies is thus, primarily, the subject of the change understood in the narrower way, as the subject of the privation.

4. How Aristotle Arrives at Matter as a Principle

What emerges as the additional principle in *Phys.* I.7–8 is 'what underlies'—the subject of the privation. But this is not the end of the story. For in chapter 9 Aristotle identifies what underlies with *matter*; and this will hereafter be his settled doctrine, that the principles of natural things are matter, form, and privation. Now the primary example of an underlying thing in chapter 7 is a human being—a compound of matter and form. How is Aristotle able to move from the notion of a subject of privation of this kind to his conception of matter? Pursuing this question will throw light on what Aristotelian matter is. It should be stressed that the account that follows proceeds at a very basic level; it sets aside most of the complications and difficulties which Aristotle's thoughts on these issues involve.

We need first to focus on the common (though not universal) cases in which the products of change can, at least in principle, change back again to their former state. Aristotle himself does not think that all changes are 'reversible' in this way (though he thinks that reversible changes underlie irreversible ones: see H.5); but for the moment we shall ignore the problems this raises. Clearly in these cases the products as well as the subjects of change are compounds of form and something underlying. It does not follow from this, of course, that the underlying thing in the product of a given change is the same as the underlying thing in the subject of that change (cf. notes on 1069b6–9), but Aristotle clearly thinks that they are the same. I think that his reason must once again be that, unless they are the same, we will not have a case of *change*, but only of the replacement of one entity by another (cf. the argument sketched towards the end of section 3).

If the same thing underlies both the original privation and the acquired form *F*, then what underlies, considered in itself, is neither *F* nor not-*F*; it is thus in a certain sense *indeterminate* with respect to being *F*/not-*F*. It can, of course, occur only in a compound which is one or the other, and so (considered in itself) it is itself an incomplete thing—again with respect to being *F*/not-*F*. At the same time, it must be enough of a determinate entity to serve as the *subject* of the form *F* and its privation, since (i) that is its fundamental role in change, and (ii) only if it can function as a subject can it (because of its persistence) succeed in meeting the 'mere replacement' challenge. Although the underlying thing may be fully determinate in many other respects, of course (as the human being is in the example of becoming cultured) we shall see that at the limit, what guarantees its ability to be this sort of subject is that it is the locus of certain *potentialities*, namely those for being *F* and for being not-*F*. Aristotle thinks that being potentially *F* involves more than the logical possibility of being *F*. A thing's potentialities are determinate states which explain why it can become *F* or *G*, and why it cannot become *H*; and if the thing does become *F*, its potentiality for being *F* is directly involved in the explanation of how it does so. As Aristotle says at Λ.2 1069b28–9, 'now if something is potentially, nonetheless its potentiality is not for just anything, but different things come to be from different things.' It is this idea of determinate potentialities which will enable Aristotle to solve the problem posed at the end of section 2, of finding something which change can be 'from' which is wider-ranging than the Presocratics' opposites, but which nonetheless has content: see notes on 1069b28–32 and below. Why is the underlying thing the locus for the potentiality for being *F*? The privation could hardly be the locus, since although possessing the privation is a necessary condition of being (merely) potentially *F*, forms and their privations are not potentially each other, but at most potentially replaceable by the other. The original compound can, of course, be said to be potentially *F*. But this must be in virtue of the potentiality for *F* in the underlying subject: for otherwise the *combination* of the underlying subject and the privation, rather than the subject itself, would have to be primarily responsible for the potentiality, and it is hard to see how it could be, since the subject's having the privation is just its lacking the form (this is a

logical precondition for the subject's *becoming F*, not a state which explains why it does so).[4]

We have thus arrived at the idea that 'what underlies' is (i) in itself indeterminate with respect to the forms which it can take on, and (ii) the essential locus of potentialities for those forms. (i) and (ii) are fundamental to Aristotle's notion of matter (matter is indeterminate: Z.11 1037a27, Θ.7 1049a36–b2; matter and potentiality: *Cael.* I.12 283b3–5; *GC* II.9 335a32–3; Z.7 1032a20–2; H.2 1042b9–10 and 6 1045a23–4; Θ.8 1050b27–8); but we have not yet arrived at that notion, since for all that has been said so far, these features are perfectly exemplified by composite substances (e.g. the human being in the culturedness example).

The final steps to the idea of matter involve consideration of the case of substantial generation. It is clear that if what underlies in a change of this sort persists through the generation, it cannot in this case be the composite substance; rather it must be an 'ingredient' or aspect of the substance. We can arrive at this conclusion another way. Hitherto 'form' has had an extremely general sense, covering any feature which a thing can acquire through change. But in substantial generation a wholly new substance of some particular kind comes to be; and this invites (though it does not entail) the thought that the form taken on by the subject is what makes a substance the kind of thing it is—its essence, in a modest sense of the term (see the Prologue to chapter 3). Form of this sort, the form *of a substance*, is for Aristotle the central and paradigm case of form: this is because substances are the primary beings, and hence, Aristotle argues, what makes substances the things they are must be the primary type of thing-that-makes-something-what-it-is. Thus a natural substance is a compound of its form and something which in itself is (or at least would appear, at this stage of the inquiry, to be) indeterminate with respect to that form—its matter. This matter cannot itself be a substance in the same way as form (though in Λ.3 and elsewhere Aristotle will claim that it is nonetheless a type of substance: see the notes on 1070a9–13). In the culturedness example, the human being could be, considered in herself, 'formless' with respect to culturedness and still be a complete, self-standing entity—a substance. But

[4] For a different view, see Charles 2018.

what underlies *a substance* is formless, or indeterminate, in a more radical way, since the form which it, considered in itself, lacks is substantial form. Nonetheless, like all underlying things, it is in a way something definite, since (i) it will be or possess some determinate potentialities (and nothing prevents it from having other properties as well), and (ii) even though Aristotle is reluctant to say that form can be predicated of matter, it must in some sense be the locus of the substance's form. This is Aristotelian matter. Note that Aristotle will have to hold that satisfying (i) and (ii) is sufficient to ensure that matter qualifies as a subject which can persist through substantial generation, rather than being simply a feature of the entities which exist before and after the change; otherwise he will not have avoided the charge that substantial generation is the mere replacement of one thing by another.[5] The line of thought sketched in this paragraph is what underpins the much-discussed passage in *Phys*. I.7, 191a3–15, in which Aristotle says that the 'underlying nature' must be grasped by analogy. He is talking here, I think, of the 'nature' which underlies a *substance*, and not of what underlies in general:

> As bronze is to a statue, or wood to a bed, or what is without form before it takes on the form to any of the other things which have some form, so is [the underlying nature] to a substance, to a this something and what is. This, then, is one principle, though it neither is one, nor is, in the same way as the this something. (191a8–13)

Why must matter be grasped by analogy? Aristotle's thought seems to be that conditions (i) and (ii) can be met by very different things in very different ways: while they play same role, identified at a relatively high level of generality, the way they do this does not qualify as simply 'the same' (for further discussion, see Judson 2020; for the similar way in which Aristotle regards lungs and gills as the same only by analogy, see the Prologue to chapters 4–5, section 1).

We can now see how the inquiry into the principles of changing things has yielded matter, form, and privation. It is not that matter in this sense must be 'what underlies' in every change: it

[5] The case of 'elemental transformation', in which one of the four elements turns into another, is a special and problematic case of substantial generation, which I shall not discuss here.

may be that in some cases what underlies a given change is the compound substance itself. Rather, by reflecting on what the underlying thing in this sense must be like in the case of substantial generation, we can see that all natural substances must be compounds of matter and form. Matter in this sense is ontologically more basic than 'what underlies', since we can make sense of the possibility of the latter in the case of substantial generation only by means of the former. This said, it should be pointed out that with the development of the idea of potentiality, Aristotle will come to see matter as having a more fundamental role than the higher-level 'underlying thing' in at least some cases of *all* types of change, and not just in substantial generation. This further step is evident in Λ.2 and 3: see notes on 1069b14–18.[6]

This account of what it is to be the matter of a substance is very abstract: one reason why Aristotle's conception of matter can seem so elusive is, I think, precisely that it is so abstract. What items in the world actually satisfy these abstract conditions? In the case of paradigmatic natural substances—members of natural species—Aristotle ties form to structure, organization, and function. He finds it natural, therefore, to take the matter of a substance to be the *constituents* of the substance which can be structured and organized in the appropriate way(s), and which can be the physical basis of the appropriate function(s). Five points need to be stressed. (i) If this account is correct, the notion of matter as a principle is not to be *identified* with that of a substance's constituents (still less with the notions of *stuff* or of matter in the standard present-day sense): rather, matter itself has a structural/functional definition, and these constituents are what carry that structure and function in the case of paradigmatic natural substances.[7] (ii) This account of the matter of natural substances faces severe difficulties when it is conjoined with the view that some changes are irreversible, or again with the closely related view that the constituents of a substance cannot be what they are (or cannot exist) in the absence of the form. Yet Aristotle

[6] The notion of potentiality is also important for the connection between having matter and being corporeal: see notes on 1069b3.

[7] Charles 2000, pp. 100–1, rightly distinguishes 'matter as a principle' from 'matter understood as what is material'.

apparently holds both these views.[8] It is controversial whether these views are inconsistent with Aristotle's view of matter, or whether they merely require some complication within his theory, but I shall not pursue this question here (for references, see notes on 1069b24–6). (iii) The constituents of a natural substance will themselves have definite natures for two reasons: they will have the definite, structured potentialities in virtue of which they are the thing's matter, but they may have other potentialities and properties: some or all of these will be, or be concomitant with, categorial properties such as hardness, heat, etc. In some derivative sense, then, they will possess their own form, and they may have something which plays the role of matter in relation to this form—'lower-level' matter (see H.4 1044a15–32). (iv) Not least for this reason, it is sometimes claimed that Aristotelian matter is a purely analytical device—that is, that it does not constitute a particular type of being, but merely a role or set of roles which a thing may be seen as playing when viewed one way but not when viewed another way. Given the structural/functional account I have offered, this seems an anodyne view of *matter in general*; but it is quite compatible with this that the *matter of a natural substance* is a particular type of being. This is an issue of especial importance given the apparently correlative nature of matter and form, since Aristotle certainly holds that the forms of natural substances are beings of a particular type; and it is relevant to the question whether matter itself is a substance. It is also relevant to a question central to the understanding of Λ.4–5: are Aristotle's principles to be viewed as the general terms of a schema in accordance with which substances are to be explained—*form, matter*, and *privation*—or are they the various items in which the schema is instantiated in different cases—*this* form, this matter, this privation? The evidence of *Phys.* I is scanty and hardly settles the issue. The argument at 191a5–7 for the conclusion that 'in a way' only two principles are needed—since *one* opposite rather than two will by its presence or absence suffice for the change—suggests the latter answer; while the very claim that there are only three (or two) principles suggests the former. This question will be discussed further in the notes on

[8] Irreversible changes: H.5. The identity and existence of an organism's matter are dependent on the existence of the organism: *GA* II.1 734b24–31; cf. *Meteor.* IV.12.

chapters 4–5. (v) In many other places Aristotle cements, as it were, this notion of matter and its role by way of teleology (final causation) and the hypothetical necessity of matter of a certain character given the end(s) of the organism or artefact (see, e.g., *Phys.* II.9 and *Parts of Animals* passim): as in *Phys.* I, there is no hint of this in Λ.2—indeed there is no explicit mention of final causation at all in Λ until chapter 7 (see notes on chapter 5 1070b22–6).

5. What are Matter, Form, and Privation Principles of in *Phys.* I and Λ.2, and How are they Related to Change?

It is clear from Aristotle's programme in Λ.1 that the principles he introduces in chapter 2 are (among the) principles of natural substances. (Whether they are meant to figure as principles of *all* substances is a further question: see the Introduction, sections 2–4, and the notes on chapter 5.) Some commentators think that the principles in *Phys.* I are principles, not of natural objects or things which are subject to change, but of processes or changes themselves.[9] This does not seem to be right. As I have said, Aristotle characterizes his inquiry as one into the 'the causes and principles of things that are by nature' (190b17–18; cf. 191a3–4). Moreover he invokes his predecessors at length in *Phys.* I as holding a primitive version of the view he wishes to defend; and he clearly takes them to have held that opposites were principles *of* the natural things of which they were in some sense components (I.5 188a27–30, discussed in Judson 2018b). This is confirmed by his inclusion of the atomists in his list of predecessors who took the view that opposites are principles: their key opposites, according to Aristotle, include full/empty and angular/unangular, which belong unchangingly to the atoms or to the void, and are not the termini of any changes. It is true, as I said above, that Aristotle's positive approach to the proper

[9] For example, Bostock 1982/2006, pp. 1–2; Aquinas 1985, Prohemium 29–34. Rapp thinks that in both *Phys.* I and Λ.2 Aristotle starts by considering the 'principles of change', but then shifts focus to the principles of changeable or natural things (2016, pp. 89–90).

identification of these principles in I.7–8 proceeds by focusing on change: but this does not mean that the principles are only principles of change—indeed, the argument in Λ.2, where the target is unquestionably the principles of natural substances, has exactly the same focus on change, with its appeals to the termini of change and to 'what remains' through a change. (How reflection on change yields principles of objects subject to change was part of the subject of sections 3–4; see also below.) It is worth noting that this leaves undetermined a further question—whether there are any further principles of natural things in addition to the three involved in change. In *Phys.* I Aristotle displays great interest in the question of how many principles there are, and insists that there are no more than three; and he assigns to 'first philosophy' some further questions about *form*, as not belonging to physics (192a34–b2). But, for whatever reason, there is no discussion of whether, for example, the *elements* of natural things (earth, water, air, and fire) are principles, and if so, whether they are subsumed under matter, form, and privation; nor does he discuss the relationship of his four causes to the three principles. Thus it is simply not clear whether the Aristotle of *Phys.* I takes this inquiry into change as revealing all the principles of natural things *tout court*, or merely all the principles which are required for being subject to change. (Some of these issues are discussed in Λ.4–5, and in Judson 2018b.)

Burnyeat thinks that there is a sharp discontinuity of approach between the two works:

> The way to read the early chapters of Λ is as a first-philosophical use of the factors invoked in *Phys.* I to explain change (matter, form and privation). These now reappear as the principles that explain the substantial being of sensible, hence changeable substantial being.
>
> (2001, p. 133)

This might seem to be no more than the view discussed above that the principles of *Phys.* I are primarily principles of *change*; but Burnyeat does agree that the focus of Aristotelian physics is on natural substances and not merely on their changes, and he speaks of 'the idea that first philosophy and second [i.e. physics] could both study sensible substantial being, each from a different perspective and focussing on different aspects of the same

subject-matter' (p. 129, n. 6): 'the focus of physics is on sensible substantial beings as things whose nature is a principle of stability and change, while first philosophy is interested in more abstract questions about their *being*' (p. 129). Burnyeat has in mind the assumption of Jaeger and others that, since Λ.1–5 is about sensible substances, it must be a part of physics, not first philosophy; and Burnyeat is entirely right to reject this assumption (see Introduction, section 3). In rejecting it, however, he overstates the position with respect to Λ.2. *Phys.* I and Λ.2 invoke precisely the same principles of precisely the same things, and (as far as the brevity of Λ.2 allows us to tell) on precisely the same basis. What is distinctly different about the two inquiries is the *subsequent* way in which physics and first philosophy will study and use them. If *Phys.* I considers sensible substances as beings naturally subject to change, so does the argument of Λ.2, which, as we have seen, rehearses exactly the same considerations about the termini of changes and the need for 'something which remains' to arrive at its three principles of substance. Rather than wonder whether this material belongs to physics or to first philosophy, we should take Aristotle's deployment of it in both contexts to reveal it as simply common to both. (See also Judson 2019, and the opening of the Prologue to chapter 8.)

A quite different sort of discontinuity is suggested by Charles (2000). He thinks that Aristotle adopts a 'distinctive and more ambitious approach' in Λ.2, 'first defining matter (as what is required for change) and then using matter (so defined) as the basis of (or principle for) an account of what substance is' (p. 95, n. 7). Charles takes Λ.2 to identify natural substances as whatever is essentially subject to change, and to understand matter and form *entirely* in terms of their respective roles as the principles of change. This is in sharp contrast to how Aristotle is supposed to proceed in *Phys.* I and Z: there

> matter may be understood as what is required for genuine substances (marked out on other grounds) to change in certain ways. . . . Aristotle appears to take as basic a notion of 'form' connected with the definition of composite substances, the criterion for subjecthood, and teleological explanation (and to construe matter as what is required for such forms), [whereas] in Λ 2 he seems to attempt to explain what substances are in terms of the matter (and form) involved in types of change. (pp. 95–6, n. 7)

This view of Λ leads Charles to detect severe problems in Aristotle's account. One problem is that, since matter and substantial form are supposed to be defined in terms of change,

> [a]ny further application of this concept must be similarly attached to change or be derivable (at least by analogy) from this central case (involving change). It is immediately clear that a difficulty must arise (for this strategy) in the case of eternal unmoving substances. (p. 105)

A second problem is with the idea of the 'topical matter' which Aristotle ascribes to the eternally moving substances (the heavenly bodies): see 1069b24–6 and notes. If matter is defined simply as the subject required for the change in question, then the matter of any of these substances should simply be that very substance, since, for all Aristotle has said, that can be the subject of change of place (as the human being is the subject of becoming cultured in *Phys.* I; cf. Bostock's complaint, 1994 *ad* H.4 1044b3–8): only in the case of substantial generation must the subject required for change be distinct, constituent matter. Yet Aristotle clearly intends these eternal substances to be *composites* of form and topical matter. A third problem (pp. 93–4) is that this account will apparently allow in as genuine substances 'phantom' objects—'Followers'—defined as ones which follow the route of an eternal perceptible substance ('the Leader') but at a specified temporal distance behind. Such 'objects' cannot, Charles thinks, be denied topical matter defined as the capacity to change place; they cannot be ruled out as merely phantom objects on the grounds that they lack constituent matter, because—on this account—Aristotle has defined matter simply in terms of the capacity to change.

Can we avoid these difficulties on Aristotle's behalf? I suggest that the project in Λ is not after all radically different from the projects in *Phys.* I and Z. Aristotle is not attempting to deduce natural substances from the bare notion of 'things which are essentially liable to change'; rather he is presupposing—as he does in Z—the (candidates for) central cases of substance, namely living organisms (cf. 1069a30–3), and asking what they must, essentially, be like if they have natures, and hence are essentially liable to regular changes of certain sorts. There is no need to see Aristotle as defining matter in Λ simply as 'whatever underlies change', or as taking the role for which 'matter' can be

used as a label in any change to *exhaust* how it is to be understood when used to denote a principle of substance. Both in *Phys.* I and in Z Aristotle introduces matter in a way which appeals to the bare idea of what underlies a change; but in both cases it turns out that this is not the whole story. As I said in section 4, I think that Aristotle argues (i) that any change requires something underlying (and persisting): in this sense a substance such as Socrates can be the 'matter' for a change; (ii) that the case of generation and ceasing to be shows that generable substances such as Socrates must be compounds of form and a (constituent) matter which is the locus of the potentiality for having/lacking that form. (iii) The role of this matter is not exhausted by its role as what underlies generation and destruction, however: to play its role in generation, the constituent matter must have properties of its own, in virtue of which it is able to have the potentiality to take on the substantial form, and thus it can be—and evidently is—the matter for at least some of the non-substantial changes the substance undergoes and brings about during its lifetime. In other words, at least some of the substance's capacities for change and changing are due to its constituent matter. This licenses the idea, not sanctioned by (i) and (ii) alone, that a natural substance can throughout its existence be regarded as matter—the material locus of certain potentialities—structured in the relevant way by the substance's form. I discuss this further in the notes on b14–18. Aristotle's claim about topical matter is no longer so problematic: the heavenly bodies are constituted by matter—the material locus of certain potentialities for their parts to occupy different locations—which is structured in the relevant way by their form.

At this point Charles appeals to the argument at b14–18, where Aristotle appears to argue that in *every* change it is matter which has the relevant potential. As we have seen, this does not follow from the idea that it must be (constituent) matter which persists through substantial generation—indeed, Charles thinks, this claim only makes sense if Aristotle is here *defining* matter as whatever has the potentiality to change. As I concede in the notes *ad loc.*, we cannot fully justify Aristotle's claim—though we can explain and defend it up to a point. But the exegetical price of justifying it by ascribing the distinctive definition of matter to Aristotle is too high, not least because it would lead to Charles's

difficulties over topical matter, which Aristotle introduces just six lines later. It is better to take Aristotle to be overstating the point about matter and change at b14–18 than to acquit him of any error there by ascribing to him an unworkable conception of matter. It might be argued that it is not the distinctive conception of matter which generates the problems, but the introduction of topical matter: perhaps Aristotle is mesmerized by his belief in eternal perceptible substances. This does not seem to be the case, however. For one thing, the Leader/Follower problem sketched above could be parroted for the supposed 'genetic' (or 'generable') matter of perishable substances, so as to drive a wedge between it and constitutive matter in just the same way. Thus there could be phantom objects such as the 'Juniors', which come to be some specified time after I do (my five-minutes, or one-year, younger alter egos). Equally, in cases of mere 'Cambridge' change, there is some 'genetic' matter which is simply (say) the matter from which my being the tallest person in the room comes to be when all the taller people leave. Once again, the obvious rejoinder is that these phantom objects lack constituent matter. Charles thinks that Aristotle cannot say this to get out of the Follower problem because '[t]he considerations which exclude the Follower also show that topical matter is not itself a self-standing principle' (p. 95). I would argue that no matter constituted in the austere way Charles ascribes to Aristotle here is a self-standing principle. A similar issue arises for form. On this austere view, form (in the case of natural substances) should be defined as what governs the natural development of an organism into a mature adult; but of course in Aristotle's view it *also* explains the organism's characteristic natural behaviour and life-style.

A final issue is the meaning of Λ's claim that matter and form are (among) the principles of substance. Charles takes this to mean that the notions he finds central to the inquiry in Z—definition, the criterion for subjecthood, and teleological explanation—do not play a central role in Λ's attempt to give an account of the nature of sensible substances. This would be strange, since although Λ pays little attention to the issue of definition, the ideas of being a this something, being an ultimate subject (in the guise of being a 'being without qualification'), and being separate are all very prominent in the discussion of substance in these chapters. Moreover the idea that matter and

form in one or more analogical senses are the principles of non-substantial items too (see chapters 4–5) seems to require that we be able to understand the core cases of matter and form (i.e. substantial matter and substantial form) in distinction from their analogues—and the notions of being a 'this something', etc., seem the obvious candidates to help us to this understanding. Why, then, are these things not also principles of substance? This is a very hard question to answer without a clearer picture of the relationship of Λ to Z than we are in a position to have (see section 1 of the Introduction). Note that an analogous question arises for Z. The notion of definition, for instance, turns out to have analogues for non-substantial items; so we cannot fix substantial form simply as that of which there is (or that which corresponds to) a definition. The unity of a definition, too, is underwritten by the unity of the form, and not vice versa. Here are two—briefly stated—possibilities. (i) Perhaps Aristotle distinguishes two questions about substance, and thinks that the analytical question 'what is it to be a substance?' involves being a this something, etc., but that the principles of substance answer the question 'what must something be like to satisfy these analytical conditions?' (ii) Perhaps he distinguishes the order of discovery from the metaphysical order. We need to use (relatively unarticulated) notions of being a this something, etc., in order to arrive at a proper understanding of substantial form and matter; but once fully developed, these latter notions will be enough to explain what it is to be a substance.

COMMENTARY

The main purpose of 'chapter 2'—1069b3–34—is to argue for the conclusion given at the end: 'There are, therefore, three causes and three principles: two are the pair of opposites—of which one is the formula and the form, one the privation—and the third is the matter.' The 'chapter' (including b3–7) has four parts: b3–9 introduces items involved in change, 'opposites' and 'something underlying' (this notion of 'something underlying' in some way yields the notion of matter); b9–14 says more about the 'opposites' in connection with Aristotle's fourfold classification of types

of change; b14–32 discusses matter and potentiality; b32–4 is the statement of the conclusion.

CHAPTER 1 1069b3–7 and CHAPTER 2 1069b7–9

1069b3

'Perceptible substance is subject to change.' Aristotle's formulation suggests that perceptible substances are by their very nature subject to change—though this is subject to a crucial qualification explained in my next paragraph. For Aristotle, being perceived is not itself a change in the perceived object, but it does involve physical processes linking the object of perception to the perceiving subject (see *De An.* II.5–III.2). Anything perceptible, then, must have a physical nature or aspect; this means that it must be capable of interactions with its environment, and hence it is subject to change (for a different view, see Charles 2000, pp. 83–4). Λ.1 1069a30–3 suggests that Aristotle takes the converse implication to hold as well—in other words, that if a substance is changeable it is also perceptible (this ignores the fact that the heavenly spheres are changeable but invisible: see notes *ad loc.*). He does not explain this implication, but presumably he must be thinking of some connection, however modest, between changeability and being corporeal. Despite appearances, this is not because of any straightforward semantic connection between 'matter' and 'corporeality': nothing in the analysis of change in terms of form, privation, and 'what underlies' considered in itself rules out incorporeal change. What does rule it out for Aristotle, presumably, is the idea sketched in the Prologue that matter is the locus of a structure which constitutes the potentiality for acquiring the new form; and it is perhaps hard to conceive how such structures could exist without a corporeal basis of some sort.[10] Aristotle might seem to admit one case of purely incorporeal potentialities, namely human *intellect* (*nous*), which must be 'unmixed with the body', because it is potentially all the objects of thought (*De An.* III.4–5). But this may only mean that the intellect lacks

[10] See also Z.10 1036a9–12 and E.1; Granger 2000, pp. 419–22; Peramatzis 2011, pp. 139–43.

a specific bodily organ, not that it is incorporeal, and in any case its potentialities are not connected with ordinary change as Aristotle understands it. This issue is discussed further in the notes on b14–18 and section 2 of the Prologue to chapter 9. Even so, as the case of the heavenly spheres shows, there is no obvious entailment of perceptibility by corporeality.

It will emerge in chapter 3 that Aristotle's use of the term 'perceptible substance' in Λ is complex. In explaining the association of perceptibility and changeability above, I used the phrase to denote substances such as individual horses, human beings, and so forth; Aristotle regards these as composites of matter and form. It is clear that these composite substances are what Aristotle intends to denote by 'perceptible substances' here. But it is also clear from chapter 3, and from the way in which Λ as a whole develops, that he wishes to classify as perceptible substances the *forms* of these composites as well: see notes on 1070a9–13. These substantial forms are not, in any straightforward sense, perceptible; and it is at best controversial whether they are changeable (for the view that they are, see Frede 1987c, pp. 63–71). Aristotle is neither confused nor guilty of equivocation, however: it is simply that the extreme compression of these chapters conceals his strategy. Although substantial forms are prior to composite substances (see Prologue to chapter 3 and notes on 1070a4–9), we only arrive at a grasp of the former by means of reflection upon the nature of the latter—and in particular by means of coming to see that (and in what precise way) they *are* composites of form and matter. Since they are forms *of* perceptible substances, these substantial forms have a close ontological connection with them—indeed, they may be inseparable from them (Aristotle discusses this in chapter 3)—and can reasonably be grouped with them; but it is also reasonable at this early stage of the inquiry for Aristotle to focus on (the principles of) composite substances in particular, since, as I have said, it is by considering them that we arrive at the very notion of these substantial forms. Since Aristotle is inquiring into principles, the questions arise: do these substantial forms also have principles, or are they themselves principles? And if they do have principles, are these the same as or different from those of composite substances? These questions will be taken up in the Prologue to chapters 4–5.

1069b3–9

This is another highly compressed argument. As in *Phys*. I, Aristotle deploys the idea of opposites (*enantia*) and what is 'intermediate' as the termini of any change, and introduces a contrast between *enantia* and 'things which are set against each other' (*antikeimena*). *Antikeimenon* is a technical term of Aristotle's, introduced in *Cat*. 10 (cf. especially *Top*. II.8 and V.6; *Met*. Δ.10, I.4 and 7). In *Cat*. 10 he distinguishes four ways in which things can be *antikeimena*: as 'relatives' (e.g. double and half), as 'a privation and a possession' (e.g. blindness and sight), as 'affirmation and negation' (e.g. 'he is sitting' and 'he is not sitting'), and as *enantia*. In this context, '*enantion*' is often translated 'contrary' and '*antikeimenon*' as 'opposite'. The modern notion of a contrary is a purely formal or logical one, linked with the notion of a *contradictory*: *A* and *B* are contraries if nothing can be both *A* and *B* at the same time, and it is possible for things which can be *A* or *B* to be neither; *A* and *B* are *contradictories* if nothing can be both at the same time, and anything which can be *A* or *B* must be one or the other. Although these notions, and their more commonly used propositional analogues, derive ultimately from Aristotle's accounts of *enantia* and of 'affirmation and negation', his own technical conception of *enantia* includes causal as well as logical ingredients, and sits as it were somewhere in between the Presocratics' notion of opposites and the modern notion of a contrary. In his set-piece discussion of *antikeimena* and *enantia* in *Met*. I.4, for example, he characterizes *enantia* as the points of greatest difference within a single genus: his talk here of 'what is intermediate' (e.g. degrees of warmth and coolness in between hot and cold) is suggestive of the same idea. Both in *Phys*. I and here, at any rate, the term 'opposite' seems the better translation for *enantion*, since (i) the idea of continuity with the terms of Presocratic explanations of fundamental physical changes is fundamental to Aristotle's strategy, and (ii) as I have said, even as a technical term *enantion* does not (standardly) have the same meaning as 'contrary' in its technical sense: for further discussion, see Judson 2018b. One drawback is that no convenient term is left to translate '*antikeimena*'; hence my ungainly translation 'things which are set against each other'.

At the same time, as we saw in relation to *Phys.* I (see section 2 of the Prologue), Aristotle's notion of the basic 'opposition' involved in change—form and privation—does not fit well with either the Presocratic notion from which he starts, or his own technical sense of *enantion*. This problem also affects the terse explanation Aristotle offers at b5 for the claim that change is not between just any *antikeimena* but between *enantia*: 'for voice is not pale' (cf. *Phys.* I.5 188a30–b26). Ross thinks that Aristotle is distinguishing contradictories from contraries in the modern sense, and is claiming that change is always between the latter. It seems correct that Aristotle is denying that change occurs between mere contradictories: in *Phys* I.5 this is the basis of his claim that 'of all the things that are nothing is of a nature to do or to undergo just anything under the agency of just anything; nor does anything whatever come to be from anything whatever' (188a32–4: see notes on b28–32 below). But for the reasons given it is hard to see Aristotle's positive view as being that change is always between contraries in the modern sense. Aristotle's argument is more likely to be that a genuine *change*, as opposed to the mere disappearance of one thing and the appearance of another, must be, or involve, a progression through a series of intermediate stages which forms a single, continuous process.[11] It is easy to see how this works with Presocratic opposites: *X*'s change from being cold to being hot will be a matter of *X*'s going through intermediate stages along the cold/hot scale. By contrast, it is hard to see how there could in general be such intermediate stages connecting merely contradictory states: if the state of there being something which is not pale—constituted by a voice not being pale—is replaced by the state of there being something pale (*X* stops talking as she grows pale), this cannot be the result of a single process through intermediate stages. But as we have seen, Aristotle himself does not believe that all genuine changes are or involve Presocratic opposites: so he needs to explain how changes from privation to form or vice versa satisfy this condition. Although Aristotle does not make the connection

[11] Or, at the limit, is of a type which could be: commentators make much of Aristotle's concession that a change such as water freezing could happen 'all at once' (*Phys.* VIII.3 253b19–26; cf. I.3 186a15–16), but this is still a change which *could* have taken place as a gradual process.

explicitly, this need is met by the introduction of the notion of potentiality (see section 4 of the Prologue).

b6–9: The expression 'there is a third thing' echoes one used in the course of discussing the difficulties faced by his predecessors at *Phys.* I.6 189a26, but Aristotle is here summarizing his own view and a rather wider stretch of argument from *Phys.* I. He gives two arguments for the existence of a third principle, 'something which underlies'. (i) If changes are between opposites, 'it is necessary for there to be something which underlies, which is what changes into the opposite condition; for it is not the opposites that change.' This clearly summarizes the main argument of *Phys.* I.7: the opposites are not the subject of the change, but rather the features in respect of which the subject changes; and this subject is the subject of the original privation. (ii) 'While something remains, the opposite does not remain.'[12] It seems plausible that without *something* persisting we would not have a case of change (as Aristotle understands it); it is not immediately obvious that the item which persists must be the same as the item which is the subject of the change: for an explanation of why Aristotle thinks they are the same, see the Prologue, section 4. The question whether Aristotle thinks that something persists in all cases of change is discussed in section 3 of the Prologue.

'There is therefore a third thing besides the opposites—the matter.' No explanation is given here (or in *Phys.* I) of the appearance of *matter*. I sketch what I think is the explanation in the Prologue, section 4. That explanation shows how Aristotle could move from the idea that all change involves something underlying to the claim that matter is a principle of changing things, despite the fact that the underlying thing in non-substantial change was presented in *Phys.* I.7 as the substance itself rather than any constituent matter. Aristotle's phrasing here may suggest that he has taken a more radical step, that of taking matter to underlie every change, but the compression of his exposition makes it hard to be sure; in any case, however, he

[12] The thought that the original feature does not 'remain', or 'endure', and this very terminology, derive from Plato's *Phaedo*, 102dff.

does take this step later in the chapter: see notes on b14–18, and on 3 1069b36–1070a4.

CHAPTER 2 1069b9–34

1069b9–14

It is Aristotle's standard doctrine that there are four types of change: qualitative change or alteration, growth and diminution, change of place, and substantial generation/destruction (see *Phys.* V.1–2). 'Change . . . in respect of what something is' here denotes substantial generation/destruction, and this may seem puzzling: the basic meaning of Aristotle's expression 'what it is' is 'what makes a thing the thing it is' or (in this very modest sense) 'essence'. As such, it can be used of items in any category; but Aristotle thinks that only substances have an essence in a primary or unqualified way (see Z.4–5), and so has a tendency to use 'what it is' to refer to what makes a substance what it is. 'Change in respect of *this*' also refers to substantial generation/destruction ('coming to be and ceasing to be without qualification'): '*this*' (*tode*) and 'this something' (*tode ti*) are common Aristotelian ways of referring to substance. Note how Aristotle continues to find it quite unproblematic to say that all these types of change involve *opposition* (see the Prologue, section 2).

1069b14–32

This section is a series of notes on matter and potentiality. It is highly compressed and rather disjointed, but Aristotle seems to be making four main points: (i) the locus of the potentialities involved in change is *matter* (b14–18); (ii) the potentiality/actuality distinction can be used to disarm Parmenides' challenge (b18–24); (iii) different types of substance have different types of matter (b24–8); (iv) different products of change require different potentialities (b28–32).

b14–18: 'It is necessary, then, for the matter which changes to be able to be in both states' (cf. Z.7 1032a20–2, 15 1039b29–30): a tacit premiss is that the matter persists through the change (cf. b7–9). In the Prologue I made the point that *what underlies*

must be able to be in both states, and inferred that this applied to matter in the case in which it, rather than the compound substance, must be what underlies, namely substantial generation. But here Aristotle presents the claim about matter as an inference from the remarks about the different types of change, and this suggests that here he means that matter must have the relevant potentiality in *every* change, and not just in substantial generation. This suggestion is strengthened by the ease with which Aristotle switches in this passage between talk of matter and talk of potentiality; and it is confirmed by 3 1069b36–1070a2, where he says that in every change it is the matter which is the subject of the change. This represents a significant shift from *Phys.* I:[13] there the subject of qualitative change—and, by implication the other types of non-substantial change—was the substance (the human being in the culturedness example, for instance). This prompts two questions: how does this shift occur, and are the two views compatible? (For a very different response to these questions, see Charles 2000, discussed in the Prologue, section 5.)

The shift involves the extension of the range of potentialities which a substance's matter may possess beyond the potentiality for having (or lacking) that substance's form. That such an extension is possible is perfectly reasonable, given that the potentiality is located in the substance's material constituents. As I said in the Prologue (section 4), these constituents will have a nature of their own, and may have many potentialities. This means that it is possible for a substance to have certain potentialities in virtue of the fact that its matter has those potentialities. Thus for any non-substantial change, it is in order for Aristotle to ask whether the potentiality involved is a potentiality of the matter. If it is, the substance will have the potentiality in virtue of its matter; and although the substance can still be said to be what underlies the change, the matter can also be given this status. This shows that, provided we acknowledge that more than one item can be 'what underlies' a change, there is no incompatibility in the two views. It does not follow from what has been said, however, that every

[13] Or at least from chapters 7–8 of *Phys.* I: it is not entirely clear whether the discussion of matter in chapter 9 is restricted to substantial generation or ranges over all types of change.

potentiality of a substance is in fact due to its matter, and despite his sweeping statements here (e.g. that in every change what changes is the matter (1070a1–2)), Aristotle has no general argument to show that this is the case. Indeed, there would seem to be many non-substantial changes which involve potentialities which belong primarily to the soul, which Aristotle takes to be the organism's form, rather than to its constituents: becoming cultured is an example. And there might be others—for example, intentional bodily movements—which involve potentialities which belong to the composite substance as a whole. These counterexamples, however, suggest a weaker position which is more plausible, namely that when a potentiality belongs primarily to a form or to a composite substance, this potentiality depends on, or involves, other potentialities which belong primarily to the matter. Thus the potentiality for being cultured requires perceptual potentialities which in turn involve physical potentialities, while the potentiality for intentional bodily movement requires the potentiality for bodily movement. Despite its plausibility, there is still no easy a priori argument to the truth even of this weaker position. A very modest version of the weaker position would be supported by the idea that every change of a non-locomotional type presupposes or depends on a locomotional change (that is, a change in location). This is because Aristotle holds that only things with magnitude can be the primary subject of change of place, and hence that forms only move in virtue of the motion of the bodies of which they are the forms (*Phys.* VIII.6 259b16–20; *De An.* I.3–4); thus potentialities for motion will belong primarily to a thing's matter. Aristotle does believe that all non-locomotional changes presuppose or depend on locomotional ones,[14] but his argument in *Phys.* VIII leaves the precise nature of this dependence unclear.

'What is is twofold' (b15–18): or 'what is <is said to be> in two ways.' Aristotle means that there are two ways in which *X* can be *F*: actually or potentially. The justification for this is that being *F* potentially is itself a determinate state, not to be identified with merely not being *F*, and one which helps to explain why *X*

[14] See *Phys.* VIII.7 260a20–261a26 and Argument E (i) in section 4 of the Prologue to chapters 6–7; cf. *Phys.* VII.2 243a35–40.

becomes *F* if it actually does so (see the Prologue and notes on b28–32). A house, for example, cannot come into being from just anything which is not a house—such as a cloud or a pile of cornflakes—but only from something such as a collection of bricks, timbers, etc., which has determinate properties which make it possible for a house to be built from it, and which to some extent will determine some of the properties of the house. Note that while we may feel some temptation to identify states of this sort with some micro-structure of the object or its matter (e.g. with some atomic or molecular state), Aristotle feels no such temptation. He does think that some potentialities owe something to the ingredients of the substance's matter; but he also thinks of these ingredients as themselves being present only potentially (*GC* I.10 327b22–31), so that it is unclear exactly what this amounts to.

b18–20: Aristotle here summarizes the alternative response to Parmenides' challenge to the coherence of change which is mentioned at *Phys.* I.8 191b27–9: this response is explained towards the end of section 3 of the Prologue. 'Coming to be incidentally from what is not' refers merely to *X*'s coming to be *F* from having been not-*F*: this is coming to be *incidentally* from what is not in the sense that it is not *X*'s state of being not-*F* which explains its coming to be *F*, but rather *X*'s potentiality for being *F*.

b20–4: The text here is uncertain: see Note on the Text. 'And this is Anaxagoras' One.' The Presocratic philosopher Anaxagoras (*c.*500–428) began his book with the words, 'All things (*chrēmata*) were together' (quoted at chapter 6 1071b28: see notes *ad loc.*). As Aristotle understood him, Anaxagoras held that the world was generated from a pre-existing, boundless mixture of an unlimited number of different stuffs such as earch, air, metals, and organic tissues. Although these stuffs are Anaxagoras' 'things', Aristotle's (perhaps not wholly serious) point is not that *these* should have been said to exist potentially, but that the primary things in his own sense—substances—were together potentially in the mixture, since their matter was there. The views of the other thinkers mentioned differed in complex ways from those of Anaxagoras; these differences need not concern us here. (For 'what Democritus says' see the Note on the Text.)

b24–6: The first of ways in which 'the matter is different': changeable substances of fundamentally different types have different types of matter. Aristotle appeals to the distinction drawn in chapter 1 between eternal and non-eternal perceptible substances. The latter (he implies) have 'generable matter': by this he means matter *for* generation—that is, matter capable of lacking and acquiring the substance's form. (On the idea that matter is itself ungenerated, see notes on chapter 3 1069b35–1070a4.) His line of thought about the matter of eternal but changeable substances—the heavenly spheres and the heavenly bodies—is set out at greater length at Θ.8 1050b6–28, discussed in section 3 of the Prologue to chapters 6 and 7. These substances do not have generable matter, since Aristotle regards their existence as necessary. The only intrinsic change which a heavenly sphere undergoes is an unvarying, eternal circular motion around the centre of the earth. (I discuss the question whether the stars and planets have an intrinsic motion of their own, or are only carried round by the heavenly spheres, in Judson 2015, pp. 172–3.) Aristotle concludes here and in Θ.8 that the heavenly bodies have instead what is usually referred to as 'topical matter'. This is Aristotle's term at H.1 1042b5–6: here and at Θ.8 1050b20–2 he calls it 'matter for whence and whither'.[15] The natural way to understand 'topical matter' is as involving a potentiality for geocentric, circular motion, since that is how the spheres move. At H.4 1044b6–8 Aristotle says that natural, eternal things 'perhaps do not have matter, or do not have matter of this sort [i.e. generable matter] but only matter which is able to change in respect of place [*kata topon kinētēn*]': this suggests the same view, especially since 'change in respect of place' (*kinēsis kata topon*) is one of Aristotle's standard expressions for motion (see, e.g., 1069b12–13, 1071b11, and 1073a12). For reasons discussed in section 3 of the Prologue to chapters 6–7, however, many commentators deny that the heavenly spheres have a potentiality for *being in motion*: they take topical matter to involve a

[15] In N.2 Aristotle argues that eternal things cannot have *any* matter: presumably he thinks that topical matter is irrelevant to his claim there that if numbers are composed of elements they must have matter and therefore the potentiality to fail to exist.

potentiality either *to occupy this location or that*, or *to be moving from this location to that*.[16]

However it is to be understood, topical matter might seem an ad hoc expedient, but I do not think that this judgement is fair (Charles 2000, discussed in section 5 of the Prologue, offers a more critical view). We might think, for instance, that the potentiality in question is not for *opposites*: but Aristotle is committed by his general analysis of change to thinking that *any* locomotion counts as a change between opposites (or 'what is in between'), and says as much at 1069b9–14 and *Phys*. V.2 226a23–32—so this difficulty is a general one, not one specific to topical matter.[17] Aristotle is right to ascribe the potentiality in question to these substances' matter because it is a potentiality concerned with change of location, and hence cannot belong primarily to their form. He thinks that the heavenly bodies are made of what he calls 'the first body' or *aither*—often later referred to as 'the fifth element' (see the Prologue to chapters 6–7, section 2), and a body's aither is presumably the constituent matter which is the locus of this topical potentiality. This gives rise to a final worry. As we have seen, the constituent matter of a heavenly body is not 'generable matter': it has no capacity for lacking the form that makes the heavenly body the substance it is. If we are inclined to think (as I do) that a heavenly sphere is a hylomorphic compound, then it cannot but be structured by this substantial form. But then it might be quite hard to regard it as such a compound—as a composite of matter and form—after all. Taken one way, the difficulty is the same as Ackrill's rightly famous worry about a form-matter account of natural organisms (see

[16] Note that neither the outermost sphere as a whole nor many of its parts occupy *places* in the strict Aristotelian sense, as this requires the existence of a surrounding body (*Phys*. IV.5–6); but this does not prevent them having locations (just as points—and places themselves—can), in virtue of their relations to things which do have places.

[17] Fazzo (2013) bases her quite different interpretation of the passage—as distancing the principle(s) of eternal perceptible substances from those of perishable ones, rather than as affirming their closeness—partly on the idea that Aristotle would simply deny that change of location involves opposites. Note that, while the idea that circular motion is a change between opposites seems highly problematic, Aristotle apparently insists that it is (*Phys*. I.5, V.1, V.3 227a7–9; on the other hand, see VI.10 241b2–3, while VIII.8 261a31–b1 seems ambivalent).

Ackrill 1972–73/97). Various counters to Ackrill's worry have been advanced (for discussion, see, e.g., Gill 1989, chs 3 and 5; Whiting 1992; Woods 1994; Lewis 1994; Shields 1999, ch. 5, and 2009; Carraro 2017), and in any case it is not obvious that there is a special problem for the heavenly bodies. Aristotle might also have reasons independent of the argument of Λ.2 for endorsing a form-matter account, at least of the heavenly spheres: these substances all have spherical shape and rotational motion in common, but they possess quite different realizations of this motion in terms of speed, direction, and the angle of rotation relative to the axis of rotation of the fixed stars (see Judson 1994 and the Prologues cited below). This line of thought, however, leads to the other way of taking the worry, namely as the question whether there is a plausible or even coherent 'division of labour' between the spheres' matter and their form: this is discussed in the Prologues to chapters 6–7 (section 3) and chapter 8 (section 2).

b26–8: This sentence is abrupt and quite awkward. 'For that which is not is threefold' can hardly be an explanation of why the problem arises, and I think that we have to understand it as elliptical for '<This is not a serious difficulty;> for . . . ', or 'For <it is possible to overlook the fact that> . . . '. There are two ways to take 'what is not is threefold.' One appeals to the three ways in which things are said not to be at N.2 1089a26–31: 'that which is false', 'that which is not *F*', and 'that which is not *F* but is potentially *F*' (so Ross). On this reading, however, the lines seem out of place. The remarks about what is not at b18–20 already make this answer to the challenge, and do so rather more clearly; so it would be tempting to regard the lines as a marginal comment wrongly added to the text. The other reading (Charles 2000, p. 89, n. 2, following [Alexander], 674.4–16) connects these lines instead with K.11 1067b25–30: there Aristotle also distinguishes, albeit in a less explicit fashion, three ways in which a thing is said not to be: as the false, as 'that which is potentially and is contrary to being without qualification'—that is, being a substance—and as 'that which is potentially and is contrary to being not without qualification'—that is, being *F*. This gives the remark some point, since Aristotle has just distinguished matter for generation from matter for locomotion.

b28–32: Introduction of the second way in which 'the matter is different.' Aristotle's point is that different substances even of the same general type may have different matter; his argument is that, since potentialities are determinate states, different products of change require the realization of different potentialities. If this is right, the argument must be handled with some care, as the complaint against Anaxagoras ('nor is it sufficient to say that all things were together; for they differ in their matter') shows. Intellect (*nous*) in Anaxagoras' system is the fundamental efficient cause of the generation of the cosmos out of the original mixture. Aristotle's objection assumes (probably without warrant) that the mixture was perfectly homogeneous: if it was, and if a single efficient cause acted on it in a single way, he argues, then how could different things come to be in or from different parts of the mixture? But—as the proviso that the Intellect is a single cause acting in a single way hints—if we allow the possibility of *different* efficient causes, the fact that different potentialities are required for a given outcome does not entail that different matters are required; for one and the same matter could possess both potentialities, each of which is activated by a different cause; Aristotle himself makes this point at H.4 1044a25–7. Thus the fact that the generation of different substances requires different potentialities is probably not intended to provide a *deduction* of the claim that their matters may be different, but rather simply to remind us of what is empirically obvious anyway.

Two points remain. (i) This distinction of two ways in which different things have different matter—one appealing to different *types* of thing, one to different things of the same type—will, in a generalized form, pervade the discussion in chapters 4–5 of whether the principles of all things are the same or different.[18] (ii) As we have already seen (Prologue, sections 3–4, and notes on b14–18), the claim that potentialities are determinate has an importance which goes far beyond its immediate context. Aristotle's language here—'if something is potentially, nonetheless its potentiality is not for just anything, but different things come to be from different things'—is reminiscent of *Phys.* I.5 188a32–4: 'nothing whatever is by nature such as to do or undergo any

[18] Cf. also the arguments against a single Platonic Form of the Good in *EN* I.6.

chance thing through the agency of any chance thing, nor does anything come to be out of just anything, except incidentally.'[19] As we saw, the problem was to make good this claim in a non-vacuous way once the Presocratic opposites had been replaced as the starting-point of the change by the subject of the privation. It is the idea that this subject has a determinate potentiality for the relevant form which enables Aristotle to solve the problem.

1069b32–4

A statement of the conclusion of the whole 'chapter' (i.e. of 1069b3–32). Notice that, while it is quite natural to speak of principles as causes (cf. 1 1069a18–19; 4 1070b22–6), and also quite natural to think of privation as a cause in the sense that it must be mentioned in an account of any coming to be, it is only with difficulty that privation fits into Aristotle's fourfold classification of types of cause. It must rank as a type of material cause even though it is neither a constituent of the product of the change nor the subject that changes; nor, again, can it be identified with the potentiality to acquire the form (see the Prologue, section 4). Presumably Aristotle takes its role to be analogous to that of the matter in the (vague) sense that it is something from, or out of which, the product comes to be. Privation will cause Aristotle further problems in chapters 4–5.

As we have seen in the Prologue and the notes on b3, Aristotle takes the investigation of change to reveal principles and causes of substances. Aristotle says nothing directly as to why, but the answer seems to be that perceptible substances are substances to which change and the ability to change are *essential* to their being the things that they are. Aristotle's paradigm examples of such substances are the members of natural species, such as human beings and horses. Among the most general features which these substances share are that they persist through time and that they change. (These are not wholly unconnected, of course: their persistence continually requires various internal changes and processes.) Thus seeing what the principles of a thing *qua* changer are

[19] This passage is discussed in the Prologue, section 2 and the notes on b3–9.

does get to the heart of the principles of natural substances. Nothing in this line of thought shows that this procedure will yield *all* the principles of such substances (cf. Prologue, section 1); but it is clear that Aristotle has arrived at what he takes to be the central principles of these substances. For further discussion of this question, see Charles 2018 and Judson 2018b.

CHAPTER 3

PROLOGUE

1. The Structure of the Chapter and its Role in Λ

After the programmatic first chapter, Λ.2 arrived at principles and causes of substances by way of the reflections on change familiar from *Phys.* I: matter, form, and privation. Once the idea is in place that perceptible, changeable substances (of which individual natural organisms are at least the paradigm cases: see section 3 below) are composites of matter and substantial form, it is natural—in the context of an inquiry into the principles of substance—to ask certain questions. Are matter and (substantial) form themselves substances? Are they prior to and/or more of a substance than the composite? Is one of them prior to and/or more of a substance than the other? Is anything more of substance than either of them? I think that most of these questions are fairly straightforwardly—if extremely briefly—addressed in Λ.3. In one way or another something like these questions are also taken up in Z and H, though the precise form which they take is a matter of controversy. The main views of Aristotle's strategy in these books are: matter and form are considered (along with universals and genera, according to some interpretations) as candidates for being substance—or for being substance most of all—in the light of various marks of or criteria for being a substance, such as being a subject or being a 'this something' (Frede and Patzig 1988; Irwin 1988, ch. 10); they are considered as candidates for being the substance *of* the *Categories*' primary substances (Wedin 2000), or for being what makes a substance a substance (Code 1997; Burnyeat 2001), or for being *what a (given) substance is* (Menn 2011, pp. 162–8, and forthcoming); Aristotle is searching for a *definition* of primary substance and of the substance of a thing, a key constraint on which is the view that form is primary substance (Lewis 2013).

Apart, perhaps, from its opening few lines (1069b35–1070a4), which to some extent hark back to a passage in *Phys.* I.9, Λ.3 moves away from material presented in the *Physics* to make a

series of points relating to matter, form, and substance, a number of which are closely related, in some way, to material in Z and H (as we should expect—and as chapter 3 itself makes clear—'matter' and 'form' now refer to substantial matter and substantial form). The chapter can be divided into six sections: (1) an argument that matter and form do not come to be (1069b35–1070a4); (2) the claim that substances come to be from 'synonyms' (1070a4–9: I shall call this 'the same form claim'); (3) the identification of matter, form, and composite as substances (a9–13); (4) a discussion of whether the form is 'over and above' the composite substances (a13–20); (5) a discussion of efficient and formal causes, and the introduction of the question whether any form survives its composite (a21–6); (6) an objection to Platonist Forms that they are redundant (a26–30).[1] These points might seem a disparate collection, and it is not easy to be certain how closely connected some of them are meant to be, and in particular whether Aristotle is developing a unitary line of argument, or merely offering a set of important but only loosely related reflections. This difficulty is mainly due to the—by now familiar—compression of Λ, but is compounded by the uncertain status of section (1): is it a coda to the discussion of the principles in chapter 2, like the parallel passage, dealing only with matter, at *Phys.* I.9 192a25–34, or is it more closely connected with the subsequent sections?[2] One might expect light to be thrown on the chapter's structure and purpose by Z.7–9 and/or by H.3 1043b14–23. It is beyond question that these bear some relation to Λ.3. All three contain the claim that form does not come to be (Λ.3 and Z.8 add the same claim for matter); all raise the question of the separability of substantial forms. This exhausts the material in the H.3 passage, but there is further overlap between Z.7–9 and Λ.3: the classification of natural, technical, and chance generations, the claim that (in certain cases) a thing is generated by something which is the same in form, the idea of the form 'without matter' and the question whether forms exist 'over and above' the composites, and arguments for the redundancy of the Platonic

[1] Hereafter I shall use 'form(s)' for Aristotelian form(s), and 'Form(s)' for Platonist ones.

[2] As I said earlier, the chapter divisions of Aristotle's texts are a later editorial device, and are by no means a definitive guide to the structure of his thought.

Forms. Z.7–9 thus contain a great deal of material very similar to that in sections (1), (2), (4), and (6) of Λ.3 (though there are also significant differences too: see Judson 2000, pp. 123–4), while the H.3 passage has material similar to that in sections (1) and (4). But the structure and unity both of the Z chapters and of H.3 are also highly problematic, and I doubt that we can rely on them to cast light on our chapter.

Z.7–9, in particular, are the subject of much controversy.[3] Most commentators regard them as having been composed separately from the main part of Z; of these many think that the chapters were added only subsequently to Z, though probably by Aristotle himself,[4] while others see them as more integral to Z's original strategy.[5] For a defence of a unitarian reading of Z, see Menn 2011, pp. 177–9. There are further controversies as to whether chapters 7–9 form a unity in their own right—and if they do, what their principal subject is: natural and craft-based generation (Frede and Patzig); coming to be (Bostock, who thinks they comprise a 'fragment of a treatise on this subject'); the 'synonymy principle' (i.e. the claim that substances come to be from substances which are the same in form: Burnyeat); the role of matter in the generation of composite substances and its implications for definition (Gill), the rebuttal of an argument for Platonist Forms (Menn). My own view is both that they are a later addition to Z and that they lack internal unity: the presentation is repetitive and disjointed, and even within a given chapter the various passages which parallel the Λ.3 material are often merely juxtaposed, with no explicit connections.[6]

However we should view these related passages, there are good grounds for detecting a unifying strategy in Λ.3, where we find that a single idea recurs sufficiently often to suggest that it is the key: this idea is the priority of form in the production and explanation of perceptible substances—priority, that is,

[3] For H.3, see Bostock 1994, *ad loc.*

[4] Ross, p. 181; Frede and Patzig 1988, *ad loc.*; Bostock 1994, pp. 119–20; Judson 2000, pp. 110–23; Burnyeat 2001, pp. 29–38.

[5] See Gill 1989, pp. 10 (n. 18), 111 and 120–6, and 2005, pp. 118–20; cf. Ferejohn 1994.

[6] For defence, see Judson 2000, pp. 110–23; for a contrary view, see Burnyeat 2001, pp. 34–6.

both over composite substances themselves and over the other principles. This is the focus of sections (2), (3), (4), and (5), and it quite naturally leads to a subsidiary concern, the distancing of Aristotelian forms from Platonic Forms (sections (4) and (6)). The critique of the theory of Forms has sometimes been seen as the chapter's main target, but these sections read more naturally as ones in which the results of Aristotle's own account are brought to bear more in the way of a digression on the Platonic theory. Though not irrelevant to the priority of form, section (1) is a less integral part of the discussion; this fits quite well with the fact that it is introduced and followed by the abrupt phrase *meta tauta hoti,* 'After these things <say> that . . . ': see note on b35. The claim that matter does not come to be is also argued for in *Phys.* I.9, as a coda to the discussion of the principles of changing things: so in a way this passage belongs both with what precedes it in Λ.2 and with what follows it. This interpretation not only yields a unified structure for the main part of chapter 3, but also enables us to see chapters 2–5 as engaged in a systematic project: having arrived at the three principles of natural substances in chapter 2, Aristotle devotes the rest of this half of Λ to two important questions about these principles: how they work as principles, and in particular their priority/posteriority relations to each other and to composite substances (chapter 3), and the question of their universality as principles (chapters 4–5). For further discussion see section 4 of the Introduction.

2. Substance Again

In Z, Aristotle deploys, and offers a complex examination of, a number of notions fundamental in some way or other to being a substance (or to being one in the fullest sense: see notes on 1070a9–13)—being a subject, being a unity, being a 'this something' (*tode ti*), being an object of knowledge and hence the subject of definition, being prior in various ways, and being separate. As noted in the Prologue to chapter 2, these inquiries have for the most part no counterpart in Λ: one could not begin to work out on the basis of Λ what problems Aristotle finds it necessary to grapple with in Z; more generally, one could

not hope either to reconstruct Z from Λ, even in outline, or to reconstruct Λ from Z. Nonetheless, some of these notions are clearly being assumed—perhaps even taken for granted—in Λ: in chapter 1, for instance, we encounter the ideas of substances being prior (in an unarticulated sense) and being separate. In the present chapter (1070a9–13) Aristotle introduces without fanfare the ideas of a substance being a 'this something' and its being a unity: the first of these seems to be a controlling (if unexamined) idea in his assertions that matter and form are substances. As noted in the Prologue to chapter 1, Aristotle says at *Cat.* 3b10 that all substances 'seem to signify a "this something" [*tode ti*].' Setting aside the problematic idea of a substance 'signifying' anything, Aristotle's idea of a 'this something'—a term of his own devising—is as obscure as it is important for his account of substance. The phrase *tode ti* can be understood in a number of ways. Syntactically, it can be taken as 'a certain *this*' or as 'this *something*' (i.e. as something like 'this *X*'): on either construal, however, it would seem as if it might be meant to invoke the idea of a (paradigmatic) *particular* or of a (paradigmatic) definite or fully determinate thing—which might, as far as being a *tode ti* goes, be a particular or a determinate kind.[7] If being a this something is interpreted as being a particular, and if this is applied to substantial forms (see notes on 1070a11–13), then we have arrived at, or are at least close to, the idea of *particular forms* (see section 3 of the Prologue to chapters 4–5): there will certainly be considerable pressure on the idea that forms are in some way general or multiply-realizable. The *Categories* gives some encouragement to this interpretation: 'As regards the primary substances, it is indisputably true that each of them signifies a certain 'this'; for the thing revealed is individual and numerically one' (3b10–13). On the other hand, Aristotle's discussion seems equivocal: he begins by saying that *all* substance signifies a this something (3b10), and then appears to deny that secondary substances do so—though his account of what they signify instead is also equivocal. On an interpretation of this sort, one of the tacit aims of Λ.4–5 would be to address the problem that arises of how

[7] For discussion, see Code 1984; Frede and Patzig 1988, II, 15; Gill 1989, pp. 31–4; Whiting 1991, pp. 612–15; my notes on 1070a9–13.

there can be knowledge of principles if principles are particulars while knowledge is of what is in some way general. As I have indicated, however, we can also understand being a *tode ti* as being a definite or complete thing, in such a way that not only individual tigers but also the form of tiger might be a this something. In Z, at any rate, Aristotle is prepared to contrast a wider kind such as *animal* as indeterminate, and hence (in a way) like matter, with the form *human being*, which is a fully determinate kind. On this reading a substantial form would be a complete thing not by being a self-standing particular, but by being something that is a fully determinate and intelligible whole, and enough (or, enough together with suitable matter) to make a composite substance the thing it is.[8]

There is an obvious connection, in either case, with the notion of a substance being a unity. This notion is a key topic in Z and H; it appears in Λ.3 only in the implied contrast with matter as 'what touches and does not have a natural unity', and will reappear in Λ.10 in connection with Aristotle's claim that his predecessors failed to say 'what makes the numbers one, or soul and body, or in general the form and the thing' (1075b34–6): see notes *ad loc.*, and section 3 below.

3. The Range of Composite Substances

In Z.2 Aristotle gives a preliminary sketch of received ideas about substances.

> Substance seems most clearly to belong to bodies. That is why we say that animals and plants and their parts are substances, and the natural bodies (e.g. fire and water and earth and each of the things of this kind) and everything which is either a part of them or composed from them (whether from some or from all) . . . . (1028b8–12)

Plants and animals are mentioned as examples of perishable substances in Λ.1, and it is clear from chapters 2 and 8 that Aristotle takes the heavenly spheres, the fixed stars, and the planets to be imperishable composite substances. Beyond this,

[8] The anonymous reader made the point that Aristotle already has a term for 'particular', namely *to kathekaston*.

the question of the extension of composite substances is not discussed in Λ (the situation is similar in the *Categories*, where animals are given as examples of (primary) substances, but there is no explicit discussion of the range of such substances). What I have called the 'same form' claim, made at 1070a4–9, that substances are generated by the same form, is only even remotely plausible for the types of case in relation to which it is explicitly mentioned, namely natural organisms and artefacts: it obviously could not be advanced for the elements (Aristotle may think that heat is needed to generate heat, but he does not think that air is needed to generate air), or for parcels of inorganic compounds of the elements such as lumps of rock. More generally, the examples of substances in chapters 2–3 (human beings and houses) are similarly restricted.[9] This appears to leave a lacuna in Aristotle's ontology: items such as parcels of the elements or of inorganic compounds are not obviously substances—neither are they parts or collections of substances—yet they do not obviously fall under any other category either, nor under any of the other ontological classes of being which Aristotle deploys, such as privation or potentiality. Aristotle could in principle try to solve the difficulty either by holding that these items are after all substances, but in a weaker or more relaxed sense, or by arguing that they do in fact come under some other class; the former strategy looks the more hopeful.

The range of substances receives more attention in Z and H. In the discussion of substance which follows Z.2's preliminary list of substances (quoted above)—and setting aside Z.7–9, for the reasons given above—it is clear that Aristotle is only concerned with natural organisms, and their form and matter; and in Z.17 he explicitly limits (perceptible) substances to natural things (1041b28–31; cf. H.3 1043b19–23). The question of what I called the lacuna in his ontology is briefly taken up in Z.16, where Aristotle says:

> It is clear that even of the things that are thought to be substances most are potentialities—both the parts of animals (since none of them exists when separated, and when they are separated then too they are all beings

[9] Although Aristotle also includes health among his examples: see notes on a17–18.

> as matter), and earth and fire and air—for none of these is one thing, but as it were a heap, until they are concocted and some one thing comes to be from them. (1040b5–10)

Aristotle seems here to opt for the second strategy, but the passage is somewhat obscure. The idea that an animal's parts are potentialities echoes his more general view that (in many cases) *A* and *B*'s being the parts of *C* that they are (e.g. hands or feet) depends on *C*'s being what it is and not vice versa, and in this sense *C* is not made up of them and they exist only potentially (Z.10; cf. *Phys.* VIII.8 263a27–b9); the remarks about (not) being separate which are apparently supposed to justify his view are hard to understand. What Aristotle says about earth, fire, and air echoes what he says about matter at 1070a9–11: but while it is plausible that matter lacks unity except insofar as it is the matter of something, it is not clear why a rock or a lump of earth does not count as 'one thing' (see Bostock 1994, *ad loc.*). In Λ.4 Aristotle makes a remark which can be construed as relying on the first strategy (claiming that the problematic items are substances): see notes on 1070b10–21. The general issue will be of some importance in chapters 4–5, when Aristotle discusses the question of the principles of *all things*.

COMMENTARY

1069b35–1070a4

'After these things <say [or: it must be explained]> that' (b35): Aristotle's words (not paralleled elsewhere except five lines further on in this chapter, at 1070a4; but compare *An. Pr.* I.1 24a10–15, *EE* II.2 1220b10, and Λ.5 1071a17) have the form of a note.

This passage presents a number of difficulties and ambiguities: what is the meaning of the claim that matter and form do not come to be, and how does Aristotle argue for it? Does the claim apply to matter and form in the same way? What does he mean by 'I mean the last <matter and form>', and why does he say it?

'Neither the matter nor the form comes to be.' This claim is treated more fully in *Met.* Z.8; that matter does not come to be is also argued for in *Phys.* I.9. Prima facie, it would be natural to take it to mean that matter and form are *eternal* (indeed in the

Physics discussion he calls matter 'imperishable and ungenerable' (192a28): this is Aristotle's standard terminology for being eternal). But it is hard to suppose that this is really Aristotle's meaning. (i) The matter of finite substances is generally also finite in duration. (ii) Even if all natural forms are eternal, the present claim is meant to apply to artefacts as well, and Aristotle does not appear to regard these as eternal (for discussion see notes on a13–18). (iii) Aristotle actually denies that all forms are eternal at a15–17, as well as a number of times in Z and H (cf. *Phys.* I.9 192b1–2): some forms, at least, 'are and are not'—that is, they sometimes exist and sometimes do not. Elsewhere Aristotle says that forms 'are and are not without coming to be or ceasing to be' (Z.15 1039b23–7; H.3 1043b14–18, 5 1044b21–2), and this provides a more promising sense for the present claim. What he seems to mean is that when they start or cease to exist they do not do so by any *process* of coming or ceasing to be; he can call this 'without coming to be', since Aristotle takes genuine change of any type, including coming to be, to be constituted by a process: something's becoming true of a subject without such a process does not, typically, count as a change (see notes on 1069b3–9; for a different view see Shields 1990). Aristotle makes the same claim about points as well as forms at 1044b21–2 (cf. B. 5 1002a30–4; *Phys.* VI.10 240b8–241a14): the idea is that when points do come into existence (i.e. become actual), this cannot be a matter of a gradual process since they have no parts.[10]

So interpreted, the claim that matter and form do not come to be presents an ambiguity: does Aristotle mean the weaker claim that the process of matter acquiring a form need not be constituted by or involve the coming to be of the matter and/or the form, or the stronger claim that no matter or form can *ever* be the product of a process of coming to be? Aristotle's infinite regress argument seems at most to establish only the weaker position, since it does not exclude a finite 'regress' of matter and form (see Woods 1993, p. 411; the same is true for the argument at Z.9 1034b10–13 that matter and form do not come to be since they must pre-exist the composite which comes to be). This weaker

[10] E.3 makes a more enigmatic claim of the same form about certain 'principles and causes', which I think should be interpreted in the same way: see Judson 1998.

claim seems to be the safer one in the case of matter. As we saw in the Prologue to chapter 2, nothing prevents matter from being itself a (lower-level) composite of matter and form, and elsewhere Aristotle says that some matter is such a composite (H.4 1044a15–32): clearly it would be absurd to suppose that the bronze of this statue could not have been the product of a process—and to say that it would have been such a product not *qua* matter but *qua* lower-level composite would not deflect the point. Z.8 repeats the infinite regress argument, but adds another which establishes the stronger view for *form*: forms are not themselves composites of matter and form, and so are incapable of being the product of a process of coming to be (1033b5–19; cf. H.3 1043b14–18).[11] Here we have an asymmetry between form and matter, since matter can be such a composite; but there is no mention in Λ.3 either of this asymmetry or of the Z.8 argument.

b36: 'I mean the last ones.' The distinction between proximate and remote *matter* is a familiar one in Aristotle (see H.4; Θ.7): as we have seen, a substance's matter has determinate properties of its own, and so can itself be a composite of form and 'lower-level' matter. 'Last matter' could mean either 'lowest-level matter' (i.e. elemental matter) or 'highest-level matter'. The latter meaning would square with the use of bronze as the relevant matter of a bronze sphere in Aristotle's example, so we should take 'last matter' to mean 'highest-level matter' (this is sometimes called 'proximate matter'); and we find this usage, for example, at H.6 1045a18. But what is proximate *form*? There cannot be an exact parallel of sense, since forms are not composites of matter and lower-level forms. Aristotle does not speak elsewhere of last or proximate forms; but he does speak of first and last items in the division of kinds, or genera, into atomic species: 'the last differentia will be the substance of the thing and the definition . . . it will be the form and the substance' (Z.12, 1038a19–26; cf. *An. Post.* II.13, B.4 999a29–31, and B.3 999a1–5, where Aristotle speaks of the most specific form, in contrast to the wider genus, as 'the last thing predicated'). It is unclear whether Aristotle's remarks in

[11] It is in a quite different sense that substantial forms have their *genus* as 'matter': see Δ.28 1024b8–9; Z.12 1037b27–1038a9.

Z.12 concern the forms of particular composite substances, or only the form of the species; but in any case they give support to the idea that by 'last form' here Aristotle means the *most specific* form, as opposed to the genera under which it falls—the form which is, or involves, the whole essence of the individual that comes to be. On this reading the 'last form' of a horse would be the form of horse, rather than the genus quadruped or the genus animal. Intuitively, there does seem to be a sense in which quadruped and animal are 'more remote' from the individual horse than the form of horse: indeed, we could define 'less/more remote' in terms of narrower/wider inclusion classes. This proximity/remoteness is not the same as that involved in the idea of last matter, but the two ideas do at least share the notion of degrees of specificity (compare Aristotle's notion of nearest—most specific—causes at H.4 1044a32–b3 and elsewhere).

Why does Aristotle make this remark? It is not that he thinks that more remote matter, or less specific genera, do come to be in the sense denied for last matter and form. Perhaps he thinks that 'last' form and matter are the only cases in which anyone might be tempted to suppose that matter and form come to be; or perhaps he is just reminding us that he is talking about substantial matter and substantial form.

b36–1070a4: As at 2 1069b14–18, Aristotle seems to commit himself to the view that a substance's matter is the subject of the change in every case in which the substance changes: see section 5 of the Prologue to chapter 2. According to the analysis outlined in chapter 2, every change involves a subject—that which underlies the change—taking on a form in the weak sense of becoming *F*; but it also involves an efficient cause (a key point not made in chapter 2): see notes on a21–6). The 'first mover' here is not the Prime Mover of chapters 6–7, but a much less remote efficient cause. Aristotle's usage at 4 1070b27–9 identifies the first moving cause with the form which is the source of the change. So 'first' does not mean 'immediate'—since there may be intermediate causes 'between' the form and the result—but something like 'principal', or 'most important' (cf. Crubellier, 2000, p. 153). As we have seen in the Prologue to chapter 2, sections 4–5, Aristotle's identification of the subject of the change with *matter* has not been established, since in some cases the proper subject may be

the composite substance itself. Aristotle's interest here is, in any case, principally in those changes (e.g. generations) whose subject is indeed the matter, since they are the ones most relevant to the claim that matter itself does not come to be.

1070a4–9

Like section (1), section (2) starts with the phrase 'After these things <say> that . . .'. This is suggestive of a new point rather than of a second step in an argument (see the opening remarks on this chapter). 'Each substance comes to be from a synonym' is potentially misleading in a number of ways. (i) The first is due to a shift in usage. We understand synonymy as a semantic relation holding between words or meanings, whereas Aristotle's synonymy is a relation between things in the world: *A* and *B* are synonyms when 'they have the name in common and the definition of being which corresponds to the name is the same' (*Cat*. 1 1a6–12).[12] (ii) In Z Aristotle is generally reluctant to say that composite substances have definitions in any straightforward sense; but given the link forged there between definition and form, we should read Aristotle's claim here to be that substances which are generated are generated by others which are the same in form; this is how it is expressed at Z.7 1032a24–5 (*homoeidēs*) and Θ.8 1049b27–9 (*tōi eidei to auto*). (iii) Even this turns out not to be quite what Aristotle wishes to say. The claim, thus construed, seems relatively straightforward (though it is not without some difficulties: see notes on a6–9) in the case of natural substances, which are normally generated by other members of the same kind. But Aristotle also wishes to include artefacts within the scope of the claim (this seems to be part of the point of the interjection 'for the things which are by nature are substances, and so are the others' at a5–6: see notes on a6–9 below). Indeed, in section (4) the discussion includes without comment other products of crafts which are not substances of any sort, such as

[12] Z.9 1034a22 and 1034b1 somewhat oddly use the term 'homonym' instead of 'synonym' when advancing the same claim as our passage: in Aristotle's standard usage, homonyms are things which share a name but which have *different* definitions (as [river] bank and [savings] bank).

health: see notes on a17–18. One might reasonably think that artefacts do *not* come to be from things which are the same in form: houses are brought about by builders, not by other houses. Aristotle's view is that in the case of artefacts the relevant form is present in the mind of the craftsman and determines the product she makes: see Z.7 1032a32–b2; *GA* I.22 730b8–32; the notes on a6–9 and a13–18 below. So the basic claim is that the generation of composite substances can be traced back to the same form, whether in another composite substance which is the same in form or in the application of a craft. (iv) As should now be clear, the focus of Aristotle's claim, despite his talk of generation by synonyms, is not on generation by things which are the same in form but on generation *by the same form*. For these reasons I shall refer to the 'synonyms' claim as the 'same form' claim. I should stress that this label is not meant to prejudge the issue as to whether substantial forms are particular forms in the sense defended by Frede and Patzig (1988) or whether composite substances of the same kind are distinct realizations of one and the same substantial form (for discussion, see Prologue to chapters 4–5, section 3). Thus 'same form' can be understood either as 'form with exactly the same specification' (see Frede 1987d, p. 78; compare 'the same' in 'Sarah and Jane have the same car', as it would normally be understood), or as 'one and the same form' ('John and Bill live in the same house').

This is the first place in the chapter where understanding Aristotle's argument reveals a focus on *form*, rather than matter, as having a key role of producing or explaining the form-matter composite. This gives a clear indication of his commitment to the priority of form not only over the composite but over matter as well.

a6–9: The key question is how far the scope of the 'for' (*gar*) at a6 extends. If it extends only to the end of the first clause ('For they come to be either by art or by nature or by luck or by chance'), the result is unsatisfactory. The argument would have to be that the 'same form' claim is true because there are natural, technical, and chance generations: but chance generations are precisely cases for which the claim is false (see below, and Z.7 1032b21–6).[13] It is

[13] An alternative, suggested by David Sedley (personal communication), is to delete the brackets around 'for the things which are by nature are substances, and

possible to find a more satisfactory argument if we take the scope to extend down to the end of the sentence at a9.

First we need to understand the remark at a7–8, 'art is a principle in something else, whereas nature is a principle in the thing.' In *Phys.* II.1 Aristotle defines natural things as having a source or principle of change and rest in themselves, and contrasts them with artefacts, whose source of change is 'in other things and external' (192b13–32). Ross takes this to be the contrast here too, and in consequence complains that it is quite inappropriate in the case of generation, since—as Aristotle's own example makes clear—the generation of a natural substance is by *another* substance. It seems better to take Aristotle to be talking about the generators, not the things generated: the form of human being involved in the generation of a human being is itself in a human being (the father); whereas the form of a house involved in the generation of a house is in something other than a house—viz. a builder. If this is right, Aristotle is continuing the focus on form as the cause of the composite substance. The involvement of form also explains why the moving cause gains automatic status as a *principle*: the imposition of substantial form on matter itself requires (at least in paradigm cases: see next paragraph) the activity of a substantial form as the moving cause. The second half of Λ will extend the idea of the moving cause as a principle significantly beyond this, to the Prime Mover.

The next point is that the claim that each substance comes to be from the same form is not true without exception, and that Aristotle is well aware of this: it is part of the argument which follows that some substances come to be by chance or luck, and (as we shall see) a necessary condition of this is that they are not generated by the same form. So Aristotle must intend the 'same form' claim to express some general rule or fundamental, though not universal, truth. A clue to what this might be is provided by the premise of the subsequent argument that luck and chance are privations of nature and art. This could just mean that chance generations are ones in which the generation is not from the same

so are the others' at a5–6, and to take 'for they come to be either by art or by nature or by luck or by chance' to support this claim. But it is hard to see quite what the support would be, since not all the products of nature, art, or chance are substances.

form, but this gives a very flat-footed argument: 'substances come to be from the same form except when they come to be as the result of a process which does not involve the same form.' Aristotle has a deeper point in mind, as his account of luck and chance in *Phys.* II.4–6 shows. His idea there is that when something happens by chance, it is, or is brought about by, a coincidental conjunction of processes, actions, etc., which is incidental to—that is, does not arise in any law-like way from—the operations of the nature or intellect of any one of the subjects involved. If someone finds buried treasure while planting a tree, we can certainly explain how it was that she found the treasure; but there will be no law-like connection between tree-planting as such and finding treasure. There clearly will be such a law-like connection, by contrast, in the case of generation of a substance by the same form. Aristotle takes all this to mean that the causes of chance events cannot figure in a scientific account of the world, primarily because he takes science to be concerned exclusively with tracking the natures of individual natural kinds: chance events are thus for him incidental 'by-products' of the regular, scientifically intelligible workings of mind and nature (for further discussion, see Judson 1991). His argument here is thus that the only cases in which the generation of a substance is not by the same form are cases in which the generation is in principle opaque to science. So construed, the argument is one designed to demonstrate the *causal priority of form*: when scientifically intelligible, substantial generation is the replication of substantial form.

We can now see one of the reasons why Aristotle believes that all or most species are eternal, and that—though well adapted to their environment—they do not evolve (for discussion, see Lennox 1985/2001). Even if we grant these beliefs, however, we might raise two difficulties with this argument. The first is that while Aristotle talks here of anomalous chance generations, in his biological works he asserts that there are whole species—such as eels, oysters, and fleas—which are regularly generated out of mud, slime, etc., 'spontaneously'—that is, without the transmission of form from parents (*GA* III.11; *HA* V.1 539a15–25; cf. *HA* V.15–16, 19, 31–2, VI.15–16). If he wishes to maintain the claim that substances of any kind *K* are (normally) generated from the same form, he will somehow have to deny that these animals are substances. (I think that there are other reasons, to do with the

lack of teleological explanations for the generation of such animals, why Aristotle must try to do this anyway: see Judson 2005, pp. 347–8 and n. 20.) The second is the problem raised in Z.8 and 9 of the mule, which is an offspring of a horse and an ass (other cases like this are briefly discussed in *GA* II.7 746a29–b11). In Z.8 Aristotle is relatively dismissive, arguing that we should regard this as a case in which the common form is (not a species-form but) something more generic, which is common to horses and asses—and hence to mules. In Z.9 he seems more willing to acknowledge that the 'same form' claim has exceptions even within the realm of natural substances (see Judson 2000, pp. 114–17).

For 'the other causes [i.e. luck and chance] are privations of these' at a7–9 see above note. It is commonly held that Aristotle takes 'chance' (*to automaton*) to be the privation of nature, and luck (*tuchē*) to be the privation of art (Philoponus, *in Phys.* 283.10–11; cf. 275.13–23; Ross 1936, pp. 40 and 520). But *Phys.* II.6 makes it clear that luck and chance are not correlated respectively with art and nature: a valuable or beneficial outcome is a case of chance rather than of luck if its subject is not capable of choice, and/or the outcome is not one which could have been the object of choice.

'Human being begets human being' (a8). It is important to bear in mind that *anthrōpos,* the term translated 'human being' here, has a crucial ambiguity of reference, since it can refer indifferently to individual human beings, the form in virtue of which they are human beings, and the species of which they are members. I shall occasionally italicise *human being* to emphasize that is being used in one of the latter two ways. This ambiguity will be of importance in chapters 4 and 5: see notes on 1070b30–5, 1071a3–17, and 1071a17–29. Here and at a27–8 Aristotle is clearly speaking of individual human beings.

1070a9–13

Despite the repetition of wording from 1069a30 ('there are three substances': as before, this means 'there are three kinds of substance'), the distinction introduced here is not the one deployed in chapter 1; rather it is a distinction within the class of perceptible

substances. Perceptible substances such as horses or human beings have now been revealed as composites of matter and form: here Aristotle says that the composites' matter and form are themselves substances. Parallel claims can be found at *De An.* II.1 412a6–11 and at H.1 1042a26–b8 (recapitulated at H.2 1043a26–8). The H.1 passage asserts that matter is a substance because it is what underlies certain changes, namely substantial generations and destructions. Z.3 offers a more complex, though also more obscure, view. On one interpretation, it asserts that being an underlying thing is a necessary but insufficient condition for being a substance: the underlying thing must also be a 'this something' and 'separate' (see Prologue, section 2, notes on 1 1069a24; notes on a13–18 below), while matter fails to be either.[14] On another interpretation, it says that matter is indeed a substance, but is less of one than the form, because it is not separate or a this something.[15]

a9–11: Matter is a substance. The phrase 'which is a this something through appearing' at a10 is odd, and it may be that the text is corrupt: if it means anything, it must be 'it (merely) has the appearance of, or *seems* to be, a this something.' Jaeger conjectured that the word *dunamei* ('in potentiality') has dropped out; Michael Frede sometimes suggested (in conversation) that *tōi phainesthai* ('through appearing') should be emended to *tōi dunasthai* ('in being potentially' or 'in capacity').[16] Both had in mind the H.1 passage quoted below, and it would be much easier if the two passages were in line; but the emendations are quite radical. If we retain the text, we have to infer Aristotle's probable meaning from the parallel passages mentioned earlier. In *De An.* II.1 he says that matter is not a this something *in itself* (412a7–8); this negative point is given a positive gloss in H.1, where matter is said to be a this something, not in actuality but *potentially* (1042a27–8). As he denies that it is a this something in actuality,

[14] Owen 1978/86, pp. 13–14; Ackrill 1981, p. 125; Lear 1988, pp. 277.

[15] Frede and Patzig 1988, *ad loc.*; Irwin 1988, pp. 204–11; Burnyeat 2001, p. 16 (though Burnyeat's view seems to be qualified on p. 53: 'matter is actually substantial being only when, and because, it is combined with form': see my notes on a9–11).

[16] The anonymous reader reminded me of Frede's view.

I take it that it is 'potentially a this something', not in the sense that it could by itself actually be a this something, but only in the sense that it is, or has, the potentiality for a certain form, and this form, and/or the composite substance, is a this something (cf. Bostock 1994, p. 251, and Burnyeat 2001, p. 53 quoted above; for a different interpretation, see Gill 1989, pp. 86–90). 'For what touches and does not have a natural unity is matter and what underlies.' Aristotle's wording is again not perspicuous. He presumably means, as Ross says, that the constituent parts of a composite substance, regarded as united only by their contiguity and not by the composite's nature or form, is its matter; thus matter, considered in itself, is more like a heap than a definite thing (on the relationship between constituent matter and potentiality see the Prologue to chapter 2, section 4). The bricks, timbers, etc., needed for a house are, considered in themselves, no more than a heap: they have no sort of unity—they are not even a definite collection—except insofar as they are given (or are thought of as having) a form, for example insofar as they are, or are identified as, the matter *for a house* (see also Z.16 1040b5–10, and notes on Λ.4 1070b10–21). It seems very odd to say that matter is a substance on the basis of these two points: if anything, they look more like reasons to *deny* that matter is a substance (see the final paragraph of the next note). Perhaps Aristotle feels some pressure from the idea apparently endorsed in chapter 4 that the elements of a substance—in the sense in which matter and form are elements—must themselves be substances: see notes on 1070a33–b10.

a11–13: Form is a substance. 'The thing's nature, which is a this something and a certain state-towards-which'. The clause which follows—'the third substance is the particular from these'—makes it clear that Aristotle uses 'nature' here as equivalent to 'substantial form' (some scholars have taken this to be relevant to the debate over 'particular forms', discussed in section 3 of the Prologue to chapters 4 and 5). No doubt natural organisms, which have a 'nature' in the technical sense which Aristotle develops in *Phys.* II, are uppermost in Aristotle's mind; but since his claims here are supposed to cover artefacts as well, we should take 'nature' here in a more relaxed sense, as 'what makes a composite substance the thing it is', and in this usage it is indeed

equivalent to 'substantial form'. The claim that the form of a substance is itself a substance is the cornerstone of Aristotle's mature metaphysics, and one to which almost the whole of Z and H is devoted: its appearance here, with a mere seven words of explanation, is a breathtaking piece of compression.

The idea behind the addition 'and a certain state-towards-which' seems to be that it is the fully-realized form which is the end-point of an organism's natural development (or of an artefact's production): this may do no more than pick up the account of coming to be at the start of the chapter (1069b36–1070a4); but there may also be the barest hint of the importance which teleology plays in Aristotle's full account of natural substances (see *Phys.* II, *Met.* H.2–4). The 'same form' claim requires the form of a natural substance (like the form in the builder's mind) to be an efficient cause of the generation; but in neither case, in Aristotle's view, can this generation be understood except as an end-directed process of which the form is also the final cause. If Aristotle's remark here is meant as an *argument* for form's being a substance (see next paragraph; I am inclined to doubt that it is), the argument would have to be that it is principally in terms of a thing's form that its generation must be understood. This would seem to do no more than support the thesis that a form is what makes something the type of thing it is. But in Z.4–6 Aristotle seems ready to move from this to the claim that form is substance via the premisses (i) that what makes a composite substance the type of thing it is is prior to the composite, and (ii) that a non-substance cannot be prior to a substance.

What is the relationship between the claims that matter and form are substances and the remarks about their being this somethings? One possibility is that the latter are intended as giving (part of) the reason why form and matter are substances. The argument would be: 'being a this something is sufficient—or sufficient given that they obviously satisfy the other necessary conditions—for matter and form to be substances; they are this somethings; so they are substances.' This gives the passage an attractive structure, and accounts nicely for the double occurrence of claims about being a this something. But in the case of matter, the argument that this reading ascribes to Aristotle is a poor one. For the way in which matter is a this something, on either understanding of his claim about this at a8–10, is

insufficient to yield the desired conclusion. Either matter has the appearance of being a this something, and hence it merely has the appearance of being a substance; or it is potentially a this something in the weak sense of being able to be the matter of a this something, and hence is, in an equally weak sense, potentially a substance. On either construal the premiss yields the conclusion only that matter is a prima facie but unsuccessful candidate for substancehood—the view of Z (on some interpretations), but not that of Λ and H. (Note also that a13 uses 'the this something' as a stand-in for the composite's form; this seems to presuppose that its matter could not be characterized in this way; cf. Z.13 1038b2–6.) What is more, neither of the parallel passages mentioned above argues in this way: in *De An.* II.1, as I have said, the focus is precisely on the fact that matter is *not* in itself a this something, while in H the argument appeals rather to the premiss that matter is an underlying subject (indeed the subject, in some sense, of the substantial form: see Prologue to chapter 2, section 4).[17] For these reasons it seems better to take the remarks about being a this something in a different way: since being a this something is a condition of being a substance in the primary or paradigmatic way, Aristotle thinks it important, here and in the parallel passages, to explain how each of these types of substance stands in relation to being a this something.

1070a13–20

a13–18: Aristotle now raises the question whether the forms of composite substances exist 'over and above' (*para*) the composites: he claims that the forms of artefacts do not, and that if any do, it is the forms of natural substances (i.e. of most living organisms): he thus seems uncommitted here as to whether these forms exist over and above the composites. This issue is discussed in three other passages. (i) At H.3 1043b18–23, the passage closest to the present discussion, he says that the forms of artefacts do not exist over and above the composites (though he also raises the question, not raised in Λ, whether artefacts are substances at all),

[17] Gill 1989, pp. 86–90, argues that a later passage in H.1 does characterize matter as a this something, but I am not persuaded by this interpretation.

and says that 'nothing yet is clear' with respect to the forms of natural substances.[18] (ii) At Z.8 1033b19–26 the upshot is apparently that *no* substantial forms exist over and above the composites (see Woods 1993, pp. 409–11). (iii) B.4 999a6–b24 are preliminary *aporiai* which express difficulties both with the view that there are things which exist over and above particulars (*ta kath' hekasta*), and with the view that there are not (for discussion, see Broadie 2009a). This *aporia* is presented in rather general terms, but Aristotle goes out of his way to express doubt that 'there is a house over and above the particular houses' (999b19–20). In the H.3 passage, being 'over and above [sc. the composite substances]' is connected very closely to being separate from them, though the text does not make clear exactly what the connection is.

It is clear in all three passages that Aristotle has his eye on Platonist Forms, and that some criticism of them is in the offing. Presumably he thinks that there is a sense or way of being 'over and above' such that the claim that there are forms/Forms over and above the composites is potentially favourable to, or even required by, Platonism; and it is this notion of being over and above that is in play in Λ.3 too. As we have seen, Aristotle thinks that *all* substances are separate (1 1069a24); while this could be taken to refer only to composite substances, since matter and form have yet to be introduced, the claim is echoed with complete generality at 5 1070b36–1071a1 and elsewhere. I take this claim to be that substances are (asymmetrically) separate from non-substantial items; on this view, being separate *from composite substances* involves different relata, so there need be no inconsistency between the separateness claim of chapter 1 and its being apparently an open question whether substantial forms are separate from composites. The *relation* of being separate may nonetheless be the same in both chapters, whether this is separation in existence, definition, or being (see notes on 1 1069a24). Elsewhere Aristotle argues that a major source of difficulty for Platonism is that its requirement (as Aristotle sees it) that the Forms be separate is in fact incoherent (see M.4 and 9 1086a31–b7; Z.13); but since in Λ and in H Aristotle allows the possibility

[18] For discussion, see Judson 2000, p. 131 and n. 57.

that some forms are indeed over and above the composites, the issue here is probably a different one. The challenge is to find an argument for not being over and above the composites which applies to artefact-forms but not obviously to the forms of natural substances.

The best way to make sense of the argument is to suppose that three necessary conditions for a form *F* being over and above composite *F*s are in play: (i) *F* can exist without the composites (this is the same as separation if that is separation in existence, and it plausibly entails separation in being); (ii) *F* is causally prior to the composite; (iii) *F* is eternal (or perhaps necessarily eternal). Aristotle appears to allow here that one way, at least, in which a form can satisfy (i) is by being thought of: as an object of thought 'the house without matter' exists without (thereby) being the form of a composite *F*.[19] When one merely thinks of a form of any sort, however, this 'form without matter' is not prior to the composite. As we have seen, the form of an artefact such as a house can also exist 'without matter' in a way which makes it causally prior to the composite—when it exists as part of the art of building, as an object of the craftsman's thought which determines her production (hence Aristotle's reference to 'everything in accordance with art' at a17: compare *PA* I.1 640a31–2—'the art is the formula (*logos*) of the product without the matter'—and Z.7 1032b11–14). The artefact-form can thus exist in a way which makes it both causally prior to and independent of the composite; but in this way it only exists from time to time (or at least only contingently)—that is, whenever there is a craftsman who possesses the art of housebuilding—and this sort of transient or contingent existence disqualifies the form from being over and above the composites because of condition (iii). Why does Aristotle insist on condition (iii)? Presumably because, taken together with (ii), it is indicative of the form's being a fully independent or ultimate explanation of the composite being the thing it is. In the case of artefacts the existence of the form in the way which makes it causally prior to the composite clearly depends on something further—the choices of the builder.

[19] It is partly for this reason that Aristotle speaks of the internal objects of perception and thought as 'forms without matter': see *De An.* III.2 and 4, and section 2 of the Prologue to chapter 9.

In the case of the forms of natural substances, things are less clear (as Aristotle says in H.3), and he is strikingly reticent about them here. Since all or most natural species are, in his view, eternal, these forms may be eternal too, and promise to be the ultimate explanation of the composite being the thing it is in the way in which artefact-forms are not. Natural forms can of course be thought of, but it is not by being thought of that they are causally prior to the composite. This leaves open the question whether, if there is such a thing as the eternal form of human being, it exists independently of the composites in some other way. Aristotle's answer here is only that *if* any forms exist over and above their composites, they are those of natural substances.[20]

a14–15: The clause 'unless the art does' could either be equivalent to 'or the art does', and so introduce a genuine condition which Aristotle thinks fails to be satisfied, or more probably it could mean 'except insofar as [or: in the sense that] the art does'—a concession which is not meant to yield the conclusion that artefact-forms exist over and above the composite artefacts: see above. In the remark which follows, 'nor is there coming to be and ceasing to be of these', 'these' refers forward to 'the house without matter, and health, and everything in accordance with art'.

a17–18: Why does Aristotle suddenly introduce non-substantial forms such as health? ('And everything in accordance with art' presumably includes other non-substantial products of art.) In Z.7 and 9 he introduces health in a similarly unexpected way in connection with the 'same form' claim as applied to artefacts (1032a32–b14, 1034a21–32; cf. 'being cultured' at Θ.8 1049b24–9). There his point must be that the 'form without matter' account of the production of artefacts holds quite generally, whether or not the product is a substance, and hence whether or not the determining form is a substantial form. His thinking here is analogous: the point he is making about the transient existence of artefact-forms which are without matter holds quite generally, whether or not these are substantial forms.

[20] For further discussion see notes on 5 1071a3–17 and 1071a17–29, and 9 1074b35–1075a5.

a18–20: Aristotle, of course, thinks that there are no Platonic Forms; so his congratulation is muted. The received text of a19–20 is quite awkward: see the Note on the Text. The remark about fire, etc., marks a contrast between matter and 'what is substance especially': the point seems to be that even the matter which is most like a proper composite substance (i.e. the composite's organic parts) is nonetheless only (its) matter. This rules out its separateness, since Aristotle takes matter not to be separate in the relevant sense: see Z.3 and the notes on a9–13 above. The remark about the range of Forms is perhaps surprising: Plato often speaks of Forms of other things too (for some discussion, see Fine 1993, ch. 6). But Plato may well not have had a settled view of the range of Forms; and as John Ackrill suggested (personal communication), Aristotle may in any case be deliberately playing on the difference between his own sense of 'having a nature' (having an inner principle of change and rest) and a Platonic sense of 'by nature'—'in accordance with reality [sc. whether changing or unchanging]'.

1070a21–6

The idea that form has a causal priority over the composite leads naturally to a discussion of its relation to efficient and formal causation. Aristotle distinguishes four types of cause (see *Phys.* II.3–7). These are usually labelled *material, efficient, formal*, and *final* causes. These 'causes' are things, of virtually any ontological type, which can be cited in giving an account of why something comes to be, is the way it is, or behaves the way it does. A thing's formal cause is simply its form (whether this is substantial or non-substantial): 'the things which are causes in the sense of formula' refers to formal causes, since the formula (*logos*) of a thing is the specification of what makes it what it is. In the case of substances, at any rate, this formula will be a definition: see Z.4–5. Aristotle's efficient causation, which he often refers to as involving a *moving* cause, is the closest of the four to causation as we tend to think of it, but it is by no means identical with it. A sign of this is that we tend to restrict causes to events and states of affairs (and, at the limit, to agents), whereas Aristotle places no such restriction on efficient causes. The examples he gives include a military attack

on Sardis, a sculptor, an offspring's father, and the sun's inclined orbit (5 1071a15–16): in particular, as we have seen, the form in a craftsman's mind is one of the efficient causes of the product. To be such a cause is, for Aristotle, to be anything on the path along which the origination of a change can be traced—though typically such a path would have as a key element a process or an action (in the wide sense which includes any case of acting-upon). See also the Prologue to chapters 6 and 7, section 2.

The claim of temporal priority for efficient causes may seem surprising, since elsewhere Aristotle claims that when an efficient cause is acting on the thing which is being changed, its action and the change are temporally co-extensive (*Phys.* III.1–3, VIII.4–5 and 10). But the two claims are compatible: what he is saying here is that an efficient cause must pre-exist its effect, not that it must act as the cause before the change happens. The pre-existence claim is nonetheless problematic. Counterexamples are provided by the Prime Mover, and many other final causes if, as I think, they can act as efficient causes too—but this is controversial: see Prologue to chapters 6–7, section 2. Aristotle's examples, however, indicate that the cases he has in mind are the forms of organisms and of the products of crafts, and the pre-existence claim is quite plausible for these cases.

'It is when the human being is healthy that health also exists' might look like an anti-Platonic metaphysical claim about what it is for health to exist (and this is how Ross takes it); but the example of the shape of the bronze sphere makes it clear that it only concerns the enmattered form (see notes on a13–18). Aristotle is thus making the point that form has a dual role in explaining composite substances, as formal and efficient cause. Perhaps this, together with the claims about form as efficient cause, are meant to constitute the basis of the idea that form is prior to the composite in time and in *logos* or formula (cf. the claims made for the priority of substance in Z.1); but if so, it is not made explicit.

'Whether something remains afterwards too has to be considered.' This is a possible qualification to the simultaneous existence of the enmattered form, not to the pre-existence of the form which is without matter. Aristotle thinks that the soul (which is for him the form of the body), or at least most of its parts, cannot survive the death of the composite substance. This is because he

does not take the soul as a whole to be a potentially independent entity, in the way that Plato did, but rather to be a set of capacities whose exercise constitutes the life of the organism; and he holds that most of these capacities, at least, involve physical structures in the body (e.g. the capacities for nutrition, growth, perception, and imagination). He at least entertains the idea, however, that the capacity for thought (*nous*) is immortal, if it does not essentially involve bodily structures (see *De An.* I.1 403a3–b19, II.1, III.4–5, and section 2 of the Prologue to chapter 9).

1070a26–30

'It is clear that there is no necessity, on these grounds at any rate, for the Ideas [i.e. the Forms] to exist.' Clearly Aristotle has some argument in mind which was, or could have been, used to support the existence of Forms. 'These grounds' could in principle refer to something implicit in the immediately preceding sentence (a21–6), but it is hard to see what argument for Forms there could be which appealed to the temporal relations of causes to what they explain (indeed, it is a familiar complaint of Aristotle's that Forms by themselves cannot explain temporally-located generations: see A.9 991b3–9 and *GC* II.9 335b7–24, discussed in Annas 1982). The reference must be to the 'same form' claim at a4–5: Aristotle is arguing that the fact that the generation of substances is (standardly, or paradigmatically) by the same form, in nature and in art, shows that there is already an explanation *in terms of form* of how substantial forms are imposed on matter, and so there is no need for Forms in order to explain this. Thus the final sentence of the chapter simply recapitulates the 'same form' claim. If this reading is correct, then the preceding remark about temporal relations constitutes a separate train of thought prompted by forms' causal priority over composite substances, and there is once again a focus on the explanatory role of form—and hence on the priority of form, the unifying focus of the whole of the chapter.

CHAPTERS 4–5

PROLOGUE

1. The Principles of All Things

Chapters 4 and 5 address the question whether the principles of all things are the same. Aristotle presents this as a puzzle arising from the existence of arguments in favour of opposed conclusions in a manner reminiscent of the *aporiai* of *Met*. B. Note also that three particular *aporiai* in B are directly related to the concerns of chapters 4–5: the very briefly stated ninth *aporia* (B.4 999b24–1000a4) raises some related questions as to what sort of unity the principles possess; the tenth *aporia* (B.4 1000a5–1001a3) asks whether the principles of perishable and imperishable things are the same or different; the fifteenth (B.6 1003a3–17) raises the question whether principles are universal or particular. It is reasonable to suppose that Aristotle is primarily interested in this question because a sufficiently negative answer would pose a threat to the view that there can be a single inquiry into the principles and causes of all things. As we saw in Λ.1, Aristotle takes it that there is such an inquiry, and that it proceeds by inquiring into the principles of substances.[1] Chapters 2–3 sketch the argument that all perceptible substances, at least, have (in a sense) the same principles—matter, form, and privation. (Note that chapters 4–5 will introduce further principles too.) Equally, there must be a sense in which different perceptible substances have different principles, and Aristotle says a little (though rather too little, as we shall see) about this in chapter 4. The main focus of chapters 4–5 is on the question whether, and in what ways, the sameness of the principles of all perceptible substances extends to the principles of all things. By 'all things' Aristotle means, presumably, all the non-substantial features of perceptible substances: the coda to chapters 2–5 as a whole at the end of chapter 5 (1071b1–2) says 'We have said, then, what

[1] I think that this is Aristotle's standard view of what 'first philosophy' is: see the Introduction.

the principles of perceptible things are, and how many, and in what way they are the same and in what way they are different.' A question which receives no direct attention is whether *all* substances—perceptible and imperceptible—have the same principles: I discuss this in the Introduction, section 4, and in the notes to 1071a3–17.

The threat to the unity of first philosophy arises because first philosophy is the science of being (I ignore controversy here in taking this to be the science of the principles and causes of *beings*), and Aristotle rejects the unity of being. In Δ.7 1017a22–4 Aristotle claims that 'being [*to on*] is said in as many ways as the figures of predication [*ta schēmata tēs catēgorias*: i.e. as the categories]' (cf. Z.1 1028a10–20). Hence, it would seem, there is no possibility of a single account of being. In his attack on the idea of a single Platonic Form of the Good in the *Eudemian Ethics* this is, famously, the basis for the conclusion that there cannot be a single science of being, introduced for the sake of a parallel claim for the good:

> For the good is <so> called in many ways, indeed in as many ways as being. 'Being', as has been set out elsewhere, signifies what-is, quality, quantity, when, and in addition that <being which is found> in being changed and in changing; and the good occurs in each one of these categories—in substance, intelligence and God; in quality, the just; in quantity, the moderate; in the when, the right occasion; and teaching and learning in the sphere of change. So, just as being is not a single thing embracing the things mentioned, the good is not either; nor is there a single science of being or the good.
>
> (*EE* I.8 1217b25–35, translation Woods 1992)

Since Aristotle plainly does hold in Γ, Z, and Λ that there can be a unified science of being, one has to suppose either that he changed his mind (so Owen 1960/86), or that the point in the *Eudemian Ethics* is only that there is no science of being (or of the good) *as the Platonist conceives of such a science*. In either case Aristotle needs to explain how his own science of being avoids the difficulty.

The claim that being is said in as many ways as the figures of predication could mean (i) that items in the different categories *exist* in different ways, (ii) that the 'is's in '*X* is a substance', '*X* is a quality', '*X* is a quantity', etc., have different meanings (so Ross, 1924, I, 307), or (iii) that items in different categories are different

sorts of being. Readings (i) and (ii) are highly problematic. Aristotle does think that there are different ways of existing—that substances exist in a primary way, and other things in a dependent way—but it is far from obvious that this line of thought yields a different mode of existing for each of the categories. Equally, it is hard to see why the difference between items in one category and those in another should imply different senses of 'is' in '*X* is a quality', '*X* is a quantity', etc. (On both these points, see Bostock 1994, pp. 46–7, and Berti 2002; for a partial defence of (ii), see Charles 2002.) Moreover, it is hard to see how the possibility that there are many ways of existing, or of being such-and-such, poses a direct threat to the unity of first philosophy, since first philosophy's subject is not *existing*, nor *being such-and-such*, but *what is*. So we should prefer reading (iii): Aristotle's point must be that items in different categories are fundamentally different types of being.[2] The threat posed by this is that a supposed science of all beings would lack a common subject matter—it would simply be a collection of studies of different types of being. But it is not yet clear exactly what this problem amounts to or how it could be resolved.

Γ.2 has sometimes been taken both to show what the problem is and to give Aristotle's solution (see especially Owen 1960/86). At 1003a33–b19 Aristotle argues that while being is said in many ways, this is not a matter of mere ambiguity, since these different ways in which being is said are all related to a central or focal case—that of substance. He compares *being* with *being healthy*:

> As everything healthy is said in relation to [bodily] health, one thing in that it preserves health, another in that it produces it, another in that it is a sign of health, another because it is capable of it, in this way what is [*to on*] too is said in many ways, but everything is said in relation to one starting-point: some things are said to be because they are substances, others because they are affections of substances, others because they are a road towards substance, or destructions or privations or qualities of substances or . . . . (1003a34–b10)

The basic point about the focal relations of the ways in which *X* is said is that the definitions of the secondary senses of *X* have to

[2] This is also the way in which I would understand Z.4 1030a17–27, mentioned in the notes on 1 1069a21–4.

mention *X* as defined in the primary or central sense (cf. Θ.1 1045b29–31). The conclusion is that 'as there is one science which deals with all healthy things, the same applies in the other cases as well.'

Owen took this argument as Aristotle's solution to the problem raised in the *Eudemian Ethics*: being is said in many ways, but what unifies the science of being notwithstanding this is that these ways are focally related (1960/86). But if this is Aristotle's argument, it is a very poor one. All that the focal meaning claim by itself shows is that the various types of being (what it is to be a quality, quantity, etc.) have a common element—the accounts of what it is to be each of them make reference to the account of what it is to be a substance. This leaves open the possibility that the existence of a common element is no more important than the differences between the various types (compare, for instance, the role of 'study of' in the accounts of *geology, biology, theology*, etc.). What is needed in addition are the claims (a) that substantial being is in the relevant way *primary*, and (b) that the account of substantial being in some way covers, or can be extended so as to cover, the other types of being. Although Aristotle asserts (a) in Γ.2, the focal meaning claim does not establish (b). As we have seen, (a) is argued for—however obscurely—in Λ.1, as it is in Z.1; (b), I suggest, is addressed in Λ.4–5. We should read Γ.2, therefore, not as trying to *solve* the problem of the unity of the first philosophy, but as making the much more modest claim that the multivocity of being does not by itself constitute a bar to there being one science of being, any more than the multivocity of health does.[3] A further point supports this conclusion and brings us back to Λ.4–5. The fact that *A* and *B* are different types of object does not determine whether or not they are the concern of different sciences: triangles and dolphins are the objects of different sciences, but ostriches and dolphins are not. There must be some further grounding of the necessity (or lack of it) for different sciences. The obvious thought, in Aristotelian terms, is that this further grounding is the sameness or difference, in the relevant way(s), of *the explanatory principles* of *A* and *B*. This, I suggest, is the reason for Λ.4–5's

[3] For further discussion, see Judson 2018a, section 4.

concern with the question whether the principles of all things are the same: (b) will be false if the principles of substances are too radically different from those of some or all non-substantial items.

Why do the differences across the categories signalled by 'being is said in many ways' pose a threat to the sameness of these principles? A clue is to be found in Z.4, where Aristotle says that only substantial forms have definitions, but then adds:

> Or is it that we speak of definition too in many ways, like *what a thing is*? For indeed what a thing is signifies in one way the substance and the this something, and in another way each of the predicates [*katēgoroumenōn*]—quantity, quality, and so on. For just as 'is' belongs to everything, but not in the same way—to one [i.e. to substance] in a primary way and after that to the others—so too what a thing is belongs without qualification to a substance, but <only> in a way to the rest. (1030a17–23; cf. Z.5 1031a7–14)

The argument appears to be: the function of the definition of *X* is to reveal or specify the essence or form of *X* (*what it is to be X*); this function is different across the categories because essence and form are different across the categories. For this argument to have any plausibility Aristotle must mean that what it is to be the form of a substance is different from what it is to be the form of a non-substantial item—that 'form' has a different sense in 'substantial form' and in 'form of a quality'. Λ.4–5 makes it clear that Aristotle thinks that this is also true for matter and privation across the categories: this is why the principles of all things are not the same in the way that the principles of all (perceptible) substances are. Note that it is not clear either from Z.4 or Λ.4–5 whether Aristotle's view is that form, matter, and privation are different types of thing in *each* non-substantial category, or merely that non-substantial form, etc., are different types of thing from substantial form, etc.[4] Nor is it clear whether he thinks that the relevant types of difference exists in all cases of form, matter, and privation, or only in some. I do not see how to make

[4] Thus the argument in Z.4 appeals at different points to the distinction between beings that are in the primary or unqualified sense and the rest—that is, to the distinction between substances and non-substances—and to the idea that there is a sense of being corresponding to each category.

the stronger versions of the claim plausible; but I suppose that Aristotle takes at least the weakest version to be true.

It might be tempting to suppose that the difference consists in this: that in the case of a substance, the matter cannot be identified (at its highest level of specification) without reference to the form. Thus the matter of a human being is flesh, bones, and so on—and not merely generic flesh and bone, but specifically human flesh and bone. In the case of non-substantial items, this is not (or not always) the case: John—or the surface of his skin—can be identified independently of his pallor. This might look like a promising route to a fundamental difference in the way in which something plays the role of matter;[5] but it cannot be Aristotle's route, at least in Λ. As we have seen, Aristotle includes artefacts in the range of perceptible substance, and for artefacts it is much harder to hold that their matter cannot be picked out as such independently of their form. A related line of thought may circumvent this problem, however, by suggesting that the matter and form of at least some non-substantial items stand in a fundamentally different relationship to each other from that in which the matter and form of a substance stand. At a very general level, the role of *X*'s form—whatever type of item *X* is—is to make *X* the thing it is: it constitutes the nature or essence of *X*. In the case of a substance the matter can be said in a certain way not to *transcend* the form. The matter may, of course, have further features of its own beyond its potentiality to take on the substantial form (see section 4 of the Prologue to chapter 2); but because of the way it functions as the matter of the composite, that composite too can straightforwardly, if derivatively, be spoken of as the subject of these features as well. The first sign that things are different in the case of at least some non-substantial items is that with them 'the composite' picks out two different things. The matter for courage, for example, is presumably the person in question. In one sense the composite of the matter and form is the quality in the person—that particular exemplification of courage. This is the composite whose nature is constituted by the form of courage; but this composite cannot be thought of as the subject

[5] Though its promise depends on making a positive virtue of the difficulty for a form-matter account of natural organisms identified by Ackrill (1972–73/97; see my notes on 2 1069b24–6).

of the other features of the matter (the person), even derivatively. In another sense the composite of the form (courage) and the matter (the person) is the courageous person: this may perhaps be treated as the (derivative) subject of the matter's other features; but this composite is not the one whose essence is constituted by the form in question: either it has—as what Aristotle calls an 'incidental compound'—no essence at all, or it has an essence to which the form of courage merely *contributes*. Thus although at a very general level the way in which the matter and form function is the same as in the case of substantial matter and form, at a more specific level it is quite different. This line of thought is hardly decisive, but it does make it plausible that what it is to be matter—and hence what it is to be form—is different in the case of courage. I have chosen a case in which the matter for the quality is the substance as a whole; this is not the case for all qualities, since for some the proximate matter will be a part or feature of the substance, as a thing's surface is the matter for its colour. But arguably the position is the same in these cases too. What holds for (some) qualities will hold for at least some other non-substantial items. I will not attempt to argue for these extensions of the claim, since I am only concerned to suggest a line of thought which makes what I called the weakest version of the claim plausible.

If substantial forms, matter, privation, and so on are different kinds of thing from at least some non-substantial ones, how can there be a single science of all beings? Or, to put the question in terms familiar from our discussion of the opening of Λ.1, how can investigating the principles and causes of substances be the way to investigate the principles and causes of all things, rather than just an important part of that wider investigation? The answer which Λ makes available is that the principles of all things exhibit an analogical connection: the forms, etc., of non-substantial items bear at least an analogy to those of substances. Substances provide the basis from which we grasp the notions of (substantial) form, matter, essence, actuality; and these are just what an understanding of the other kinds of being requires, albeit in an analogical form. The investigation of all beings takes the form of investigating substance, Aristotle plainly thinks, because we must grasp these analogues by way of the case of substantial form, etc.; and this is so because substantial being is the primary type of being: see Λ.1 and notes. Presumably he also thinks that the

analogical connection provides our only route to grasping the notions of form, essence, etc., as they apply to quality, quantity, and the other categories.

What does Aristotle mean by saying that the principles of all things are the same by analogy? Elsewhere he says that analogy involves four things: *A* is analogically the same as *B* if as *A* is to *C* so *B* is to *D* (*Met.* Δ.6 1016b31–1017a3). Aristotle uses this idea frequently in the biological works:

> There are some animals whose parts are neither identical in form nor different in accordance with excess or deficiency; but they are the same only in accordance with analogy, as, for example, bone is only analogous to fish-bone, nail to hoof, hand to claw, and scale to feather; for what the feather is in a bird, the scale is in a fish.
>
> (*HA* I.1 486b17–22)

See also *HA* II.1 497b6–12; *PA* I.4 644a12–23 and 644b7–15, 5 645b20–8. Parts which satisfy some general description which is important to the understanding of what they are—for example, they perform the same function—and differ only 'in excess or deficiency' (i.e. by being bigger/smaller, harder/softer, etc.) are the same in kind (*genos*): so a horse's lung and a human's are both lungs in a straightforward sense. There is mere sameness by analogy where the parts are sufficiently different to resist the ascription of straightforward sameness. An example of this sort of case might be the analogical sameness of hand and claw. The differences between these are not all a matter of more and less, or 'excess and deficiency', since some are structural differences (e.g.—to simplify—the presence/absence of opposable thumbs); but at least some of the central functions which they perform (e.g. grasping) are just the same. Other examples, however—such as that of lungs and gills—suggest a further possible structure for analogical sameness, viz. that in which the function is only straightforwardly the same at a very general level (in Aristotle's view, the introduction of a cooling agent for the area around the heart), but, if characterized at a relatively specific level, is itself only analogically the same.

Aristotle deploys both of these models in his biology; but in the sorts of metaphysical context which we are considering the second seems to be what is required: as we have seen, his view in Z.4 is that definitions of qualified beings are only qualifiedly definitions. What is crucial in Λ.4–5 is the idea that matter and form

serve the same functions for substances and non-substances alike at a very general level of description, but not at a more specific one: hence the claim that they are the same, but only by analogy. This move promises to solve the problem of the unity of first philosophy in a way that the ideas of focal meaning and the priority of substance cannot by themselves do; thus Λ provides a key element in Aristotle's metaphysics which is not echoed anywhere else. Z, most notably, is silent on this matter; so either it relies in some other way upon the priority of substance, or it takes the analogy point for granted. To make good the promise, of course, one would need more in the way of justification than Λ's compressed discussions offer. In particular, we would like to know more as to what constraints there are on sameness by analogy—what constraints there are on differences being merely 'in excess and deficiency' in the biological case,[6] and on being 'sufficiently different' in both the biological and the metaphysical case, and also what the criteria are which distinguish cases which allow analogical sameness from those which do not.[7]

Finally, it is worth noting that elsewhere Aristotle assigns a role to analogical connection in our grasping the notion of substantial matter itself:

> The underlying nature is known by analogy. For as the bronze is to the statue, the wood to the bed, or the formless before it receives the form to any of the things which has some definite form, so is the underlying nature to substance—the this something, or what is.
>
> (*Phys*. I.7 191a8–12)

2. How Does Aristotle Conceive of Principles?

What seems to us a fundamental question which Aristotle's discussion of the principles' sameness and difference might be expected to settle is what sort of items Aristotle's principles are. We can distinguish what I shall call the 'concrete' and the

[6] There is a brief discussion of this in *PA* I.4 644a12–23, but hardly enough to warrant Aristotle's confident demarcation of types of parts into those which are the same and those which are mere analogues: see Lennox 2001a, *ad loc*.

[7] For further discussion of analogy in Aristotle, see Wilson 1997 and 2000, especially chapters 2–3; Beere 2009, pp. 181–4.

'schematic' conceptions of principles. What is perhaps the standard view of Aristotle's principles involves the concrete conception: the principles of *X* are its actual form, matter, etc. The principles of a horse and of a human being will, on this understanding, be different at the fundamental level, since they will be respectively the form and matter of the horse and the form and matter of the human being. There is controversy as to what sort of an entity the form of a particular horse or human being is, and what its relationships are to the forms of other particular horses/humans and to the form *horse*/*human*—for example, whether the form of this horse is numerically identical with, or numerically distinct from, the form of every other horse (this will be discussed in section 3 below and in the notes to 5 1071a24–9). My characterization of the concrete reading of Aristotle's principles is meant to leave this question entirely open. Another understanding of Aristotle's principles involves the schematic conception. The idea is that the principles of a thing are the basic terms in which a proper account of it—both of its coming to be and of its being what it is—has to be given. Thus the principles of a horse and those of a human being are, at the fundamental level, exactly the same—namely *form, matter, privation*, etc. On the concrete conception, principles are entities (of whatever ontological status) on which the things whose principles they are fundamentally *depend*; on the schematic conception they are the elements of fundamental explanatory schemata.

Reading what comes *after* chapters 4–5 would naturally lead us to ascribe the concrete conception to Aristotle: in chapters 6–10 he repeatedly characterizes particular substances—and especially the Prime Mover—as principles, and he links this with claims about dependence: 'on such a principle, then, depend the heavens and nature' (1072b13–14; cf. 1072a18).[8] Yet reading the discussion of principles which precedes chapters 4–5—and especially chapter 2's emphatic conclusion, 'there are, therefore, three causes and three principles'—would lead us to ascribe the schematic conception to him. Now there would be no difficulty in Aristotle's speaking of principles in these two ways if he thought that one was fundamental and one not: if form and matter are

[8] There is also an occurrence of this way of speaking in chapter 3, at 1070a7–9.

principles, it would not be absurd to take a thing's actual form and matter to be—in a different way—principles too. And this idea would explain the fact that he speaks both of matter and form, on the one hand, and of body and soul, or art, or a thing's nature, on the other hand, as principles. Nonetheless we might expect Aristotle at least to distinguish these ways of speaking and to explain which conception of principles is fundamental; this might be particularly important for the discussion of sameness and difference in chapters 4–5, since concrete and schematic principles have quite different identity conditions. What is striking, however, is the way in which, especially in chapters 4–5 themselves, Aristotle simply switches back and forth between ways of speaking about the principles of substances (or of all things) which are each appropriate to one conception but not to the other. We can see this at the level of individual arguments: chapter 5's opening argument that the principles of substances are principles of all things (1070b36–1071a2) relies on the concrete conception's idea of dependence, while the inference from this in the very next sentence (1071a2–3) seems to presuppose the schematic conception (see notes *ad loc*.; for a case of a slightly different sort, see notes on 1070b30–5). We can also see it permeating the whole discussion of sameness and difference. The claim that the principles of substance are the same naturally suggests the schematic reading: Aristotle does not say that these principles are all the same *only in kind*—which the concrete conception requires. Equally the claim that the principles are different for different substances is illustrated at 1070b24–30 in terms of the difference between the form of a house and that of health, and so presumably should be construed throughout in that sort of way.

It is clear that within chapters 4–5 one could try to 'explain away' either sort of talk and take the other to be canonical: one could eliminate the schematic conception by construing 'same' as, after all, no more than 'same in kind', or the concrete conception by taking the remarks about difference to descend a level, to non-fundamental principles. Something could likewise be done to sanitize either of the two arguments at the start of chapter 5 that I mentioned above. Moving outside chapters 4–5, the situation is not so straightforward. One might suppose that the appearance of the schematic conception in the earlier chapters could be explained away by construing Aristotle's talk there as

itself a schematic way of referring to concrete principles—i.e. the claim that there are three principles would be read as 'for each perceptible substance there are three principles—*its* form, its matter, and the associated privation.' But this is not as promising. It is not at all an easy reading of chapters 2–3 even taken in isolation; and I do not think that it is possible to take the discussion of principles in *Phys.* I, on which these chapters plainly depend, in this way. On the other side, one might hope to explain away the talk of concrete principles in the later chapters as, once more, a change of level from the fundamental to the less fundamental: this idea does not seem impossible, though making it good would involve showing how it fitted in with the general relationship of chapters 6–10 to chapters 1–5, and hence with Aristotle's conception of first philosophy in Λ: this is discussed in the Introduction. Faced with a choice between the two conceptions of fundamental principles, then, the schematic conception is preferable. But Aristotle's complete neglect of the issue, and of the qualifications and caveats which ought to attend his ways of speaking about principles in one context or another, makes one suspect that it may be a mistake to look for a determinate view.

3. Particular Forms

Intense controversy surrounds the question of the ontology of substantial forms.[9] Consider two human beings, Socrates and Kallias. Each has the form of a human being: is the form one and the same item in each case, or are there two distinct items? Broadly speaking, there are three types of view. The first is that there is only one item, the form of human being: this view can be found in Lear 1988 (§6.6, esp. p. 287: 'Yet, though species-form is a "this something," there is no particularity about it. Any two humans have the same form. The crucial feature of a particular is its particularity.'). The only thing about Socrates and Kallias

[9] The extensive literature on this question includes Sellars 1957; Albritton 1957; Modrak 1979; Code 1984; Frede 1987c,1987d, and 2000a, pp. 24–7; Frede and Patzig 1988 (reviewed in Gill 1990, Wedin 1991, Whiting 1991, and Woods 1991a); Irwin 1988, ch. 12; Woods 1991b and 1993; Menn 2011, pp. 172–3. There are helpful summaries of some of the issues in Bostock 1994, pp. 185–90, and in Galluzzo and Mariani 2006, pp. 79–83.

which is numerically distinct, on this view, is their matter. The second and third types of view hold that there are two items, but differ over what distinguishes them and how they are related both to each other and to *being human*: the second type of view is that the two items are in some way posterior to one and the same 'general' form, while the third is that these items are basic particulars which are ontologically prior to any 'general' form (cf. Charles 1994, pp. 91–3). The principal proponents of the third type of view are Frede and Patzig (1988), and the claim that 'Aristotle believes in particular forms' is often identified with their interpretation. For this reason, and/or for philosophical reasons relating to the specific interpretation they accept, some proponents of views of the second type are unwilling (though others are willing) to characterize their interpretation as ascribing to Aristotle a belief in particular forms. The variety of views of the second type is due to the fact that some commentators (e.g. Woods 1991a, 1991b, and 1993) think that Aristotle took substantial forms to be neither particulars nor straightforward universals, while others, who take the universal/particular distinction to be exhaustive, nonetheless hold that there is more than one kind of universal, and/or more than one way in which universals can be realized in individuals (Modrak 1979, for example, contrasts instantiation with the type/token relation)—this is sometimes linked to a distinction in kinds of predication.

The debate has focused partly on the best way to understand the apparently inconsistent claims that Aristotle makes (or appears to make)—that substances are this somethings, that universals are not substances, that substances are (among) the proper objects of knowledge, and that particulars are not proper objects of knowledge because they are not definable—and partly on particular texts in Z, H, and Λ. The key passages in Z and H include: (i) the references to 'what being is for *X*', where *X* is a particular (Z.4 1029b14–15, 6 1032a8, 15 1039b25); (ii) Z.7 1032a24–5, where Aristotle says that the producer is the same in form (*homoeides*) as the thing produced; (iii) Z.8's claim that Socrates and Kallias 'are different because of their matter, which is different, but they are the same in form, since the form is indivisible' (1034a6–8); (iv) the apparent identification of a thing with its form in Z.10 and 11; (v) the claim that certain forms come to be and cease to be, albeit in a special way (e.g. H.5 1044b21–9; cf. Λ.3 1070a22–6, and

various passages in *De Anima* and *Parva Naturalia*)—though Aristotle also says that in cases of substantial generation the form and the matter pre-exist (Z.9 1043b12–13; Λ.3 1070a21–6). The key passages in Λ are in chapter 5: the reference to 'the proper form' of a human being at 1071a14; 1071a19–20 ('those universals, then, are not'); and 1071a27–9 ('and the causes and elements for things which are in the same form are different, not in form but because there is a different one for different particulars: your matter and the form and the mover, and mine, <are different>; but they are the same in the universal formula'). These are discussed in the notes.

COMMENTARY

Chapters 4–5 conclude the first half of Λ by considering whether the principles of all things are the same or different. The universal scope of the question might seem out of keeping with the opening statement of Λ.1 that the inquiry is concerned with the principles and causes of *substances* (1069a18–19). But as we saw, the rationale for the focus on substance is that the narrower inquiry into the principles of substances is the means to the wider one into the principles of all things (see notes *ad loc.* and Introduction, section 4). And that is how Aristotle in fact proceeds here, since his answer to the universal question is developed out of an answer to the narrower question 'are the principles of substances the same or different?'

Aristotle's treatment of these questions spans both chapters (once again, the Renaissance chapter division is unhelpfully placed). 1070a31–3 is a brief statement of the conclusion which he will reach—a characteristically Aristotelian one that '[the principles of all things] are in a way different . . . and in a way . . . the same.' 1070a33–b10 offers two arguments which purport to show that the principles of all things cannot be the same; in 1070b10–1071a29 Aristotle argues for his own view; 1071a29–b1 summarizes it, while the concluding sentence (1071b1–2) briefly rehearses the topics of the whole discussion of perceptible substances given in chapters 2–5.

In addition to the usual compression, much of chapter 4, in particular, is obscurely expressed. For a different view both of Aristotle's general strategy and of a number of individual sentences in chapter 4, see Crubellier 2000; Code 2000 discusses chapter 5.

CHAPTER 4

1070a33–b10

This passage is highly reminiscent of the aporetic arguments of Book B. Aristotle presents there a series of metaphysical *aporiai*, or problems, mostly in the form of quite tersely stated arguments for simple antinomies (i.e. pairs of antithetical conclusions, such as 'it must be a single science that studies all four causes'/'it must be more than one science'); sometimes only one half of the antimony is argued for, but this is at least sometimes because Aristotle takes the other half to have some obvious claim to plausibility. Many of the arguments in B deploy Platonist premisses and/or focus on Platonist doctrines. It is clear that Aristotle himself does not endorse every argument—though it is not at all clear how far he constructed these problems in a correspondingly aporetic frame of mind, and how far from a position of knowing how he himself would resolve them. When the problems raised are addressed in later books of the *Metaphysics*, some premisses are rejected outright; but more often we find the idea, explicit or implicit, that the terms of the original *aporia* were over-simple, and that its resolution involves making further distinctions, showing that various claims are true in one way but false in another, that the original dichotomies were not exhaustive and/or not exclusive, and so on. The present passage shares a number of these features. (i) The two arguments here are constructed in a similar way in uncompromising support of one half of the 'same/different' dichotomy. No argument for the other half is presented, but it is easy to see what its attraction is: the idea discussed in the Prologue, section 1, that there is a unified science of being seems to require that the ultimate principles of all beings should be the same. (ii) Aristotle's positive view takes the initial dichotomy to be over-simple: the principles of all things are in a way the same and in a way different. (iii) The arguments have a Platonist orientation to some degree, as we shall see, and the way in which Aristotle introduces his response at b10—'Or rather, as we say'—seems to confirm this, since Aristotle often uses this phrase to indicate a contrast between a Platonist position and his own. But as in B, this leaves it unclear how much of the arguments Aristotle himself endorses and how much he thinks

should be rejected or qualified; and this problem is compounded by the obscurity of the arguments themselves.

a36–b4: The first argument. Both this and the second argument focus on substances and 'relatives'. If Aristotle has his own category of relatives in mind (this includes such things as knowing and being double or larger than: see *Cat*. 7), it must be meant as a representative non-substantial category: to be relevant to the question about the principles of *all* things, the arguments must be meant to apply equally to qualities, quantities, etc. The addition, 'and similarly in respect of each of the categories' at a34–5 (cf. 'the other things which are predicated [*katēgoroumena*]' at b1–2) supports this. Alternatively, Aristotle may be using 'relatives' here in line not with his own theory but with that of a number of Platonists (most notably Xenocrates), who held that there were two basic kinds of being, per se beings and 'relatives'—which in this sense covered all or most of Aristotle's non-substantial categories. If this is right, the remark 'and similarly in respect of each of the categories' will have to be a later gloss by someone who took the passage in the first way. When Aristotle refers back to this passage at 1071a30 he refers to 'substances and relatives and qualities': this supports the first interpretation rather than the second, but is itself a little odd, as we would expect him to indicate the inclusion of all the categories by 'and so on'.

Aristotle's use of 'element' (*stoicheion*) here is striking. On the one hand, he is occasionally happy to speak without distinction of 'principles, causes, and elements' (see *Phys*. I.1 184a11); on the other hand, he normally reserves 'elements' for a thing's basic material constituents, or for analogues of these such as the letters of a syllable—and in Z.17 he distinguishes a thing's elements from its form (1041b11–33; cf. H.3 1043b4–14). Here, however, 'element' is used so as to cover form, privation, and matter (including, by implication, high-level matter, which would not count as an element in Aristotle's usual sense); it may be used in the same way at 1069a32–3, and certainly is at *Phys*. I. 6 189b16–18.[10] Although a similar usage of 'element' occurs in Platonist contexts

[10] See also Malink 2017, pp. 187–8.

in B,[11] Aristotle's usage here cannot simply be deference to a Platonist way of speaking, since he continues with it when developing his own view (b16, b24–6); there are problems with this usage too (see notes on b22–6 below.)

The argument presumes that if the principles of substances and relatives are the same, these principles (the singular 'this' at b1 is an odd way to refer to them) must be (i) things which are neither substances nor relatives, or (ii) substances, or (iii) relatives. The argument against option (i) at b1–2 is that it would require something both common to and prior to substances and relatives. 'Over and above' (*para*) here must, as in chapter 3, signify priority as well as distinctness, otherwise the next point, 'but the element is prior to the things of which it is an element', will have no connection with the argument. It is not clear what is supposed to rule this option out. The idea could be that there is simply nothing common to items in all the categories; but then the insistence on its having to be prior seems redundant. Or it could be that nothing except substance is prior to *substance*, and so nothing could fulfil the role of being a principle of substance without itself being a substance. The arguments against options (ii) and (iii) are only gestured at. Presumably the idea is (as Ross and [Alexander], 679.6–9, suggest) that the elements of substance cannot include relatives (or quantities, or . . .), because elements are prior, and only substance is prior to substance; nor can they be (all) substances, as that would make it the case that something whose elements were substances was itself a mere non-substance. If these considerations are sound, then they also rule out a fourth option not explicitly mentioned, namely that the principles are a mix of substances and relatives, etc. But their soundness hinges on the claims that nothing except substance is prior to substance and that the elements of *X* are prior to *X*. Aristotle does insist in many places (e.g. Λ.1 1069a18–26, Z.1) on something close to the first of these claims—and for this reason denies that substances can be 'composed of non-substances' (*Phys.* I.6 189a34–5; cf. Z.13 1038b23–9). This may not mean any more, however, than that the elements of a substance cannot *all* be non-substantial—whereas the argument

[11] B.1 995b27–9 and 3 998a21–b8, of which part is quoted in the notes on b4–10; cf. A.6 987b18–21, Δ.3 1014b10–11 and various passages in M and N (e.g. N.1 1087b9–15).

just sketched requires the stronger claim that *no* element of a substance can be a non-substance. Indeed, it is hard to see how the stronger claim could be squared with the doctrine that privation is a principle, since whatever the ontological status of privations of substantial forms, they are plainly not substances (a point Aristotle himself makes at *Phys.* I.9 192a3–6)—though Aristotle seems to get into difficulties over the case of privation more than once in chapters 4–5: see notes on b10–21, b22–6, and 1071a3–17. Moreover, although the second claim—that the elements of *X* are prior to *X*—might look self-evident (given the unusual meaning of 'element' here), it is not perhaps straightforwardly true for Aristotle, since he holds that an organism's matter, and more generally its bodily parts, are only in a quite weak sense prior to the composite organism: see Z.10, especially 1035b14–27, with the discussions *ad loc.* in Frede and Patzig 1988 and Bostock 1994. Aristotle certainly agrees with the basic thrust of the argument he presents here, since he denies that items in different categories can have (all) the same principles as each other; but though he endorses versions of its premisses, it is doubtful that he can rely on the argument as it stands. When he comes to argue the case later in the chapter, he treats as virtually self-evident the idea that one and the same thing cannot be, in a straightforward sense, a principle of items in different categories: see Prologue, section 1, and notes on b10–21.

b4–10. The second argument is very puzzling whichever text we read (see the Note on the Text *ad* 1070b7). (i) If we accept the text printed by Ross and Jaeger, the basic structure of the argument is:

(1) No element of *X* can be the same as *X*.[12]
(2) None of *them* [i.e., presumably, none of the putative elements of all things] will be a substance or relative.
(3) But they must be.
(4) So all things do not have the same elements.

[12] Note that Aristotle's illustration of (1)—'B or A [cannot be the same] as BA'—is ambiguous: 'A' and 'B' could stand for the letters *A* and *B*, and 'BA' for the syllable, or they could be schematic letters standing for the elements of any composite. But this hardly matters for the purpose of the argument, especially since the example of the syllable and its letters is Aristotle's standard example of a composite and its elements.

The natural way to take premiss (1) is as meaning 'no element of *X* can be identical with *X*.' But this yields a feeble argument, since the only grounds it offers for denying that all things have the same elements is that some things—that is, elements—have no elements at all; this is quite compatible with there being the same elements for everything that does have elements. A further problem with this reading is that it makes steps (2) and (3) contribute nothing to the argument. (Alternatively, we could suppose that (2) is meant to follow from (1): but it plainly does not.) A more substantial argument would result if we took (1) to mean 'no element of *X* can be of the same kind as *X*', and took Aristotle to be thinking of ontological kinds—that is, the categories. The argument then would be that there cannot be the same elements for items in all the categories, as any 'universal' elements would have to be in none of the categories. This reading of (1) gives steps (2) and (3) some work to do—though in return it makes the clause 'for example, B or A as BA' quite banal. But it is an awkward reading of the Greek, and is philosophically absurd: why should an element of a thing have to fall under a different category from that of the thing itself? (Note that understood this way, premiss (1) is actually incompatible with the premisses of the earlier aporetic argument, since they involved the idea that at least one of the elements of a substance must be a substance—and hence in the *same* category.) Perhaps Aristotle is tacitly relying on some Platonist assumptions which would make more sense of this, but it is unclear what they would be.

The aside at b7–8 creates a problem on either of these readings of premiss (1). It seems to argue that being and unity cannot be elements—presumably, of *any* composite—because they are present in every composite. The aside could only be connected to the main argument, as it purports to be, if the latter's first premiss were (1′) 'no element of *X* can be identical with *anything present in X*'. The passages in B referred to above suggest that such a doctrine was advanced by at least some Platonists:

> . . . concerning the principles, whether one should suppose that the *kinds* are the elements [*sic*] and principles, or rather the primary constituents present in [*enhuparchontōn*: the word Aristotle will use to mark out 'elemental' principles later in our chapter] each thing. (B.3 998a21–3)

It would yield the desired conclusion—(4)—if the elements of some composites were present in other composites (though this

would again leave steps (2) and (3) doing no work). But (1′) is an impossible reading of Aristotle's premiss (1). It is worth noting that at Z.16 1040b21–4 Aristotle argues that being and unity cannot be *substances* on the grounds that they are common to many things; but neither the argument nor the precise meaning of the conclusion is spelled out. (The phrase 'the objects of thought' is a piece of Platonizing terminology, used because in Platonist theory being and unity are among the ultimate substances: see notes on 1069a26–30.)

(ii) On the reading adopted in the translation, the argument's basic structure is somewhat different:

(1*) No element of *X* can be the same as *X* <so all things do not have the same elements>.
(1a*) No intelligible elements, such as being or unity, can be the elements of all things, because these belong to each of the composites as well, and so:
(2*) None of *them* [i.e. the intelligible elements] will be a substance or relative.
(3*) But they must be.
(4*) So all things do not have the same elements.

We have to fill out the argument in the new (1*) in one or other of the unsatisfactory ways sketched for deriving (4) from (1)—so in this respect there is no improvement. b7–8 no longer constitutes an aside, but introduces a further argument, (1a*)–(4*), which is presumably meant to rule out a Platonist move which sees the elements of things as higher genera. Perhaps the argument is that, in their role as belonging to substances and relatives, there is no one category of which being or unity can in every case be a member; but in their putative role as the same elements for all things there would have to be such a category. The latter claim seems reasonable, at least given Aristotle's doctrine of the categories; the former claim is perhaps connected with his anti-Platonic view that being and unity cannot be principles because they are not, in his view, themselves genera.[13] The argument thus seems to presuppose the success of other Aristotelian attacks on Platonist principles.

[13] See *Met*. B.3 998a17–38; for discussion see, e.g., Grice 1988; Shields 1999, pp. 244–60; Berti 2009; Castelli 2010, ch. 2.

1070b10–1071a29

This passage presents Aristotle's positive account of the sameness and difference of the principles of things. It can be divided into three main sections, although it is controversial where the first ends and the second begins (see notes on b10–21):

1070b10–21 (or b10–30): although the elements of some things are (in a way) the same, the elements of *all* things are not the same—except analogically.

1070b22–35 (or b30–5): introduction of a further principle, the moving cause.

1070b36–1071a29: three ways in which the principles (including the moving cause) can be said to be the same:

1070b36–1071a3: the principles of substances can be said to be the principles of all things;

1071a3–17: the principles can all be characterized as actuality or potentiality;

1071a17–29: the principles—including the moving cause—can be said to be the same if they are 'said universally'.

Aristotle's discussion is convoluted, and in two places (b10–35, b36–1071a29) there is some unclarity as to its structure.

1070b10–21

The main claims of this passage are:

The principles of *certain* things are the same—yet they are also different.

The principles of *all* things are not the same in this way [whatever it is]—yet they are also the same 'by analogy'.

So we can ask (i) what is the initial, 'favoured' group—the things whose principles are said to be the same? (ii) In what way are the principles of these things the same? (iii) In what way are they different? (iv) Why do the principles of *all* things fail to be the same in the way that those of the favoured group are the same? (v) What is involved in the principles of all things being the same 'by analogy'? It is unclear where exactly the discussion of the

favoured group and the sameness of its principles ends, and hence unclear where the discussion of the things whose principles are only analogically the same begins and ends. There are two main possibilities. The one I prefer is that the discussion of the favoured group ends at b15–16, 'of these things, then, the elements and principles are the same (though different for different things).' The discussion of principles which are (only) analogically the same then begins in the next sentence (b16) and ends at b21. The other possibility (advanced in Crubellier 2000, pp. 140 and 149–51) is that the discussion of the favoured group ends at b21 with the examples of colour and day/night; although they are mentioned at b16–17, the principles which are analogically the same are only explained at b25–9. What is principally at issue is what the favoured group is (question (i) above). On Crubellier's reading it is natural kinds or 'genera', of which the cases of colour and day/night are supposed to be examples; on this reading 'of these things, then, the elements and principles are the same' at b16 must look forward to these examples rather than back to substances. Aristotle's 'analogy' claim is supposed to be that the principles of things within a natural genus are only analogically the same as those of things in another genus. On the reading I prefer, the favoured group is substances: Aristotle's analogy claim is that the principles of non-substantial items are only analogically the same as those of substances, and the cases of colour and day/night are examples of such non-substantial items.

A possible advantage of Crubellier's reading is that elsewhere Aristotle says that *matter* (perhaps substantial matter: see Prologue to chapter 2, section 4) must be grasped by analogy (*Phys.* I.7, 191a3–15), and one might suppose that the same should apply to (substantial) form: this is a complex issue which I discuss in Judson 2020. On the other hand, there are some drawbacks to Crubellier's reading. One is that it reduces the relevance of b10–15. Another is that the examples of colour and day/night are very oddly chosen if they are supposed to illustrate the sameness of principle within a natural genus: they seem rather to be a very difficult case for that thesis, since they are sufficiently distinct to involve different principles, but not sufficiently different to be obvious examples of different genera (on my reading, they simply represent the two types of way in which (in Aristotle's view) colours come to be: on surfaces and in transparent media such

as air). Its main disadvantage, however, is that analogy seems too weak a relation to underwrite the sameness of the principles across some natural kinds: as I said in the Prologue, section 1, Aristotle distinguishes cases in which animals belonging to different kinds can be said to have the same part or feature and cases in which they can only be said to have analogous ones—and one would expect the same distinction to hold for their matter generally.

The crucial point in understanding Aristotle's position is that the fact that the principles of the favoured group differ from each other is compatible with their also being straightforwardly 'the same': so the principles of all things—which are not straightforwardly the same—must differ from each other (in some cases) in a more radical way. Aristotle does not explain why this is the case. The most likely answer is that the favoured group is *substances*, and that the principles of non-substances cannot—or cannot all—be said to be form, matter, or privation in the same sense as those of substances: at least some of them can only be said to be form, etc., by analogy. See section 1 of the Prologue.

Aristotle begins with question (ii), at b10–17. He is not entirely explicit in the course of this passage as to the answer to question (i)—what the favoured group is. At the outset he speaks of the principles of 'perceptible bodies', and he goes on to say that 'substances are these and the things which are from them' (b13). Unfortunately the reference of 'these' is unclear. He could mean that the *principles* are substances; but this would commit him to the claim that 'substantial' privations are themselves substances, and this is not his view (see notes on a36–b4 above). Perhaps he is only thinking of form and matter here, and the inclusion of privations is simply careless.[14] The alternative is that 'these' refers to what Aristotle calls the 'simple bodies'—fire, air, water, and earth—whose principles are, in Aristotle's view, the hot, the cold (and the wet and the dry: see below), and their matter. Earlier in Λ, as we have seen, Aristotle is prepared to count the matter of perceptible substances as substance, despite its lack of unity, so perhaps he is willing to extend this even to the simple bodies—though he does nothing to signal this watering down of

[14] The apparent inclusion of privations in the class of principles 'present in a thing' at b22–6 also gives rise to difficulties: see notes *ad loc*.

the sense of 'substance', and elsewhere his view is more restrictive: at Z.16 1040b5–10 he says that earth, air, and fire are not substances but only 'heaps' (cf. Z.17 1041b11–28). (There are perhaps philosophical advantages to Aristotle's deploying such a sense, as it gives him a way of accommodating the simple bodies and their inorganic compounds within his general ontological framework: see Prologue to chapter 3, section 3.)

How do Aristotle's remarks about the hot and the cold answer question (ii)? It might be natural to take them to mean that the primary or most important principles of all perceptible bodies are the same because these principles are simply the hot, the cold, and 'primary' matter ('as matter the primary thing which is in itself potentially these'). But this cannot be Aristotle's meaning. On this understanding, 'primary matter' would have to refer to the same kind of thing in any perceptible body, and hence would have to refer to the most basic kind of matter—perhaps to the featureless 'prime matter' which some commentators take Aristotle to be committed to.[15] But the examples at b20–1 make clear that 'the primary thing which is in itself potentially these' (b12–13) refers not to any such 'prime' matter, but to what we might call the highest-level matter of a thing (cf. notes on 'last matter' *ad* 3 1069b35–1070a4 and 5 1071a18–19). In any case, although hot and cold (together with dry and wet) are fundamental to Aristotle's account of organic materials (*PA* II.2–3; for an example of how this is applied, see *PA* II.7), he insists that the primary principles or elements of natural substances are not their lowest-level constituents, but their form and their highest-level matter. Thus, for example, he attacks Empedocles for the view that the growth of a plant can be explained solely in terms of the simple bodies of which it is, ultimately, composed (*De An.* II.4 415b28–416a8). Aristotle's point must rather be that the hot, the cold (and the dry and the wet: presumably he omits them here for simplicity), and their primary matter are indeed the highest-level form, privation, and matter *for the simple bodies*: the principles of more complex natural substances are likewise their—more complex—substantial forms, the corresponding privations,

[15] For discussion of 'prime matter', see Charlton 1970, pp. 129–45, and 1983; Williams 1982, pp. 211–19; Gill 1989, pp. 243–52; Bostock 1995/2006; Broadie 2004; Charles 2004.

and their highest-level matter. If this is his line of thought, it confirms the idea that the favoured group is substances.

It is a little hard to see why Aristotle says 'for what comes to be must be different from them' at b15–16. Ross's explanation is that Aristotle wishes to justify the previous line's 'assumption' that compounds are different from their elements; but this overstates things, since b15–16 offers no *justification*. The remark should, rather, be construed as a mere reminder of the point that there is no problem in taking flesh and bone to be made up from the simple bodies, even though no adequately explanatory account of their natures in terms of hot and cold can be given. Another option is to suppose, with [Alexander] 680.27–30, that the remark is displaced from b9; but this is a desperate remedy.

In what sense are these principles the *same* for different substances? Here the distinction drawn in section 2 of the Prologue between the schematic and the concrete readings is relevant. Aristotle could mean that the principles are numerically the same—that is, that the principles of each substance are (substantial) *form, privation*, and (highest-level) *matter*. This would correspond to the schematic reading. Or (less naturally) he could mean that they are the same *kind* of thing in each case. This would correspond to the concrete reading, according to which a substance's principles are its substantial form, privation, and matter, and the principles of all substances are the same only in that they are all substantial forms, privations, and matter. The qualification that the principles are nonetheless 'different for different things' can likewise be understood in a number of ways: as 'realized or instantiated in specifically and/or numerically different forms (etc.) in different substances', or as 'specifically and/or numerically different forms (etc.) in different substances'. The schematic reading requires some version of the first, the concrete reading some version of the second. The answer we give to question (iii), in other words, depends on how principles are conceived of; and nothing in Aristotle's own answers to questions (ii) and (iii) makes this clear.

Aristotle turns to question (iv) at b17–21: 'But the elements and principles of *all* things cannot be said to be the same in this way, but only by analogy' (b17–18). What prevents the principles of all things being the same in the way as those of members of the favoured group? As I said above, the answer cannot be simply

that different things have different forms, privations, and matter; for the same is true of the members of the favoured group itself, as Aristotle acknowledges when he says that their principles are 'different for different things'. The answer must be that he takes at least some of the forms (etc.) of things outside the favoured group to be forms (etc.) *in a different way* from the way in which those of the favoured group are. As I have said, the only likely explanation for this involves a contrast between the principles of substances and those of non-substances: I explain Aristotle's probable line of thought in section 1 of the Prologue. Aristotle's answer to question (v)—the principles of all things are the same by analogy—is likewise discussed in the Prologue.

If this general interpretation of questions (ii)–(iv) is correct, 'each genus' at b19–20 must refer to the categories. The absence of any connective particle in the two examples which follow (b20–1) is unusual; this form of phrasing is repeated at b28–9. Though closely related, the examples at b20–1 refer to different cases, since air is not a visible *surface*: for discussion, see the second paragraph of this note.

1070b22–35

b22–6: Aristotle here brings in the moving cause, introduced as a principle in chapter 3 (see notes on 1070a6–9), and contrasts it with the other principles as being 'outside'. In chapters 4–5, as I have said, Aristotle uses 'elements' to signify a thing's form, (highest-level) matter, and privation: the rationale for this usage is apparently given here. Aristotle describes these 'elements' as 'the things which are present in a thing [*enhuparchonta*]', contrasting them with the cause which is outside it—the moving cause. This rationale is problematic. There is no difficulty in the idea of form and matter being present in the composite substance, but the privation is precisely what the matter *loses* when it takes on the substantial form, and so it is hardly 'present in the thing'. Of course the composite substance will possess other, 'non-substantial' privations, for there are many non-substantial forms (qualities, quantities, etc.) which it can acquire; and so in this sense privation is present as a principle in the substance: see notes on 1069b32–4. But Aristotle is primarily concerned with

substantial forms (as b13–14 makes clear: see notes *ad loc.*), and hence with 'substantial' privations; when he speaks of form as one of the principles of substance, it is substantial form that he has in mind. So if he is thinking of the wider range of 'privation', including non-substantial privations, instead of the narrower range ('substantial' privations only) which is relevant here, that would be a mistake. An alternative explanation is that Aristotle has run together two ways of taking 'principles of substance'—as 'principles required to explain the coming to be of a substance', which would include substantial privation, and as 'principles of which the substance is composed', which would only include substantial form and matter. (A third, less likely, possibility is that he is thinking of the point that at any given time a *developing* organism has only a partially realized form: it has developed some of the capacities which constitute its form, but not others (see, e.g., *GA* II.3); there might therefore be a sense in which it both had and lacked its form. But Aristotle does not anywhere characterize this development in terms of privation.) It may seem surprising to find the claim that the moving or efficient cause is *outside*, since an organism's own form or nature is a moving cause both of its development into maturity and of its characteristic activities. But at least it is true that a moving cause of a thing *can* be external to it, whereas its matter cannot be (for the distinction see Θ.7 1049a5–18). More to the point, perhaps, is that Aristotle is primarily thinking about the generation of a substance, and as we have seen, the moving cause of that includes a substantial form external to the substance in question (see notes on 3 1074a6–9).

What is most striking about the discussion is the complete absence of any mention of final causes. Final causes, which involve the idea of the end, or the good, of a substance or its parts—and likewise the end of a process or activity—are central to Aristotle's account of natural substances in the *Physics* (though they do not figure in the account of principles in *Phys.* I either) and in his biological works; and in Λ.6–10 the first principle of all things—the unmoved mover—is characterized as causing motion by being a final cause.[16] Why are final causes not mentioned here along with efficient causes? It ought not to be

[16] Cf. the emphasis on the end as a principle in A.2 982b5–7.

because of his view that form and final cause 'coincide' (see *Phys.* II.7 198a24–7),[17] since form and efficient cause also coincide in this sense—and Aristotle appeals to this very point at b30–5. It might be that Aristotle thinks that, however closely the notion of a final cause is tied in with that of change (and Aristotle's idea of change as an imperfect actuality suggests that the connection is a close one), it is not fundamental to the very idea of a natural substance essentially subject to change (for discussion, see Frede 2000a, p. 18). Or—more plausibly, perhaps—it might be that he thinks that a full understanding of *substantial form* will reveal that it itself is teleological in character, so that final causes will figure not as a further principle, but as part of what it is to be (a) substantial form. This is perhaps suggested—but is certainly not spelled out—by the characterization of form in chapter 3's list of the three kinds of substance: 'the thing's nature, which is a this something and a certain state-towards-which' (1070a11–12). Elements of this idea, at least—that being is better than not-being, that life and activity are by their nature good, and have to be understood in terms of their value—are certainly present in the accounts of the Prime Mover and of the place of goodness in the world in the second half of Λ, as is the need for a teleological understanding of the character and behaviour of natural substances: see notes on 7 1072b14–30, 8 1074a24–31, and 10 1075a11–25, and sections 1 and 2 of the Prologue to chapter 10.

'It is clear that principle and element are different' (b23): because something can be a principle without being an element (though not vice versa)—see above. The phrase 'and principle is divided into these' at b24 also appears at b29–30 (see Note on the Text); its latter occurrence looks like a copyist's mistake. Here, presumably, it elucidates the point just made: 'principles can be divided into the elements and the non-elemental ones.'

b26–30: Aristotle repeats the point that different things nonetheless have different principles, and says that it applies to the 'first' moving cause as well. His example identifies the four principles for the case of someone's becoming healthy: health is the form, disease is the privation of health, the body is the matter, and

[17] For a somewhat sceptical analysis of this view, see Rosen 2014.

the moving cause—in the paradigm case—is the art of medicine. It is clear from Λ.3 and from b33 below that 'the medical art / the art of building' here is the *form* of health or of the house, thought of as present in the craftsman's mind and determining her production.[18] By 'first cause-as-a-mover' here Aristotle must mean something like 'principal moving cause': see notes on chapter 3 1069b36–1070a4. On the relevance of this passage to the schematic/concrete issue, see section 2 of the Prologue.

b30–5: Aristotle first appeals to the coincidence of formal and efficient causes mentioned above. He is thinking of the 'same form' claim which we encountered in Λ.3—the claim that (in paradigm cases) a substance is generated by another substance which is the same in form. In this sort of case, identifying form as one of the thing's principles will cover both the substance's own form and its efficient cause; hence there is a sense in which 'there are three causes' rather than four. Notice that Aristotle is prepared to say *both* that the form of human being counts as one principle in the generation of a human being *and* that it counts as two (since the begetter and the begotten are two human beings): this does not hold out much promise that we will be able to settle the issue of the schematic/concrete understandings of 'principle' simply on the basis of Aristotle's ways of counting principles.

'While in the things which result from thought it is the form or the opposite' (b31–2). Aristotle's standard view is that, whereas natural capacities are essentially capacities to produce a single outcome (such as becoming hotter), the 'rational' capacities—including the crafts—are for opposites: see *Met.* Θ.2 and 5. This seems to be the point referred to here; but in the context of the 'same form' claim it is problematic. The 'same form' claim is primarily true of substances (cf. Z.9 1034b16–19), but substances have no opposite (cf. Prologue to chapter 2, section 2), and it is not very plausible that the capacity for building a house is the same as the capacity for producing formless heaps of building materials.[19] Perhaps the remark about opposites is included here

[18] On the use of health as an example, see the notes on 3 1070a13–18.

[19] For discussion of '*this* lack of arrangement' (cf. 'the opposed unstructuredness' at *Phys.* I.5 188b12–13) see Beere 2009, pp. 82–5 (which defends Aristotle) and Judson 2018b, sections IV–V (which offers further criticisms).

because of Aristotle's continuing use of the example of health (medicine is Aristotle's star example of a two-way capacity in Θ.2, as well as his favoured example in the discussions of the sources of generation in Z.7–9), or perhaps it is a later gloss by someone thinking of Θ's claims about capacities.

b34–5 is the first—tantalizingly brief—mention of the momentous idea which will dominate the second half of Λ: the Prime Mover, the principle on which 'depend the heavens and nature' (1072b13–14). 'In addition to these things' probably means 'in addition to the other moving causes just mentioned' rather than 'in addition to these kinds of principle'. In any case, although the account of the Prime Mover's role as a principle in Λ.6–10 focuses primarily on its being a final cause, it is plainly introduced here as an efficient cause: I shall later argue that it is meant to be both final and efficient (see Prologue to chapters 6–7, section 2).

CHAPTER 5

1070b36–1071a30

Chapter 5 comprises this main section, which concludes Aristotle's positive account, a summary of chapters 4–5 (1071a29–b1), and a brief coda to chapters 2–5 as a whole (1071b1–2). Once again there are two ways to understand the structure of the main section. Though both face difficulties, the first is distinctly preferable. It takes Aristotle to be introducing three separate and co-ordinate ways in which the principles of all things can be said to be the same:

(i) substances are the principles of all things because they (alone) are separate (b36–a3);
(ii) all principles can be regarded as (types of) actuality and potentiality (a3–17);
(iii) the principles of all things can be said to be the same if they are 'said universally' (a17–29).

This reading is very strongly suggested by the way in which the three points are connected. Points (ii) and (iii) are introduced by *eti* ('again', or 'further')—Aristotle's usual term for continuing a list—and point (ii) begins with the words 'Again, there is another

way in which, by analogy, the principles are the same': this leads us to expect a further point about the principles of all things, coordinate with the first. The difficulties with this reading are that the summary at the end of the chapter (1071a29–b1) makes no reference to point (ii), and that point (iii) is problematic: it is easy to see how the idea of 'being said universally' introduces a fresh point about the sameness of the principles of certain *subsets* of all things—for example, the principles of all human beings—but it is hard to see how it can be making a fresh point about the principles of all things.

The other way of understanding the section sees (ii) and (iii) as subordinate to the claim about substances in point (i), so that they serve primarily to introduce further ways in which the principles *of substances* can be said to be the same; their application to the principles of all things is only via the claim in (i) that substances are the principles of all things. This reading to some extent mitigates the difficulty over point (iii), though it does not solve it altogether. It certainly does avoid the difficulty over point (ii)'s omission from the final summary, as on this reading we would not expect any mention of that point; but this advantage over the first reading is more than cancelled out by the fact that, by the same token, point (iii) should not be included in summary, and yet a35–6 ('Further, the first thing in actuality') looks very much like a reference to it. The only way to avoid this difficulty would be to take a35–6 as a reference, not to point (iii), but to the Prime Mover; but this is unsatisfactory for a number of reasons: see notes *ad loc*. A further problem is that it is hard to take the introduction of point (ii), quoted above, as ushering in a subordinate point about the principles of substances rather than a coordinate one.

On separateness, see notes on 1 1069a24 and 3 1070a13–18. Note that 'for this reason' in the second sentence could look forward or back, leaving it unclear whether separateness is introduced merely as the distinguishing mark of substances, or whether it is more closely connected with the claim of ontological independence. 'Because without substances there are no attributes and processes': this will only yield Aristotle's conclusion about principles if the reverse does not hold—but such an asymmetry is hard to justify (see Prologue to chapter 1, section 2). Four points are worth noting here. (i) Aristotle's argument does not

show that all things have exactly the same principles, but at most only that *some* principles are principles of all things; so we should understand 'the causes of all things are the same' here as only making the weaker claim. (ii) The argument does not show that the causes of substances are the causes of everything else in the sense that they *explain* everything else as well, but only in the more modest sense that everything—substances and non-substances alike—*depends on* them for their existence. Note that this appeal to dependence sits more easily with the concrete conception of principles than with the schematic one (see section 2 of the Prologue). (iii) Aristotle mentions only attributes and processes, rather than all the non-substantial categories. Perhaps he simply means these as examples of non-substantial items—though it is striking that the same phenomenon occurs in chapter 1 (1069a23: see notes *ad loc.*). (iv) Aristotle's talk of 'all things' must be handled with care. Plainly it must be understood within the general scope of the inquiry of Λ.2–5—viz. that of perceptible substances and their attributes, etc. But as we have seen, Aristotle does not address the question of the various types of thing which are neither organisms nor artefacts, and yet which fail to belong to any of the non-substantial categories either (see section 3 of the Prologue to chapter 3). Some of these things are easy to accommodate within the claim that the principles of substances are, in a sense, the principles of all things: parts and collections of substances depend (to Aristotle's way of thinking) on those substances in a straightforward way. As before, it is the 'simple bodies' and their inorganic compounds that cause a problem. Perhaps 'all things' means 'perceptible substances and their attributes, etc.' (so that the problem is bypassed); or Aristotle thinks of the simple bodies and their compounds as dependent on perceptible substances in a sufficiently strong sense (as Z.16's claim that they are potentialities might suggest); or he takes them to be substances in some reduced sense, as 1070b10–16 may imply. Of these possibilities, the first buys sense at the cost of reduced interest, and the second seems highly implausible; philosophically, the third seems the best option.

a2–3: 'Then soul, perhaps, and body or intellect and desire and body, will be these.' Given the reading of the text which I favour here (see Note on the Text), these are introduced as causes of

substances which, in virtue of being such causes, are also the causes of non-substantial items. Aristotle's claim gives rise to an important difficulty. Aristotle can hold that soul and body are the causes of *some* substances because he thinks that an organism's soul is its form, and its body its matter. But the perceptible substances recognized in Λ include artefacts such as houses as well as natural organisms (see notes on 1070a4–9); and even Aristotle's most favoured class of substances, natural organisms, includes plants, which have no 'intellect and desire' at all; indeed in his view non-human animals only have intellect (*nous*) in a very attenuated sense. So the claim is too strong. This problem arises whatever view we take of the questions of the range of 'all things' and of the status of the simple bodies. The only sensible solution is that Aristotle is really claiming that *substantial form* and *substantial matter*, rather than soul and body, are in this way the principles of all things. If this is what he means, soul and body must be examples of substantial form and matter rather than the items which are the principles of all things, and Aristotle's train of thought must be: 'So, for instance, soul and body are in this way the principles, not just of the composite substance of which they are the form and matter, but also of the attributes and processes which depend for the existence on that substance; hence, in general, substantial form and matter are the principles, not just of composite substances, but of all things which depend for their existence on composite substances—that is, of all things.' (Since 'desire' does not name a substantial form, we should take 'intellect and desire' together as a more specific characterization of 'soul'—only straightforwardly applicable in the case of human beings, as I have said.) If this reading is correct, the remark is a significant example of a claim which requires the schematic conception of principles, since it is simply false on the concrete reading. At the same time, the passage (like many others) shows Aristotle as willing to move between different levels of characterization of principles, since although his claim is about substantial form and matter as principles, he is happy to speak of soul and body as principles too.

a3–17: As Aristotle might have put it, actuality and potentiality are in a way different principles from matter, form, privation, and moving cause, and in a way the same. His idea is that when one of

these latter principles is a principle of something, it is so either as an actuality or as a potentiality. Thus in the generation of a house, the moving cause is the art of building, which is an actuality of the form present in the builder (see notes on 3 1070a13–18); the matter (the bricks) is potentially a house (see 2 1069b14–20, the Prologue to chapter 2, and H.6 1045a23–5). It is unclear what the contrast implied by 'in some cases' at a6 is: perhaps Aristotle is looking ahead to the Prime Mover, which is always in actuality (see the last paragraph of this note).

The sentence at a8–10 contains a number of strange features which, taken together, make it doubtful that it has been correctly transmitted. (i) There is something odd about the structure of the sentence. The first of the four clauses contains the particle *men*, which indicates that there is to be a contrast; the contrast clause should be marked by the particle *de*, and it is clearly going to involve the contrast between being in actuality and being potentially. The second clause is introduced by *kai* ('and'), and so belongs on the same side of the contrast as the first. The third clause contains *de*, and so ought to introduce the other side of the contrast; but 'potentially' only appears in the fourth clause (also containing *de*). The result is very awkward: the least bad construal is to take the first *de* just to mean 'and', and to take only the fourth clause as contrastive (so Rapp 2016, p. 108). This leaves Aristotle saying that the privation is an actuality, however; this too is awkward—and indeed it is hard to fit privation into the actuality/potentiality scheme at all. As we saw in the Prologue to chapter 2 (section 2), Aristotle sometimes treats privation as the (mere) absence of form: on this understanding of privation, all Aristotle can mean by associating it with actuality is that something's having the privation of *F* is (in part) a matter of its being actually not *F*. Sometimes he treats privation as a more positive state its own right—as the particular way of lacking *F* which is required if a thing is to be able to become *F*—but he rightly does not attempt to identify the privation with the potentiality to be *F*.[20] Code avoids this difficulty by taking the

[20] Aristotle may be tempted by the idea that the nature of a privation is derivative from the nature of the corresponding form; it is perhaps this which leads him to gloss over the question of how, if they are actualities, substantial privations fit into his categorial scheme.

third clause to be an aside—'the privation is for instance "dark" or "diseased"' (2000, p. 168); but such an aside seems pointless, and Aristotle ought to be saying something about how, if at all, his claim that the principles can be thought of in terms of actuality and potentiality applies to privation. (ii) The phrase 'the ill' (*kamnon*) at a10 is an unusual (though not impossible) way to refer to the privation of health. *kamnon* is simply a neuter adjective meaning 'ill': we have to supply the definite article *to*, and understand 'the ill' as 'illness' rather than as the perhaps more natural 'that which is ill'. (iii) The qualification 'if it is separate' at a9 is odd: plainly *every* form is an actuality, so the qualification, however it is to be understood, seems inappropriate. (iv) 'That which is from both' (a9) refers to the composite substance, which is indeed an actuality on Aristotle's view, and 'both' refers to form and matter, even though there has been no recent mention of matter. (v) It is unclear why the composite is mentioned here at all: it is an actuality, but it is not a (relevant) cause—rather it is that of which form, privation, and matter are the causes. Code suggests that 'that which is from both' refers to the *other* composite substance which is the efficient cause of the substance in question (2000, pp. 170–1); but this seems hard to square with the fact that Aristotle is focusing on the case in which the actuality and potentiality are in the *same* thing: see notes below. Perhaps Aristotle means to say that when the matter has acquired the house-form, that form is an actuality (cf. Θ.8 1050b2–3).

'These too are different in different cases' (a5–6) makes the same point as 4 1070b17: the actuality that is the form of a house is a different actuality from the actuality that is the form of a human being. We might expect the next point to be that non-substantial actualities are only analogically the same as substantial ones; but in fact 'in different ways' introduces a different idea, namely that different sorts of actuality and potentiality are involved in the case of form, matter, and privation on the one hand and the case of the moving cause on the other. Although the general idea is clear enough, the way in which Aristotle characterizes the two cases at a6–11 and a11–17 is not transparent. The first case is that in which the matter is the same: the idea clearly is that in this case it is one and the same thing that is *F* potentially and actually. When it comes to the case in which the matter is *not* the

same, we might expect that this would involve two distinct things which have different matter from each other; it would be natural to take these to be the agent which brings about the change and the patient on which the agent acts. But if this were right, Aristotle would have to be saying that the agent is actually *F* and the patient potentially *F*; and this cannot be his point, since this does not yield a different type of potentiality from the first type of case, and, as he is about to stress, not all the relevant agents are actually what the patient is potentially. So I think that Aristotle must mean that actuality and potentiality are different in the things whose matter is not the same as the matter of the things which come to be *F*—that is, he is concerned with actuality and potentiality in the *agents*. This does yield a different type of potentiality as well as of actuality, viz. the capacity for *making* something come to be *F*. The form of a thing is an actuality in the sense of being what makes the thing the thing that it is; correspondingly its matter has the potentiality for acquiring that form. In the case of the moving cause, however, the relevant actuality is that of *agency*—the exercising of a capacity to change something—and correspondingly the relevant potentiality is that capacity itself. Note that Aristotle distinguishes exactly these two senses of actuality and potentiality in Θ.6 (1048a25–b9), and says that they are one by analogy. The ideas of actuality and agency will be central to Aristotle's account of the Prime Mover in chapters 6–7 (and this is no doubt part of the reason why he introduces these ideas here: see the last paragraph of this note and section 4 of the Introduction), but as we shall see, the Prime Mover is an agent in a rather different way, and its actuality does not consist in the exercise of a capacity.[21]

In introducing the second case, that of agents, at a12–13, Aristotle says that these are things 'which do not have the same form, but a different one'. This is puzzling, since some agents do have the same form as the thing they generate; and of course this sameness in form is the basis of the 'same form' claim discussed in chapter 3. Ross remedies this by adding *eniōn* ('some') to the text, so that it reads 'of which *some* do not have the same form . . . '. But there are two solutions to the problem which do not require

[21] For a different view of the passage, see Rapp. 2016, p. 109.

changing the text. First, even in the case of two things which are 'the same in form', Aristotle may recognize a sense in which they can be spoken of as if they have different forms: see notes on a27–9.[22] The second solution is perhaps preferable: since Aristotle is concerned not with agents and patients, but with agents alone (see above), he may mean that these things (sc. even when they are all moving causes of the same thing) have different forms *from each other*. This point is certainly borne out by what follows: the examples are precisely of moving causes of the same thing which are different in form from each other. If this interpretation is correct, then the example at a13–17 should be read as follows: the causes of a human being are, first, the elements in Λ's special sense of the term—that is, form, proximate matter, and privation (though privation is not mentioned, and fire and earth are not Aristotle's own candidates for the proximate matter of a human being)—and, second, a different sort of cause, the agents or movers. When Aristotle says at a16–17 that these movers are 'neither matter nor form nor privation nor the same in form', he must on this occasion mean that they are not the matter, etc., *of* the substance whose causes they are; the claim that they are not the same in form here must therefore mean that they are not the same in form as that substance. Now one of these movers—the father—clearly is the same in form as his offspring; and Aristotle's view is that most substantial generations likewise involve something which is the same in form (this is just the 'same form' claim). So this remark must be a compressed way of saying 'these movers need not all be the same in form as the generated substance.' If, as I have suggested, Aristotle's primary concern here is to stress that the movers need not have the same form as each other, the role of the remark must be to supply an explanation of that fact: not every mover of a substance need be the same in form as that substance's other movers, since not every mover of a substance needs to be the same in form as that substance.

Returning to Aristotle's example (for which cf. *Phys.* II.2 194b13), 'the oblique circle' is a reference (from a geocentric

[22] The phrase 'the proper form' (*to idion eidos*) at a14 might also reflect this, and mean 'the form of the human being in question'; but it might instead mean 'the form proper to a human being'—that is, the form of human being—so we cannot rely on this phrase as evidence of a commitment to particular forms.

point of view) to the sun's annual path about the earth along the ecliptic (see the notes on 6 1072a9–18 and 8 1073b17–32): this in Aristotle's view is the cause of all generation and ceasing to be by being the cause of the regular procession of the seasons and hence of the continuity of the transformation of the elements into each other, and of the generation of all living beings.[23] Aristotle is clearly thinking that there is a series of movers—of agents which bring about the generation—which runs back from the father, no doubt through intermediate movers, to the regular approach and retreat of the sun. In chapter 6 it will emerge that one can trace this series even further back, to the Prime unmoved mover mentioned at the end of chapter 4. Lines a13–17 have an extremely important implication: Aristotle is willing to count *many* things as efficient causes of one and the same generation. The view that for Aristotle a process such as the generation of a human being has only one efficient cause is a common one, but this sentence shows that it is false. Aristotle's term for 'efficient cause' is, more literally, 'source of the change', and these lines suggest that anything suitably placed along the causal route which led to the change can count as one of its efficient causes. See also the Prologue to chapters 6–7, section 2.

Although Aristotle says nothing about it here, it will turn out in the second half of Λ that even the highest principle, the Prime Mover, can be understood in terms of actuality: if investigating the principles of natural substances leads us to substantial form, and if this in turn leads us to the notion of actuality, there is a clear sense in which investigating the principles of natural substances leads us to the principle of *all* substances—even unchanging ones. This idea has to be understood carefully, to avoid any self-contradictory version of the idea that the highest principle has itself a principle; but with that caveat, it seems to me to be a key ingredient in the unity of Λ's project: see Introduction, section 4.

[23] See *GC* II.10 336a32–b34, where Aristotle ascribes the variation of the seasons to the 'approach and retreat' of the sun: this might mean the difference in the sun's distance from a given terrestrial region (on Aristotle's theory the sun remains equidistant from the centre of the earth), or it might be a way of referring to the variation in both the length of the solar day and the meridian altitude of the sun, which is the actual cause of seasonal variation.

a17–19: The claim that 'some can be said universally and some not' could be read as 'there are some universal as well as some non-universal truths'—or as 'some *principles* can be said universally and some not.' In either case the upshot is presumably the same, namely that principles may be said to be the same if we speak universally. It is clear what sort of move Aristotle has in mind, but it is less clear how it yields a sense in which the same things can be said to be the principles of *all* things. One can see that, speaking universally, the principles of all human beings could be said to be *human being*, human matter, and the privation of human form (cf. a21–4 below); likewise in the case of all (perceptible) substances the principles could be said, universally speaking, to be substantial form, matter, and privation. But if this is what Aristotle means he faces two problems. (i) If one tries to extend this idea to the principles of *all* things, it seems to fall foul of the point which chapter 4 insisted on, that it is not true straightforwardly, but only 'by analogy', that the principles of *all* things are form and matter. Aristotle seems to acknowledge this point at the start of chapter 4, where he speaks of the principles of all things being the same 'if one were to speak universally *and analogically*' (1070a31–3). (ii) It is hard to see how 'speaking universally' introduces a *fresh* way in which even the principles of all substances can be said to be the same: for chapters 3–4 have already argued that it is straightforwardly true that the principles of all substances are form and matter. If the 'speaking universally' manoeuvre has more subtle resources to deal with these problems, Aristotle gives no hint as to what they are.[24] Although he certainly presents the point as one about the principles of all things, and apparently refers back to it as such in his summary at the end of the chapter (see notes on a35–6), it is tempting to suppose that Aristotle's eye is on the argument which he is about to launch against 'those universals' (a19ff.), and that he is really interested in universal claims about more restricted

[24] We could avoid problem (i) by supposing Aristotle to be operating within the general framework of the claim made at the start of the chapter that the principles of substances are, in a way, the principles of all things; thus the present claim would be that the principles of all are the same because the principles of substances are, universally speaking, the same. But there are difficulties with this reading, as I said earlier, and Aristotle would still face problem (ii).

ranges of things, such as 'human being is a principle of all human beings.'

In the next sentence—'Now the *this* which is first in actuality and something else which is potentially are first principles of all things' (a18–19)—'the this which is first in actuality' might look like a reference to the Prime Mover, which will be characterized as an actuality in chapters 6–7, and was introduced as 'first of all things' in chapter 4. But the addition 'and something else which is potentially' rules this interpretation out, since there is no potentiality at the level of the Prime Mover. Moreover, the sense in which the Prime Mover is a principle of all things, even if not entirely unqualified, is not a matter of speaking universally rather than non-universally. This will be important when we come to the reference to 'the first thing in actuality' at a35–6. It is clear that Aristotle is actually referring to the substance's highest-level form (said to be a 'this something' at 3 1070a11) and highest-level matter (cf. 4 1070b12–13, where matter is described as 'the primary thing which is in itself potentially these'). Alternatively, 'the *this* which is first in actuality' could refer to the thing's proximate efficient cause instead of its form—and if so, to the composite substance (e.g. the father) or to the efficient cause's form. In that case 'and something else which is potentially' would refer to that on which the efficient cause acts to produce the new substance. But in these chapters Aristotle tends to group a thing's form and matter together, as its 'elemental' principles, and not to link together agent and patient; so the reference here is more likely to be to the thing's form and matter. (Note that, in either case, there is no mention of the privation.) The meaning of 'first principles' has also to be gathered from the context. It could refer to the ultimate principles or to the 'proximate' ones: if the 'first this in actuality' is the thing's highest-level form rather than the Prime Mover, 'first principles' too ought to refer to the proximate principles of a thing. The examples which follow at a21–4 (though examples of movers—that is, efficient causes) bear this out.

Even with these clarifications there are two ways to construe the sentence as a whole. (i) We can take it to be making a point about the *difference* of the principles of different things, not their sameness. The line of thought would be: 'another way in which the principles of all things can be said to be the same is that they can be said to be the same if one speaks universally. But they are

not the same if one does not speak universally: each thing's first principles are its highest-level form and matter, and these are different for different things.' This has the advantage of supplying a premiss for the following argument about 'those universals', since the implication would be that the highest-level form and matter are principles in a more fundamental way than principles 'said universally'. But this reading requires us to take 'the principles of all things' to mean 'the principles of *each* thing', while throughout chapters 4–5 it has meant 'the principles of everything', and it would be natural to take it this way here too; it also makes it impossible to connect this sentence with 'the first thing in actuality' at a35–6 (see notes *ad loc.*). (ii) The alternative is to take the sentence as explaining how one can say, speaking universally, that the principles of all things are the same: the principles of all things are the proximate form and matter *taken universally*. As I have said, it is hard to see how this can be straightforwardly true, on Aristotle's account, but the first sentence commits him to it anyway. I prefer reading (ii) since it allows 'principles of all things' to have the sense we expect, and it enables us to make better sense of a35–6.

a19–24: '*Those* universals, then, are not' (a19–20). This abrupt phrase is difficult, and has given rise to at least four readings. One might take it to mean 'those universals do not exist', and as saying that there simply are no universals of the kind referred to in the claims about principles 'said universally'. This would provide strong support for the view that Aristotle believed in particular forms which were ontologically basic in the way proposed by Frede and Patzig (1988; see section 3 of the Prologue). The point would be that only non-universal principles really exist, and its basis would be that 'it is the particular that is a principle of particulars'; it would then be natural to infer from all this that for Aristotle the only real principles are particulars. But Aristotle has just insisted that one *can* make these universal claims, and this leads to two difficulties for taking a19–20 in this way. (i) On this interpretation Aristotle gives as the reason for saying that those universals do not exist the premiss that 'it is the particular that is the principle of particulars'; but this does not seem to be sufficient to rule out the existence of the relevant universals, but only their claim to be the sole principles. (ii) More importantly, if Aristotle

holds that true claims about the universal principles can be made 'speaking universally' even though the universals do not exist, he must understand these true claims in a way which does not commit him to their existence; but then it is odd that he says '*those* universals', since on this reading he has not introduced any universals into the discussion. A second way to understand the remark (Menn 2009, pp. 234–5), is as 'these [i.e the principles] are not the universals.' This involves the difficulty of understanding Aristotle as affirming that 'human being is the principle of human being in general' while nonetheless denying that human being is a principle. A third way to make sense of the remark is to retain 'those universals' as the subject, but to understand some supplement with 'are not', such as 'those universals are not principles in the way that the particular principles are.' Why would they not be? As Aristotle seems to go on to say, although *human being* is a principle, one must not suppose that it exists as 'universal human being': for *human being* to be a principle is for there to be general truths about human beings in virtue of which we can have a general (scientific) understanding of human beings—of what a human being is (see Frede 2000a, pp. 24–7). It would be a further question, however, whether Aristotle thinks that such general truths are underwritten by a general form of human being which was prior to the particular principles of particular human beings. Frede thinks not: the form of human being is only a logical construction out of the exactly similar particular forms found in particular human beings (1987d, p. 78). I find this idea quite unpersuasive, and I think that in any case this reading of the passage leaves it open whether particular humans are principles for other particular humans in virtue of their possession of particular forms, or in virtue of their relationship—whatever it is—to the general form of human being, or both: see further the notes on a27–9. A fourth reading, which I prefer, is that '*those* universals' refers to *Platonist* universals—that is, the Forms. Aristotle's point would be that the Platonist theory in effect confuses universal and particular. There are indeed universal principles, since one can truly say that human being is the principle of all human beings; but one does not have to construe such universals as themselves *particulars* in order to be able to say that particular things have principles which are particular.

The idea that there are universal principles if one speaks universally could be intended either to undercut the status of forms 'said universally' (such as *human being*), by implying that what really matters are the particular principles, or to bolster it—by asserting that while particular principles are necessary, so are forms said universally (e.g. they are the proper, universal objects of knowledge). Aristotle here makes some negative points about universal forms ('there is no <universal human being>'), which Frede takes to show that Aristotle rejects universal forms. This is a possible reading, but it is not the only one: he may only be pointing out that the 'universal' form cannot be responsible for the generation of a substance except via a particular generator. This would be a reasonable point for Aristotle to make about his own account of form; but it would be even more to the point if, as I suggested in relation the remark 'those universals, then, are not' at a19–20, Aristotle is criticising Platonist Forms. His concern to stress the particular may have its origins in the thought that the Platonist Forms are particularly badly suited to be the principles of (the generation of) particulars. It is hard to conclude that Aristotle is in fact arguing that *everything* fundamental is particular.

a24: 'And then the forms of substances'. See the Note on the Text. The remark seems to mean 'the same argument—about universal and particular principles—applies to substantial forms too.'

a24–9: The next two sentences make two points about the ways in which the principles of certain things are *different* (that is, despite their sameness if 'said universally'; but see above). The first, at a24–7, makes the now familiar point that the principles of things in different categories are only the same by analogy. Colours and sounds are in different categories, according to Aristotle: the former are qualities, the latter (*Sens.* 6 446b25–6) a kind of process. The next sentence (a27–9) turns to the case which is, as it were, at the other extreme—that of the principles of things which are not merely in the same category but also the same in form: here too there is a sense in which the principles are different: 'And the causes and elements for things which are in the same form are different, not in form, but because there is a different one for different particulars: your matter and the form and the mover,

and mine, <are different>; but they are the same in the universal formula.' This passage—like the general thrust of the whole passage—is very strong evidence for the view that Socrates' form and Kallias' form are in some way or other two items. The phrase 'your matter and the form and the mover, and mine' can be taken in a number of different ways, as equivalent to (i) 'your matter, your form, and your mover, and my matter, my form, and my mover'; (ii) 'your matter, and my matter—and the form and the mover'; (iii) 'your matter, and my matter—and the form, that is, the mover'. Reading (iii) is quite awkward, and does not sit well with Aristotle's repeated listing of form and mover as coordinate principles in these chapters. I prefer (i), which is the standard reading, over (ii) and (iii). Konstan and Ramelli (2006) argue for (ii) on the grounds that the words 'your' and 'mine'(*sē* and *hē emē*) are in the feminine singular, and thus agree in number and gender with 'matter' (*hulē*), and that this is not the usual way to connect possessives with three terms of different genders (the terms for 'the form' and 'the mover' are both neuter). But on the other side, it hard to see why Aristotle includes the form and the mover in the list if he does not wish to distinguish your form and your mover from mine. In any case, even if the possessives only qualify 'matter', it is hard not to understand Aristotle as saying that each of the three principles in you and in me is different: at the start of the sentence he says that the causes and elements (plural) in these cases are different 'because there is a different one for different particulars': the remark applies to all the principles, and not just to matter (Konstan and Ramelli interpret this remark as 'because there is something different in each of the different individuals', but I do not think it can mean that). For these reasons I am also unconvinced by Code's suggestion (2000, p. 178) that what Aristotle is saying is different in you and me is the *collective triple* of matter, form, and mover—and that this is different simply because the matter is different in each triple—rather than that each member of the triple is different.

This sentence does, then, appear to commit Aristotle to holding that my form and yours are in some way distinct (and hence to rule out the 'one item' view outlined in the Prologue, section 3); we may well interpret a20–4 in the same way. It does not, however, begin to settle the question of what this difference consists in:

whether my form and yours are ontologically basic particular forms of the kind proposed by Frede and Patzig (and if so whether there are also universal forms which are in some way posterior to these), or distinct instances of a universal form, or distinct realizations of a general form understood in some other way.

1071a29–b1

This passage is a summary of chapters 4–5.

a31–6: Lines a31–4 summarize the results of the first part of Aristotle's positive account, 1070b10–35. The phrase 'when the causes and elements are said in many ways' means 'when they are spoken of in a way which ignores the fact that items in different categories cannot all be characterized as causes or elements *univocally*': see notes on 1070b10–21 (for a different view, see Crubellier 2000, p. 137 and n. 2). a34–5 refers to the first of the three further ways in which all things can be said to have the same principles outlined at 1070b36–1071a29. We might expect this to be followed by a summary of the other two ways; what Aristotle actually gives us is the cryptic sentence at a35–6, 'Further, the first thing in actuality.' 'Actuality' is my usual translation for *energeia*, but here it translates *entelecheia*. These terms are discussed in the notes on 6 1071b12–21; as Aristotle uses them they are very closely connected in sense, and though they are not synonymous I doubt that there is any significance in his choice of *entelecheia* rather than *energeia* in this particular context (see below). The remark could be understood—as Ross and Rapp (2016, p. 110) take it—as a reference to the Prime Mover: 'another way in which all things have the same principles is that they all depend on the Prime Mover.' This has the advantage that we do not need to supply very much to complete the sentence, but that is outweighed by a number of drawbacks. (i) There has only been one brief reference to the Prime Mover so far (at the end of chapter 4), and although chapters 6–7 will reveal its crucial role as the highest actuality, this role has yet to be mentioned. (ii) The account of ways in which all things have the same principle(s) in chapter 5 did not mention this way (the material for it is there in the idea of the Prime Mover being the ultimate efficient cause of all things,

but the inference has not been drawn), so it would be odd for it to appear in this summary. (iii) There has been, on the other hand, a reference to 'the *this* which is first in actuality' at a18–19, which must signify proximate form rather than the Prime Mover. It is true that a18–19 uses the term *energeia*, not *entelecheia*; but it is hard to make much of this. The choice of term might have been significant if *entelecheia* were Aristotle's favoured expression in connection with the Prime Mover; but in fact he uses it to characterize the Prime Mover only once (1074a36), and it is actually *energeia* which is his favoured term. It is more economical, then, to suppose that a35–6 is a reference to a18–19 than to suppose that the summary introduces a new way in which something is a principle of all things. (I assume here my preferred reading of a18–19, according to which it is about the sameness of principles 'said universally'. If we took that sentence to be about their difference instead, then we should take a35–6 as [Alexander] does (685.11–14), namely as introducing the summary of the differences among principles which occupies a36–b1—that is, as 'Further, <the first principle in each case> is what is first in actuality.')

a36–b1: 'All the opposites': Aristotle means forms and privations (cf. 'chapter 2' 1069b3–9 and notes, and the Prologue to chapter 2, section 2). 'Which are neither said as genera nor said in many ways': since 'nor said in many ways' refers to the categories, 'genera' here presumably refers to kinds such as *human being* or *pale*, so that 'neither said as genera' picks up (at least part of) the point about principles 'said universally'. 'And further the matters'—that is, the matter of different things—completes the familiar trio of principles; in this highly compressed summary the absence of the moving cause is not significant.

1071b1–2

After the summary of chapters 4–5, the final sentence of the chapter sums up the course of chapters 1–5 as a whole—reminding us that the study of perceptible substances is only part of the project of Λ.

CHAPTERS 6–7

PROLOGUE

The main purposes of chapters 6–7 are to argue for the necessity of at least one unchanging substance (it will turn out that there is a plurality of them), appealing to a number of arguments set out at much greater length in *Phys.* VIII, and to explain the essential character of substance(s) of this kind and its (or their) relationship to the rest of the world. Aristotle's presentation presupposes a knowledge of some of his cosmology, discussed in sections 2 and 3 below and in the Prologue to chapter 8.

1. Aristotle's Cosmology

Aristotle gives his most extensive account of the structure of the universe in his work *De Caelo* (*On the Heavens*). Much of this account was written before *Phys.* VIII and Λ, and at least some of it can be taken as constant across subsequent works. As we shall see, however, it is unclear how far the *De Caelo*'s conception of the heavenly bodies and of the explanation of their motion is maintained as the background, first to *Phys.* VIII and then to Λ; this issue is complicated by the possibility that some parts of the *De Caelo* were written independently of the rest, and that others were revised or added later in the light of one or other of the subsequent works. For more detailed discussion, see Guthrie 1939, Introduction, and Judson 1994.

Aristotle endorsed the view very widely, though not universally, accepted in the ancient world that the earth was stationary and occupied the centre of the ordered world or *cosmos*, with the heavenly bodies rotating around it. This geocentric view was not, for Aristotle, simply a naive assumption, but an integral part of what was a highly successful physics, combining (as would its successor, Newtonian physics) comprehensiveness of explanation with elegance and economy: see the Prologue to chapter 8 and Judson 2015.

Aristotle uses the term 'stars' (*astra*) to apply both to what we now normally call the stars and to the moon, the sun, Mercury, Venus, Mars, Jupiter, and Saturn. Aristotle calls the former group the 'unwandering stars', because of their regular and seemingly unvarying apparent motion, and the latter group the 'wandering stars' or 'planets'. The earth is not called a planet because on his account it does not move. I shall follow Aristotle's usage of 'stars' both in the commentary and in the translation. The cosmos is, in his view, eternal, spatially finite and unique; it is spherical in shape, and constitutes the entire universe—there is neither matter nor void outside it. The most distinctive features of Aristotle's world-picture as sketched in the *De Caelo* are, first, the sharp distinction he draws between the heavenly bodies, which are not subject to generation, ceasing to be, or qualitative alteration, and which move in perfectly regular and unvarying ways, and the 'sublunary' region, which we and all other organisms inhabit ('sublunary' because the moon is the lowest of the stars in Aristotle's world): here there is also great deal of order, but many regularities hold only 'for the most part', and in addition things may happen by luck or chance. Second, despite this sharp distinction, the physics of the whole universe is underpinned and unified by the idea that each element is characterized by a *natural motion* in a specific direction, related to its *natural place*. The sublunary region contains four elements, fire, earth, air, and water, which are characterized by different permutations of the pairs hot/cold and dry/wet. By nature fire moves upwards towards the spherical periphery of the sublunary region, earth downwards towards the centre of the universe; air and water have natural motions up and down respectively, towards intermediate positions. What we might call the *natural condition* of each element is to be either in motion towards its natural place or to be at rest there—more precisely, to be at rest as part of a mass of that element which is appropriately located in, or in the case of earth around, its natural place.[1] The four elements can be transformed into each other, and can combine to make inorganic and organic compounds. There is a fifth element—or rather, as Aristotle calls

[1] For Aristotle's elegant argument for the sphericity of the earth, based on the natural motion of the element earth, see *Cael.* II.14 297a8–298a20.

it, 'the first element' or 'the first body'—which fills the region of the stars and whose natural motion is in a circle around the centre of the cosmos; it is not subject to transformation into or combination with the other elements. This first element came to be called 'aither' (though possibly not by Aristotle himself: see Falcon 2005, pp. 113–17), and for convenience I shall use this term too.

The apparent motion of the unwandering stars seemed easy to account for on such a model. Aristotle takes the stars to be spherical bodies which are fixed within the 'rim', so to speak, of a hollow sphere (the modern technical term for such a sphere is a 'shell', but I shall follow Aristotle's usage and speak of 'spheres'):[2] the rotation of this sphere about the centre of the earth gives rise to the unwandering stars' apparent motion (the variations in the fixed stars' apparent motion due to precession were not discovered until the second century BCE: see notes on chapter 8 1073a28–32). Accounting for the apparent motion of the moon, sun, and other planets is not so easy. Like Plato (*Timaeus* 36b6–39e2; *Laws* VII 821b5–822d1), Aristotle hoped that the apparently irregular motions of each of these bodies can be explained as the combined effect of a number of perfectly regular circular and homocentric motions operating at various angles to each other, at different speeds, and in different directions. In this Aristotle was presumably inspired by the work of the astronomer Eudoxus (roughly contemporary with Plato), whose theory he reports in chapter 8; in the case of Plato and Eudoxus the influence may have been in either direction, or in both. Eudoxus' complex homocentric scheme is a key part of the subject matter of chapter 8, and will be discussed in the Prologue to chapter 8, section 2, and the notes on 1073b17–38. Plato envisages a composite of two motions for each planet—one daily motion from east to west, like that of the unwandering stars, and a slower one in the opposite direction and at an angle to the first to account for the planet's apparent motion across the signs of the zodiac. It is unclear what mechanism (if any) Plato imagined for this, and whether he thought this two-motion system adequate to account for the intricacies of the planets' motion. There are strong indications of a two-motion system in

[2] For the location of the visible stars *within* the body of the hollow sphere, see Judson 2015, section 5.

the *De Caelo* as well (II.2 285b27–33, 10, 14 296a34–b3); but one chapter (II.12) clearly presupposes a detailed multi-motion scheme.[3] It seems as if the *De Caelo* does not have an entirely consistent view, and it may be that II.12 is a later insertion by Aristotle. What is more consistently presented in this work is the mechanism which Aristotle envisages for the required circular motions, whatever their number: the stars and planets are set in a number of homocentric, nested spheres, made of aither, which rotate in various ways about the centre of the cosmos (II.7, 8, 12 292b25–293a11; cf. 2 285a27–286a2, 11 291b11–17). Aristotle's view in the *De Caelo* is that both the heavenly spheres and the stars are alive, and that the outermost sphere, at least, is a divinity (I.9 279a30–b1, II.1, 3 286a9–12). In Λ he retains the former view (see section 2) but it is the unmoved movers that are presented as the divinities here.

The details of the astronomical scheme which Aristotle advances in Λ will be discussed in the Prologue and notes to chapter 8; the questions which will concern us here relate to the material nature of the heavenly bodies and the explanation of their motion. Λ.6–8 argues that the motion of each sphere is dependent on a causal relation between an immaterial substance—an unmoved mover—and the sphere's love for that substance. In the *De Caelo* there is no mention of an unmoved mover (except for two self-standing passages in II.6, 288a27–b7 and 288b22–289a8, which were probably inserted after the composition of *Phys.* VIII), and there is no emphasis on any role for the spheres' soul in generating their motion. On the contrary, all the emphasis is laid on the fact that the spheres are made of an element which, like the other elements, possesses a natural motion (I.2–3)—indeed Aristotle repeatedly stresses that the whole cosmology of *Cael.* I–II rests on the doctrine of natural places and motions (see e.g. II.13). If we had not read *Phys.* VIII or Λ, we would find it natural to infer that the five elements' natures were, in Aristotle's view, an entirely sufficient explanation of elemental motion, at least in the absence of hindering factors. In the case of aither there are two crucial points of difference from the other elements about which Aristotle is explicit (I.9 279a33–b3, II.1):

[3] Possibly an early scheme by Eudoxus, of which the one described in Λ.8 is a revision; for a different view, see Easterling 1961.

that nothing can hinder or block its motion, and that—although of course it has a natural location, the region of the stars—there is no natural place *towards which* it moves. The latter point means that there is a qualification to the parallel to the other elements: aither's natural condition cannot have the same disjunctive form (to be either in motion towards or at rest in its natural place), but is simply to be in motion around the centre of the cosmos. The former point, taken with the insistence on the parallel with the other elements, strongly suggests that (in the *De Caelo*) Aristotle supposes that the nature of the aither by itself explains the fact that the heavenly spheres move in a circle.[4] It is thus reasonable to suppose that at least the main parts of the *De Caelo* account were written before Aristotle came to believe that the circular motion of the spheres required an unmoved mover, and that the arguments of *Phys.* VIII represent a substantial development in his views. What is important here, however, is not the compatibility or incompatibility of the *De Caelo* account with the requirement for an unmoved mover, but rather Aristotle's silence about any significant disanalogy between the natural motion of aither and that of the sublunary elements and about any further causal factors involved. I shall return to the question of (in)compatibility in section 2: this is a controversial matter, not least because when Aristotle introduces the unmoved mover(s) in *Phys.* VIII and Λ he says nothing at all about this question or—except for his brief reference to 'matter for whence and whither' in Λ.2—about the nature of the aither.

2. The Unmoved Movers

Surprisingly, the *Physics* says nothing about how the unmoved mover for which it argues moves without being moved, or about

[4] The differences in the spheres' speed, direction, and inclination cannot be due to the simple nature of aither: in this sense it has a 'blank capacity' for determinable circular motion around the centre of the universe which can be realized in any of indefinitely many different specific, regular rotations (cf. Bodnár 1997, p. 111). These differences must be due in some way to the structure of the spheres and/or their souls, and some of them are given a teleological explanation (see II.2 and 12; Judson 1994, section 1, and forthcoming). This issue is much more to the fore in Λ.8: see the notes to 1073b17–1074a31.

its character; nor is anything said about the nature of the heavenly spheres. We are thus left to guess whether Aristotle takes the *De Caelo*'s account of them as composed of aither, and of aither as possessing a natural circular motion, as still in place. In Λ we are told that the heavenly bodies have 'matter for whence and whither' (the so-called 'topical matter': see notes on 2 1069b24–6 and section 5 of the Prologue to chapter 2); and of course we are told rather more about the Prime unmoved mover, and by implication about the other celestial unmoved movers argued for in chapter 8. But we still can only speculate about much of the detail of their relationship to the heavenly spheres and of the spheres' nature.

Λ.7 presents the famous doctrine that the Prime unmoved mover 'causes motion as something beloved'. The unmoved mover is thus the *final cause* of the motion of the outermost sphere. Not all final causes, in Aristotle's view, involve love or desire: he thinks, for instance, that the development and operation of an animal's organs have final causes in terms of the animal's survival or well-being, and these causes do not, in general, operate via the animal's desire for survival. But his term here, *erōmenon*, unequivocally introduces the notion of love (see also the notes on 1072a26–b3). Aristotle thinks that objects of desire *in general* are not only final causes but also 'unmoved movers' in the weaker sense that they cause motion without transmitting it (but they are not the ultimate source of motion: see Argument C (ii) in section 4). He gives an account of this in *De An.* III.10:

> It is always the object of desire which produces movement, but this is either the good or the apparent good; and not every good but the practicable good . . . . That which produces movement is twofold: that which is unmoved, and that which produces movement and is moved. That which is unmoved is the practicable good, and that which produces movement and is moved is the faculty of desire . . . .
>
> (433a27–b17; cf. *MA* 6)

That the cosmic unmoved mover is a final cause, causing motion through being loved, commits Aristotle to a great deal of further 'machinery' about which he is entirely silent. The sphere of the unwandering stars must be the body of a living being which is capable of apprehending and in some sense loving the unmoved mover; and this love must in some way give rise to the sphere's

eternal motion. Λ.8 will reveal that each heavenly sphere is moved by an unmoved mover of its own; thus each sphere must be alive and must love its own unmoved mover.[5]

To avoid some of this complexity, and some of the difficulties which I shall mention below, some commentators have taken Aristotle's claim to be metaphorical, or have denied that the unmoved movers are in any way 'transcendent' or separate from the heavenly spheres (see Broadie 1993; Kosman 1994a; Berti 2000): they are instead just the spheres' forms or souls. (Some of these commentators are reluctant to use the term 'souls', however, since the *De Anima*'s account of soul is in terms of a living being's capacities, and as we shall see later, it is problematic to what extent the spheres' life is a matter of the exercise of capacities.) Interpretations of this kind are very hard to sustain, for a number of reasons. (i) In his summary of chapters 6–7 at 1073a3–5 Aristotle describes the unmoved mover(s) as 'separate from perceptible things'. Broadie argues that, because of its eternal character, the sphere's eternal motion is not perceptible, and so its mover 'is beyond anything perceptible' (1993, p. 398). But Aristotle is explicit in Λ that eternal changing substances (the heavenly bodies) count as perceptible, their eternal character notwithstanding (see 1 1069a30–4 and notes); and even if the eternal motion itself does not count as perceptible, the internal unmoved mover is, ex hypothesi, *not* separate from its heavenly sphere, so is not 'beyond anything perceptible'. (ii) By the same token, the study of the 'souls' or forms of the heavenly bodies does not belong to Λ.6–7 at all, but to chapters 2–5, whose subject matter, according to Aristotle's programme for Λ, is perceptible substances both perishable and eternal (1069a30–b2): this includes the forms of such substances, as chapter 3 1070a9–13 makes clear. If the unmoved movers are not transcendent, it would be the business of these earlier chapters to discuss them. (iii) Aristotle's standard view is that when a soul causes motion in its body the soul itself is moved 'incidentally';[6] but Aristotle insists that the Prime unmoved mover is not moved even incidentally.[7] (iv) The argument of *Phys.* VIII is entirely

[5] A somewhat different view is advanced in Blyth 2015.
[6] *Phys.* VIII.6 259b16–20; *De An.* I.3–4. See notes on 8 1073a23–5.
[7] Λ.8 1073a23–5; *Phys.* VIII.6 258b13–16, 259b7–31.

opposed to the idea that the ultimate origin of motion is something's engaging in any form of pure self-motion; yet on these interpretations that is what the outermost sphere (the composite of 'soul' and body) seems to engage in. (v) The phrase 'it causes motion as something beloved' (1072b3) implies that the subject of 'it causes motion' is exactly the same as the thing which is beloved, and so is hardly the way to characterize how an unmoved mover internal to the sphere is a cause of the sphere's own motion.[8]

Charles offers a quite different deflationary view (2012, pp. 246–53). He argues that in many cases—including, possibly, the case of Aristotle's appeal to the Prime Mover as the final cause of the heavenly spheres' motion—when Aristotle appeals to teleology in cosmological contexts he does not mean to commit himself to the 'literal truth' of these appeals. According to Charles, Aristotle is not aiming to do any more than to give an account of puzzling phenomena which will show how they are not *irredeemably* puzzling: he is making no claim that his explanation is *true*. When, as he often does in such contexts, Aristotle describes the view he outlines as 'reasonable' (*eulogon*: for references see the notes on 8 1074a14–17), we should not, Charles thinks, take this to mean 'warranted' or 'probably true'; rather it signals that the account is meant not as an attempt at the truth, but only as a 'likely story' which does not set out to describe reality. Charles's main argument is that Aristotle is not in a position to establish what he needs to in order to ascribe genuine teleology to heavenly bodies—in particular, that they have unified natures which involve goal-directed capacities sensitive to their good. Aristotle is certainly impressed by how difficult it is to know things about the heavenly bodies.[9] But from the fact (if it is one) that Aristotle cannot to his mind demonstrate that the heavenly bodies possess all the characteristics required for teleology, it does not follow that he does not think it probable that they do actually possess these characteristics—nor that it would be unreasonable for him to think that. If he has reason to suppose that they are alive, then he has reason to suppose that they are

[8] On Broadie's interpretation, for example, the object of the mover's love is its own intellectual activity of generating its motion (1993, pp. 386ff.).

[9] See *Cael.* II.3 286a4–7, 12 292a14–18; *PA* 1.5 644b24–8 and 31–2.

subject to teleology: it would be question-begging to argue that because a full demonstration of their natures is not available he cannot have reason to suppose that they are alive. It is also unclear what sense we can make in these contexts of the idea of an account which is 'reasonable' but not any sort of attempt to describe reality. Some commentators think that this is exactly what Plato means when he characterizes the *Timaeus* as a 'likely account' or a 'likely story' (an *eikōs logos* or an *eikōs muthos*: *Timaeus* 29b1–d3). If this is correct, it will be because Plato thinks that there is no such thing as knowledge of—or perhaps even, strictly speaking, being true in—the sensible world;[10] but Aristotle does not share this view. Another possibility, in principle, might be that 'reasonable' in these contexts is a term of purely 'dialectical' assessment, meaning reasonable (only) on the basis of commonly held views to which Aristotle himself is not necessarily committed (or which he neither accepts nor rejects);[11] but Charles rightly rejects the view that all Aristotle's teleological arguments are in this sense purely dialectical: '[m]any are aimed to cohere not with widely held opinions but with what is independently plausible or with results which Aristotle takes himself to have established about (e.g.) the explanation of animal behaviour' (Charles 2012, p. 262, n. 46; cf. Falcon and Leunissen 2015, and the notes on 8 1074a14–17). One clear example of this is *Cael.* II.12 292a18–21: 'we think of the stars as mere bodies and units, having a certain arrangement but completely lifeless; but we ought to think of them as partaking of action and life.' In any case, the various appeals to teleology in Λ all suggest that Aristotle takes himself to be aiming at truth. (i) As we have seen, he straightforwardly asserts that the Prime Mover 'causes motion as something beloved': there is simply no indication that he means 'we have no idea how it can cause this motion without being moved: here is a mere "likely story".' (ii) Λ.8's argument that there are 56 (or 50) immaterial substances depends crucially on (what Aristotle takes to be) a deductive argument in his own person which relies on teleological premises such as 'heavenly motions are for the sake of the star they help to move' (see

[10] For discussion of this issue, see Johansen 2004, ch. 3.
[11] Bolton 2009 argues for a position close to this.

notes on 1075a24–31). He qualifies these premisses as 'reasonable'; but he contrasts this with *provable*, not with aiming at truth (see notes on 1074a14–17), and the argument would be pointless if Aristotle thought of himself as not in the least committed to their truth. Moreover, he congratulates himself on doing better than the Platonists on the grounds that 'they have said nothing which can even be clearly stated concerning the number of such substances' (8 1073a15–17). (iii) Aristotle concludes Λ with a list of the many difficulties we will face if things are not as his own account says—that is, if his account is not *true*.[12]

A number of questions nonetheless arise for Aristotle's view that the Prime Mover causes motion as something beloved. (i) How do the heavenly spheres apprehend their unmoved mover? One passage (*De An.* II.4 415a26–b7) might suggest that Aristotle ascribes some form of cognizance of the ultimate unmoved mover to *every* sentient being, but on any account this is just a manner of speech, since the remark applies also to plants, which according to Aristotle are incapable of any cognition (see the Prologue to chapter 10, section 1, and the notes on 10 1075a16–25). In the case of the heavenly spheres, however, some form of intellectual grasp of the unmoved mover is clearly required; but we are told nothing about the nature of this understanding, nor of the mechanism which produces it (it cannot, for instance, be inferential in the way that our grasp of the unmoved movers is).

(ii) In what sense is the unmoved mover the object of the sphere's love? In the *De Anima* account quoted above, the everyday 'unmoved mover' operative in each case of ordinary action is the practicable or attainable good; but a heavenly sphere cannot attain its cosmic unmoved mover, or even its form of perfection—or if it could, it would be in virtue of its thinking, not in virtue of its eternal motion. For this reason Aristotle's account of how the unmoved mover figures in the sphere's desire does not conform with his general account of everyday 'unmoved movers', unless we supposed the sphere to be in an eternal state of *frustrated* desire. This point is often used as a criticism of Aristotle's account

[12] These considerations also tell against Caston's view that the Prime Mover's causing motion as something beloved 'needn't literally involve a desire or conscious state at all' on the part of the heavenly spheres, and that it is simply that their behaviour tends towards perfection (1999, p. 217).

of the cosmic unmoved movers—or as a reason to doubt that the unmoved movers are separate from the spheres (see, e.g., Berti 2000, pp. 186–7)—but I think the objection is misplaced. The difficulty arises only because Aristotle's account of unmoved movers in general is over-simple: it does not account for any case of what we might call 'inspired action'. The essential idea behind any appeal to final causation of *X*'s acting, when this involves a desire, is that *X* is sensitive to a good or end at least in the sense that had the good been different in a way which would have rendered *X*'s action inappropriate in relation to it, *X* would (normally) have acted differently.[13] Cases in which the final cause inspires action through love or admiration (a not uncommon occurrence in ordinary human life) clearly satisfy this general characterization, even though they do not satisfy the *De Anima* model: they require a more complex, two-level model, giving rise first to a desire not to attain but to emulate the final cause, and thus to one or more lower-order desires to pursue what the subject takes to constitute appropriate emulation for itself. The objectors point out that Aristotle is silent about this difference in chapters 6–7—but Aristotle is silent about many important matters in these chapters, as throughout Λ, and so arguments from silence are especially weak here.

(iii) Why cannot the motion of the sphere depend merely on its falsely believing that there is an unmoved mover of the appropriate sort—an apparent rather than a real good? Aristotle might have several replies. First, this would mean that the sphere was the ultimate source of its own motion—a case of the 'absolute' self-motion he rejects (see Argument C in section 4). Second, the holding of this false belief would be an entirely unexplained brute fact about the universe: this might be hard to accept against the background of Aristotle's 'intelligibility constraints' (see Argument A in section 4). A related point is that there is on Aristotle's account an explanation of why the heavenly sphere's cognitive state is unchanging and eternal—namely that it is the thought of an object which is itself unchanging and eternal; it might seem mysterious that the sphere's self-generated false belief

[13] For some of the issues this raises, see Charles 1991 and 2012: I discuss the latter in the notes on 7 1072a26–b4.

is immune to change. Third, the idea that the highest being in the universe could be permanently mistaken about the most fundamental feature of the world would go deeply against the grain for Aristotle, who takes it for granted that beings capable of knowledge are naturally fitted for achieving it.[14]

(iv) The arguments of *Phys.* VIII for the need for a first mover are cast in terms of efficient causes (see especially Argument C in section 4): by introducing the unmoved mover as a *final* cause, has Aristotle failed to fulfil his own requirements? The unmoved mover's role as a final cause is sometimes held to be incompatible with its being an efficient cause of the sphere's motion as well (see, e.g., Vlastos 1963/95), but I do not think that this is true (for discussion, see Judson 1994, pp. 164–7; Berti 2000; Frede 2000a, pp. 43–7; Tuozzo 2011; Lagnerini 2015). Objects of desire are efficient as well as final causes in those—quite common—cases in which the goodness of the final cause is the efficient cause of the occurrence of the relevant desire (as when the good features of health are what prompt my desire to be healthy): in such cases the desire is the proximate efficient cause of the action, and the efficient cause of the desire is a more remote efficient cause of the action (for this distinction see, e.g., 4 1070b27–35 and 5 1071a14–17, and notes). Such cases are neither anomalous nor exceptional; on the contrary, this type represents the normal causal structure when, e.g., intentional action is focused on an already existing object (whether as an achievable goal or as the object of emulation). Objectors often cite *GC* I.7 324b14–15, where Aristotle says that the final cause does not act upon things (is not *poiētikon*). Even if Aristotle meant this as a quite general truth, it would not follow that final causes could not be any sort of efficient cause. In any case, what Aristotle has in mind here are those cases of being active which involve *interaction*, and by the same token he is thinking of final causes such as health, which are clearly not *active*: he simply does not have cases such as Λ's unmoved movers in view. Note that in the type of case in which intentional action is focused on an already existing object there is a sense in which the object of desire is a final cause primarily,

[14] One might also add to this Aristotle's claim at Θ.9 1051a19–21 that 'in eternal things there is nothing bad. . . .'

and an efficient cause only in virtue of being a final one. This is because it can only act as an efficient cause in the way it does (i.e. by being perceived to be good) if it also acts as a final cause; whereas it could in principle act as a final cause in the way it does (by being the object of a desire) without being the efficient cause of the desire. In the case of the unmoved movers, of course, this asymmetry holds only at a very abstract level, since the envisaged counterfactuals are only remotely possible, if at all.

This interpretation brings Λ into line with the arguments of *Phys.* VIII: there is no need to see any change of view from an account in terms of efficient causes to an account in terms of final causes. It also makes it possible to give the terms *kinētikon* and *poiētikon* ('something which can cause change', 'something which can act upon things') at 6 1071b12 their most natural sense—as referring to efficient causation (cf. Berti, 2000, p. 186; Frede 2000a, p. 43)—without undermining Λ's central claim that the unmoved mover moves as an object of love.

3. The Material Nature of the Heavenly Spheres

In the face of the requirement of one or more unmoved movers, what should Aristotle say about the nature of the heavenly spheres? If the unmoved mover is required as the ultimate source of any motion, then, whatever Aristotle's position was in the *De Caelo*, he cannot hold that the spheres are made of an element whose natural condition is to be in motion. In *Phys.* VIII he argues that the four sublunary elements do have an external cause of motion in whatever causes them to come into existence or removes an obstacle to their natural motion (see Argument C (ii) in section 4); but since the spheres are ungenerated and there are no obstacles to their motion, he cannot suppose the role of their external source of motion to be the same. It might be in the spirit of this account to hold that it is the spheres' nature to move, and that the unmoved movers' role is to sustain the spheres' *existence*; but this would be impossible to square with the claim that the unmoved movers accomplish their task as objects of the spheres' love. Aristotle says nothing about this problem, but the natural solution is to weaken the parallel with the other elements somewhat, and to suppose that the body of which the spheres are

composed (their 'topical matter': see 2 1069b26 and notes) has a natural capacity for circular motion which requires continuous *activation* by the desire of the spheres' souls and hence by the unmoved movers.[15] In this way, Aristotle can retain the *De Caelo's* key unifying idea that the five elements all have natural motions defined by the centre and periphery of the universe, while insisting on the need for one or more unmoved movers.

A further problem emerges, however, if this view is combined with another idea to which Aristotle seems committed by what he says at 6 1071b12–21—that eternal things possess no unrealized potentialities. If the 'activation' account is correct, then it seems that the natural condition of the aither of which the heavenly bodies are composed is to be in circular motion *or to be at rest*: it has, we might say, a natural capacity for being in these two conditions.[16] This would mean, however, that the spheres would possess a potentiality for being at rest which is never exercised. Aristotle says nothing about this difficulty, and indeed—with the possible exception of the passage in Θ.8 discussed below—shows no sign of developing a view of the heavenly bodies which takes account of this idea. How could he respond? He would, in my view, be best advised to give up or modify the idea that eternal capacities cannot go unactualized: if he does not, as we shall see, he will have to give up the unification of aither and the sublunary elements entirely. In the notes on 1071b12–21 I suggest that Aristotle's denial of unactualized eternal potentialities is based on something analogous to his 'nature does nothing in vain' principle—the idea that eternal substances should not have any essential features which have no function. If this is right, it would seem that Aristotle could maintain that general principle but still accommodate the spheres' possession of a natural capacity for being in motion *or* at rest, on the grounds that this was the best capacity that they can have (given the impossibility, as Aristotle sees it, of self-motion and the arguments for an unmoved mover) if they are to be able to move at all.

[15] So Judson 1994 and 2015, pp. 160–1; Bodnár 1997. For a contrary view, see Waterlow 1982a, ch. 5 and Appendix to ch. 5. It is not clear whether or not this view squares with Aristotle's claim that the motion of the spheres is 'effortless' (see below).

[16] By 'natural capacity' I mean a potentiality whose actualization expresses or realizes the thing's nature (or part of it); so all natural capacities are potentialities, but not vice versa.

Aristotle has no good options if he insists that eternal things possess no unrealized potentialities. He might argue that it is not correct to view the heavenly spheres as possessing a natural capacity for being at rest on a par with their capacity for rotation: their being at rest would rather be a matter of their not exercising their capacity for rotation—of the capacity's being dormant. On this way of seeing the matter, there would only be a threat of the spheres' coming to rest if the unmoved movers or the spheres' souls could fail to inspire or to be inspired, and hence to fail to activate the spheres' capacity for circular motion. This move has an air of desperation about it. In any case, Aristotle would still be committed to holding that the spheres have a *potentiality* to fail to be in motion, for two reasons. (i) He thinks that having a potentiality to be *F* entails having a potentiality to fail to be *F* (Θ.8 1050b8–9: 'every potentiality is at the same time a potentiality for the contradictory; for . . . everything that has the potentiality <to obtain> can fail to be active'; cf. Λ.2 1069b14–15). (ii) If the spheres lack this potentiality, there is no need for the unmoved mover. Bodnár 1997 defends something like the view just criticized by suggesting that, for Aristotle, the eternal rotation of a heavenly sphere requires infinite power—which as a finite body it cannot possess itself (Bodnár's rejection of point (i) is discussed below). This idea promises to maintain consistency with the *De Caelo*, and does justice to the 'infinite power' argument in *Phys.* VIII (Argument F), summarized at 1073a5–11 (see notes *ad loc.*). Yet it is very difficult to square, on the one hand, with Aristotle's claims about the effortlessness of the sphere's rotation (see *Cael.* I.9 279b1–3 and II.1 284a14–16 (cited in section 1), and Θ.8 1050b22–8, discussed below) and, on the other, with the claim that the unmoved mover causes motion by being the object of love, which is not a matter of bestowing power or energy. Moreover, if the sphere's own nature is such as to let its motion peter out without the input of external energy, it is hard to see how it can lack a capacity for rest. Another response would be to deny that the spheres have a natural capacity for moving at all (this, chiefly on different grounds, is Beere's view (2009, pp. 314–24: see below). On this view, their motion is an activity not grounded in any capacity—in something like the way that the unmoved mover's thinking is not grounded in a capacity (see notes on 1071b12–21). But this seems hard to square with the requirement for a cause of

the spheres' motion—the spheres, on this view, cannot but rotate eternally in any case. Perhaps the least unpromising response would be to abandon the parallelism with the natural motions of the other elements, and hold that the first body has no natural capacity for rest *or* for motion: it has only the blank capacity for the sphere's parts to be in this location and that.[17] Motion, on this view, is bestowed on it—neither forced on it, nor activated in it, since, on this view, neither motion nor rest are expressions of any of the sphere's own bodily capacities—by the sphere's soul, in emulation of the unmoved mover as the best way to realize this capacity. This, too, seems quite desperate.

Aristotle seems unaware of these consequences of the idea that eternal things possess no unrealized potentialities, given his views about the heavenly bodies' natural capacities and the parallelism between the aither and the sublunary elements. A difficult passage in Θ.8,1050b6–28, to which 6 1072a4 may refer (see notes *ad loc.*), presents some of the same issues in a different key, since the argument there is concerned with potentialities in general. This passage is usually taken to show Aristotle consciously applying the idea that eternal things have no unrealized potentialities to the heavenly bodies.[18] I discuss the passage, and suggest that Aristotle does not deploy this idea there (and that its argument is very closely connected to some of the arguments in Λ.6–7) in Judson 2016.

4. The Arguments of *Physics* VIII

The structure of *Phys.* VIII is sufficiently convoluted to prevent an easy summary: I shall confine myself to a brief account of the main arguments to which Aristotle appeals in Λ.6–7; for further commentary, see Ross 1936 and Graham 1999.

Argument A: that change exists always because there is no first or last change (VIII.1 251a8–b10, 251b28–252b5). This argument depends on important 'intelligibility constraints' which Aristotle assumes (or insists on): not only must every natural change have a cause, it must have one which is in the relevant sense intelligible.

[17] Cf. Broadie 1993, p. 400; Makin 2006, pp. xli and 215–16.
[18] See Witt 2003, pp. 89–94; Makin 2006, *ad loc.*; Beere 2009, pp. 314–24.

The paradigm for such intelligibility is the regular operation of a substance's nature. The field of intelligible causation extends more widely than this, since Aristotle will include in it (subject to some further constraints) intermediary causes and conjunctions of intelligible causes; and the operation of the Prime Mover itself cannot be described as the operation of a *nature* in Aristotle's strict sense, since for him a nature is a principle of the thing's own changing and resting (see *Phys.* II.1 and 7). The field is not simply wide open, however: Aristotle will not countenance supernatural volition, or causes which do not flow intelligibly from the workings of individual substances.[19] While these intelligibility constraints are much stronger than a straightforward empiricist would countenance, Aristotle is not a grand deductivist after the fashion of Spinoza (or possibly of the Plato of the *Republic*): he does not think that every feature of the cosmos can be deduced from a single first principle or set of principles. He does not, for instance, attempt to explain why there are just the planets that there are, or why they have just the motions that they have—any more than he attempts to explain why there are just the animal species that there are. He warns against expecting an explanation for everything at *Cael.* II.5 287b28–32.

Argument B: **(i)** that time must always exist and **(ii)** that change must always exist since time does (VIII.1 251b10–28). Argument **(i)** depends on the idea that the 'now'—the present moment—must have time on either side of it. As it stands, this seems feeble; but Aristotle seems to have held that the existence of time is bound up in some way with the possibility of *observers* of its passing (*Phys.* IV.11 and 14; Hussey 1993, *ad loc.*): this may have made plausible the thought that any instant (including any putative first or last instant) must have been able to have been perceived as present, and hence must have time on either side of it. Argument **(ii)** involves Aristotle's view that the existence of time depends on that of change ('[time] is either the same as change or an attribute of it' at 1071b10 echoes 251b12–13; both passages reflect *Phys.* IV.11—though there Aristotle argues for the latter view and rejects the former).

[19] For a discussion of how this influences Aristotle's account of chance, see Judson 1991; see also the notes on 1071b32–1072a3.

Note that arguments A and B appear to establish at most that there is always change: they fall short of showing that there is some one continuous change which always exists. Aristotle clearly relies on the latter claim in the rest of *Phys.* VIII, yet there is nothing which looks like an argument for it; see Argument D below and the notes on 1071b5–11.

Argument C: **(i)** that everything which is moved is moved *by* something (VIII.4), and **(ii)** that there are (in a crucial sense) no *self-movers* (VIII.4–5, 6 259b1–20). Behind both arguments lies the idea of what we might call the true originator of *X*'s motion, or its canonical mover. The model of the stick and hand at 256a21–b3 shows that, for Aristotle, *X*'s canonical mover is not only a cause of *X*'s motion but satisfies a further constraint. If *Y* causes *X* to move, but does so by *transmitting* motion, then *Y* is itself in motion. In this case, Aristotle thinks, *Y* is playing the same role as the stick I use to move a pebble: it is only an intermediary mover, and the true originator of *X*'s motion must be something else, just as it is (in ordinary parlance) I, not the stick, that can be said to be the originator of the pebble's motion. Aristotle insists that for every motion there must be a canonical mover: but why cannot it be the case that each of *X*'s movers is moved by a further mover which, like *Y*, causes motion by transmitting it, so that every mover is like the stick? (We would of course in that case think that the term '*intermediary* mover' was inappropriate.) Aristotle's opposition to this idea does not stem from a rejection of beginningless or infinite causal chains in general, as some commentators think (though it is true that *Phys.* VII.1 gives some encouragement to this view): Aristotle's belief in the eternity of the world, and of at least most species, commits him to the existence of a plethora of such chains, and it is hard to see why Aristotle might think that the case of the causing of motion was special in this respect. All that I can suggest is that in this case, the effect produced (being in motion) is the same (type) as the condition which constitutes the mechanism of causation; whereas in other cases the effect produced (possession of the relevant form) is not the same as the condition which constitutes the transmission of the form. Aristotle may thus have been tempted to think of the transmission of motion as metaphysically on the 'effect' side, or as insufficiently distinct from the effect to be able to be its ultimate cause.

Turning to **(ii)**, Aristotle denies that *X* can be the ultimate originator of its own motion: he finds the notion of canonical self-motion incoherent. There are some things—that is, animals—which do merit the term 'self-mover', because (some of) their movements are caused by their own desires, but in all such cases Aristotle insists (a) that in any given motion there is a part of the body which is in motion and another which causes its motion, and (b) that the animal does not generate its motion from rest: it is always triggered by some internal (but unnoticed) or external process (259b1–20). Equally there are things—the four elements—which may appear to be capable of self-motion, but which are not in fact so capable: as mentioned in section 1, Aristotle thinks that the elements are always set in motion by an external mover, which either actualizes the element (by transforming it from another element) or removes an obstacle to its natural motion (254b33–256a3).

The idea that canonical self-motion is impossible is an intuition not shared by all: Plato thought the heavens possessed a soul which was indeed self-moving in this sense (see notes on 6 1071b32–1072a3). I imagine that Aristotle could see no difference between a world in which *X* was the ultimate originator of its own motion and one in which there was simply no cause of *X*'s motion. (If this guess is correct, then Aristotle's own idea that the heavenly spheres are made of an element whose nature it is to move in a circle might provide the materials for just such a difference: but clearly Aristotle did not see things this way: see sections 1 and 2.)

Aristotle concludes that there must be a primary mover which causes motion in some way other than by transmitting it—an *unmoved* mover. This mover must be eternal if it is to be the cause of an eternal, continuous motion (VIII.5 258b5–9, 6 259a6–b1).

Argument D: supposedly a separate argument for the existence of a primary unmoved mover based on the claim that if motion always exists it must be continuous rather than successive (VIII.6 259a13–20). The argument appears to be this. If there is always change there must be an eternal continuous motion (see Argument B above). Suppose that there is a *first* continuous motion (Aristotle does not make this move explicit, but it is needed to make sense of the argument): its cause must be an unmoved

mover, since if its cause is a motion the supposed first motion will not be first. This argument is not entirely separate, since it relies on the assumptions that the first motion must have a cause and that it cannot be a case of self-motion.

Argument E: **(i)** that change of place is the primary form of change, and **(ii)** that it, and only it, can be an everlasting and continuous change (VIII.7, 9 265b17–266a5); **(iii)** this motion must be circular motion (VIII.8), which **(iv)** is the primary form of change of place (VIII.9). Aristotle thinks that all change is 'between opposites' (cf. 'chapter 2'1069b3–7 and the Prologue to chapter 2, section 2) and hence *prima facie* always limited (see VIII.2). Here he argues that continuous eternal change of *place*—that is, motion—is possible, since motion in a circle satisfies (he argues) the constraint of being between contraries without having to be limited; rectilinear motion, for Aristotle, must be limited, since the universe is finite in extent, and he regards any change in direction as beginning a fresh motion. He also argues that motion is the primary form of change since other forms of change presuppose it, and thus that eternal circular motion does not presuppose a change of any other form.

Argument F: that the primary unmoved mover must be without parts and without magnitude (VIII.10 266a10–b27, 267b17–26). In outline the argument is this:

(1) Nothing with finite magnitude can cause an infinite motion.
(2) Causing an infinite motion requires infinite power, but nothing with finite magnitude can have infinite power.

(1) and (2) each independently show that:

(3) The cause of an infinite motion cannot be a thing with finite magnitude.
(4) Nothing possesses an infinite magnitude (proved elsewhere: see *Phys.* III.5 and *Cael.* I.5).
(5) So, by (3) and (4), the cause of an infinite motion can have neither a finite nor an infinite magnitude.
(6) So it must have no magnitude.

One problem is that the arguments which Aristotle gives for both (1) and (2) appear to rely on the idea that the cause of the infinite motion is acting on the thing which it moves by expending

power or energy: his idea seems to be that, if the cause had magnitude, determinate amounts of power would be located in distinct spatial parts of the cause, and used up successively, like a series of batteries used one at a time. But in Λ, at least, the Prime Mover moves by inspiration, as an object of love, and so does not need to expend energy; even in the present passage Aristotle says that the primary mover's way of causing motion 'involves no effort [*aponon*]' (267b2–3); he has appropriated this term from his earlier description of the first motion itself—see *Cael.* II.1 284a13–16. This will be discussed in the notes on 7 1073a5–11.

5. Change and Motion

Aristotle thinks that there are four basic kinds of change—substantial coming into being and ceasing to be, growth and diminution, change of quality, and change of place. He uses two main terms for 'change', *metabolē* (and its cognate verb *metaballein*) and *kinēsis* (and its cognate verb *kinein*). He standardly uses *metabolē* as a more general term, covering change of any kind (see, e.g., 1069b2), while reserving *kinēsis* for change of place ('motion', or more formally, 'locomotion'), for which he also uses the term *phora*. We see this usage at 1072b8–9: 'motion [*phora*] is the first of the kinds of change [*metabolē*]'. But Aristotle's use of *kinēsis* is quite fluid, and he is often happy to use it to refer to change in general, as at 1073a12: 'for the other changes (*kinēseis*) are posterior to that in respect of place.'[20] In both *Phys.* VIII and Λ.6–7 Aristotle begins with considerations about change in general, arguing that there must be eternal change, and gradually shifts focus to the case of motion. This is understandable since (as it turns out) the only eternal change there can be is circular motion, and since the priority of motion (change of place) over other forms of change means that in showing the cause of the eternal motion to be unmoved (*akinēton*) Aristotle has also shown it to be entirely unchanging. In the discussion in Λ Aristotle barely uses *metabolē* and *metaballein* (once each, at

[20] His use of *kinēsis* is further complicated by another contrast he uses it to mark—that between *process* (*kinēsis*) and *activity* (*energeia*): see Θ.6; Ackrill 1965/97; Charles 1984, ch. 1, and 2015, section V; Burnyeat 2008b.

1072b8–9 and 1071b15–16 respectively: there seems to be nothing especially significant about these occurrences), and consistently uses *kinēsis, kinein*, and *akinēton* (*phora*, which I also translate 'motion', is used twice, at 1072b5 and 8–9, and very frequently in chapter 8). This poses a problem for the translator. To use 'motion' and its cognates throughout misrepresents at some points the generality both of Aristotle's argument and of the sense of *kinēsis*; to use 'change' throughout likewise ignores the shift in focus to change of place. For this reason I use 'change' at the outset, and switch to 'motion' at the start of chapter 7 (except for the occurrence at 1073a12 quoted above); this policy has the two drawbacks that it conceals the fact that Aristotle is using the same set of terms throughout, and makes the shift seem more clear cut—and more precisely located—than it really is.

COMMENTARY

CHAPTER 6

1071b3–5

Aristotle here refers back to 1 1069a30–3, making it clear that Λ.6–10 continues the programme for the investigation of substance introduced in chapter 1, and thus that the two halves of the book are intended as parts of a unified project: see Introduction, sections 2–4. 'Since there were three kinds of substance' at b3: the Greek more literally says 'since there were three substances', but Aristotle is clearly referring to kinds or classes of substance. That 'it is necessary that there be some eternal substance which is unchanging' will be argued for in what follows, at 6 1071b5 – 7 1072a26 (once again the Renaissance chapter division is not well done): the main argument is presented at 1071b5–22 and 1072a21–6. The fundamental idea is that a substance of this kind is needed as an *originating cause* of an eternal motion, which in turn is required if there is to be change at all; the rest of chapter 7 (1072a26–1073a13) considers how this substance acts as a cause, and what its essential character is. This brief summary corresponds to the strategy of *Phys.* VIII; but there is an important difference in focus in Λ.6–7, which emerges in 1071b5–11,

1071b12–21, and 1072a9–26: whereas *Phys.* VIII focuses only on change, the need for an eternal motion, and the need for an unmoved cause of that motion, Λ is also concerned to establish more concretely—but nonetheless at a very abstract level—what we might call the structure in which that causal nexus must be realized. Thus the conclusion of the argument at 1071b5–11 is not that there must be an eternal change, but that there must be some eternal substance which is the subject of such a change. For 1071b12–21 and 1072a9–26, see the notes *ad loc.*

The conclusion announced in the present passage is recapitulated at the end of chapter 7 (1073a3–5). Note that 'some eternal substance' is non-committal as to the number of these unchanging substances: see notes on 1071b12–21 below. The discussion up to 1072a9 is either explicitly about such causes of eternal motion in general—as with the reference to the plurality of such causes at 1071b20–2—or at least capable of being taken in this way. Some commentators think that Aristotle's account continues to be about such substances in general throughout chapters 6–7 (and indeed in chapter 9: see section 1 of the Prologue to that chapter and section 1 of the Epilogue). But several passages show that at some point Aristotle moves to talking (albeit in a very abstract way) about the *first* unchanging cause—though these texts do not rule out his moving back to a more general level of discussion at some point(s). The first of these passages is 1072a9–18. Despite its very abstract approach, this passage cannot be construed as about eternal motions *in general*: it only makes sense if Aristotle is talking about the ultimate first motion (that of the outermost heavenly sphere). The same is true of the recapitulation at 1072a21–6, where what is spoken of is not eternal motion and its originating causes in general but explicitly the motion of the 'first heaven' (i.e. the outermost heavenly sphere) and its cause—that is, the ultimate originating cause. Finally, when Aristotle turns to the nature of this cause at 7 1072b4–14, he is again focusing explicitly on the first of these causes: see notes *ad loc.*

1071b5–22

This argument is the most important in the whole of Λ. It has two parts: the first (b5–11) introduces—on the interpretation I favour—the ideas that change is everlasting and, more

importantly, that there is an everlasting change, whose subject is an eternal (but of course changing) substance; the second (b12–22) considers the ultimate cause of a change of this sort. Aristotle will argue that this cause must be an eternal substance of a quite different kind: it causes eternal change in virtue of engaging in an activity which is not grounded in any potentiality or matter, and hence it is essentially active, and yet—though this is not spelled out until chapter 7—necessarily unchanging.

b5–11: There are two ways to understand the basic structure of the first part of Aristotle's argument. The appeal to substances as 'the first of the things that are' might suggest that the weight of the argument is carried by the ontological priority of substances—the idea that non-substances depend for their existence or being on substances (see 5 1071a1–2 and the Prologue to chapter 1). With slightly different punctuation from that understood in my translation (a period rather than a semicolon after *chronon* at b7, and a semicolon rather than a period after *chronou* at b9), this yields the following argument:

(1) Substances are ontologically prior to everything else.
(2) If every substance can cease to be, then everything can cease to be.
(3) Change cannot cease to be (based on two arguments: 'for it was shown to exist always' at b7 presumably refers to Argument A from *Phys.* VIII.1 (see Prologue, section 4), while b7–10 on this reading is a telescoped inference from the eternity of time to the eternity of change, which looks like Argument B(ii)).
(4) So not every substance can cease to be.

This way of reading the argument has the advantage that step (3) reflects the structure of *Phys.* VIII.1, where Arguments A and B are used together in the demonstration that change exists always. But the ontological priority of substances—premiss (1)—is an inadequate basis for (2). (2) is ambiguous between (2a) 'If *each* substance can cease to be, then it can be the case that everything ceases to be' and (2b) 'If it can be the case that *all* substances cease to be, then it can be the case that everything ceases to be.' Premiss (1) seems to licence (2b) (and this is all that the argument at 1071a34–5 requires), but (4) appears to require

the stronger claim (2a). This objection may not be very strong, since, as we shall see, something like this gap in the argument will remain however it is understood; it is nonetheless a drawback to this reading that the gap is so blatant. Another drawback is that the remark at b10–11—'no change is continuous except for change in respect of place, and of this only that which is circular'—has no connection with the argument, and must be merely an anticipation of doctrine to be made explicit later (e.g. at 1072a9ff.); yet at the same time the next argument seems to presuppose that the effect whose cause is in question is indeed an eternal, continuous motion. For these reasons I prefer to see the structure of the argument in the following way:

(1*) There must always be change (based on Argument A), and there must always be time (based on an argument, presumably Argument B(i), gestured toward at b8–9: 'since there cannot be earlier or later if time does not exist'.
(2*) Therefore there must be at least one single, continuous eternal change (continuous in the same way that time is: b9–10 is an aside on this reading).
(3*) This change must have a single substance as its subject—because substances 'are the first of the things that are'.
(4*) This substance must be eternal.
(5*) Therefore, if there is no eternal substance, change cannot be continuous and so could not exist always; in that case everything would be perishable.

Step (2*) is the crucial move. I can see no way to defend it against the objection that (1*) would also be satisfied by an everlasting sequence of individually finite changes. Why might Aristotle have taken (1*) to licence (2*)? One might suppose that he thinks that without the input of a continuously-acting cause, any series of finite changes would eventually peter out (this might be more plausible within Aristotle's framework of natural motions and places than within, say, an atomistic framework). But the argument for the eternity of change on which Aristotle is relying in step (1*) ought to exclude any such petering out. Ackrill suggests that Aristotle takes (2*) to be required for change to be not merely eternal but *necessarily* eternal (1981, p. 130; cf. Ackrill 1991/97); but either Aristotle takes the argument in (1*) to show that change is necessarily eternal—so, once again, it would not

seem to exclude a sequence of finite changes—or he takes it to fall short of showing that, so that the need for a single eternal motion has not been established. Whatever the explanation, Aristotle does seem to have thought that (2*) followed directly from (1*), since he argues in just this way at *Phys.* VIII.6 259a13–20—though it also has to be said that at VIII.7 260b19–29 he seems to deny the validity of the argument, and draws exactly the required distinction between an everlasting series of successive changes and a single everlasting continuous change. It is also worth noting that in *Phys.* VIII.1–2 Aristotle first argues that there is always change—step (1*) of the present argument—and immediately turns to consider objections, some or all of which are actually objections to the possibility of a single eternal change (see Waterlow 1982a, pp. 220–1; Graham 1999, pp. 60–1). In Θ.8 Aristotle also claims that without necessary substances nothing would be (1050b19): for discussion, see Makin 2006, pp. 208–15; Judson 2016; the notes on 1071b26–31.

At b10–11 Aristotle tacitly appeals to Argument E, claiming that the eternal continuous change arrived at in step (2*) must be *circular motion*.

b12–21: Aristotle now turns his attention to the cause of this eternal substance's continuous circular motion. Note that Aristotle's argument continues to be, in principle, neutral as to the number of these motions and as to the number of the associated causes. He does use the singular in referring to the cause(s), but this may reflect the thought that each eternal motion would have its own cause (cf. 8 1073a32–6), rather than the idea that there is only one; certainly Aristotle does not find it difficult to slip into the plural at b20–1. Thus we should take the conclusion drawn at b19–20—'there must, therefore, be a principle of this sort, whose substance is activity'—to affirm the need for one or more substances of a certain *type*, not for the existence of a particular token of the type (cf. the opening of Λ.8: 'but the question whether we suppose one substance of this kind or more than one—and how many—must not be overlooked'). For this reason we have not yet been given an argument for the existence of a unique, *ultimate* originating cause of motion. On the other hand, the materials for such an argument will turn out to be all to hand, and we shall see that at 1072a9–18 Aristotle has moved from thinking about such causes in general to a unique ultimate cause: see the notes *ad loc.*

The *unmoved* character of these causes is not made explicit until chapter 7, and in keeping with this I shall not use 'unmoved mover(s)' until Aristotle introduces the term 'without being moved [*ou kinoumenon*]' at 1072a25, but will instead use 'originating cause [sc. of an eternal continuous motion]'.

One key presupposition of Aristotle's argument is that a substance's eternal motion must have a *distinct* originating cause. Aristotle says nothing about this here: it reflects his denial of 'absolute' self-motion and his acceptance of the intelligibility constraints discussed in connection with Argument A in section 4 of the Prologue. Note also that there is no explicit use here of the argument which is central to the demonstration in *Phys.* VIII, Argument C—though he will rely on it at two later points (see below and the notes on 1072a19–26). It seems that he sets this argument aside in favour of the present one in order to arrive at a conclusion about the *nature* of the originating cause of motion which goes beyond anything in the *Physics*—that its 'substance is activity'. This in turn reveals a further presupposition—that this cause must itself be a substance. This is presumably based on the idea that only a substance can be prior to a substance (see notes on 4 1070a36–b4). As we shall see in Λ.8, eternal motion is not an incidental feature of the substance which is its subject, but is an intrinsic part of its life, of the fulfilment of its nature: the cause of this cannot, then, be less than a substance, or a non-substance would be prior to a substance. Aristotle argues in just this way in chapter 8, at 1073a34–6.

Though rather awkwardly expressed, Aristotle's argument has a straightforward structure. His strategy is in effect to set out a series of conditions which might seem to be sufficient for the putative originating cause to fulfil its role, and to argue that none of them, except the last, is actually sufficient. Rearranging the order of presentation, the argument is in essence this:

> The originating cause must be (a substance which is) *eternal*; but satisfying this condition will not suffice for its role as such a cause, since an eternal substance might not be able to be a *cause*. But satisfying the condition *being an eternal substance which is able to be a cause* will also not suffice: the originating cause must exercise this ability—otherwise there will be no motion. But this will still not be sufficient if this exercise is grounded in a potentiality;

for such a potentiality will not yield an eternal motion. So we must suppose that the exercise is (or is grounded in) an *activity* not itself further grounded in a potentiality.

Matters are complicated by the fact that Aristotle's presentation does not begin at the beginning: the first sentence ('Yet if there is something which can cause change or act upon things, but is not active in some way, there will be no change') is an anticipation of a subsequent development, since it appeals to the insufficiency of a condition which is itself only introduced a number of steps later. Despite the 'then' with which it is introduced, the argument's starting-point is actually the second sentence (b14ff.). The line of thought in the first sentence might be an anticipation of the argument of b16–17 ('Yet not even this will be sufficient . . . for unless it is active there will be no change'), or more probably, an anticipation of the argument's conclusion: in that case the claim that it must be active in some way has to be understood as 'it must in virtue of its substance be active in some way', and 'for that which has a potentiality can fail to be active' simply prefigures the argument at b19. The latter interpretation is strongly suggested by the parallelism of 'for that which has a potentiality can fail to be active' with 'since that which is potentially can fail to be' at b19.

The phrase 'which can cause change or act upon things' translates *kinētikon ē poiētikon*. The term *poiētikon* can mean 'able to be productive', and might in some contexts have a sense quite distinct from *kinētikon* ('able to cause change' or 'able to cause motion'); here I do not think that Aristotle intends any sharp distinction, and so translate *poiētikon* as 'able to act upon things' (for further discussion, see section 2 of the Prologue and the notes on 10 1075b30–4; see also Berti 2000, p. 187; Lagnerini 2015). On the translations 'be active in some way' and 'activity', see below. Note that the nature of the originating cause's activity is deliberately left unspecified: the implication might be that the originating cause achieves its causal role by means of some *distinct* activity, and in any case this turns out to be true. The activity in question is *thinking*: see notes on 1072b14–30.

The first condition in Aristotle's series is that the originating cause must be an *eternal* substance: presumably this is because if it exists only for a finite time, then part of the eternal motion will have taken place before the cause came into existence. (Aristotle

does not consider the idea that the cause might be timeless rather than eternal, but would no doubt have been impressed by the difficulties of giving an account of how such a cause could be related to its temporal effect.) The eternity condition, though in Aristotle's view necessary, will not suffice, for an eternal substance might not be able to be a *cause of change*. 'To cause change' at b15–16 translates *metaballein*, Aristotle's most general word for change: see Prologue, section 5. The verb *metaballein* can be transitive or intransitive: here it is clearly transitive, picking up (e.g.) 'something which can cause change' (*kinētikon*) at b12. In Aristotle's view, this condition rules out what might have been taken to be the eternal substances par excellence, the Platonic Forms. It is a standard complaint of Aristotle's that these Forms cannot serve as causes of change (see *GC* II.9 335b7–24; *Met*. A.9 991a8–b9; Λ.10 1075b27–8; M.5). His chief argument is that changes take place at particular times, and so require variable causes which act at some times but not at others; but clearly this argument will not apply in the present case, in which the effect is unvarying and eternal. Aristotle faces a further major problem here: given that the mode of causation which the originating cause deploys is final causation (see 1072a26–b3), it is not at all obvious why the perfection of the Forms could not act as such a cause. I discuss this below.

Given the preceding argument, the reappearance of the Platonic theory in what follows (b16–19) is surprising, but the point seems to amount to this. Suppose that (*per impossibile*) we ascribe an ability to cause change to the Forms, or to the Form of the Good.[21] This will still not be sufficient: we must also suppose that the originating cause exercises this ability—otherwise (trivially) there will be no motion (b17). But even if we suppose it to be active as a cause rather than inactive, it must meet a further condition: its substance must not be potentiality. We have not met talk of the substance *of* a substance before in Λ, though it is

[21] The 'other substance besides the Forms' at b16–17 is probably a reference to this, rather than, as Ross suggests, to the so-called 'mathematicals'; Plato describes it as the cause of the other Forms and as 'beyond being' at *Republic* VI 509b6–10. Menn (2009, p. 255) suggests that Aristotle is referring to Plato's Demiurge.

pervasive in Z.[22] It embodies the thought that what makes a substance the thing it is (the thing's substantial form) must itself be a substance, since it is either prior to or in some sense identical with that substance. Aristotle is thus concerned with the essential character of the originating cause, and with what in this character grounds its acting as a cause.

The clause 'since that which is potentially can fail to be' (b19) recurs in a slightly different form at b25–6. It is possible to read the remark there in two ways—either as the claim that a potentiality for *F* involves the possibility of failing to be *F*, and that at some point this latter possibility must be actualized, or as the claim that a potentiality cannot actualize itself: without a *cause* it will fail to be (i.e. to be actual): see notes *ad loc*. In the present passage, the remark must be read in the first of these ways: Aristotle is already supposing the cause to be active ('it will not be sufficient if it is active . . . '), so his point cannot be that a potentiality would require a cause to actualize it. His argument is thus that even an actualized potentiality will not *always* be actualized, and so will at some point cease to be active. Hence 'there will not be *eternal* change.' Aristotle deploys a similar argument at N.2 1088b14–28. This argument seems quite fallacious: the fact that a cause might fail to operate does not entail that it will fail. One defence which might be offered is, once again, that Aristotle's premiss is that eternal change is *necessary*, and so even the possibility that the cause might fail must be excluded (see notes on b5–11). This reading would, however, require us to take 'eternal' in 'there will not be eternal change' to *mean* 'necessarily everlasting'; it would also require Aristotle to take his earlier argument for the necessity of an everlasting change to have established the necessity of a *necessarily* everlasting one. That said, Aristotle might have done better not to argue that there will not be eternal change, but instead that if the eternal change required is grounded on a potentiality which *could* fail, then for us simply to posit its not, as a matter of fact, ever failing is to rely on an unhappily ad hoc brute fact.

[22] Its use there is controversial: for discussion, see, e.g., Bostock 1994; Wedin 2000; Burnyeat 2001; Lewis 2013. It is also unclear whether the usage in Λ.7 and 9 (and correspondingly in Θ.8) has exactly the same force as the usage in Z: see Judson 2016, pp. 148–9.

Some commentators suppose that Aristotle is relying on the Principle of Plenitude—the idea that (as a matter of brute metaphysical fact or as a conceptual truth about the nature of possibility) if something is possible it will at some point in an infinite time be actual (see Hintikka 1973, chapters 5, 8, and 9; Waterlow 1982b). There is clear evidence that Aristotle did not accept this unhappy principle, and that he thought that there are possibilities which go forever unactualized.[23] He does, however, believe that *some* possibilities cannot go unrealized, namely those which in some sense flow directly from the essential or natural features of eternally existing things: this is clear from his argument for the eternity of the world in *Cael.* I.12, and it finds expression at *Phys.* III.4 203b30: 'in eternal things there is no difference between being possible and being.'[24] Since this belief is not based on a more general rejection of unactualized possibilities, I suggest that it is based on a thought about *economy*: I do not mean the thought that it would be uneconomical for a theory to ascribe to eternal things properties which do no work in the theory, but rather the thought that it is scientifically unacceptable to suppose that the world would contain such redundancies (we will meet this thought again in chapter 8: see notes on 1074a17–24). The idea is that, though not ruled out by logic or by the nature of possibility, it would be nonetheless fundamentally unintelligible that the eternal substances should have an essential feature which had no function. This would be an analogue (though no more than that) of Aristotle's principle in relation to perishable substances that 'nature does nothing in vain.'[25] This latter principle clearly leaves open considerable room for organisms to possess features which have no functional role to play; but these features are incidental by-products of the functional features which they do have by nature, or arise through interaction with their environment. Does the present argument leave open an analogous possibility for the originating cause? It is hard to see how the potentiality to fail to act as cause could arise as a by-product of some other feature; but in any case Aristotle has a further argument up his sleeve: see below and the notes on b21–2.

[23] See *Int.* 9 19a7–17; Judson 1983, pp. 219–25.
[24] See Sorabji 1980, pp. 128–32; Judson 1983.
[25] See, e.g., *PA* II.13 658a8–9, III.1 661b23–4; *IA* 2 704b15–17.

Sections 2 and 3 of the Prologue discuss the problem which Aristotle faces in connection with the nature of the heavenly spheres if he maintains the view that eternal things' natures can include no unrealized potentialities.

If the substance of the originating cause is not potentiality, Aristotle concludes that it must be activity. Both the meaning and the scope of this conclusion call for comment. 'Activity' translates *energeia*, which can cover *exercising a capacity, activity*, and *actuality*. He plainly does not mean the first of these here: his point is precisely to deny that the originating cause operates by exercising any capacities. The normal correlative of potentiality (*dunamis*) is actuality (and for this reason I have translated *energeia* as 'actuality' in chapters 1–5), and clearly not every actuality (i.e. something's being actually *F*) is an activity—being a house is not. We might, therefore, expect Aristotle to infer that the substance of the originating cause, if not potentiality, is actuality. But for a number of reasons we should take his conclusion to be the stronger one that its substance is *activity*. (i) As we saw, Aristotle's earlier objection to the Forms implies that in his view the originating cause must be active. (ii) The cognate verb-form *energein* is most naturally construed as referring to *being active*, and it is this form (*energoun ti*) which appears in the opening sentence of the passage (1071b12–13), which, as I have said, is an anticipation of the conclusion that the substance of the originating cause is *energeia*. (iii) The conclusion is picked up at 1072b14ff. and is immediately cashed out in terms of the *way of life* of the originating cause—that is, its activity. While the translator may have to switch from 'actuality' in earlier chapters to 'activity' here (and indeed back again at 1072b5 and b8), Aristotle does not, I think, trade on any confusion between the two.[26] As we have seen, a commitment to the idea that the originating cause must be active is a presupposition of the whole argument, and not something which arises as an inference from 'its substance is not potentiality' (indeed, it may already be a presupposition of the argument in *Phys.* VIII for the originating cause's lack of magnitude, which is recapitulated at the end of

[26] For a variety of views, see Kosman 1984 and 1994b; Menn 1994; Beere 2009, chs 8–9.

Λ.7: see notes on 1073a5–11). If the originating cause must be active if it is to be a cause at all, then there is no mistake in a close association between '*X* is the originating cause in actuality' and '*X* is the originating cause in virtue of being active in some way.'

Though this is clearly Aristotle's view, it is nonetheless not obvious, as I noted above, why originating causes must be *active* if they are to cause eternal motion, since they work as final causes. Why could the perfection of inactive Platonic Forms not do just as well? It might be thought that an originating cause must expend energy on its associated sphere in order to activate the sphere's capacity for motion (see section 3 of the Prologue); this appears to be Bodnár's view (1997, especially p. 117). The 'infinite power' argument (Argument F) summarized at 1073a5–11 might appear to support this idea. But as we shall learn in chapter 7, the originating cause works by inspiring desires, and it is only through those desires that it causes the sphere's motion: this is something quite different from the imparting of energy. Moreover, the character of the cause as an absolutely unchanging being is not obviously compatible with the expenditure (i.e. loss) of energy—even if the expenditure itself is unvarying. For these reasons I shall suggest that the infinite power argument may be best construed as *not* presupposing that the originating cause expends power: see the notes on 1073a5–11. Aristotle's insistence that the originating cause must be active is probably the result of a hierarchical thought: if, as he clearly thinks, activity is better than other forms of actuality, then the (indirect) ultimate causes of all other activities ought not to display an inferior form of actuality to them, and hence must be active.

Even if we grant Aristotle his argument so far, it seems only to establish that at least *part* of the originating cause's character is essentially active—the part which grounds its acting as a cause. Yet the wording of Aristotle's conclusion more naturally suggests that its *whole* character is to be active. Could the originating cause not be a substance which had an essential activity (thinking, say), while at the same time having (like a heavenly sphere) an eternal body and associated potentialities? Perhaps Aristotle believes that thinking by anything which has a body must itself involve potentiality; but in the absence of an independent argument for such a view, appealing to it here would simply beg the question. It is more likely that Aristotle is relying on a line of thought from the

Physics, that the ultimate originating cause must be entirely unchanging. If it were not, there would have to be some prior cause of its change, and the issue would repeat in relation to the new 'ultimate originating cause': the series would at some point have to stop or none of the causes in it would count as the true mover of the others (cf. Argument C (i), and the argument at 1072b5–10). If there is no possibility of the originating cause changing, then by the economy argument sketched above it cannot have any potentialities for change. It has to be conceded that this interpretation does not seem to leave much room for the argument at b21–2 to be a distinct one: see next note.

b21–2: 'Moreover, these substances must be without matter' (on the plural see the beginning of the notes on b12–21 above): a further claim about the character of the originating causes, which also yields the conclusion that the substance of the originating causes must be activity (tersely drawn again at b22: 'Activity, then.'). One might expect Aristotle to argue here that these substances have no matter because they have no potentialities. His appeal to the eternity of these substances seems beside the point, since the heavenly bodies are also eternal, and do have matter: the charitable view would be that this appeal is meant to be fleshed out with a further flourish, such as 'and must be unmoving if anything else is to move'.[27]

1071b22–1072a7

I keep to one translation of *energeia* and its cognates in this passage ('activity' and its cognates: see notes on b12–21 above), but doing this is not entirely straightforward. The objection discussed in the passage arises in the context of Aristotle's claim that the substance of the originating cause is not potentiality but activity: the objection uses the verb *energein*, which, as I have

[27] These lines might instead be meant as a *fresh* argument for the claim that the substance of these causes is activity; but it is hard to see what the argument can be if it is not simply the preceding one with an additional intermediate step about lacking matter. Berti suggests that the emphasis is on the plurality of the matterless substances, and that at b22 we read a different text: 'Activities [*energeiai*] then' (2000, pp. 191–2).

said, more naturally lends itself to the sense 'be active'. On the other hand, the basic issue is whether potentiality or *any* form of actuality is prior; and some of the views Aristotle discusses later are better thought of in terms of actuality rather than activity. As before, this need not reflect any confusion on Aristotle's part. Note that, as with chapter 1's claim that substances are prior, Aristotle does not pause to discuss what type of priority is in question: at the very least it must involve causal priority.[28]

There are three main problems for the overall understanding of this difficult passage. (i) It is unclear whether the presentation of the objection ('But there is a difficulty') ends at b24 or at b31. (ii) It is not clear whether the remark at b25–6, 'for it is possible for a thing to be able <to be> but not to be,' makes the same point as the similar phrases at b13–14 and b19, or a different one. (iii) We might expect Aristotle to mark the end of his discussion of the objection with a statement of the conclusion that prompted it—the conclusion that the substance of the originating cause must be activity; but a statement of this kind does not occur until well after the difficulty has been met, at 1072a24–6, and after a certain amount of new material about the items it moves has been developed on the basis of resolving the objection: see notes on 1072a7–9.

b22–1072a3: As I have said, the structure of the passage is unclear. We can read the objection as comprising b22–4 (potentiality seems to be prior), and Aristotle's response as starting at b25 (it cannot be prior); or we can take the difficulty to be an antinomy, of which the first arm (potentiality seems to be prior) is presented at b22–4 and the second (it cannot be prior) at b25–31—on this reading Aristotle's response begins with 'this is why some posit perpetual activity' at b31ff. The basic strategy of Aristotle's response is the same on both readings, however. He argues (or accepts the second half of the antimony which argues) that if potentiality were prior to activity in the case of the originating cause(s), the natural world as we know it could not have come to be; he infers, firstly, that there must have always been activity,

[28] Aristotle lists some senses of 'prior' in Δ.11, and has an extensive account of the priority of actuality in various senses in Θ.8 (discussed in Dancy 1981; Witt 1994 and 2003; Makin 2006, *ad loc.*; Beere 2009, ch. 13; Menn 2009; Peramatzis 2011, ch. 8; Judson 2016). See notes on b22–1072a3.

and secondly that this activity must be due to an originating cause (sc. whose substance is activity). The first reading—which I prefer—makes it harder to give a satisfying interpretation of b25–6 ('for it is possible for a thing to be able <to be> but not to be'): see below. The second reading avoids this problem; but if b22–31 is an antimony, it is not properly integrated into its context, since Aristotle has already accepted its second arm. On either reading there is a closely related argument at B.6 1002b32–1003a5 (see Madigan 1999, *ad loc.*; Menn 2009, pp. 212–21 and 248–65).

The objection (or the first arm of the antimony) which Aristotle considers at b22–4 might seem question-begging: in order to argue that activity presupposes potentiality (in such a way that the activity of the originating cause would have to be grounded in a potentiality) the objection simply asserts what Aristotle has just denied—that everything which is active has a potentiality. Perhaps the emphasis is on '*seems* to have a potentiality': Aristotle is trying to deal with the problem that his claim about the originating cause is prima facie implausible, because it is prima facie plausible that potentiality is in the relevant way prior to actuality. There are two ways to construe the basis of the objector's claim that potentiality is prior, that 'everything which is active seems to have a potentiality, but not everything which has a potentiality is active.' One way is to take the alleged existential asymmetry as itself what matters: (it seems that) things which are potentially *F* can exist without being actively *F*, but not vice versa. On this construal the objection is aimed at the idea that the activity of originating cause exists without any corresponding capacity. This existential reading is reminiscent of a 'test' for priority which Aristotle ascribes to Plato in Δ.11 1019a1–11, and which he connects there with what he calls 'priority in substance and nature'. The test in Δ.11 is cast in terms of *X* being without *Y*: as we saw in the discussion of separation in section 2 of the Prologue to chapter 1 and the notes on 1069a24, this language can be construed in terms of *X*'s existing or in terms of what it is to be *X*; but Aristotle seems to understand Plato's test as an existential one, and in any case, the language in our passage invites the existential reading rather than the 'what it is to be *X*' reading. If this is how the objector's test for priority is to be taken, it is not clear that Aristotle himself accepts it. Certainly, when Aristotle argues that actuality is 'prior in substance' to

potentiality at Θ.8 1050a4–b6, his argument applies quite generally—that is, to actualities which are grounded in potentialities as much as to ones which are not—and does not appeal to Plato's test. He does not argue that actualities can exist without potentialities (still less that the reverse is not true), but appeals to teleological considerations, not even hinted at here, relating to the development of natural substances and to the idea of activities as the final cause of the corresponding potentialities.[29] The other way to construe the objector's premiss is to take the alleged asymmetry as intended as an indication of some form of causal dependence: (it seems that) activities causally depend on or require potentialities (because they are the exercise of potentialities), but not vice versa. That this sort of dependence might be the basis of a priority claim receives some support from *Cat.* 12 14b9–23, where Aristotle says that items whose being (or existence) is mutually entailing can nonetheless be related by 'priority in nature' if one item is the cause of the being or existence of the other: his example is a true statement and what makes it true. It receives more direct support from the continuation of the Θ.8 passage (1050b6–28), which argues that the nature of eternal beings reveals a different way—also referred to as 'priority in substance'—in which actuality is prior: as I understand this type of priority, it is involves precisely this type of causal dependence (see below). Aristotle's response seems much more in tune with this construal, since it focuses on the explanation of coming to be and change; so does his later concession that potentiality is in a way prior to activity (1072a3–4).

As noted above, b25–31 can be taken either as the start of Aristotle's response to the objector (the reading I prefer), or as the development of the second arm of an antinomy; the general upshot is the same, since if the passage is developing an antinomy, it is clear that Aristotle accepts this second arm. The phrase 'the same impossibility' at b28 suggests that b25–6 (which echoes B.6 1003a2–4) represents Aristotle's main response (or the principal move in this arm of the antinomy) and that b26–31 applies it to the case of those of his predecessors who—to his mind—accepted

[29] For discussion see Witt 1994 and 2003; Beere 2009, pp. 293–313; Peramatzis 2011, ch. 8.

that potentiality was prior to activity in their accounts of the coming to be of the natural world. If this is right, the main response is only gestured at: 'if this is the case, none of the things which are will be; for it is possible for a thing to be able <to be> but not to be.' It would be natural to take the latter phrase to be making the same point as the similar phrases at b13–14 and b19, but if it does, the result seems very flat-footed: in reply to an objection to his argument, Aristotle simply repeats a premiss of his argument. The advantage of reading b25–6 as developing an antinomy is that we can take the phrase in this way while avoiding this problem, because the argument becomes more loosely connected to the earlier material. The resultant dislocation of the structure of the passage is a considerable drawback to the antinomy reading, however, and it seems better to take Aristotle to be developing his own response here. There are then two ways of dealing with the problem of 'for it is possible for a thing to be able <to be> but not to be.' We can take the point being made here as different from that made at b13–14 and b19: the point would be instead the one made at b28–31, that the existence of a potentiality does not lead to its actualization without a *cause* as well. (On this reading, 'to be able to be' and 'not to be' should be construed as 'to be able to be *F*' and 'not to be *F*'.) Aristotle will be thinking of the subject of the primary eternal motion: without a prior cause, its potentiality for motion (however this is to be understood) would go unrealized, and the world of change could not exist. This switch in sense is quite awkward, however, and it is preferable to retain the sense deployed in the earlier passages—a potentiality for *F* involves the possibility of failing to be *F*, and at some point this latter possibility must be actualized—and to try to defuse what I called the flat-footedness of this reply. We can do this by supposing that Aristotle is offering a promissory note: the cases which follow, of potentiality preceding activity (b26–31) and of eternal activity without an originating cause of the right sort (b31–1072a3), will show that no other types of account will explain how there comes to be an ordered world of the sort we find around us ('none of the things that are will be' is meant to signify 'the world around us as we know it will not exist': see below).

At b26–31 Aristotle considers two examples of types of world-view according to which, to his mind, the ordered world came to be out of a prior set of potentialities, and hence could be said to

incorporate the idea that potentiality is prior. Aristotle's method in invoking his predecessors calls for comment. We are familiar with—and expect—a certain sort of approach to historical claims about earlier philosophical positions, in which considerations of faithfulness are paramount; but Aristotle's approach here and elsewhere is quite different. We can see this most obviously in relation to his second example, with its quotation from Anaxagoras. He talks generally of 'the natural scientists'—that is, the Presocratics and perhaps Plato. But Aristotle knows that none of the other major Presocratics shared Anaxagoras' theory, and as the rest of this passage tells us, even the general scheme of prior potentiality does not apply to some of the Presocratics (e.g. the atomists) nor to Plato (see below); and at 1072a4–5, by focusing on (or reinterpreting) the role of Intellect in Anaxagoras's theory, he depicts him as thinking that activity, not potentiality, is prior. Aristotle is not *misrepresenting* his predecessors: he has no intent to do so and his procedure is quite transparent. Rather he uses them as a philosophical quarry from which important alternative views to his own can be mined.

'Those writers about the gods': Aristotle has in mind a number of cosmogonic works, of the seventh to fifth centuries BCE, which set out to explain the origin of the world wholly or largely in terms of the origins and birth of the gods and other divine beings. Apart from Hesiod's *Theogony* (probably early seventh century BCE), none has survived except for quotations and reports in later writers, and relatively little is known about them. In Hesiod's poem night is not, strictly speaking, the origin of *all* things (nor for that matter is 'chaos'—possibly a name for the dark and formless space between sky and earth—which is brought in at a7–8). While it is possible that Aristotle may have a different work in mind, his interest here, as I have said, is not in historical precision: his thought is that he can identify a basic approach to cosmogony in one or more of these writers which at a relatively general level illustrates the idea that the world came to be from a state of mere potentiality or formlessness. 'All things together' is a quotation from Anaxagoras (cf. 2 1069b20–4 and notes). In Anaxagoras' view the ordered world came into being from a pre-existing, undifferentiated mixture of an unlimited number of eternal ingredients ('all things together'), as a result of a rotation in the mixture initiated by something he calls 'Intellect' (*Nous*);

although the ingredients in this mixture are actual all along, everything else about the ordered world was (by Aristotle's lights) a matter of the ingredients' potentialities. Why does Aristotle not acknowledge the role of Intellect as an active efficient cause? I think the point is that Intellect *starts* to be active at a particular time, and was thus (Aristotle supposes) inactive for an infinite time before that: so without some *other* actual cause this potentiality would remain unactualized (cf. *Phys.* VIII.1 and Argument A in section 4 of the Prologue). For a less sympathetic reading, see Berti 2000, p. 194.

'The same impossibility': that is, that 'none of the things that are will be.' If we grant the existence of night, or of the mixture, then what follows is not, of course, that *nothing* will exist, but that the ordered world will not: this is probably what Aristotle means. As before, the result follows because potentialities require active causes to actualize them: if there is no actuality to activate the prior potentialities in the mixture or in the original formless night, then there will be no change. The argument thus depends once more on the intelligibility constraints sketched in section 4 of the Prologue. Aristotle elaborates this argument in various ways in *Cael.* I.10–12 and *Phys.* VIII.1 252a13–22. The examples at b29–31 serve to illustrate the point rather than to establish it: they pair matter with what are, for Aristotle, efficient causes acting so as to realize the form in question in this matter (see 1070b26–30 and notes). The word for 'timber' here (*hulē*) is also Aristotle's technical term for 'matter'; in animal reproduction Aristotle thinks that (in very basic terms[30]) the female provides the matter (the 'menstrual fluids') and the male the form.

b31–1072a3: Accounts which posit perpetual activity promise to avoid the 'impossible result' just sketched because they do not involve a pre-existing state of global potentiality. It is unclear whether Aristotle regards the views cited here as incorporating the idea that activity is prior, since he says nothing about the *substance of* the things which are always active. In any case, he identifies problems with these views which make them seem ad hoc in the face of the present objections: this in effect reveals

[30] His full account is much more nuanced: see Connell 2016.

constraints which his own account of the priority of actuality must satisfy. Leucippus was the originator of the first atomic theory; what Aristotle has in mind is that the atoms are always in motion, changing direction as a result of collisions. The example of Plato is less straightforward. In the *Timaeus* Plato describes the Demiurge's creation of the ordered world from chaotic, inchoate materials. In *Cael.* I.10–12 Aristotle extracts from this account a naturalistic cosmogony, with the Demiurge removed, in which the ordered world comes to be as a result of the capacities and movements of inchoate elemental materials which had been in 'discordant and disordered motion' (as Plato says at *Timaeus* 30a4–5; cf. 52d2–53b7) for an infinite time.

What are Aristotle's criticisms and are they just? The first series of complaints—'but why there is and what it is they do not say, nor the cause of its taking place in *this* way rather than in *this*'—should be taken very closely together: specifying what the motion is goes hand in hand with specifying its cause. In the following sentence, 'there must always be something present' probably means 'in each case there must be an efficient cause which determines the nature of the change'; 'through the agency of intellect' refers to the exercise of crafts and/or to voluntary action in general, while 'something else' is either a catch-all to cover any cases of action not properly said to be due to intellect, or, more probably, refers to 'imagination' (*phantasia*), which plays an analogous role to intellect in the case of animal behaviour. Aristotle makes related complaints against the atomists at *Cael.* III.2 300b9–14:

> They ought to say with what motion the atoms move and what their natural motion is. If each of the atoms is forcibly moved by force by another one, nonetheless each one must have some natural motion also, from which the forced motion diverges. Moreover the primary cause of motion cannot cause it by force, but only naturally; for we shall go on to infinity if there is no first thing which causes motion naturally, but there is always a prior one which causes motion because it is moved by force.

The present complaint echoes this one: the atomists do not (perhaps cannot) trace their perpetual activity back to any *natural* capacity in the atoms for a specific sort of motion.[31] Aristotle's

[31] Cf. A.4 985b19–20. Aristotle's objection at *Phys.* VIII.1 252a32–b1 should be understood in the same way (for a different view, see Barnes 1979, II, 128–30).

objection is the same in the case of Plato. The motions of the inchoate elements cannot be traced back to their nature (in this case because they do not, according to Plato, have proper natures); to the extent that Plato does trace them back it is to the unexplained 'shaking' effect of the characterless 'receptacle' in which they are located (*Timaeus* 52d2–53b7). The force of the complaint that Leucippus and Plato do not say 'what sort of change is primary' is more opaque. The function of the 'primary changes' in Aristotle's system (the eternal motions of the heavenly spheres) is, *inter alia*, to be a true origin (though not of course the ultimate origin) of all other motions; perhaps the point is simply that of the plethora of different types of motions exhibited by the atoms or the inchoate elements, none can be identified as prior to, or the origin of, the rest. Plato ascribes the origin of motion in the *ordered* world to the world's soul, which is, he thinks, self-moving (*Timaeus* 34a8–35a1, *Laws* X 893b1–899c1; cf. *Phaedrus* 245c5–246a2): Aristotle's final point is that Plato cannot trace the elements' 'discordant and disordered' motions back to the world soul, since (if the ordered world did come to be) these motions pre-exist it.[32]

Aristotle's criticisms of the atomists and Plato in effect offer a further promissory note—that his own account of the prior actuality will avoid the difficulties he has identified in the accounts of Leucippus and Plato. It will thus be part of his task to show that something whose substance is activity can satisfy these constraints and cause the requisite motion appropriately. First, Aristotle can presumably ascribe the motion of each heavenly sphere jointly to its own hylomorphic nature and to the causally prior activity of its unmoved mover (the originating cause of its motion)—and ultimately to the Prime Mover. Together these explain why there is always change and what it is, and in some ways why it takes place in this way rather than in that. (See the notes to 8 1074a14–31 for discussion of the extent to which Aristotle thinks that there are teleological or other explanations of the various directions, speeds, and inclinations of the rotations of the heavenly spheres; section 2 of the Prologue to

[32] For discussions of whether Plato intended talk of the world's coming to be literally, see *Cael.* I.10 279b32–280a10; Vlastos 1939/95 and 1965/95; Sorabji 1983, ch. 17.

chapter 10 examines how far Aristotle is successful in tracing the motions of all the heavenly spheres back to the Prime Mover.) Second, as we have seen, there is a primary change in Aristotle's account—the rotation of the outermost sphere. Third, Aristotle thinks that only on his account can activity be properly prior to potentiality: see notes on a19–26 below.

a3–4: This has every appearance of a statement that the objection has been met (or the antinomy resolved), though as I have said, some of the inferences Aristotle goes on to make are not quite what we would expect from this. (Note that at a20–1 Aristotle announces that 'these things would be resolved': this could be his principal statement that the objection has been met, but more probably refers to the difficulties facing all (non-Aristotelian) cosmologies sketched at 1071b26–1072a3.) The term *energeia* in the conclusion that 'thinking that potentiality is prior to activity, then, is in a way right and in a way not' might quite naturally be translated as 'actuality'; I have retained 'activity' for the sake of consistency: see notes on 1071b12–21. Aristotle's conclusion is hard to square with the idea that the objection was based on an alleged existential asymmetry of being, since that seems to imply that either activity is prior to potentiality or potentiality is prior to activity, but not both (see notes on 1071b22–4). Given his response to the objection, it is natural to take Aristotle to mean 'some activities are the exercise or realization of potentialities, but some are not.' This fits better with the idea that the objection was concerned with the apparent causal dependence of activities upon capacities.

'We have said how' is also surprising, as Aristotle has not said how potentiality is prior to actuality. The form of the reference is unusually brief for a reference to another work—normally Aristotle adds something like 'elsewhere', or 'in the work on such and such'.[33] If the reference is to another work, the best candidate is the passage in Θ.8 mentioned in section 3 of the Prologue (1050b6–28). Aristotle's conclusion there, that 'actuality is prior in a more proper way as well; for eternal things are prior in

[33] There is one such brief reference in Λ which is unequivocally to another work, at 1073a5; on the other hand this may be a special case: see notes *ad loc*.

substance to perishable things' (1050b6–7), corresponds to Λ.6's claim that activity is prior.[34] It may well be that Aristotle is simply anticipating how he would flesh out the discussion in Λ: such an expansion would naturally include conceding that many activities do depend on prior potentialities.[35]

a4–7: The appeal to his predecessors as witnesses on his side is characteristic, but in this case only loosely connected to the argument. Anaxagoras' theory shows that he saw the need for a cause to act on (what Aristotle characterizes as) the potentialities of the mixture; Empedocles' Love and Strife are, likewise, causes which act on the elements to produce and destroy an unending series of ordered worlds.

1072a7–26

In this section Aristotle gathers together the threads of his argument, and at the same time draws some new conclusions (see the introductory note to 1071b22–1072a7, and notes on a7–9 below). The chapter division, part way through this section at a19, is unhelpful.

a7–9: On 'chaos or night', see notes on 1071b26–31 above. Aristotle's thought is that if an activity is genuinely prior to all relevant potentialities, then none of the latter can have pre-existed it, and the activity must have always been operative; otherwise some further cause would be needed to explain its activation. So he can rule out cosmogonies like those of Anaxagoras, the 'writers about

[34] For discussion, see Makin 2006, *ad loc*.; Beere 2009, ch. 13; Judson 2016.

[35] As I noted in section 2 of the Introduction, Menn argues that this cross-reference must be to the Θ.8 passage and also that (because of the unqualified form of the reference) this shows that Λ is a part of the same work as Θ. This is unpersuasive. Unqualified references of this sort in the *Metaphysics* are never to a passage as far away as Θ.8 is from Λ.6 (even if we ignore I and K), and in fact are almost always to something in the very same chapter; so if we take the unqualified form of Aristotle's reference to be significant, we must take the reference to be to the materials for the claim that 'thinking that potentiality is prior to activity . . . is in a way right and in a way not' given earlier in chapter 6. In any case, the compression and evident haste of composition of parts of Λ (see section 2 of the Introduction) make it doubtful that we should rely on the form of the reference being significant. For further discussion see Judson 2018a, Appendix I.

the gods', and so on, according to which the ordered world was preceded by an infinite period in which there was no such world. Thus when he says 'the same things always' Aristotle is speaking of the existence of an ordered world: he does not mean that nothing changes, nor, for that matter, that there is a pattern of precise eternal recurrence. By 'either cyclically or in another way', Aristotle is probably thinking on the one hand of systems like that of Empedocles' 'cosmic cycle' in which a process of the successive coming to be and ceasing to be of an ordered world is eternally repeated, and on the other hand of views such as his own, in which the same world eternally endures; but it may be that 'cyclically' covers Aristotle's own view too (since this involves the cycles of the seasons and the transformation of the sublunary elements)—in that case, 'or in another way' would be a gesture at the (remote) possibility of some other account. We might reasonably expect Aristotle now to reaffirm his conclusion that there is an eternal originating cause of motion whose substance is activity; but in fact he does not mention this again until b24–6—and even then it looks forward as much as back, by making explicit for the first time the idea that this cause is unmoved. Aristotle is picking up the argument against the potentiality objection at a somewhat earlier point: he has excluded cosmogonies in which activity is not perpetual; but he has moved closer in some way to his own view than (say) the cosmogonies of the atomists or Plato discussed at 1071b31–1072b3. His sudden interest in the outermost heavenly sphere at 1072a9–18 suggests that he is taking it for granted that, to meet his own objections to Plato and the atomists, there must not only be change continuously but something which changes continuously—and hence which changes in an unvarying way.

a9–18: The argument focuses on the cyclical case, but if 'in another way' represents a genuine possibility Aristotle must mean it to apply to both types of case. It begins from a problem (discussed in somewhat different terms in *GC* II.10 336a23ff.): if there is something which is an eternally unchangingly active cause, how can it produce the highly variable changes which take place in the sublunary world?[36] Aristotle's discussion seems

[36] 'Coming to be and ceasing to be' refers to the central, though not the only, cases of such changes.

overcomplicated; this complexity arises in part from his desire to characterize as abstractly as possible both the problem and the heavenly structure required to solve it. He identifies two items—something which 'must always remain, being active in the same way' and 'something else which is active in different ways'—and refers to these as 'the first thing' and 'the second thing' respectively. It might be natural to take the 'first thing' to be (in concrete terms) the originating cause, but the parallel with the 'second thing', and the reference to 'the way the changes are' at the conclusion of the argument make it clear that it is in fact the outermost heavenly sphere. If this is right, it is confusing of Aristotle to call the sphere 'the first thing', since in causal terms the originating cause is first and the sphere is second: what he means is 'the first thing in this list of items'. When he later introduces a hypothetical 'different thing', I call it 'third' because it is introduced third, but its causal 'position' would be between the first and the second things. The 'second thing' is (again in concrete terms) the heavenly sphere which carries the sun in its oblique orbit around the earth: see *GC* II.10 336a32–b34 and the notes to 1073b17–38.

Given that in Aristotle's view the motion of each of the heavenly spheres is perfectly uniform and unvarying—no less so than that of the outermost sphere—in what way is this sphere 'active in different ways'? He is thinking of a variation which exists *relative to the sublunary world*. This sphere carries the sun in an annual orbit around the earth in a path which varies in that it involves what Aristotle elsewhere calls the sun's 'approach and retreat' from any (non-equatorial) region of the earth's surface, which in his view is the reason for seasonal variation (see notes on 5 1071a3–17). The point is not, or not merely, that the sun passes over different parts of the earth and that it is the cause of varying effects (that much is also true of the sun's diurnal motion, which is about to be classified as an 'unvarying' change); rather it is that the sun's approach and retreat causes sufficiently significant changes to explain how all the other changes in the sublunary world come about—at a higher level, what makes organic life possible, and at more fundamental level, why the elements do not simply separate out into their natural places but are

always sufficiently mixed up for elemental transformation to continue.[37] Aristotle now distinguishes two ways in which this sphere is active. 'In *this* way' means in the 'varying' way just described: the sphere causes these seasonal effects in virtue of its own motion. '[It is active] in *that* way' means 'it is active in an "unvarying" way': Aristotle must have in mind the way in which (as a result of the motion it acquires from the spheres above it) it carries the sun round the earth every twenty-four hours, in much the same way that the outermost sphere carries the stars around the earth. Aristotle's point about the putative 'third' thing seems to be that this 'unvarying' motion must be traced back to a cause which itself is in 'unvarying' motion, and that since this cause can be the outermost sphere it is uneconomical to posit something *else* as the cause instead.[38]

As I said in the notes to 1071b3–5, this passage is not concerned with eternal first motions *in general*: it only makes sense if Aristotle is talking about the ultimate first motion, that of the outermost sphere. The same is true of the recapitulation at a21–6, where what is spoken of is not eternal motions and their originating causes in general but explicitly the motion of the first heaven and its cause—that is, the ultimate originating cause. When Aristotle turns to the nature of this cause at b4–14, he is again focusing explicitly on the first Prime Mover: see notes *ad loc*. It is impossible to say exactly where the shift in focus to *the* originating cause takes place—and perhaps it was indeterminate for Aristotle too—but by the start of this passage there clearly has been such a shift.

a18: The question 'Why, then, should we seek other principles?' might look like a grand rhetorical flourish, and this is probably what inspired the later chapter division. But its scope is actually relatively modest: the principles are the two heavenly bodies and their corresponding motions, and the flourish is in honour of these basic features of Aristotle's cosmology, and not in honour of the

[37] Cf. *Cael*. II.3 286b2–9; *Phys*. VIII.6 259b32–260a19; *Meteor*. I.9.

[38] Aristotle faces an odd difficulty of his own making here: see notes on 8 1073b38–1074a5.

principle on which, as 1072b13–14 will assert, all things depend, the Prime Mover. Aristotle should not be understood as claiming that these (or even these and their associated movers) are the *only* principles (and indeed they are not, in his system): his point is rather that, at this level of abstractness, they are the only ones needed to generate a continuous series of finite changes.[39]

CHAPTER 7

a19–26: This passage is again rather awkwardly constructed. The line of thought is:

> The structure identified at 1072a7–18 is a possible one; if it is not the actual one, we would have to suppose that potentiality is prior to actuality ('what is not' should be construed as 'what is (potentially but) not actually' rather than as 'nothing': cf. 2 1069b14–20). But as 1071b25–31 argued, this would mean that the coming to be of the ordered world could not be explained. So we should take these difficulties to be resolved—that is, by Aristotle's account. 1072a21–6 then rehearses the main elements of this account.

Note that the argument assumes that Aristotle's account is the only acceptable account which makes actuality prior to potentiality. 'These things would be resolved': although 'resolved' (*luein*) is Aristotle's standard word for the resolution of an *aporia*, he is probably not referring to the resolution of the objection about the priority of potentiality raised at 1071b22ff., but to the difficulties which face any attempt to give a fundamental account of the ordered world which are outlined at 1071b26–1072a3 (in effect, the difficulty of meeting Aristotle's intelligibility constraints).

The passage at a21–6 summarizes the argument of 1071b2–22 and 1072a7–18; it adds the only—or at least the most explicit—argument for the view that the ultimate originating cause must be *unmoved* (point (iv) below), though chapter 6's claim that it must lack matter (1071b20–2) already entails its not being subject to change. The passage advances six claims. (i) There must be an

[39] Ross fails to see this and supposes that the 'other principles' which we do not need must be the Platonic Forms; Broadie is inclined to see flat inconsistency in Aristotle's claim (2002, p. 306, n. 15).

eternal motion,[40] and this can only be circular motion. 'This is clear not only through argument but in fact': Aristotle means that we can observe the circular motion of the fixed stars. Of course, even if this motion were eternal, we could not observe it to be so; nor is the motion in fact perfectly circular, as Aristotle supposes it is, because of the phenomena known as the precession of the equinoxes (not to be discovered for another two centuries) and nutation (not to be discovered for another 2,000 years). See also the notes on 8 1073a28–32. (ii) There is a sphere in which these stars are fixed and which is the subject of this primary motion: this is an economical inference only if we grant Aristotle a lot of theory. (iii) There must be something which causes this motion (a23–4 is ambiguous, and could mean 'there is therefore something whose motion it causes'; but on that reading the 'therefore' is quite out of order). (iv) This cause must be an unmoved mover; and (v) an eternal substance, (vi) whose substance is activity. The text of a24–5 is slightly uncertain, but the sense is not in doubt (for discussion, see the Note on the Text). The argument for (iv) which it offers is in essence Argument C (section 4 of the Prologue); see also the notes on 1070b12–21. The sphere of the fixed stars causes motion in other things—the other heavenly spheres and, ultimately, things in the sublunary world. It does so, however, by transmitting its own motion; thus it cannot be the originator of their motion, but only an intermediate link, as the stick is when I move a pebble by pushing it with the stick. Since (Aristotle assumes) there must be a true originator of the motion which is not merely an intermediate link, this originator must not only cause motion without transmitting it, but also be itself unmoved.

1072a26–b4

Aristotle now turns to the explanation of how the Prime Mover causes motion, and his celebrated doctrine that it does so by being the object of love; for discussion, see section 2 of the Prologue. Taken by itself, 'this is how the objects of desire and of intellect cause motion; they cause motion without being moved' (a26–7) is ambiguous: Aristotle could be explaining the way in which the

[40] The phrase 'unceasing motion' (*kinēsin apauston*) at a21 echoes *Cael.* I.9 279b1–3.

Prime Mover causes motion, or merely pointing out one way in which one thing can move another while being unmoved. The rest of the passage, however, makes it very clear that Aristotle means the former, since it constitutes an argument for identifying the Prime Mover (or the kind of substance it is) with the highest object both of thought and desire; and it is confirmed by b3–4, 'it causes motion as something beloved.'

a26–b1: 'The primary objects of these': that is, of desire and of intellect. 'Intellect' and 'object of thought' here translate *nous* and *noēton* respectively, while 'thinking' at a30 translates *noēsis*: see section 1 of the Prologue to chapter 9. Aristotle's strategy is to argue first that all desire is primarily—that is, ultimately—for what is good, and then that the highest good is also the primary object of thought; this enables him (he supposes) to identify the primary object of desire and intellect. The argument owes much to *De An*. III.9–10, though there Aristotle's goal is the more straightforward one of establishing the roles of desire and intellect in causing animal motion. 'Good' in the present passage translates *kalon*, often translated 'beautiful' or 'fine'. Although when talking about desire Aristotle sometimes reserves *kalon* for the objects of virtuous desires (see, e.g., *EN* IV.1 1120a23–9), the generality of his claim here requires it to have a correspondingly general sense. The contrast drawn between appetite (*epithumia*) and wish (*boulēsis*) is a little unexpected. 'Wish' is Aristotle's technical term for desire aimed at what the agent judges is good or beneficial for her, 'appetite' for bodily desires which Aristotle takes to be aimed at pleasure (*EN* III.4 and 2 1111b15–18); the distinction between real and apparent goods, as he usually draws it, is the quite different one between correct and incorrect judgements as to what is good—and Aristotle denies that all bodily pleasures are merely apparently good. The distinction between appetite and desire is a confusing irrelevance, since what Aristotle needs here is just the thought that all desires attempt to aim (whether successfully or not) at something good: this would give a reasonable sense to the claim that the primary object of desire is the primary or highest good.[41] It does not follow

[41] A similar idea found in Plato's *Republic* and *Symposium* is presumably in the background.

that this good is the ultimate object of desire for every human being (still less: for every animal), but only that it is the best thing which can be desired.

The claim that it is also the primary object of thought is more obscure. Aristotle argues first that the occurrence of a desire for *X* is explained by a judgement that *X* is good rather than vice versa ('good' is clearly to be taken in the general way required by the previous argument). Aristotle thinks that something like this is true even in the case of animals who lack intellect, and for whom 'imagination' (*phantasia*) represents the object of desire as attractive (*De An*. III.10). The point which Aristotle is aiming to establish here is that the good is a genuine object of thought. This seems only to require the weaker (though still controversial) claim that not all judgements that *X* is good are based upon a prior desire for *X*, and hence that thinking (*noēsis*) is a principle—by this Aristotle only means that it is a starting-point of action. It then remains for him to show that the primary good is also the primary object of thought, but the argument is woeful.

The 'two columns of opposites' (*sustoichia*) is an idea which goes back to the Pythagoreans, who constructed lists of opposites in groups which they regarded as good and bad, or better and worse (A.5 985b23–986a26). Aristotle invokes the idea of pairs of columns of opposites, apparently on his own part, in a number of different though related forms: (i) a Pythagorean-style list of opposites (N.6 1093b11–14; *PA* III.7 670b20–3; *Sens*. 7 447b26–448a19; *GC* I.3 319a14–17); (ii) a *sustoichia* in which members of the second column are privations of the members of the first (Γ. 2 1004b27–30; *Phys*. III.2 201b24–6; on Aristotle's uneasy association of opposites with form and privation, see the Prologue to chapter 2, section 2); (iii) a *sustoichia* in which each column is restricted to broader and narrower items falling within the same genus (I.3 1054b33–1055a2 and 8 1058a13–16: see Castelli 2018, *ad loc*.). Aristotle seems here to have in mind a *sustoichia* of the second sort. His first column appears to be a list of things which are directly objects of thought (this is what he means by 'one of the two columns of opposites is in itself an object of thought'); the second column is, presumably, a list of their negations or privations—which he thinks are understood not 'in themselves', but through the corresponding 'positive' in the first

list. This curious idea is also found in Θ.2, and perhaps has its origin in the idea that a privation is simply the absence of a form (*Phys.* I.7 191a5–7 and 9 192a3–5); but elsewhere Aristotle thinks of privations as having their own determinate character (*Phys.* I.5; *Cat.* 10 12a26–13a36; *Met.* I.4 1055a33–b11 (cf. I.7 1057a18–19)). Aristotle envisages the list of intelligible things as *ordered*, in such a way that substance ranks above other things. He does not elaborate on the nature of the ranking: it could be that a higher item is simply one which is prior to a lower one, or that it is by nature more intelligible.[42] Note that 'substance' here could mean substances, or kinds of substance, or substance in general (all of these could be said to be prior to non-substantial items): Aristotle does not disambiguate this here. His next move is to claim that substance(s) of a certain kind, or a certain kind of substance, rank(s) above all other (kinds of) substances, namely 'that which is simple and exists in activity'. The substance(s) in question are clearly meant to be those which are not composites of form and matter (this is the force of 'simple' here; cf. also Z.17)—that is, the immaterial substance(s) whose existence was demonstrated in chapter 6. Since things which are good and choiceworthy are also objects of thought (a27–30), they too are in the first column (a34–5). At a35–b1 Aristotle adds the premiss that in every case what is primary is the best thing or something analogous to the best; from this he infers that the primary item in the column which contains the good must itself be the best and hence must be the primary object of desire as well as of thought. Both the added premiss and the final inference require defence—it is not evident why the premiss must be true at all, and the inference assumes (among other things) that every good thing can be an object of desire. Just as Aristotle does not say whether these claims are about kinds or the members of the kind, so too he does not say whether his final conclusion concerns the immaterial unmoved movers in general, or whether the Prime Mover is supposed to emerge as the primary object of thought (and hence of desire) over them. (For discussion, see Frede 2000a, pp. 28–30.) Whatever he intends for his first column, the argument in Λ.8 that there must be an immaterial mover for each of the

[42] For the distinction between being more knowable relative to us and more knowable by nature, see *Phys.* I.1.

motions of the heavenly spheres presupposes that the object of a heavenly sphere's desire is an individual unmoved mover, and not merely the general kind.

b1–3: See Note on the Text. This is not so much an argument to show that final causes (that for the sake of which) are unmoved as the removal of a possible misunderstanding. If something is said to be for the sake of *X, X* could either be the beneficiary ('*for* something')—which does, typically, change—or the goal or end (*of* something), which need not (for a different account of the distinction, see Gelber 2018). The distinction is also drawn at *De An.* I.4 415b20–1, and referred to at *Phys.* II.2 194a33–6; see also B.2 996a21–9. In the present case the heavenly sphere is the 'beneficiary',[43] and the unmoved mover the 'goal or end'. Some commentators make much of the point that the unmoved movers do not constitute *attainable* goals: I discuss this issue in section 2 of the Prologue.

b3–4: The sense is very compressed: 'it causes motion [sc. in the outermost heavenly sphere] as something beloved, while it is by means of a moving thing [again sc. the outermost sphere] that it causes motion in the rest' (see Note on the Text). By 'the rest' Aristotle is probably thinking both of the nested heavenly spheres and the things in the sublunary world: while the Prime Mover moves the first sphere without itself being in motion, the first sphere moves the second sphere by transmitting motion, as does the second sphere the third, and so on down—though it is the motion of the sun rather than of the lowest sphere which is the principal cause of the changes of the sublunary world: see notes on 1072a9–18. For discussion of the general question whether the Prime Mover does cause motion in the rest, see the notes on 8 1073b38–1074a5 and section 2 of the Prologue to chapter 10.

1072b4–14

b4–10: The text here may be slightly corrupt (see Note on the Text), but the overall sense is not in doubt. The 'primary motion'

[43] This will turn out to be a slightly complex matter, since Aristotle says in chapter 8 that the motions of the heavenly spheres are for the sake of the *stars*. See notes on 8 1074a24–31.

at b5 is the subject of 'is moved' and 'it can also be otherwise' at b5–6: so we should understand it as a metonymy for 'the subject of the primary motion' (compare the immediately preceding sentence: 'if something is moved, it can also be otherwise than it is'). Aristotle is contrasting the subject of the primary eternal motion—the outermost heavenly sphere—with the Prime Mover. This sphere 'can be otherwise in respect of place', not in the sense that it can change its location, but in the sense that its parts can: see notes on 2 1069b24–6. By 'it cannot be otherwise in respect of substance' Aristotle means that it is incapable of not existing—cf. the distinction between generable matter and topical matter in 2 1069b9–11.[44] By contrast, the Prime Mover not only causes motion without transmitting it, but is not subject to any sort of change—and hence, implicitly, is able to be the ultimate principle while the outermost sphere is not.

'The primary motion is indeed in actuality' merits three comments. (i) Once again the reference to 'the primary motion' could in principle be generic (to any eternal circular motion) or specific—to the first of these motions, that of the outermost sphere (see notes on 1071b3–5). But the argument at b8–10 must be about the Prime Mover, so 'the primary motion' here must refer specifically to the motion of the outermost sphere. (ii) 'Actuality' here and at b8 translates *energeia* (see notes on 1071b12–21): Aristotle's point is either that the sphere's motion is indeed something actual, not something potential—but is nonetheless grounded in a potential for change—or (less probably) that the sphere's motion is indeed an activity—but one which is the exercise of a potentiality. (iii) On any reading of the passage, the reference to the primary motion must be understood as a metonymy for the subject of the motion, since he goes on 'but in this way it can be otherwise—that is, in respect of place—even though it cannot be otherwise in respect of substance.'

The Prime Mover's freedom from change was already established at 1071b15–22, but that argument, I think, implicitly relies on the one given here, since the earlier argument concluded that motion—change of place—not change in general, required an unmoving originating cause. The primacy of motion over other types of change—that is, that all changes of other types

[44] This is very close to the line of thought about the heavenly bodies in general which I think we should detect in Θ.8 1050b6–28: see Judson 2016, pp. 151–7.

presuppose some prior motion—and of circular motion over other types of motion are argued for at *Phys.* VIII.7 260a26–261a26 and 9 265a13–b16 (Argument E (i) in section 4 of the Prologue). The argument here relies on the further and by now familiar premisses that there must be a primary eternal motion and that it must have an originating cause *O*: if the originating cause were to change in any way, this would either be or presuppose a further *motion*, prior to the supposed primary one: this would in turn require its own originating cause *O′*, and this would be prior to *O*.

b10–14: Since the Prime Mover is entirely changeless, its existence (like its intrinsic properties) is necessary in the sense that it cannot be otherwise.[45] 'Inasmuch as it exists of necessity, it does so well, and in this way it is a principle': the first claim is obscure. Perhaps Aristotle's idea is that if one looks at the features of the Prime Mover in virtue of which its existence is necessary—eternal, changeless, causally independent, and so on—it will seem obvious that it must be good.[46] The second claim is more straightforward: the Prime Mover is a principle through being good at least in the first instance because it is by being good that it is the cause of the primary motion. Further reflections on the ways in which the Prime Mover's goodness makes it a principle are offered in 10 1075a11–25.

'On such a principle, then, depend the heavens and nature': this is famously quoted by Dante (*Paradiso* XXVIII.41–2). 'The heavens and nature' is to be understood as 'the heavens and (the whole of) the natural world'. Aristotle's remark echoes one he makes at *Cael.* I.9 279a28–30: 'on this depend the being and life of the rest'—but the reference of 'this' in the *De Caelo* passage is quite unclear (see notes on 1072b26–30). It is worth noting that the verb translated as 'depend' which Aristotle uses—*ērtētai* (he uses the cognate *exērtētai* in the *De Caelo* remark)—is not a technical term: it leaves it quite open what sort of dependence is involved. The ways in which the world depends on the Prime Mover are discussed further in chapter 10 (see sections 1 and 2 of the Prologue to chapter 10, and also section 2 of the Epilogue to chapter 9).

[45] 'Necessary without qualification' here means 'necessary in the primary sense': see Δ.5.

[46] N.4 1091b15–22 presents an equally obscure argument about the goodness of the first principle, in this case not necessarily offered on Aristotle's own part.

1072b14–30

Aristotle has now (to his mind) established the existence of (at least one) unchanging and immaterial substance—the conclusion announced at the start of chapter 6. As we have seen, Aristotle thinks that this 'principle' on which the world depends must be unchanging and immaterial, but *active* (see notes on 1072b12–21): he now turns to the identification of this activity as *thinking* (*noēsis*) of a certain sort. Note that we would expect Aristotle's account to apply to the other immaterial substances whose existence and number he is going to establish in chapter 8, but he is silent on this point: see sections 1 and 2 of the Epilogue to chapter 9. Two lines of thought converge on the identification of this activity with thinking: first, Aristotle's view that this sort of thinking is the only activity which need not require matter; second, his conviction that thinking is the best possible activity.[47] The sort of thinking in question is what Aristotle elsewhere calls *theōria*, usually translated 'contemplation'—the active (and in the case of immaterial substance, the unvarying) intellectual contemplation of one or more intelligible items (for humans, at any rate, these appear to be (certain) unchangeable essences): what the object(s) of the immaterial substances' thinking is/are is controversial: see the notes on 9 1074b28–1075a10 and the Epilogue to chapter 9, sections 1 and 2. Since its activity is thinking, Aristotle is able to say that this immaterial substance is alive (this is spelled out at b26–7) and has—or is—a 'way of life' (*diagōgē*), and he will go on to call it 'God' at b25 and b28–30.

b14–18: Another compressed passage. Ross's punctuation and bracketing seems preferable to Jaeger's. The starting-point of the train of thought is 'its [the immaterial substance's] activity is also pleasure.' Aristotle takes pleasure to be identical with, or a function of, 'unimpeded activity': the better the activity (in terms of the type of activity, its quality, and the quality of its objects) the more pleasant it is or can be (see *EN* VII.8–13, X.1–5). Since the immaterial substance's activity is entirely and necessarily unimpeded, and has the best possible object(s) (see chapter 9), it must

[47] For a different interpretation, see De Filippo 1994.

on this account be the most pleasant activity possible. Aristotle infers from this that this way of life (or its analogue for humans: see notes on b18–26) is the best possible one for us as well—albeit one which we cannot sustain continuously. His thought seems to be that if we are capable of even a small amount of the best form of activity, that is the best thing for us to do.[48] As it stands, this seems not to follow, since it might be that engaging in the best activity was injurious to *us*, or prevented us from engaging in the most worthwhile activities open to us at other times. It is clear from his ethical writings (see *EN* I–IV and X) that Aristotle believed that neither of these is the case, though his view of the relationship between the value for human beings of contemplation and that of other good activities (especially the exercise of the virtues of character) is a matter of controversy. Aristotle's next claim is that 'this' explains the pleasantness of 'waking, perception, and thinking (*noēsis*)'—the last of these is presumably meant in a more general sense than 'contemplation': see section 1 of the Prologue to chapter 9. 'This' might refer to their being activities (so Ross, and Laks 2000, p. 234); but this makes the point rather weak, and it seems better to suppose it to refer to contemplation's being pleasant (or even to the contemplation itself, to parallel the reference of 'because of these'). Aristotle's idea would be that these activities involve the exercise of capacities which are related or analogous to our capacity for contemplation, so that it is not surprising that their exercise is pleasant.

b18–26: I use the pronoun 'it' rather than 'he' for Aristotle's God (*theos*), both here and in the translation, since it is neither male nor female.[49] Although the immediately preceeding passage, with its talk of life and of the best possible activity, has clearly been leading up to this, it is here that Aristotle first refers to the Prime Mover as God.[50] For a discussion of the place of theology

[48] See *EN* X.8 1178b21–3: 'therefore the activity of God, which surpasses all others in blessedness, must be contemplative; and of human activities, therefore, that which is most akin to this must be most of the nature of happiness.'

[49] Even as a word '*theos*' can be masculine or feminine in gender: see, e.g., Herodotus, *Histories* 1.105.3–4; Homer, *Odyssey* 10.228; Burnyeat 2008a, p. 44, n. 1.

[50] This does not exclude the possibility that there are other gods; plausibly all the immaterial unmoved movers are, for Aristotle, gods.

in Aristotle's conception of first philosophy, see the Introduction, sections 3–5, and Judson 2018a. Aristotle now argues for some of the claims made at b14–18 in the opposite direction, so to speak—from the value and pleasantness of human contemplation to that of the activity of God (for a different interpretation, see Ross). Two things make it likely that Aristotle is now talking about human thinking. First, the remark that the intellect *becomes* the object of thought: this is true for human thinking, as Aristotle understands it (see section 2 of the Prologue to chapter 9, and the notes on 1074b38–1075a5), but not for divine thinking. Second, the phrase 'what is divine about the intellect' implies that Aristotle is concerned with human intellect. 'Thinking in itself' is probably a way of referring to the highest form of human thinking, namely contemplation; this is confirmed by the reference to intellect coming to be an object of thought 'in touching and thinking <it>', since 'touching' (*thinganōn*) is the verb Aristotle uses to characterize thinking of 'incomposites' (the highest form of human thinking) in Θ.10: see the notes on 9 1075a5–10.

Aristotle's starting-point is that contemplation has the best objects—better, presumably, than the objects of other activities such as perception, and better than the objects of craft-based procedures such as building or painting—and he clearly thinks that this stands in no need of argument. Humans have a capacity or set of potentialities for thinking which Aristotle calls *nous*. I translate this usage of *nous* as 'intellect' (on the difficulties involved in rendering *nous* see the Prologue to chapter 9, sections 1 and 3). In the activity of thinking the human intellect in some sense actualizes the object of thought, and this is the basis for Aristotle's claim that 'it is itself which the intellect thinks, by sharing in the object of thought': see section 2 of the Prologue to chapter 9, and the notes on 9 1074b28–1075a5. When he says that the object of thought is 'the substance' (b22), he probably means the substantial form, that is, the essence. On the text at b23, see the Note on the Text. Aristotle seems to be claiming—it is hardly an argument, despite the 'consequently' at b23—that it is the activity of thinking (this is, I think, 'the former' at b23) rather than the object of thought ('the latter') that makes the intellect have something divine about it. This might seem incompatible with the claim to which Aristotle subscribes in chapter 9 that the value of an activity of thinking depends on the value of

its object (see notes on 1074b17–21, b29–33, and 1074b35–1075a5), but this is not the case. Aristotle's point here is that the intellect seems to have something divine about it *when it actively thinks*: the mere availability of an object of thought is not enough. The 'seems' (*dokei*) suggests that Aristotle is not appealing to some theoretical view of his own (e.g. that actuality is better than potentiality), but some more common (though still perhaps philosophical) view that it is in the activity of thinking that human beings come closest to imitating the gods. These comparisons of human and divine thinking prompt the question whether these forms of thinking are essentially the same: see section 3 of the Epilogue to chapter 9.

b26–30: Yet another compressed passage, and once again there is a textual question: see Note on the Text. On the text adopted here, the argument must be: (i) Life belongs to God, because (ii) the activity of the intellect is life, and (iii) God's activity is activity of the intellect. As with the phrase 'thinking in itself' at b18, the phrase 'which is activity in itself' means 'which is the highest or most genuine activity'. So Aristotle's next steps are: (iv) God's activity is the highest form of activity [and so] is the best life and an eternal one. (v) This is [sc. whether we realize it or not] why we describe God as 'a living being eternal and best'. The final clause, 'so that life and lifetime . . . ', is awkward on this reading: as a further conclusion to the argument it does little more than repeat earlier results; perhaps it is a compressed way of saying 'so that, according to what we say, life and lifetime . . . '.

The term 'lifetime' translates *aion*; Aristotle is reworking an idea found in *Cael.* I.9 (though it is not entirely clear whether Aristotle there is talking about the heavenly bodies or about other divinities beyond the world):

> Unalterable and impassive, they live for the whole lifetime [*aion*] in possession of the best and most independent life. Indeed, the people of long ago were inspired when they made this word: the end which embraces the time of each thing's life, and which cannot in nature be exceeded, was called the lifetime of each. By the same token the end of the whole heaven, the end which embraces the whole of time and infinity, is its lifetime, taking the name from 'always existing' [*aiei einai*], immortal and divine. (279a20–8)[51]

[51] This passage immediately precedes the sentence quoted in the notes on b10–14.

'*This* is God': 'this' could refer to the characterization of God as the unchanging activity of the highest form of thinking, or to its eternally having the best life: in this case the point would be 'and it is this kind of being which we call God.'

1072b30–1073a3

Aristotle completes his discussion of the goodness of the ultimate originating cause by arguing against an opposed view—that the best things are not the origins or principles but the end-products. Speusippus is also attacked for holding this view in N.5. Speusippus took the principles of things to be disjoint and to form what Aristotle calls a 'succession' (see notes on 1 1069a19–26 and 10 1075b37–1076a4): goodness appears only at a late stage in this succession, if at all (cf. N.4 1091a29–b3). Aristotle's response is the same in both passages, namely to claim that the grounds for supposing that what is best is posterior or dependent are unsound: a given 'perfect' thing—a mature organism—does indeed come from what is less perfect—seed—but the seed can only be produced by a prior mature organism. One might object that Aristotle has only arrived at a symmetrical impasse: chickens are generated from eggs and eggs from chickens. Aristotle's response is implicit in the 'same form' claim made in chapter 3: it is the form of the organism which controls and explains both types of generation, and so is prior. He develops this point in teleological terms in arguing for the general priority 'in substance' of actuality over potentiality at Θ.8 1050a4ff.: for discussion see Witt 2003, pp. 80–9; Makin 2006, *ad loc.*; Peramatzis 2011, pp. 278–91. It is not clear why the Pythagoreans are associated with the Speusippan argument (see Tarán 1981, pp. 335–6).

1073a3–13

There are signs that this passage is in some way internally disjointed and/or not fully integrated with what precedes it. a3–5 reads like a summary of chapters 6 and 7 as a whole; a5–11 then adds a fresh argument for a conclusion at best only implicit in what has gone before, with an unusually brief form of back-reference to another work; a11–12 sits awkwardly, and it is hard

to tell whether it is meant to continue the additional material begun at a5, or picks up the summary at a3–5; a13 is a somewhat vague summarizing sentence. There is also strong stylistic evidence that Aristotle has reused one or more passages taken from an earlier piece of writing, starting at, or at some point after, a3–5, and continuing well into chapter 8: see section 1 of the Prologue to chapter 8. For reasons explained there, matters are complicated by the fact that, even if this idea is correct, it is impossible to determine exactly where this earlier material begins, how many separate passages were reused, or whether Aristotle made any revisions to this material at the time of its incorporation into this new context. A plausible conjecture is that Aristotle wrote a3–5 as a summing up of chapters 6–7, then added a stretch of text which included the further points about the Prime Mover at a5–11 and the first fifty to sixty lines of chapter 8. Lines a11–13 might be a (now redundant) conclusion summing up a longer portion of the earlier piece of writing, of which a5–11 constituted the final part, or a slightly clumsy addition to provide a new 'closing summary' of chapters 6–7.

a3–5: This summary picks up the opening of chapter 6 and its programme of demonstrating the existence of an eternal and unchanging substance (on the importance of this within Aristotelian first philosophy, see the Introduction, sections 3–5). The Prime Mover's separateness from perceptible things has not been mentioned; but if it is characteristic of substances in general to be separate (see 1 1069a24 and notes), we would expect the highest substance to be separate too. If separateness is a matter of ontological independence, then the Prime Mover would seem to be separate to the highest degree: there could be no perceptible things—since they are by their nature subject to change—if there were no Prime Mover, whereas its activity of thinking is independent of their existence. If Aristotle has separateness in being in mind, he must think that the full account of what it is to be a changing substance will include a reference to the Prime Mover (or to unmoved movers as a general kind), but not vice versa.

It is quite striking that in his characterization of God in chapters 6 and 7 Aristotle never uses the term 'form', the key principle of natural substances. His most general term is 'actuality/ activity' (*energeia*). For discussion, see the notes on 8 1074a31–8.

a5–11: adds some fresh material. 'It has also been proved': if the reference is to a surviving work, it is *Phys.* VIII.10 (Argument F in section 4 of the Prologue). Normally Aristotle uses cross-references of this brevity only to refer to another part of the same work, but this conclusion has not been proved earlier in Λ (we encountered another problematic case of this sort at 6 1072a4). It is unsatisfactory to take it, as Ross does, to refer to a proof earlier in Λ of premisses (e.g. that the Prime Mover lacks matter) from which the conclusion might follow—especially as a7–11 is obviously a summary of the *Physics* argument. In this particular case it is also possible that the reference is to a now lost piece of writing of which the passage may be an excerpt (see the introductory notes on a3–13; so Burnyeat 2001, pp. 142–3). If this is the case we have to suppose either that Aristotle was happy to retain a reference of this brief form to what is (in this new context) another work—in which case the form of the cross-reference is not so problematic after all, and could just as easily be to *Phys.* VIII—or (quite plausibly) that its retention in the new context represents a simple failure to do the requisite editorial work.

The argument is highly problematic (see Judson 1994, pp. 167–71). The premiss that 'nothing finite can have an infinite power' is established in *Phys.* VIII.10, apparently on the basis that causing an eternal motion involves expending 'power' (or as we might say, energy) on the thing which is in motion. But the Prime Mover does not cause motion in this way (see section 2 of the Prologue and the notes on 1071b12–21). Perhaps Aristotle's idea (here and in the *Physics*) is not that the Prime Mover must expend power, but that it would have to do so *if* it possessed magnitude. This might seem to push the problem back a step: why would a final cause which did possess magnitude need to expend power in causing motion any more than one which had no magnitude? Aristotle's answer cannot be that such a being would need to expend power simply on *maintaining its own existence*. The heavenly bodies provide a counterexample, since either they can expend such power infinitely despite possessing only finite magnitude, or, as I would suppose, they stand in need of no such maintenance—as 2 1069b25–6 tells us, they have no matter for generation (sc. or destruction), and they can neither come to be nor pass away (cf. 1072b6–7, on the outermost sphere, and Judson 2016). Nor is their existence maintained by

the Prime Mover's causal activity, for its mode of causation—as an object of love—presupposes, and cannot explain, their existence. One might suppose that the answer lies in Aristotle's insistence that the Prime Mover must be *active* (see notes on 1072b12–21), together with an assumption that any activity on the part of something which has magnitude—even thinking—necessarily involves the expenditure of power. Once more, however, the heavenly spheres provide a counterexample: they move eternally, and think eternally, but possess magnitude.

a11–13: Unlike the preceding one, this conclusion (in somewhat different terms) has been argued for earlier, at 1072b4–10, which draws on arguments in *Phys.* VIII. There is no verb introducing 'that . . . ', and for the reasons given in the introductory notes to 1073a3–13, it is unclear whether we should understand the sentence as picking up 'is clear from what has been said' at a3–5 or 'it has also been proved' at a5.

CHAPTER 8

PROLOGUE

Λ.8 is often regarded as an embarrassment. For some commentators—notably Jaeger and Ross—what is embarrassing is its assertion of a plurality of immaterial unmoved movers, which conflicts with what they suppose to be Aristotle's more settled view that there is only one, the Prime Mover; for this reason (among others) they take the chapter to be a later insertion into the rest of Λ. For at least one recent commentator (Lloyd 2000), the embarrassment is the way it (supposedly) reveals Aristotle's incompetence as an astronomer. More generally felt is a doubt that considerations of astronomy have any place in First Philosophy, and/or a worry that some of the doctrines to which Aristotle commits himself in chapter 8 are too outlandish for comfort.

These concerns, I think, are all misplaced. I shall discuss the supposed doctrinal conflict, and the idea that chapter 8 is a later insertion, in section 1, and deal with the charge of astronomical incompetence in the notes on 1073b34–8 and 1074a12–14. Worries about boundary-crossing solve themselves: Aristotle does cross the boundaries between sciences here—as he does in the appeal to the arguments of *Phys.* I in chapter 2 and to those of *Phys.* VIII and (implicitly) the *De Anima* in chapters 6–7 and 9—but this is not evidence of aberration. What it shows is simply that, though Aristotle thinks that there are boundaries between different sciences, these boundaries are porous (see Prologue to chapter 2, section 5, and Judson 2019). As for the outlandishnesss or otherwise of Aristotle's ideas, I think that careful attention to the chapter reveals it to be a rich vein of important material in the development of Aristotle's unification of astronomy and physics—an intellectual achievement certainly not without flaws, but nonetheless quite extraordinary in its scope and ambition (see Judson 2015).

1. The Composition of Chapter 8

The question of the date of composition of this chapter, and its relationship to the rest of Λ, is a controversial one (on the need for caution in thinking in terms of *the* date of composition of any surviving Aristotelian work, see section 2 of the Introduction). Jaeger argued that the rest of Λ was written early in Aristotle's career, but that chapter 8 was written much later and was inserted into Λ by a subsequent editor (1923/48, pp. 219–27, and ch. 14); this picture was accepted by Ross (p. 384), and has been widely influential. Jaeger's arguments are inadequate, however. He based his early date for the rest of Λ on claims about Aristotle's philosophical development which there are very good reasons to reject.[1] For their dating of chapter 8 Jaeger and Ross use four main arguments. (i) Λ.8 is stylistically unlike the other chapters; this will be discussed in the next paragraph. (ii) At 1073b32–8 Aristotle reports astronomical work by Callippus, who is known to have devised an astronomically important seventy-six-year cycle to harmonize the solar and lunar years, a cycle which seems to have commenced in June 330 BCE, in Athens.[2] There is no reason, however, to date the quite different work mentioned in chapter 8 (Callippus' modifications of Eudoxus' homocentric theory) to the same time. (iii) Jaeger and Ross think that chapters 6 and 7 assert the existence of just one divine unmoved mover, and thus that there is a doctrinal inconsistency with chapter 8's insistence on a plurality of movers: they associate the 'monotheism' of the earlier chapters with an earlier stage of Aristotle's thinking, and see the 'polytheism' of chapter 8 as a late development. There is no such inconsistency: although chapters 6–7 do not offer any argument for a plurality of unmoved movers, they do not argue that there is only one, but rather that there is at least one (see Frede 2000a, pp. 47–8, and my notes on 6 1071b3–5); and there is a reference to such a plurality in chapter 6 (1071b20–2). Jaeger and Ross are likewise wrong to see 1074a31–8 as an earlier, monotheistic 'fragment': see notes *ad loc*. (iv) They think that chapter 8 breaks up 'an obvious flow' between the end of

[1] As I said in section 1 of the Introduction, it is in fact hard to find a good argument for any particular date, early or late, for Λ's composition.

[2] Aristotle died in 322 BCE.

chapter 7's discussion of the Prime Mover's way of life and the start of chapter 9's investigation of divine thinking. The question 'how many unchanging substances are there?' arises quite naturally, however, in the context of an argument that there must be at least one. That said, the transitions are not very smooth. Aristotle does not simply go from 'there must be some unmoved substances' to 'how many are there?', since in between, as we saw, he switches focus at some point to the *first* unmoved substance and its way of life; and there is also a certain degree of dislocation in the final part of chapter 7 (see notes on 1073a3–13 and below).

There is no good reason to regard chapter 8 as a later insertion; there is, however, something distinctive about this part of Λ which makes it likely that the final part of chapter 7 and some parts of chapter 8 reuse material which was written earlier. In 1875 Friedrich Blass identified two sections of text, 7 1073a3 – 8 1073b38 and 8 1074a38–b14, which are almost entirely free of hiatus, while the sections before, in between, and after these contain a good deal of it. Hiatus is the juxtaposition of a vowel at the end of a word with a vowel at the beginning of the next, without an intervening pause; in Ancient Greek, avoiding hiatus for a sizeable stretch of text (even with some allowable exceptions) can be quite difficult to achieve, and it is usually a sign of a self-consciously literary style. In his extant writings Aristotle sometimes avoids hiatus at the start of a work or of a new discussion, and occasionally elsewhere, but usually he does not strive to keep his prose hiatus-free. The sharp contrast between these sections of Λ.7–8 and the surrounding text (together with much weaker subsidiary arguments) led Blass to suggest that Aristotle excerpted them from some earlier, more highly polished work: Blass's favoured candidate was the now lost dialogue, *On Philosophy*, which we know to have contained material on cosmology and theology (see Blass 1875, especially pp. 486–7).

These facts about hiatus-avoidance make it quite probable that Aristotle incorporated a certain amount of material from another piece of writing into Λ.7–8, as Blass claimed; but some important caveats are called for. (i) In the nature of the case, it is not usually easy to determine exactly where a deliberately hiatus-free passage begins or ends, since although hiatus is quite common in Greek prose when the author is not trying to avoid it, it is by no means pervasive; so on the basis of hiatus-avoidance alone it may be

indeterminate whether the initial (or final) sentences of a stretch of hiatus-free prose are part of the deliberately hiatus-free material or not. This is why I said in the notes on 1073a3–13 that we cannot be sure just where the incorporated material begins. For that matter, once it is supposed that the author allows himself an occasional hiatus in a deliberately hiatus-free section—as Aristotle does in these sections—one cannot necessarily infer that this section starts at some point after the last occurrence of a hiatus, or that it ends at some point before the next occurrence. In fact Blass's particular choice of beginning and end-points, which are often invoked in later discussions without comment, are partly governed by his views about which stretches of text seemed to be self-contained on the basis of their content rather than their style. Thus he included as the final part of his first section the seven lines discussing Callippus' modifications of Eudoxus' astronomical system (1073b32–8), despite the fact that these include two cases of hiatus in the space of three lines,[3] so that the Callippan material might or might not be part of the excerpted material—indeed, as far as style goes, the balance of probabilities is against it being part of this material. (ii) If Aristotle did reuse material in this way, we cannot tell what editorial changes, or changes to the content, he made, if any (see the notes on 1073a3–13), though it is clear that the latter part of the first hiatus-free section (i.e. the part which starts at the beginning of chapter 8) is incorporated into a more complex argument which includes additional material: see the notes on 1073a14–22. (iii) By the same token, we cannot tell whether Aristotle reused two passages more or less corresponding to Blass's two sections, or one extended passage comprising both sections (as Burnyeat suggests: see below), or a larger number of distinct passages. (iv) The suggestion that the material was excerpted from *On Philosophy* is economical, but we simply cannot tell: it might have been taken from some other lost work, or may even itself have been a fragment of a project which Aristotle began but did not complete.

Commentators are also struck by the fact that 'these' at 8 1074b3 seems to have no obvious referent. Blass and Jaeger thought it must refer to the divine bodies mentioned at 1074a30–1; Jaeger took this

[3] Cf. Menn 2011, p. 198, n. 45.

to be a sign that the supposedly 'monotheistic' passage in between (1074a31–8) was a fragment carelessly inserted by a later editor. Burnyeat (2001, pp. 141–3) takes the reference to be to the planets mentioned much further back, at 8 1073b37–8: this is the end of the earlier hiatus-free section *if* this section included the passage about Callippus despite the two hiatuses. Burnyeat takes this as evidence that Aristotle incorporated one long passage from *On Philosophy* and broke it up by inserting 1073b38–1074a38. I discuss this question further in the notes on 1074a38–b3.

2. Astronomy and Astrophysics

Aristotle appeals to astronomical theory to settle the question of how many unchanging, immaterial substances there are. He takes the leading theory of his day to be, essentially, that of Eudoxus. One of the greatest mathematicians of his time, Eudoxus was responsible for the general theory of proportions which we find in Book V of Euclid's *Elements*, and for the associated method of approaching a limit for proving area and volume relations (Book XII); he also did work on ethics, as we know from *EN* I.12 1101b27–31 and X.2 1172b9–25. Beyond this we know remarkably little about him, and very little about his astronomy. He came from Knidos, a city on the coast of what is now Turkey; his dates are uncertain, but probably fall within the range 410/390–360/340 BCE. It is not known when he developed his astronomical theory; it was probably set out in a book called *On Swift Things* or *On Swiftnesses* (*Peri Tachōn*), which is now lost (and to which only one explicit reference survives). Its two core elements were the ideas which we met in section 1 of the Prologue to chapters 6–7: that the earth is motionless at the centre of the cosmos, and that all the apparent motions of the heavenly bodies could be explained in terms of combinations of unvarying, uniform, spherical motions, all about the centre of the cosmos—that is, the centre of the earth. I shall call these 'perfect motions', and the general type of theory advanced by Eudoxus—and by Callippus and Aristotle—'homocentric theory'. Callippus is said to have been a student in Eudoxus' school in Kyzicos on the southern coast of the Sea of Marmara; as noted in section 1, commentators have argued that Callippus' work on homocentric theory must

date from about the time of his work in Athens on solar and lunar cycles, but there is no basis for this. It is unclear whether or not Callippus wrote a book on homocentric theory; if not, Aristotle must be reporting lectures or discussions.[4]

What we know of Eudoxus' theory and of Callippus' modifications derives almost entirely from Aristotle's all too brief account here and from a longer discussion in Simplicius' commentary on Aristotle's *De Caelo*, written in the first half of the sixth century CE.[5] Although he gives the name of Eudoxus' book, Simplicius almost certainly did not have a copy; in addition to Aristotle's texts he relies heavily on a book (also now lost) by a philosopher and astronomer of the second century CE, Sosigenes, called *On the Back-Winding Spheres*. Simplicius probably had this book in front of him—but it is possible, if rather less likely, that his knowledge of it was only by way of Alexander of Aphrodisias' now lost commentary on the *De Caelo*, on which Simplicius also draws. Sosigenes was an Aristotelian, and taught Alexander of Aphrodisias, but he is highly critical of homocentric theory, which by his time had been long discarded in favour of accounts using eccentric and epicyclic motions—the type of astronomical theory on which Ptolemy put his stamp in Sosigenes' own day, and which remained dominant until Copernicus. For information about Eudoxus Sosigenes drew on a history of astronomy by Aristotle's pupil Eudemus (another lost book): we do not know whether Sosigenes used other sources, nor whether he had access to Eudoxus' own book, though this latter seems unlikely. Despite his usual reliability and acuity, Simplicius' testimony has to be approached with great care, especially since an occupational hazard for historians of astronomy is to assume, when trying to understand an earlier period, the intellectual concerns and the extent of knowledge of phenomena of a later one. Nonetheless, I think that Simplicius turns out to be a useful source.[6] Even so

[4] Simplicius says that he worked with Aristotle, 'correcting and amplifying Eudoxus' discoveries with [him]' (*in Cael.* 493.5–8); but this may simply be someone's inference from Λ.8.

[5] *in Cael.* 488.18–24, 493.4–506.8: this is translated in Mueller 2005 and in Bowen 2013.

[6] For a trenchantly sceptical stance, see Goldstein 1997 and Bowen 2002 and 2013; there is some rebuttal in Mendell 2000.

the nature of Eudoxus' theory—what phenomena he sought to explain, and how, in detail, his account worked—is now very largely a matter of conjecture and reconstruction, and almost everything about it is controversial. Here and in the commentary I can only give an outline, with very little technical detail.[7]

Homocentric theory took its starting-point from the motion of the so-called fixed stars: this motion seemed simply to require one such perfect motion per day (or rather once in a period very slightly (about four minutes) less than a solar day;[8] this one-sphere scheme ignores the phenomena known as precession and nutation: see notes on chapter 7 1072a21–6). It might also have seemed obvious, given the limited amount and often qualitative nature of the available astronomical data, that the sun's motion required just two perfect motions, a daily one and an annual one; as I said in section 1 of the Prologue to chapters 6–7, there are some indications that Plato thought of the motion of all the planets as involving two perfect motions (this is controversial)—and there are signs of a two-motion scheme in parts of the *De Caelo*. It is clear from Aristotle's account that Eudoxus thought that the motions of all the planets, including the sun, required a more complex treatment; there are a number of possible reasons for this, which I discuss in the notes on 1073b17–38. As Aristotle describes it, Eudoxus's theory involved a separate set of three or four nested, rotating spheres for each of the seven planets. Within a given set, the outermost sphere rotates in a particular way about the centre of the earth—that is, with a certain uniform speed, in a certain direction, and at a certain angle to the axis of rotation of the sphere of the fixed stars. This outermost sphere transmits its motion down to the sphere immediately inside it; this inner sphere

[7] For fuller discussion, I recommend Dreyer 1906/53; Dicks 1970; Lloyd 2000; Mendell 2000; Bodnár 2005a. Those who wish to pursue the subject in greater detail should also read Neugebauer 1953 (or 1975, vol. 2, 624–31, 675–85); Hanson 1973; Goldstein 1997; Mendell 1998; Yavetz 1998, 2001, and 2003; Beere 2003; Bowen 2002 and 2013.

[8] In our terms, a sidereal day (a 'star-related' day) is the time it takes for the earth to rotate once on its axis, so that the fixed stars appear to be in the same position again. A solar day (a 'sun-related' day) is the time taken for the earth to move in such a way that the sun appears to move from its highest point in the sky back to its highest point the following day; because the earth is orbiting around the sun as well as rotating on its axis, this takes nearly four minutes longer (exactly twenty-four hours).

has in addition a motion of its own, so that its overall motion is a combination of the upper sphere's motion and its own intrinsic motion. This combined motion is then transmitted down to the next sphere in, and so on; the planet itself is located (we should presume) at the equator of the innermost sphere of the set, and it moves in a way which results from the combination of the motions of all of the spheres in that set. Aristotle takes it as read that the spheres in these planetary sets are homocentric about the centre of the earth (given Aristotle's endorsement of Eudoxus' approach, anyone who had read the *De Caelo* would take this for granted), and that each sphere's own intrinsic motion is uniform in direction, angle, and speed—this is Aristotle's view in *De Caelo* (argued for in II.6) and is what we would expect from the arguments of Λ.6–7. As we shall see, Aristotle gives us almost none of the crucial determinants of the character of each sphere's rotation—its speed, its direction, the angle of its axis to that of the sphere of the fixed stars. The significance of Aristotle's reticence will be discussed in the notes on 1073b34–8. Aristotle goes on to tell us that Callippus added extra spheres to all the planetary systems except for those of Mercury and Venus, but he offers no clue as to why; equally, he gives no reason why he himself is unsure whether Callippus' extra spheres for the sun and moon are necessary (see the notes on 1074a12–14).

Setting aside his modification of the number of spheres required, Aristotle's own contribution to homocentric theory at this stage of chapter 8 (1073b38–1074a14) is to pursue the consequences of 'putting together' the spheres in each of Eudoxus' seven separate sets (see the notes *ad loc.*). The import of this has been both overstated and underappreciated. It has been overstated because it has often been taken to mark the difference between a purely instrumentalist approach on the part of Eudoxus and Callippus, and Aristotle's realist approach. It is clear from the way in which they treat the planets separately that Eudoxus and Callippus were principally interested in the geometrical solution of the planets' irregular motions; but that is no reason to regard them as instrumentalists who took the truth of their theories to *consist* in their predictive success.[9] Whether

[9] See Wright 1973; Musgrave 1991; Judson 2015, section 1.

they took their solutions to have implications for the physical mechanisms behind planetary motion is a separate question which we simply cannot answer.

Whether or not Eudoxus and Callippus had an interest in the physical basis of their systems, it is Aristotle who pursues the project of a thoroughgoing *integration* of astronomy—the theory of what the motions of the heavenly bodies are which produce the observed phenomena in the sky—with physics, the theory of what produces those motions, what physical reality underlies them. His 'putting together' of the spheres is a part (though only a part: this is why it is generally underappreciated) of this momentous project. The key question which Aristotle pressed was, what does the world have to be like if Eudoxus' or Callippus' theory is right? The physics—or, better, the astrophysics—which for Aristotle underlies astronomical theory relies on the following five principles:

(i) The heavens consist in a number of fundamental bodies: these are all nested, geocentric hollow spheres. (There are, in addition, the fixed stars and planetary bodies.)
(ii) These fundamental bodies are composed of an element whose nature it is to move in what I have called a perfect motion: this is a regular, natural motion determined, as the natural motions of the other elements are, by the centre and periphery of the universe, and which is hence part of Aristotle's unified element-theory (see Prologue to chapters 6–7, section 1). Each fundamental heavenly body has thus exactly one intrinsic geocentric circular motion (though it can in addition be moved by spheres higher up in the system, so that its resultant motion may be complex).
(iii) Each heavenly sphere transmits its motion down to the next sphere, if there is one (see notes on 1073b38–1074a14).
(iv) Beyond the different, nested locations of the heavenly spheres, the *only* variations in the heavenly bodies required by physics are (a) the further determination of each perfect motion (its speed, direction, and angle); (b) the locations of the visible heavenly bodies; and (c) the differences in the numbers of spheres in each planetary set.
(v) Arguments from physics require that the heavenly bodies are living, intelligent beings, who are inspired to move in

their eternal circular orbits by their contemplation of the unchanging perfection of a god (see Λ.6–7). They are therefore subject to teleological explanations in just the way in which animals and plants are.

Note that Aristotle says nothing about how a sphere transmits its motion to the next one: it seems to have the status of a basic postulate of his system.[10] He is equally silent on what determines the angle, direction, and speed of a sphere's own intrinsic rotation. What these are is, presumably, necessary in each case, but Λ says nothing on whether they are determined by physical structures (the location and nature of physical axes of rotation, etc.), so that the heavens are like a vast clock, in which love plays only the role of the weights on the pendulum, or whether they are principally due to the *form* of the sphere[11]—and if so whether or not this is a matter of the choices or desires of the sphere. To say that the form or soul plays a part in the motion of the sphere is not necessarily to say that it does so by means of a desire, since many of an animal's or a plant's functions and activities are, in Aristotle's view, due to its soul without being the products of desire. Animals and plants have complex structures which cannot be fully explained in terms of the organism's material nature, nor in terms of the mere activation of that nature by the soul: the essential nature of these processes cannot be understood, he thinks, except in terms of the organism's form. I return to this question in the notes on 1074a24–31. The presence of teleology in his astrophysics may seem particularly outlandish to us; but from

[10] As the anonymous reader pointed out, Aristotle reports Eudoxus as saying that 'the poles of the third sphere in every case are on the <circle> which goes through the middle of the constellations of the zodiac' (1073b28–9): this might suggest (though it does not explicitly say) that the poles are physically fixed to the sphere above at these points, and that motion is transmitted down mechanically by way of the poles. But Aristotle says nothing to confirm that this is his own view, nor to explain how this mechanism would operate in his cosmos. In particular we might ask: (i) since there is no void—so that the whole outer surface of the sphere must be in contact with the sphere immediately above—what is it about the poles that makes them, and them alone, 'fixed' to the sphere above? (ii) Since the whole sphere is made of the same type of body, aither (varying perhaps only in density: see Judson 2015, section 5), what are the mechanics of the transmission of the poles' inherited motion to the rest of the sphere?

[11] There is a hint of this view in *Cael.* II.2: see Judson 1994, pp. 159–61.

Aristotle's perspective it is a further element in the unification of supra-lunary and sublunary science—and it solves some otherwise intractable (but quite serious) problems: see section 2 of the Prologue to chapters 6–7 and notes on 8 1074a24–31.

Despite these and other problems, this is a system of extraordinary coherence and simplicity, which physicists (and even many astronomers) found compelling long after the Eudoxan system was replaced. The great flood of new astronomical data which came the Greeks' way in the Hellenistic period made Eudoxan, and hence Aristotelian, astronomy untenable. It was replaced by a new and spectacularly successful system developed principally by Hipparchus in the second century BCE and Ptolemy in the second century CE. The extraordinary impact of Ptolemy's work had the consequence that little care was taken subsequently to preserve earlier astronomical writings, and the history of homocentric theory after Aristotle—whether it became the dominant account, and if so, the course of its decline and of the rise of eccentric/epicyclic theory in its place—is almost entirely obscure. There were attempts, culminating in Ptolemy's *Planetary Hypotheses*, to revise Aristotle's astrophysics in the light of the demise of homocentric astronomy; but this new astrophysics was seriously inadequate in comparison with Aristotle's. It is a commonplace in the history of science that it was because of the sheer authority with which Aristotle was embued that his physics continued to be pre-eminent until the time of Galileo, and there is some truth in this; but it was also because no one could devise a better astrophysics.[12]

COMMENTARY

1073a14–22

Aristotle introduces the main topic of the chapter: the number of unmoved, immaterial substances. His discussion will have three main steps. (i) At a22–b1 he argues that there must be at least as

[12] I discuss Aristotle's system further, explore how he could meet a number of the difficulties it faces, and compare it with Ptolemy's astrophysics, in Judson 2015.

many unmoved substances as there are heavenly spheres. (ii) At 1073b1–1074a17 he discusses the number of the spheres required to explain the motions of the fixed stars and planets, since there must be at least that number of unmoved substances: (iia) 1073a22–b17 introduces this; (iib) 1073b17–32 and (iic) b32–8 set out the views of Eudoxus and Callippus respectively; (iid) 1073b38–1074a14 presents Aristotle's own view. (iii) 1074a17–31 argues that the cosmos contains no *more* heavenly spheres than this, and that there are no more unmoved substances than there are spheres; as a rider to this, 1074a31–8 argues that there is only one cosmos (so there are no further spheres—and so no further unmoved substances—in a separate cosmos). The first hiatus-free passage (see section 1 of the Prologue) comprises the final part of chapter 7 together with (i), (iia), (iib), and possibly (but not probably) (iic): it is thus embedded in a well-structured argument that includes (iid) and (iii) as well. The second hiatus-free passage, 1074a38–b14, is less closely attached: in its present context it serves as a more general coda to chapters 6–8.

a15–17: A rare but not unparalleled note of self-congratulation (cf. *Soph. El.* 34 183b16–184b8): Aristotle's own theory of unmoved substance offers at least the promise of a definite answer to the question of how many such substances there are.

a17–22: Aristotle focuses on Platonic theory, since he sees it as the major (or only) proponent of the existence of unmoved substances apart from his own (cf. 1 1069a30–6). Anaxagoras' Intellect might be thought of as an unmoved substance, but is ignored here presumably because Anaxagoras did not characterize it as such, and/or because Aristotle took it to have matter—a not unreasonable view, given Anaxagoras' description of it as 'the finest [in texture] of all things'. 'Those who say that there are Ideas say that the Ideas are numbers': Aristotle makes something like this claim in a number of places, but what it means and what its basis is are equally obscure.[13] It may have had its origins in Pythagoreanism: impressed by the elegant way in which simple

[13] For discussion, see Annas 1976, pp. 62–73; Burnyeat 1987, pp. 235–8; the Prologue to chapter 10, section 3.

arithmetical ratios underlie harmonics, some Pythagoreans developed views to the effect that *everything* was, in some way, a number (see, e.g., M.6 1080b16–21, 8 1083b8–19). At its most literal-minded this involved identifying (e.g.) the number four with justice (four pebbles make a square with all sides equal), and five with marriage. The point of introducing the identification of Ideas and numbers here is that at first sight it offers a principle for determining the answer to the 'how many?' question: Aristotle's complaint is that no such principle emerges. 'They sometimes speak of them . . . as limited by the number 10': the idea that the numbers are somehow limited to 10 is ascribed to Platonists, and linked to the question of the number of Forms, in M.8 (1084a10–b2), and to Plato himself (with no mention of Forms) at *Phys.* III.6 206b27–33. Again both meaning and warrant are unclear. Presumably the idea was that the numbers 1–10 were in some way or other the 'elements', and that the rest of the natural numbers were derivative from or somehow contained in them; this idea may derive from Pythagorean numerological enthusiasm for the number 10. In a surviving fragment Speusippus extols at rather extravagant length the importance and fundamental character of the number 10 (fr. 28 (Tarán 1981); cf. Annas 1976, pp. 54–5); but note that Aristotle seems to have taken Speusippus to have rejected Platonic Forms altogether.

'Nothing is said with demonstrative rigour': Aristotle's complaint might seem to imply a very exacting requirement—one which his own account does not meet (see notes on 1074a14–31). But at B.4 1000a18–22 Aristotle contrasts the 'mythological sophistries' of Homer's and Hesiod's accounts of the gods consuming nectar and ambrosia and the 'demonstrative accounts' of Presocratic thinkers, whose accounts Aristotle certainly thought deficient: this suggests that failure to show demonstrative rigour is a criticism earned by writers who engage in unphilosophical fantasizing (cf. Madigan 1999, p. 99). If this is correct, Aristotle probably has in mind some Platonist numerology concerning the number 10.

1073a22–b1

a23–5: '. . . is unmoved both in itself and incidentally': this distinction was not mentioned in chapters 6–7, and Aristotle is once

again relying on *Phys.* VIII. The idea is that something can be the unmoved cause of a motion but be nonetheless carried along with the thing whose motion it causes: the paradigm example, for Aristotle, is an animal's soul, which can act as an 'unmoved mover' of a sort (see section 2 of the Prologue to chapters 6–7), but is still 'moved incidentally' because it is the soul of the thing which is in motion, and is moved with it (see *Phys.* VIII.6 259b16–20). In this way (presumably) the soul of the eternally moving outermost sphere is moved incidentally. The Prime unmoved mover, by contrast, is not moved even incidentally: *Phys.* VIII.6 258b10–16, 259b20–31. In the latter passage, the claim is presented as resting on the idea that the Prime Mover should be entirely immutable and free from change if it is to be the cause of eternal and continuous motion: Aristotle's point is presumably that if the first cause of the eternal motion were also moved by that motion, it would constitute a case of the sort of 'absolute' self-motion which he rejects (see Argument C in section 4 of the Prologue to chapters 6–7). See the notes on a32–4 below.

a26–8: This rather ponderously rehearses the conclusions of some of the arguments of chapter 6. The idea that 'the single motion must be caused by a single thing' at a28 has not been mentioned in Λ before (it is presented in *Phys.* VIII, at 259a17–19). It is, perhaps, implicit in the idea of the true originator of a thing's motion (see Argument C in section 4 of the Prologue to chapters 6–7), and certainly in the argument of Λ.6 as a whole; it reflects Aristotle's conviction that, in paradigmatic cases, at least, causes are located in (the operations of) individual substances: see Judson 1991, sections IV–VI.

a28–32: 'We see . . . *other* motions—the eternal motions of the planets.' Aristotle here contrasts the 'simple' motion of the fixed stars—an apparently unvarying rotation—with the motions of the wandering stars. What Aristotle claims that we 'see' is a mixture of observation and theory. It is reasonable to say that we observe that the paths traced by the planets relative to a point on the earth are not circular (e.g. because of the nature of their apparent motion relative to the fixed stars); but the idea implied that their motions are complex rather than simple is a matter of the theory of homocentric spherical motions to which Aristotle is

about to appeal, and the claim that they are eternal also transcends observation (cf. notes on 7 1072a21–6). The remark at a31–2, 'for the body which moves in a circle is eternal and unresting; the proof for this has been given in the works on nature' seems clumsily placed, and may have been added—by Aristotle or possibly a later editor—for just these reasons.[14] That said, Aristotle certainly believes that observation shows invariance in the heavens over a very long time.[15]

a32–4: 'Each of these motions must be caused by a substance which is unmoved in itself and eternal.' It is unclear whether this means only that each motion must be caused by some unmoved mover or other, or the stronger claim that each eternal motion is caused by a *different* unmoved mover: but the inference to the stronger claim is the crucial move in the whole argument, and is made either here or at a36–b1. Wherever it is drawn, this stronger conclusion does not seem to follow: what prevents a single unmoved mover being the cause of all the eternal circular motions? Of course, it would then be the case that the spheres and their souls would react to a single and unitary perfection by rotating in a variety of directions, inclinations, and speeds, but the prospects of an explanation of these differential reactions seem no worse than the prospects of an explanation in terms of a plurality of unmoved movers. At *Phys.* VIII.6 259b32–260a10 Aristotle had argued that the Prime Mover will always cause a 'single motion'; but what he has in mind there is a contrast with the moved movers—especially the sun—which can have variable effects at different times (cf. notes on 6 1072a9–18), and his argument does not show that the Prime Mover can only have *one* effect. Has Aristotle been misled by his claim at b28 that 'the single motion must be caused by a single thing' into thinking that he has shown that each cause can only cause one motion?—as we saw, b28 only means that a unitary eternal motion must have a unitary cause.

Each of what we might call the 'subordinate unmoved movers' is only said to be unmoved 'in itself'; the rider 'and incidentally'

[14] The 'proof' referred to is given in *Cael.* I.2, II.3 and 6; *Phys.* VIII. 8–9.

[15] See *Cael.* I.3 270b11–16; there are references to the astronomical records of the Babylonians and/or Egyptians at *Cael.* II.12 292a7–9 and *Meteor.* I.6 343b9–11 and b28–30.

does not appear here. This *might* be significant: at *Phys.* VIII.6 259b28–31 Aristotle writes 'incidental motion of a thing by itself and incidental motion by something else are not the same thing: the former belongs only to perishable things, whereas the latter belongs also to certain principles in the heavens, of all those, that is to say, that are subject to more than one motion.' If the 'certain principles' are the subordinate unmoved movers, then Aristotle would be allowing that they are subject to a certain form of incidental motion. This would mean that each of these unmoved movers is somehow—despite its immateriality—'attached' to its associated heavenly sphere, so that as the sphere is carried round by the next sphere up, its unmoved mover is carried round too. This unattractive—not to say bizarre—picture could only be avoided if we were to take the 'principles' referred to in the *Physics* passage to be the spheres themselves—a somewhat desperate remedy. In any case, the omission of 'and incidentally' in the present passage need not have any special significance, since Aristotle omitted it in his last reference to the Prime unmoved mover as well, at a27.

a34–6: Aristotle relies implicitly on an argument like the one given here in chapter 6: see the notes on 1071b12–21. The mention of the *stars* rather than the spheres is striking, however. Throughout chapters 6–7 Aristotle argues for the existence of unmoved substances on the basis that there are eternal circular motions, and that these require an unmoved cause; these circular motions are plainly the motions of the spheres, not of the stars. The same is true of the present chapter, in which it is the number of moving spheres, not the number of moving stars, which determines the number of unmoved movers. It would be reasonable to think that it is the spheres, not the stars, which are the subject of the motions in question, since it is a clear implication of homocentric theory that the stars are carried round by the sphere in which they are fixed; and Aristotle explicitly argues for this in *Cael.* II.8.[16] This is not the whole story even in the *De Caelo*, however, since in discussing a problem relating to the complexities of the motions of the planets, *Cael.* II.12 offers a teleological explanation in terms of how the *planets* attain their own good.[17]

[16] I discuss how this claim is to be understood in Judson 2015, pp. 172–3.
[17] See Judson forthcoming. For a different view, see Leunissen 2010, ch. 5.

Aristotle also says that the crucial point is that the planets have a share in life and action (292a18–21); some commentators take him to be saying only that we must think of them *as if* they have life, but the idea that by being moved they achieve their own good is not in doubt (except on deflationary views such as Charles's: see the Prologue to chapters 6–7, section 3). Moreover, at 1074a24–31 he will say that the motions of the spheres are for the sake of the (motion of the) stars. So when in the present passage Aristotle talks of the eternal motions of the stars, it is not a mere aberration: the significance of this is discussed in the notes on 1074a24–31.

a36–b1: The principal conclusion of the section: see the notes on a32–4. Note that Aristotle's argument at most shows that there are at least as many unmoved substances as there are eternal motions: he has not yet shown that there are no further unmoved substances not associated with any motion. Here and at 1074a14–16 he says 'just as many' when perhaps he means 'at least as many' (see notes *ad loc.*). 'Without magnitude for the reason given earlier': see 7 1073a5–11.

1073b1–17

b2–3: 'In accordance with the same ordering as the motions of the stars': again we would expect Aristotle to say 'spheres': see notes on a34–6. Aristotle is starting at the outermost sphere (its unmoved mover is first), and then counting inwards, so that the second star-motion is that of the planet nearest to the fixed stars and furthest from the earth (i.e. Saturn), the third the next one in (Jupiter) and so on down to the moon. But since each planet is carried around by several spheres (as Aristotle points out at b8–10), there is no such thing as *the* unmoved mover associated with Saturn or Jupiter. Thus although the motion of Jupiter is the third star-motion, the third unmoved mover cannot be the unmoved mover which moves the sphere in which Jupiter is located, and is not even any of those involved in causing Jupiter's motion. Rather it must be the one associated with the third heavenly sphere (again counting inwards, with the outermost sphere as the first): this is the second of the spheres which jointly produce

the motion of Saturn.[18] Aristotle's point about the order of the motions of the stars might only be that it follows the ranking of the spheres in the sense that if we count down through the spheres starting from the outermost one we will reach the planets in the (descending) order of their distance from the earth; but this seems too trivial a point to be worth making. The claim that there is an ordering of the unmoved movers is unproblematic if Aristotle simply means that they can be so ordered. If he means that they are in their very nature hierarchically related in a way that corresponds to the spatial ordering of the spheres, that is something which has not been established (see notes on 1074a31–8).

b3–8: 'The mathematical science which is most akin to philosophy': Aristotle is not here marking off philosophy as a separate discipline in the way with which we are familiar. By 'philosophy' here Aristotle means what he elsewhere calls 'first philosophy'—that is, metaphysics, the type of inquiry in which he is engaged in Λ.[19] Aristotle classifies astronomy as a branch of mathematics, and the work of Eudoxus and Callippus to which he is about to appeal involves an entirely mathematical analysis of complex non-circular motions into a set of perfectly circular ones. But this does not mean that he regards astronomy as non-empirical: it is, for Aristotle, a 'subordinate' science like harmonics and optics.[20] Sciences of this 'mixed' kind investigate the mathematical properties of a set of well-demarcated natural things—in this case, the heavenly bodies—and he would be the first to insist that the analysis must answer to observational data: see 1073b35–8 and b38–1074a5.[21] It is 'most akin' to metaphysics presumably

[18] For more on the arrangement of the spheres, see the notes on 1073b17–38.

[19] Cf. E.1 1026a18–19: 'there are three sorts of theoretical philosophy, mathematical, physical, and theological.'

[20] See *An Post*. I.13; *Phys*. II.2 193b22–194a12; Lennox 1986; Mueller 2006.

[21] The classification of astronomy as mathematical goes back at least to Plato, but Plato himself went on to distinguish 'ideal', mathematical astronomy, which turns its back on the observational fine print to describe the ideal motions of perfect astronomical bodies, from what he regarded as the imperfect empirical kind (*Republic* VII 528e4–530c4). In calling astronomy a branch of mathematics Aristotle is certainly not siding with Plato's preference for the former over the latter. Note that we cannot say one way or the other whether the interest of Eudoxus and Callippus in the subject was only mathematical: see section 2 of the Prologue.

because it is concerned with substances—and eternal ones at that—while other subordinate mathematical sciences study non-substantial natural items such as optical lines, and in a very different way the superordinate ones such as arithmetic and geometry study the attributes or other items of natural substances somehow abstracted from their being such attributes.[22]

b8–10: 'That the motions are more in number than the things which move, is clear even to those who have engaged in the subject to even a moderate extent': by 'the motions' Aristotle means 'the eternal circular motions', so this is clear only to those who have accepted at least the principle of the homocentric theory of heavenly motion (cf. 1073a28–32).

b10–17: Aristotle will first recount the theories of Eudoxus and Callippus ('what some of the mathematicians say'). This will 'help our thinking' presumably by making clear the basic ideas of the homocentric theory, and by giving a concrete analysis to assess ('so that we may have some definite number to grasp in thought'). Then he will turn to his own views, taking over much of what Eudoxus and Callippus said—this is what 'in part learn from the inquirers' means—while adding his own modification, the introduction of the unwinding spheres: see 1073b38–1074a14. b15–17 combines an expression of respect for their work and expertise with an indication that he takes his own modification of their accounts to yield something closer to the truth.

1073b17–32

In this note I shall generally speak on the—very limited—basis of astronomical data and beliefs (true or false) which were almost certainly accessible to Eudoxus and Aristotle. Thus I shall speak as if the earth is indeed stationary at the centre of the universe, and shall for the most part ignore features of the heavenly motions of which Eudoxus and Aristotle were plainly or probably unaware: this means that I shall generally speak as if these

[22] For Aristotle's account of the subject matter of geometry and arithmetic, see E.1; M.2–3; Annas 1976, pp. 26–41.

motions are much more regular and free of anomaly than they actually are, and will avoid over-precision in relation to periods such as day, month, and year. It is highly controversial what the full range of data and beliefs was on which Eudoxus brought his theory to bear; some of this controversy is outlined in the notes.

b17–22: The sun and the moon have three spheres each. In the system for the sun the first or outermost sphere rotates in the same way as the sphere of the fixed stars, to produce the sun's daily rising in the east and setting in the west. Aristotle says 'the first is that of the unwandering stars' (b18–19), and so could be taken to mean that this sphere simply is the sphere of the fixed stars; what he says at b25–6 ('for he says that the sphere of the unwandering stars is the one which carries all the stars') might seem to confirm this. Eudoxus himself might have begun each system with the sphere of the fixed stars itself rather than with a new sphere with the same motion; but the phrase 'the poles of the third sphere in every case' at b28 (cf. b30–2) shows that this is not how Aristotle understands him, and that he takes Eudoxus to have a distinct system of spheres for each planet. So Aristotle means that the first sphere in each case has the same motion as the sphere of the fixed stars (see also the notes on 1073b38–1074a5).

Of course the sun's apparent motion does not exactly replicate that of the fixed stars: the times of its risings and settings are not synchronous from day to day with those of any given star, and the points on the horizon (and correspondingly the point relative to the fixed stars) at which it rises and sets change over the course of a year as it describes a path from west to east on a plane (later to be called the ecliptic) inclined at an angle to the paths of the fixed stars. So the first sphere clearly will not account for the sun's motion by itself, and Aristotle says that in Eudoxus' system there were two further spheres. The second sphere of the set of three rotates 'along the <circle> through the middle of the constellations of the zodiac' (b19–20)—that is, with its poles at right angles to the plane of the ecliptic. 'Constellations of the zodiac' translates *zōidia* (literally 'little (animal) figures'): this text and three passages in *Meteor.* I.6–8 are the earliest surviving astronomical uses of the term; but the idea of the zodiac is much older, and as Mendell points out (2000, p. 79), the fact that Aristotle can expect his readers to supply the word 'circle'

suggests that he is employing terminology familiar at least to this group. The ecliptic runs through the middle of the zodiac—the band of the sky occupied by the zodiacal constellations against the background of which the (apparent) motions of the planets all take place. The third sphere rotates at an angle to the circle through the middle of the zodiac: 'the <circle> slanted across the breadth of the constellations of the zodiac' suggests, though it does not perhaps require, that the angle does not exceed the width of the zodiacal band—about 8° either side of the ecliptic, in our terms—and Aristotle says that the angle of the sun's third sphere is smaller than that of the moon's third sphere. Aristotle says nothing as to the direction or speed of either sphere. On a two-sphere model the second sphere would yield the motion of the sun along the ecliptic reasonably well if its intrinsic motion were to rotate from west to east in a year, and one could understand Aristotle simply taking these details to be obvious. With a third sphere in operation, however, we would need to know more about its intrinsic motion before we could draw conclusions about the speed of the second sphere. It is striking that Aristotle says absolutely nothing about the effect of these perfect motions on how the sun moves or about the phenomena which the system of spheres is intended to account for: see the notes on b34–8. It is not obvious what feature of the sun's motion the third sphere is supposed to yield. According to Simplicius, it is a supposed small deviation in latitude from the plane through the middle of the zodiac.[23]

Aristotle's account of the Eudoxan system for the moon is similar. Its outermost sphere rotates in the same way as the sphere of the fixed stars, to produce the moon's daily risings and settings. The second sphere again rotates on poles at right angles to the zodiacal circle—presumably reflecting the fact that the moon moves within the zodiacal band—but (we should suppose) at a different speed, since the moon completes a circuit around the

[23] Simplicius' testimony is confirmed by Hipparchus (*in Arati et Eudoxi Phaenomena* 1.9.2): see Bodnár 2018. From Ptolemy onwards, and possibly from Hipparchus onwards, this plane was expressly defined in terms of the sun's path, so that, trivially, the sun cannot deviate in latitude from it; this way of understanding the middle of the zodiac need not have been Eudoxus' or Aristotle's, however.

zodiac in a month. As with the system for the sun, what this sphere's speed is depends on what the third sphere does, which again Aristotle does not tell us. The third sphere rotates at an angle to this, larger than that for the sun's third sphere (but probably still within the width of the zodiacal band: see above). The most likely explanation of the point of the third sphere is that it is designed to yield the moon's deviation in latitude (of about 5°, in our terms) from the plane of the ecliptic: Simplicius gives this explanation together with the idea of accounting for the movement, relative to the fixed stars, of the moon's 'nodal' points (the points at which the moon crosses the ecliptic).[24]

b22–30: The other planets have four spheres each. 'The first and second of these are the same as those mentioned above' (b24–5): that is, the first sphere in each system replicates the motion of the fixed stars (see notes on b17–22), while the second is the same in the weaker sense that it rotates at the same angle and (presumably, though Aristotle does not make this explicit) in the same direction—though the speed of rotation will not be the same in all cases, because the planets take significantly different times to complete the circuit around the zodiac.[25] This is why at b25–6 Aristotle distinguishes the way in which the two spheres in a sense recur in each system: the first sphere 'is the one which carries all the stars', while the second is 'common to all'. Once again the speeds required for the second sphere are in principle dependent on what the lower spheres do: in the case of these four-sphere systems, there is reason to suppose that the east/west motions of the third and fourth spheres cancel each other out, and hence that the second spheres should rotate with the periods listed in n. 25.

[24] Many commentators argue that the account in Simplicius gets the speed and direction of the second and third spheres the wrong way round; if this were correct, Aristotle would also be in error when he says at b22–7 that the second sphere is 'common to all' the Eudoxan planetary systems (see notes *ad loc.*). For a defence of Simplicius' account, see Dicks 1970, pp 180–1; Mendell 2000, pp. 100–4.

[25] The modern values—with those ascribed to Eudoxus by Simplicius in brackets—are: Mercury 225 days (one year); Venus 88 days (one year); Mars 1.88 years (two years); Jupiter 11.86 years (12 years); Saturn 29.46 years (30 years); note that from a geocentric perspective, the periods of one year for Mercury and Venus—the two planets whose orbits lie inside that of the earth—are sensible values (apparently also reflected in Plato's *Timaeus* (38d)).

For the third and fourth spheres we are again told only their angle of rotation: the axis of the third sphere is parallel to the zodiacal circle (i.e. at right angles to the equator of the second sphere), and the fourth sphere 'is slanted in relation to the middle <circle> of this', that is, in relation to the equator of the third sphere. The purpose of these spheres is the subject of intense debate; the traditional, and in my view least unlikely, theory (first developed in Schiaparelli 1875) is that they make it possible for the system to produce planetary retrogradation.[26] Although the zodiacal motion (i.e. the motion relative to the fixed stars) of the planets other than the sun and the moon is mostly from west to east, periodically each planet slows down, stops, and then for a short period moves backwards, from east to west; then it stops and once more begins to move from west to east.[27] Given only the resources of homocentric theory—spheres rotating with uniform motion—retrogradation of this kind might seem to be a completely recalcitrant phenomenon; but it turns out that it is indeed possible to produce just such a motion using only homocentric spheres. The third and fourth spheres can be arranged so as to produce a combined path for the planet in a shape like a figure of eight projected onto the inside of a sphere.[28] When this path is arranged on its side, as it were, so that it lies along the planet's path through the zodiac (the motion produced by the second sphere in the system), half of the movement around the figure of eight will be in the same direction as the zodiacal motion and half 'backwards', in the opposite direction; with suitable speeds and angles, the backwards motion can more than counterbalance the forwards motion imparted by the second sphere, and so produce temporary retrogradation through the zodiac. It is probable that Eudoxus discovered this geometrical fact, even if it is less clear what use he put it to; he called the figure of eight shape a 'hippopede' or 'horse fetter'. The hippopede system does well at

[26] For discussion and a variety of views, see Dreyer 1906/53, pp. 95–106; Dicks 1970, pp. 182–8; Goldstein 1997; Mendell 1998 and 2000, pp. 104–21; Yavetz 1998, 2001, and 2003; Bowen 2002 and 2013; Lloyd 2008, pp. 77–81; Judson forthcoming.

[27] From a heliocentric perspective, this is a parallax effect occurring against the backdrop of the fixed stars when the earth overtakes or is overtaken by the other planet as both orbit the sun at different speeds.

[28] Its modern technical name is a spherical lemniscate.

producing retrograde motion qualitatively; it is quite unclear whether Eudoxus attempted to give any sort of quantitative account. (Eudoxus' scheme can do reasonably well at yielding something approaching the actual retrogradations of the planets only in the case of Saturn and Jupiter, and it does extremely poorly in the case of Mars and Venus.[29])

b30–2: Aristotle finishes his account of Eudoxus with what seems like a stray detail, that the poles of the third sphere are set at the same points—sc. of the zodiacal circle—in the systems for Mercury and Venus, but not in the other systems. Why this should be important is baffling on the basis of the little Aristotle tells us.[30] For a suggestion as to why Aristotle mentions it see the notes on 1073b34–38.

1073b32–8

b32–4: It is unclear what Aristotle means by 'Callippus supposed the same setting [*thesis*] of the spheres as Eudoxus': perhaps he simply means that Callippus does not change any feature of Eudoxus' spheres and their motions, but merely adds more: this is suggested by the particles (*men . . . de*) which Aristotle uses to contrast what Callippus did with respect to the *thesis* and with respect to the number of spheres. Alternatively, Aristotle might mean only that their order and angular relations to each other were unchanged. At 1074a3 *thesis* apparently involves the direction, and perhaps the period, of the spheres' motion, but need not

[29] See Dreyer, Dicks, Mendell, and Yavetz cited in n. 26 above. Mendell argues that the fact that Eudoxus could not have observed the retrogradation of Mercury means that he could not have intended his system to model it (2000, p. 120); but if Eudoxus thought that all the other planets exhibited retrogradation, he might well have decided that Mercury must too.

[30] On the retrogradation interpretation of Eudoxus' theory, however, these poles do need to be set in a particular way for Mercury and Venus to yield the geocentric version of their pattern of superior and inferior conjunctions with the sun (i.e. their alignment with the earth and sun while behind and in front of the sun respectively) and of their failure to appear in opposition (i.e. in an alignment with the earth between the planet and the sun: this is the point in their circuit around which the other planets retrograde, whereas Mercury and Venus retrograde around inferior conjunction); cf. Dreyer 1906/53, pp. 101–2.

be restricted to that. The phrase 'this is the arrangement of the distances' sits very awkwardly in its context, and it is hard to see it as part of Aristotle's original text. It looks instead like a marginal note by someone puzzled by 'the same setting'. The 'distances' could be the distances between the spheres, though there is no hint elsewhere in Aristotle or in Simplicius that Eudoxus also specified distances between the spheres.[31]

b34–8: Aristotle gives us no information at all about Callippus' modification of Eudoxus' scheme except the number of additional spheres in each system. The reason(s) for the addition of spheres for Mars, Venus, and Mercury, and the reason why none was needed for Saturn and Jupiter, have not been preserved, and cannot be satisfactorily reconstructed. Simplicius is probably right that the additional spheres for the sun were designed to yield inequalities in the seasons—as we think of it, the changes in the sun's angular velocity which mean that it takes different times to go through a quarter of its yearly circuit, from solstice to equinox or from equinox to solstice: for further discussion, see notes on 1074a12–14. The phrase 'to give the phenomena', which recurs at 1074a1 (cf. *EE* VII.2 1236a25, where the context is the definition of friendship), is in the same semantic field as (or possibly is the immediate ancestor of) the famous phrase 'saving the phenomena' (*sōzein ta phainomena*): for discussion, see Bodnár 2012. It is commonplace in histories of astronomy to treat this latter phrase as a slogan of *instrumentalism*, the view that an astronomical 'theory' is merely a device or instrument for predicting astronomical phenomena (e.g. where a planet will be at a given time or when there will be an eclipse), and that it makes no claims at all as to the causes, if any, of these phenomena. On this sort of view, to say that the motion of Mars is the product of several homocentric spherical motions is to make a purely geometrical claim about its motion which in no way implies that it is actually moved by homocentric spheres; a realist approach, by contrast, takes the business of the theory to be to state the real causes of the motions, and not merely to predict them. In fact,

[31] Mendell suggests that 'distances' here might be the angular distances between the poles of neighbouring spheres (2000, p. 81); this would be in line with the second interpretation of 'the same setting' suggested above.

neither phrase in itself suggests anything more than a commitment to the theory's being answerable to—doing justice to—the phenomena. As I said in the Prologue (section 2), Aristotle's approach to astronomy is clearly realist. In the case of later Greek astronomers, characterizing them as instrumentalists is usually either inaccurate or no more illuminating than characterizing Newton's gravitational theory as instrumentalist.

Aristotle gives frustratingly little information about the details of the systems of Eudoxus and Callippus, and none at all about their motivations. Lloyd argues that Aristotle must think that the question of the number of spheres can be assessed *without* any detailed analysis of what each sphere is supposed to do (2000, p. 258)—and thus that he betrays a complete lack of understanding. But this counsel of despair is only called for on the assumption that Aristotle thinks he is giving us, *in this text*, the basis for judging how many spheres are needed, and he obviously does not; rather he is giving a compressed report of findings. Whether the compression is due to the general character of Λ as a sketch or plan, or to a view that the assessment of the findings belongs to astronomy rather than to metaphysics, is a harder question—and one complicated further by the likelihood that the material on Eudoxus, at any rate, may have been reused from another context (see Prologue, section 1). We may still ask whether there is any rhyme or reason to the information about the spheres which Aristotle gives and withholds: if he merely gives random snippets, we might have grounds, though different from Lloyd's, for supposing Aristotle to be out of his depth. Mendell quite reasonably thinks that the information given is, by and large, the most relevant to Aristotle's particular interest here, namely the total number of the spheres (2000, pp. 82–3). I suggest in addition that most of the information Aristotle gives is what is needed to draw illustrative diagrams of the planetary systems: he gives enough detail on the angular separation of the spheres' rotation for this purpose, since this can be represented by circles or other curves set at different angles, and is silent, for example, on speeds, which cannot be drawn. (The lack of specifics about the angles might reflect a corresponding lack in Eudoxan theory or the fact that the diagrams were intended to illustrate the basics of the theory.) This idea receives some slight confirmation from the presence of the 'stray detail' discussed in the notes on 1073b30–2: one could

easily imagine the parallelism of the poles for the third sphere of Mercury and Venus being shown, or being evident, on a pair of diagrams. If this suggestion is right, Aristotle is writing with a series of diagrams in view—perhaps drawn by Eudoxus and/or Callippus (in books or drawn for the purpose of discussion), or perhaps ones which Aristotle himself prepared for his readers and/or a lecture audience.[32]

1073b38–1074a14

b38–1074a5: 'But it is necessary, if all the spheres *put together* are going to give the phenomena . . . ' On 'to give the phenomena' see previous note. As I said in section 2 of the Prologue, a key question for Aristotle was what does the world have to be like if homocentric astronomical theory is correct? His first step was to suppose that the heavens should actually contain hollow, nested, and geocentric spheres, each of which is the subject of one of the perfect spherical motions specified by homocentric theory, and which transmits its motion downwards to the next sphere to generate the combinations of motions which the theory requires: each planet is moved by a set of these nested spheres. This means that the sets of nested spheres are themselves nested, so that the set which moves a lower planet lies within the set(s) of spheres which move the planet(s) above it. Aristotle's next step is to 'put all the spheres together'—that is, to suppose that Eudoxus' distinct systems of spheres for each planet are integrated into a single connected system: Aristotle saw that, without potentially ad hoc restrictions, *every* sphere should transmit its motion on to the next sphere down, if there is one. The lowest sphere in one set (e.g. Saturn's) is connected to the highest sphere of the next set down (in this case Jupiter's) in just the same way as the spheres within a planetary set are, so that the lowest sphere of Saturn's set transmits its motion to the highest sphere of the set for Jupiter. This

[32] Aristotle refers to a diagram showing the Milky Way at *Meteor.* I.8 346a31–2, and uses one showing the directions of winds at length in *Meteor.* II.6; the discussions of haloes at III.3 373a6–19 and of rainbows at III.4–5 clearly presuppose several diagrams. For other references to diagrams or tables, see *Int.* 13 22a22–31; *HA* III.1 510a29–35, where he speaks of '*this* diagram'; *HA* I.17 497a31–3, IV.1 525a7–9; *EN* II.7 1107a32–3; *EE* II.3 1220b36–1221a12.

poses a problem, which Aristotle introduces the 'back-winding' (*anelittousai*) spheres to solve. Once again Aristotle does not go into detail, but the idea behind the back-winding spheres is clear enough. The lowest sphere of one planetary set moves with a complex motion which results from the transmitted motions of all the higher members of its set together with its own intrinsic motion. This complex motion—call it *M*—will also be the motion of the planet attached to this sphere (assuming, as Aristotle appears to, that it is located on the equator of its sphere). If this sphere is connected to the next sphere down—that is, to the highest sphere of the next planetary set—the motion *M* will be passed on; so that the set for Jupiter, for example, will inherit the complex motion with which Saturn moves—and so Jupiter will move in completely the wrong way. Aristotle's idea is that what prevents this is a further group of spheres underneath each planetary set (except the lowest, that of the moon), which rotate in such a way as to undo the motions of the higher set; and just as *M* is built up from a series of simple, intrinsic spherical motions, counteracting *M* can be done by a similar series which undoes these simple motions one by one. 'Back-winding spheres' seems to have later become a general name for spheres of any sort in a homocentric theory, presumably because in later centuries Aristotle's scheme was considered the most authoritative version of the theory.

Clearly if a given number of motions are required to produce *M*, the same number of counteracting motions will be required to undo *M* completely. But in Aristotle's account each group of back-winders is one fewer than the spheres they are winding back, and so the result of the winding-back is to counteract all but one of the component motions of *M*. Even the lowest back-winding sphere in the group will have this remaining motion, as nothing has undone it. This will be the motion of the first sphere in each planetary set, since (to speak generally) the back-winders need to be arranged in 'mirror-image' order in respect of the spheres whose motion they unwind.[33] Aristotle seems to recognize this, since he says '[the back-winding spheres] wind back and in every case restore to the same setting the first sphere of the star

[33] I am grateful to István Bodnár for help on this point.

which is arranged below it': this must mean that for each set, the back-winders counteract the second and subsequent motions of the planetary set above and allow the first motion (identical to that of the fixed stars) to continue on down to the highest sphere of the next planetary set.[34]

Many commentators point out that Aristotle's scheme is now in difficulties. Call the four spheres which move the highest planet, Saturn, in descending order Sat_1, Sat_2, Sat_3, and Sat_4 (Saturn itself is located in Sat_4); and suppose that the back-winders are arranged as the mirror-image of the spheres they counteract, so that the highest back-winder counteracts the intrinsic motion of Sat_4, the second that of Sat_3, and the third that of Sat_2 (Aristotle says nothing about such an arrangement, but ought to have adopted it). The third and lowest back-winding sphere has an intrinsic motion which undoes that of Sat_2, and has a resultant motion which is the same as that of Sat_1—the motion which the back-winders do not counteract. This motion is the same as the diurnal motion of the sphere of the fixed stars (see the notes on b17–22). The next sphere down in the system is the highest sphere of Jupiter (Jup_1): how will Jup_1 move? Its resultant motion is also supposed to be the same as that of the sphere of the fixed stars, but if this is the case it must have no intrinsic motion of its own, since the lowest back-winding sphere of the set for Saturn transmits its resultant motion down to Jup_1. But then Jup_1 is redundant, and, since it has no motion if its own, needs no unmoved mover, contrary to Aristotle's view (see 1073a28–34 and 1074a14–16). If, on the other hand, Jup_1 has the same intrinsic motion as that of the sphere of the fixed stars, its resultant motion will be twice as fast as it should be, since it is also being moved by the back-winding sphere immediately above it (cf. Hanson 1963, pp. 226–7, or 1973, pp. 66–79). This problem clearly affects the first sphere of each planetary set below Saturn. Most commentators think that it is a problem which arises because of the introduction of the back-winding spheres, and that it is in essence a failure by Aristotle to see that he could

[34] Here 'restore to the same setting [*thesis*: see b32–4]' must refer principally to the fact that the motions of the first spheres are made the same; but even so, *thesis* need not be only a matter of motion, since other aspects of the spheres' arrangement are not influenced by the back-winders.

reduce the total number of spheres.[35] The problem extends more widely, however, and so cuts more deeply; for there is an analogous difficulty for the first sphere of the set for Saturn, even though there are no back-winders above it. If all heavenly spheres are connected and transmit motion downwards, the sphere of the fixed stars ought to transmit its motion down to this sphere; but if so this sphere (Sat_1) is likewise either redundant, and in need of no mover, or subject to a double resultant motion (cf. Hanson 1963, pp. 231–2, or 1973, pp. 79–80). If the sphere of the fixed stars is not connected in this way to the first sphere of Saturn, it is unclear why any of the sets of planetary spheres would need to be connected to each other (see Prologue, section 2). Some commentators suppose that the first sphere of Saturn's set simply is the sphere of the fixed stars, which would remove this element of the problem; but Aristotle shows no sign of treating Saturn's set differently from any of the others in this respect (see 1073b22–32).

There is no satisfactory solution to this problem. Dicks suggests that Jup_1 is not redundant because the poles of the lowest back-winder are not aligned with those of the sphere of the fixed stars (rather, they will be aligned with the poles of the sphere whose motion is being wound back—Sat_4 in this case): so Jup_1 is needed as a sphere with its poles so aligned (1970, p. 202). But it is not clear that there must be such a sphere, and in any case the problem remains that either Jup_1 has no unmoved mover or its resultant motion is too fast; nor would this solution address the problem of Sat_1, since the sphere above it *is* the sphere of the fixed stars. Beere suggests that the lowest back-winder of the set for Saturn could not serve as the per se cause of the diurnal motion of Jupiter, since the back-winder's intrinsic motion is quite different, and it only possesses the diurnal motion incidentally: a sphere whose intrinsic rotation is the same as that of the fixed stars—viz. Jup_1—is needed to serve as the per se cause (2003, pp. 12–14). Sat_1 does not have a doubled motion because, Beere thinks, a given sphere does not transmit its *rotation* to the next sphere down (pp. 8–9). What it does instead is to move the poles of that sphere around in a circle: we are to suppose the poles to be

[35] So Dreyer 1906/53, pp. 112–13; Heath 1913, pp. 218–19; Ross 1924, I, cxxxv, and II, 392.

fixed into the higher sphere in such a way that they are carried around by the higher sphere's resultant motion without also acquiring rotational spin. Thus in the special case in which the poles of the lower sphere are the same as the (notional) poles of the higher sphere's resultant motion, the higher sphere has no effect on the lower one at all. This interpretation of how the spheres transmit motion would indeed explain why Jup_1—and indeed Sat_1 too (though Beere does not make this point)—do not move at double speed; but it is very hard to accept, for two reasons. (i) It seems to require an inconsistent understanding of the poles of the spheres. If they are not to be moved by the higher sphere in the 'special case', they must be thought of as lacking a diameter—that is, as geometrical entities—since otherwise they would be moved round as the higher sphere rotated; but in the normal case it is, on Beere's view, by moving these poles that the higher sphere moves the lower one, and it is hard to see how this can work if the poles are sizeless axes rather than physical spindles with some real diameter/thickness. (ii) As Bodnár points out (2005a, pp. 266–70) the back-winding spheres would have to function not by rotating so as to counteract the rotation of some higher sphere, but simply by having their poles oriented in such a way that the relevant motion is not transmitted down to them: in other words, the back-winding spheres would not have their own intrinsic motion. But it is clear from what Aristotle says at 1074a17–31 that he thinks that each heavenly sphere has an intrinsic motion, caused by its unmoved mover; and of course part of the problem is that Aristotle appears to be faced with unmoved movers which cause no motion. Beere's claim that Sat_1, Jup_1, etc., are needed to serve as the per se cause of their planet's diurnal motion is also unconvincing. It is not clear why Aristotle should think that each component of the planet's motion should have a per se cause; and even if he did, if we removed Sat_1, Jup_1, etc., from the system, the sphere of the fixed stars would be this per se cause for every planet (note that its motion is not 'filtered out' by the back-winding spheres, as Beere claims (p. 13)). I return to this problem in section 2 of the Prologue to chapter 10.

The best explanation of why Aristotle faces these difficulties is that he has stuck too closely to the individual planetary systems of Eudoxus and Callippus when integrating them into a connected system. As Eudoxus and Callippus construct them, each

planetary system starts with a sphere which has the same motion as that of the fixed stars. Aristotle takes this over into his scheme, quite rightly introduces back-winders, and (presumably) gets as far as seeing that there is no need to counteract the diurnal motion, since this is common to all the planets, but does not get as far as thinking that this means that the first sphere in each planetary system needs to be removed as well (or—less satisfactorily—further back-winders introduced). That Aristotle does not get so far might mean that he is out of his depth; or, more probably, it may simply mean that this text represents a very early stage of working out his integration of the planetary systems and that it was never properly revised (see section 2 of the Introduction).

a6–12: As noted above, Aristotle sees that back-winders are not needed for the system for the lowest planet, the moon. It is sometimes said that Aristotle's account of the motion of comets, which he thinks are in some cases dragged around with the rotation of the fixed stars (*Meteor.* I.7 344a33–b12; cf I.8 345b35–346a6) means that he needs back-winding spheres below the moon as well, to allow an equivalent motion to be the lowest heavenly motion.[36] But Aristotle is in any case committed to the idea that the fixed stars and the planets can act on the sublunary air despite their separation from it, by some sort of field effect (see Judson 2015, pp. 173–5); and in the passages cited Aristotle claims that the planets too can drag comets along. This 'field effect' idea is highly problematic, but there is no special problem as to how the fixed stars can move comets, and so no need for unwinding spheres beneath the moon.

Given the Callippan scheme, and Aristotle's back-winders, the total of fifty-five is correct: Saturn and Jupiter need four spheres each, and so each have three back-winders as well—a total of fourteen. Mars, Venus, Mercury, and the sun need five each, with four back-winders, which makes a further thirty-six; the moon also needs five spheres, but has no back-winders. Note that the total of fifty-five is for the system *below* the sphere of the fixed stars (see the note on b38–a5 above): the grand total including that sphere is fifty-six.

[36] Heath 1913, p. 219; Hanson 1963, p. 231; Dicks 1970, p. 261, n. 387.

a12–14: This sentence raises two problems. First, why does Aristotle entertain the idea that Callippus' additional spheres for the sun and the moon are unnecessary? If the purpose behind the sun's additional spheres was, as Simplicius says, to generate the inequality of the seasons (see the notes on 1073b34–8), one would expect Aristotle to know this, and thus it is puzzling that Aristotle doubts the need for these spheres. Lloyd takes this—and indeed Aristotle's hesitancy—as further signs that he is out of his depth (2000, pp. 261–2); but things are actually less clear-cut. The idea of an inequality in the seasons was first formulated in *c.*430 BCE by Euctemon and Meton, who are said to have given the days for each season (starting with summer) as ninety, ninety, ninety-two, and ninety-three; a second-century BCE papyrus known as the *Ars Eudoxi* ascribes to Callippus the figures of ninety-two, eighty-nine, ninety, and ninety-four (the last of these is an inference from the other three figures).[37] As Mendell points out (2000, pp. 114–15), we do not know whether these Callippan figures formed the grounds for the additional two spheres for the sun or whether at the time he modified Eudoxus' theory he was thinking of the earlier figures of Euctemon and Meton with their significantly smaller inequality; we can add that we do not know what the basis for the figures was in either case. It is also worth noting that Eudoxus will have known about Meton and Euctemon, and yet his scheme for the sun does not appear to allow for any inequality (assuming that the testimony of Hipparchus and Simplicius about Eudoxan solstices is correct); we do not know whether Eudoxus regarded this as a problem, or whether he doubted the inequality, or gave some other explanation for it extraneous to homocentric theory in a way which Aristotle was tempted to follow. These points make it simply impossible for us to tell whether Aristotle's hesitancy and doubts about the need for these extra spheres are well placed or misplaced.[38]

[37] These are in fact the correct figures, rounded to whole numbers, for Aristotle's time; but for doubts that Meton and Euctemon or Callippus arrived at them by observation, or that they construe these inequalities in terms of the intervals between solstices and equinoxes at all, see Neugebauer 1975, p. 628; O'Neil 1986, pp. 56–7; Goldstein and Bowen 1988, especially pp. 58–63.

[38] Simplicius' report somewhat bizarrely says that additional spheres for the moon were also designed to yield the seasonal inequalities: presumably what lies behind this is the idea that they were likewise designed to yield variations in the

The second problem concerns Aristotle's total of forty-seven. The revision removes two spheres for each of the sun and the moon, and consequently also two of the sun's back-winders—the moon having no back-winders in any case. This means that there should be six fewer spheres, and so the total should be forty-nine. It is possible that forty-seven is a copyist's error (or mistaken 'correction'); if so, it must have occurred quite early in the tradition, since Sosigenes discusses the problem. If the mistake is Aristotle's there are a number of possible diagnoses, of which the most plausible is that he subtracted two more back-winders, forgetting that the moon has none (see Simplicius *in Cael.* 503.10–22). Sedley argues that Aristotle 'stopped at 49 because that is the number he was aiming for all along', because forty-nine (7×7) is a numerologically significant number (2000, p. 331, n. 7). It is worth noting that the number in question here does not include the outermost sphere, unless the sphere of the fixed stars also serves as the first sphere of the set for Saturn; so that if forty-nine is the correct number at a13–14, the *total* number of spheres will be fifty.

1074a14–31

a14–17: It is very hard to get a reasonable sense out of the received text: the substances and principles in question must be the additional unmoved movers, whose number is linked with that of eternal circular motions at 1073a30–b1, and the words 'and perceptible' are probably a later, mistaken gloss. One MS, M, has 'and not perceptible', however, and this would make very good sense (this reading is adopted by Fazzo and Alexandru).

The contrast between reasonableness and 'necessity' might seem to be a false one, since the former term is an epistemic one and the latter a modal one; but Aristotle clearly has an epistemic contrast in mind. He usually uses the term *eulogon*, which I have translated 'reasonable', and its cognate adverb *eulogōs* ('reasonably') to give a very positive commendation, and their use need not mark any lack of confidence in the conclusion,[39] though they

moon's angular velocity; whether Callippus knew about these variations is another question we cannot answer.

[39] See, e.g., *Phys.* I.5 188a27–30, III.7 207b1–5, IV.12 220b24–6; *GC* I.7 324a9–11, II.3 330b1–7, 10 338a14–b1; *PA* II.1 647b4–6.

can indicate that the grounds being offered are not conclusive.[40] They are also Aristotle's preferred terms when dealing with cosmological matters when proof and/or direct confirmation are not in the offing.[41] So it is likely that by denying that necessity is available Aristotle is only denying that there is a *proof* of the result, and this is compatible with his thinking that there is very good reason to accept it. For discussion of Charles's view that Aristotle's use of *eulogon* signals that what follows is meant only as a 'likely story', not an attempt to describe reality, see section 3 of the Prologue to chapters 6–7.

The sentence gives rise to two further, related questions: to what, exactly, does Aristotle mean to ascribe (mere) reasonableness, as opposed to necessity? and how is the sentence related to the following one? Aristotle could mean that his conclusion—the number of unmoved movers arrived at by the inference from 'the spheres are so many' to 'the (additional) unmoved movers are so many' (i.e. fifty-five or forty-seven), is reasonable but not necessary, or, as Lloyd thinks (2000, pp. 262–3), that the claim which underlies the inference, that the number in the two cases is the same, is what is (merely) reasonable. The former seems preferable, since Aristotle has already argued for something close to the underlying claim at 1073a30–b1, and did not there characterize it as only reasonable. The argument at a17–24, moreover, concludes that the inference from the number of spheres needed for the motions of the stars to the number of unmoved movers is necessary; but it does not do so by seeking to fill in a gap between mere reasonableness and necessity, but by trying to show that there could not be *more* unmoved movers than this number of spheres. Aristotle's point here is thus that the number of unmoved movers which he has arrived at is one which is reasonable, but no more than that. This is obviously because he thinks that his conclusion as to the number of heavenly spheres is a reasonable one, but no more than that: he has no *proof* that this is the right number of spheres. In saying 'let *necessity* be left for more powerful thinkers to speak of', Aristotle leaves it open whether or not

[40] See, e.g., *HA* VI.13 567b9–11; *GA* I.1 715b13, II.7 747a3–4.

[41] Examples include *Cael.* II.2 284b18–24, 8 290a1–5, IV.4 312a5–8; *GC* II.10 336b25–34; *Meteor.* I.3 341a23–6 (a similar contrast is expressed without *eulogon* at *Cael.* II.5 287b28–288a2).

he thinks there can even in principle be such thinkers—that is, whether there can be such a proof. Aristotle does think that some cosmological conclusions (e.g. that the universe is finite, spherical, and that it contains no void) can be proved, and he offers such proofs in *Cael.* I.5–7, II.4, and *Phys.* IV.7–9; on the other hand he is sensitive to what he sees as the severe epistemological difficulty of cosmological questions.[42]

As I have said, the sentence following the present one (a17–24) claims that since there cannot be more unmoved movers than are needed to bring about the motion of the stars (i.e. than the number of spheres which the correct astronomical account requires), there must be exactly that number. Aristotle connects the two sentences with the particles *men . . . de*, which have a linking and usually contrastive force; this would be entirely natural if Aristotle had said here 'there must be *at least as* many unmoved movers as the number of the spheres required by astronomy', rather than that there are 'just as many'. All that I can suggest is that in framing the *men . . . de* structure Aristotle's mind was on the 'at least as many' claim (which is in any case the most that he is really entitled to in advance of the argument at a17–24); note that he also says 'just as many' instead of 'at least as many' at 1073a36–b1.

a17–24: Aristotle's slightly opaque phrasing leaves it to some extent open what is being referred to by 'nature' and 'substance' in their various occurrences at a19–21. When Aristotle refers to 'the number of the substances' at a22 he must be referring to the unmoved movers, as a22–3 makes clear ('For if there are others, they would cause motion as being an end of motion'). I favour the view that 'every substance' at a19 also refers to the unmoved movers, and that 'every nature and every substance' is not a conjunction of separate items but means 'every nature, that is every substance' ('and' in Greek (*kai*) often has this epexegetic force); if this is right, then 'there would be no other nature beyond these' will also be about the unmoved movers. This reading has the advantage that Aristotle keeps the same referents for the same term in the same sentence, though it does make his presentation of the argument a little ponderous, and we have to take

[42] See, e.g., *Cael.* II.3 286a3–7, 12 291b24–9, and 292a14–18; *Meteor.* I.7 344a4–7; *PA* I.5 644b22–645a4.

'natures' in a decidedly non-technical sense if it is to refer to the unmoved movers. For some of the other possibilities, for example that 'nature' refers to the spheres or even to their motions, see Lloyd 2000, pp. 263–4.

The argument is only given in the barest outline: exactly how it goes depends on the issue just discussed, but the basic strategy is not in doubt. (i) There can be no heavenly motion which is not bound up with the motion of a star; (ii) there can be no unmoved mover which does not cause a heavenly motion; so (iii) there are no more unmoved movers than are needed for the motion of the stars; (iv) each heavenly motion requires a distinct unmoved mover (advanced earlier: see the notes on 1073a32–4 and 1073a36–b1); so (v) there are at least as many unmoved movers as the number of spheres needed for this; so (vi) the number of unmoved movers equals the number of spheres needed for this ('it would be necessary that this be the number of the substances' at a22–3). Premiss (i) is presented without argument (Aristotle returns to it at a24–31 with what appears to be meant as a supplementary argument), and there is only a hint of an argument for premiss (ii). We might find it natural to defend these premisses by an appeal to theoretical economy: if the best theory to explain the data requires only so many entities of a given kind—and the theory is comprehensive in what it explains—we should not suppose that there are more of these entities than that. In general, however, Aristotle shows little sign of interest in arguments of this sort, and it would be characteristic of him to envisage a teleological defence instead. It is sometimes thought that his use of teleology in the *De Caelo* is tentative or provisional (so, e.g., Leunissen 2010, ch. 5). Not only is teleology more pervasive there than this charge would lead us to expect, however, but Aristotle has a very clear and consistent position: the stars and the heavenly spheres which carry them around are all alive, and how they move is partly constitutive of their attaining their own good (see II.2 and 5, II.3, II.12). The supplementary argument at 1074a24–31 is also teleological in character: see notes *ad loc.* A natural place to start is Aristotle's famous principle 'nature does nothing in vain'. His use of this principle in biology is pervasive (for discussion see Lennox 2001c), but he also appeals to something like it in a number of cosmological contexts (*Cael.* I.4, II.8, 9, and 11; see also Prologue to chapters 6–7, section 3).

The most straightforward application of this principle would be the idea that a heavenly motion which was not required to help produce the motion of a star might seem superfluous, and nature produces nothing superfluous (cf. Bodnár 2005a, p. 261). This is open to the objection that the heavenly motion in question might simply have some other end—as indeed such motions do, since they are part of the heavenly spheres' own perfect life. Perhaps Aristotle's thought is rather that if it is part of the nature of some heavenly motions to have the function of moving stars, then it must be part of the nature of all such motions to have the ability to perform this function; but this ability would be superfluous in the supposed additional motions, and hence 'in vain'.[43] Note that whatever else might be said about it, this sort of argument requires that it is not accidental that the heavenly motions contribute to stellar motion: they must be for the sake of that motion. This is not the standard view of Aristotle's position; and it might seem to conflict with a restriction which Aristotle places on teleological explanation, that the good appealed to must be a good for the subject of the explanandum (this is, correspondingly, a restriction on the 'nothing in vain' principle as well: 'nature brings about nothing in vain, but always the best of the possibilities, in its essential being, in relation to each kind of animal' (*IA* 2, 704b15–17). As we shall see, however, there are good textual and philosophical reasons for ascribing exactly this position to Aristotle—that the motions of the heavenly spheres are for the sake of the stars and planets—and it is in fact compatible with the restriction just noted: see notes on a24–31.

Aristotle seems to have an analogous argument in mind for premiss (ii) at a19–20 and 22–3. 'Every nature and every substance which is unaffected and which has in virtue of itself attained the best' refers to the unmoved movers, which like the Prime Mover engage unchangingly in the best activity: such beings must serve as an end—that is, cause motion by being loved—because otherwise their ability to do so would be 'in

[43] An animal might have some teleological capacity in vain, in this sense; but this would involve either some defect elsewhere in the animal's nature, or some contingent failure in its environment which prevented the exercise of the capacity; it is hard to see Aristotle countenancing an analogue of either of these in the case of the heavens.

vain'. Clearly such a line of argument in the case of unchangeable substances, which are not in any straightforward sense a part of the natural world at all, would require a great deal more defence.

Some commentators think that the 'back-winding' spheres are not bound up with the motion of their star, since they make no contribution to it; and so they constitute a problem for premiss (i) (see Dicks 1970, p. 207 and n. 403 (p. 264)). One response to this is to see their contribution as belonging to the next star down; but it has to be said that Aristotle always counts them as part of the set of spheres for the star above them. A better response is that the back-winding motions are bound up with the motion of the star above by being an essential part of a complete system which produces the star's motion while not affecting the other stars (see Bodnár 2005a, p. 263, n. 13).

a24–31: 'It is reasonable to suppose this': on 'reasonable' see previous note. 'This' presumably refers to premiss (i) of the previous argument, that is, to the claim that any heavenly motion must be bound up with the motion of a star. 'The things that are being moved' are the stars. What follows would make no sense at all if we took it to be about motions in general; and it is clear from the conclusion, and the reference to stars at a28, that it is restricted to the context of the stars, the homocentric motions of heavenly spheres (actual or hypothesised), and the things they move or might move by carrying them along with them (i.e. stars and other spheres). That Aristotle leaves this restriction tacit is more understandable because he uses the active and passive voices of verb *pherein*, whose core meaning is 'to carry'; it is cognate with the noun *phora*, which is used for 'motion' in this argument. That said, the connection with carrying is not to the fore in Aristotle's general usage of these terms, and does not bear any weight in the argument (see below); as elsewhere, I translate these terms by 'move' and its cognates.

His argument appears to be this:

(i) If a (heavenly) motion moves something, it is for the sake of that thing.
(ii) Every such motion moves something.
(iii) So if such a motion is not for the sake of a star it must be for the sake of itself or of another motion.

<Suppressed premiss (iv) No such motion can be for the sake of itself.>

(v) There cannot be an infinite regress of the form 'This motion is for the sake of X_1 which is for the sake of X_2 which is for the sake of . . . .'

(vi) So every heavenly motion must be for the sake of a star.

On premiss (i), see the next paragraph. Premiss (ii) is open to the same objection raised against premiss (i) of the previous argument: I suggest that Aristotle's defence of this premiss would proceed along the same lines.[44] The inference from (i) and (ii) to (iii) presupposes that the only candidates for being moved by heavenly motion are the stars, other heavenly spheres (by means of the standard transmission of motion in Aristotle's astronomy), or the motion itself. The last candidate barely makes sense, and this is presumably why premiss (iv) is not even stated. The idea behind premiss (v) is analogous to a point about intermediate and ultimate ends made in *EN* I.2 (1094a18–21): if a given motion is for the sake of another motion, that motion itself must either be for the sake of a further motion or for the sake of a star; if the series of motions *never* includes one which is for the sake of a star, the series will be viciously infinite. Aristotle takes 'being for the sake of' to be transitive, so that if a motion X_2 is for the sake of a star, and X_1 is for the sake of X_2, X_1 will also be for the sake of the star. On this view, when Aristotle says at a26–7 that no motion can be for the sake of another motion, he is not denying that X_2 can be an intermediate end of X_1, but only that it can be the ultimate end: this must be a star. The claim that the motions of the spheres are for the sake of the stars might, in principle, be the weak claim that they are simply for the sake of making the star *move*, or the stronger claim that they are for the sake of making the star move in the particular way that it does. The weak reading is extremely unattractive, since systems of multiple nested spheres are not required simply to make the stars move. We should accept the stronger reading, since Aristotle's whole argument has been focused on the question of how many

[44] To suppose that it is the very nature of *carrying* (see above) to have an object (something which is carried) would beg the question, since the issue is in effect whether there could be a heavenly motion which did not carry anything along with it.

spheres, arranged in what way, are needed to make the stars move in the way they do. How Aristotle can find this plausible will become clear below.

Premiss (i), and the conclusion (vi) which it yields, are among the most striking claims in the whole chapter. Why does Aristotle believe the premiss? Even granting that a sphere's motion must be for the sake of something, it need not be for the sake of the thing moved (whether that be a star or the motion of another sphere); indeed, Aristotle is clearly committed to its being for the sake of its subject, the sphere itself. One might be tempted to suppose that premiss (i) is a momentary aberration. But a number of considerations suggest that we must take this as Aristotle's considered view. (a) It is parallel to the immediately preceding one at a21–3 concerning the unmoved movers ('every nature and every substance which is unaffected and which has in virtue of itself attained the best is an end'). (b) As we saw, the 'nature does nothing in vain' argument which I have suggested underpins both premiss (ii) and premiss (i) of the previous argument presupposes the view that the heavenly motions are for the sake of the stars. (c) A linkage of the unmoved movers with the motions of the stars, rather than with those of the heavenly spheres, was already foreshadowed at 8 1073a34–6 and 1073b2–3: see notes *ad loc*. (d) As noted earlier (notes on a17–24), the *De Caelo* appears to combine the view that the stars are carried along[45] by the spheres with the view that their motion is subject to teleological explanation and that they attain a good of their own.

The answer to the question why Aristotle believes the premiss may become clearer when we consider the significance of his conclusion. The orthodox view is that what each of the heavenly spheres does to emulate the perfection of its unmoved mover is to rotate eternally and with perfect regularity; the fact that in so doing all these heavenly spheres contribute to the motion of a planet such as Jupiter or Venus is a mere by-product, an incidental matter. This view is well put by Lloyd:

> The perfection of each moved mover [is] secured and exemplified by its eternal perfectly regular circular motion . . . . From the point of view of the entire system of 55 unmoved movers and the 55 moved movers, one

[45] In some sense: see Judson 2015, section 5.

> cannot help thinking that the fact that there is, from time to time, a planet, such as Jupiter, . . . is, in a way, an irrelevance. The present claim is sharply at odds with this picture: these motions are for the sake of what is moved—the star—as well as, for the sake of the perfection of the heavenly spheres themselves. (2000, pp. 254 and 265)

If this were right, it would seem to be a serious defect in Aristotle's integration of astronomy and physics. But if the motions of the spheres are for the sake of the movement of the stars, it is not right. So not only does Aristotle include teleology in his cosmology, but it seems that he takes motions of the whole system of fifty-six or fifty spheres to be explained by the goodness of the movements of the stars and planets.

This account now seems to face another difficulty (mentioned in the notes on a17–21), which I discuss in more detail in Judson 2015, section 6: here I shall only summarize the problem and its solution. It is a key principle of Aristotle's teleology that a teleological explanation of why *X* has a certain feature or behaves in a certain way must cite the good of *X*: 'we must explain the *why* in every way, namely . . . [a list of the various ways, concluding with teleology:] . . . and because it is better thus—not without qualification, but with reference to the essential being of each thing' (*Phys.* II.7 198b5–9). This suggests that final causes must specify some good *for the thing in question*. While some commentators take this 'teleological axiom' (Lennox 2001a, p. 341) only to require that the good specified be good for something or other (see Sedley 1991, pp. 179–96, and 2000, pp. 327–50), I find this quite implausible (see Bodnár 2005b; Judson 2005, pp. 359–62). Indeed, the stronger axiom *should* be a key principle of Aristotelian natural teleology: it is hard to make any sense of the idea that the features or behaviour of a natural substance are, in virtue of that substance's own nature, sensitive primarily to the good of something *else*—unless we import a designer or a cosmic nature (see, e.g., Charles 2012, pp. 227–34). This is how Aristotle applies teleological explanation throughout the biological works;[46] and it is also how he applies it in the *De Caelo*, where he appeals to the good of the individual substances concerned rather than to what

[46] With one possible exception, the famous case of the shark's teeth at *PA* IV.13 696b23–34: see Judson 2005, pp. 362–3, and Charles 2012, p. 244.

is good in some vague general sense or to what is good for the cosmos as a whole (see above). The position in Λ, however, seems to be that the motions of the spheres, while indeed serving the good of the spheres, are also teleologically subordinate to the good of *other* things, namely the stars and planets.

As I noted in section 2 of the Prologue, Aristotle says nothing about whether the speed, angle, etc., of a heavenly sphere's motion are in some way or other due to nature or to the choices or desires of the sphere's soul. The teleological axiom might not apply in the latter case, but an analogous problem would arise nonetheless. On the orthodox view, as I have said, the sphere's soul is inspired to activate the motion of its spherical body because in this way the soul/sphere compound comes closest to the perfection of the unmoved mover which inspires it. Once again, even the partial subordination of this motion to the good of something else (the *star*) makes little sense: the motion of the star might be a good *by-product* of the sphere's pursuit of perfection—though that would be the unsatisfactory position with which we began—but if it were an additional *end*, it would seem to have no connection with the soul's desire for perfection. It will turn out that, just as the problem is similar, the solution is similar also.

Although the teleological axiom requires the final cause of *X*'s being *F* to be a good for *X*, this leaves open the possibility that *X*'s being *F* might be for the sake of something else, *Y, providing* that benefiting *Y* in the relevant way is itself good for *X*. It also leaves open the possibility that *X*'s being *F* might be for the sake of the order and beauty of the cosmos as a whole, providing that contributing to the order and beauty of the cosmos in the relevant way is itself good for *X*. So, I suggest, the heavenly sphere contributes to the motion of its star because the latter's motion in some way benefits the sphere itself. The most promising possibility is that the motion of the star constitutes a benefit to the sphere—that the motion of the star is closely connected with the perfection of the heavenly sphere itself. In other words, contributing to the star's motion is itself a part of what the sphere does to emulate the perfection of its unmoved mover. We should suppose that Aristotle thinks that the path of the star across the heavens is a supremely beautiful and orderly thing. Construed in this way, contributing to the star's motion could indeed be part of the

perfection achieved by the heavenly spheres. We can now see how Aristotle can say that the motions of the heavenly spheres are for the sake of the motions of the stars *and* continue to hold the teleological axiom: perfection, for a heavenly sphere, *consists* (or partly consists) in helping to make the cosmos beautiful. Equally, if the sphere *aims at* the star's motion, this will not be a separate end, but part of its aim of its own perfection.

1074a31–8

Aristotle uses 'heaven' (*ouranos*) in a variety of ways: to refer to the outermost heavenly sphere, the region of the cosmos from the outermost sphere down to the moon, and the cosmos as a whole (see *Cael.* I.9 278b9–21). This introduces a slight indeterminacy into the argument, although as far as the conclusion goes it does not matter, since Aristotle is supposing that the uniqueness of any one of these entails the uniqueness of the others. Some earlier philosophers, notably the early atomists, did believe in a plurality of cosmoi scattered across an infinite space. Aristotle's argument is that if there were more than one heaven there would have to be a distinct Prime Mover (this is what 'the principle relating to each' is) for each one; but there could only be a plurality of Prime Movers if they had matter, which is impossible, because the Prime Mover has no potentiality.[47] Aristotle gives a number of arguments for the uniqueness of the cosmos in *De Caelo* I.8–9; these are largely based on consideration of the natural motions of the elements and their natural places. He also refers there to 'arguments from first philosophy, and from circular motion, which would have to be eternal in the same way both here and in the other cosmoi' (277b9–12). This is a little obscure, but it is not hard to see it as a reference to the type of argument we have here: the thought is that since each cosmos would have to have an eternal circular motion, it would

[47] The striking phrase 'the first essence' (*to ti ēn einai to prōton*), not used elsewhere in the *Metaphysics*, also refers to the Prime Mover; for the claim that it is actuality, see 6 1071b19–20 and 7 1072a25–6.

have to have its own Prime Mover, and this would lead into the present argument.

The argument raises a number of questions and difficulties. (i) 'Things which are many in number have matter.' It is important to note that this must mean 'things which are many in number *but one in form or essence* have matter'—otherwise Aristotle could not believe in a plurality of non-enmattered forms of any sort. Is Aristotle claiming that it is matter that individuates things which are one in form or essence, or that the possession of matter is required by the individuating factor (which might be, e.g., spatial location, or the contingent history of the individual), or just that—for some other reason—things which are the same in form or essence and which constitute pluralities have matter? A famous passage in Z.8, 1034a5–8 (Socrates and Kallias 'are different because of their matter, which is different, but they are the same in form, since the form is indivisible'; cf. also Δ.6 1016b31–5), seems to suggest the first of these, but its interpretation is controversial.[48]

(ii) What is the meaning of 'for there is one and the same account for many things, for example for man, but Socrates is *one*' at a34–5? Aristotle usually uses expressions of the form '*X* is one' to affirm *X*'s *unity*—to its being one thing. A reference to this seems irrelevant to the present concern, however; and Aristotle usually ascribes a thing's unity to its form, not its matter. Perhaps, as Ross suggests (p. 395), he means here that human beings are one in form, and so it cannot be form which makes the form-matter composite Socrates (only) one of them—that is, that what makes each human a distinct, countable item is the 'addition' of matter to the form to make a composite substance.

(iii) Is Aristotle, in any case, willing to apply the term 'form' to the unmoved movers at all—are they (or do they have) a form? Some commentators argue that either claim would be incoherent, on the grounds that form is correlative with matter, and the unmoved movers have no matter. Aristotle certainly avoids this

[48] See Code 1984, pp. 16–17; Cohen 1984; Frede 1987d, p. 78; Frede and Patzig 1988, pp. 147–8; Irwin 1988, pp. 252–3; Gill 1994; section 3 of the Prologue to chapters 4–5.

way of speaking, preferring 'actuality' in chapters 6–7 (and 'essence' in the present passage); it is less clear whether he thinks that, as a matter of logic, there can only be forms of substances which can exist as form-matter compounds.[49] In any case, Aristotle must think that for each immaterial substance there is something that it is to be that substance—its being or essence—whether or not he calls it a form.

(iv) Aristotle's argument has been held to be inconsistent with the idea that there is a plurality of unmoved movers, since like the Prime Mover they have no matter.[50] It is better to suppose that Aristotle thinks that the unmoved movers are different from the Prime Mover and from each other *in essence*, but that two putative Prime Movers could not differ in essence (see Ross, and Wolfson 1958, pp. 239–51). There seem to be three possibilities for this difference in essence: (a) the unmoved movers differ in virtue of what they act on—the heavenly spheres—so that it is part of the essence of, say, the third mover to be the mover of the third sphere; (b) they differ intellectually in virtue of each thinking in some way about the particular motion which it inspires; (c) they differ intellectually in virtue of some other difference in the contents of their thinking, unconnected with the spheres. It would be essential, on either (a) or (b), for the spheres themselves and/or their intrinsic motion to be differentiated by their matter and/or their place in the order (as second, third, etc., in the whole system of spheres), and not merely by being numerically distinct, since otherwise two Prime Movers could differ in virtue of their relation to numerically distinct outermost spheres. Note also that Aristotle cannot be supposing that the general character of the spheres' motions is enough to differentiate them, given

[49] See Ryan 1973; Brennan 1981; Burnyeat 2001, p. 130, n. 8; Menn forthcoming Iα2, n. 11. These commentators argue that (despite Aristotle's very close association of form and essence in Z.7: 'by the form I mean the essence of each thing, that is, the primary substance' (1032b1–2; cf. 1032b14, 10 1035b32; H.4 1044a36)) immaterial substances cannot be or have forms. In particular, they claim (i) that form is correlative with matter (but then one needs to explain why the grounds for this are stronger than those for saying that actuality is correlative with potentiality); (ii) that forms are primarily formal causes of something, and immaterial substances are not formal causes of themselves (but the premiss does not seem obviously true); (iii) an argument from silence (there is some dispute over possible references at *Phys.* I.9 192a34–6 and II.2 194b9–15).

[50] See Jaeger 1923/48, pp. 351–3; Ross 1924, I, cxxxix–cxl.

the reduplication, in each planetary set, of the motion of the outermost sphere (as well as the consequential reduplicated back-winders): see notes on 1073b38–1074a5. Aristotle says nothing here or anywhere else to help us decide if any of these possibilities are in his mind, still less which one; but option (c) seems the most promising, at least if we suppose that the unmoved movers' thinking is not vacuously self-reflexive (see notes on chapter 9 1074b28–1075a10). I discuss this further in sections 1 and 2 of the Epilogue to chapter 9. Simplicius reports a further objection to the argument for the uniqueness of the cosmos offered by Alexander, that one and the same Prime Mover could be the final cause for more than one outermost sphere (*in Cael*. 269.29–271.27). Aristotle clearly disagrees, but may not have a good answer to the objection: see notes on 1073a32–4.

Jaeger and Ross thought a31–8 'a fragment belonging to [an] earlier and more monistic period of Aristotle's thought' (Ross, p. 384). As we have seen, it has no such monotheistic implications. Others think that it is in any case nonetheless out of place, and that it interrupts the discussion of the divine substances apparently picked up again at a38 (see notes on 1074a38–b3). In fact the passage is the proper completion of the discussion of the number of divine substances: Aristotle takes himself to have shown that there are exactly as many as there are heavenly spheres, and that there are no superfluous spheres in the cosmos; the issue outstanding, therefore, is whether there might be further cosmoi, each with its own system of heavenly spheres, and hence with additional unmoved movers (this explanation is given by Aquinas in his commentary on Λ; see Merlan 1946, pp. 12–13; Wolfson 1958, pp. 250–1).

1074a38–b14

Aristotle makes a number of similar appeals to traditional or mythological views about the gods in the *De Caelo* (see especially I.3 270b4–20). Although he clearly rejects the anthropomorphic conception of the gods, he expects that his views do not represent a complete break with tradition. His rationale is his belief that there is likely to be some germ of truth in things which all or most

people believe, which in turn reflects the conviction that as beings which are a part of the natural world and which are naturally equipped with various cognitive faculties, humans are naturally fitted to discover truths about the world. This perhaps explains why he thinks that the periodic cataclysms which, in his view, wipe out civilisation over and over again are followed by the repeated discoveries of the same sets of beliefs, political institutions, and so on.[51] Note that here Aristotle seems to think that the germ of truth has *survived* the repeated cataclysms.

a38–b3: To what does 'these' (*houtoi*) at b3 refer? Those who think that a31–8 is an intrusion point to the lack of a referent in the immediate vicinity; if a31–8 is taken away, the 'divine bodies' (i.e. the stars) mentioned at a30–1 becomes a natural referent (see Prologue, section 1). But if, as I have suggested, a31–8 completes the discussion of the number of unmoved movers, it is not hard to see 'these' as referring back to the subject of this discussion, the unmoved movers. Does this mean that Aristotle is ascribing a belief in a theory of unmoved movers to the people of ancient times?[52] He need mean no more than that they believed the beings at the outer regions of the universe to be gods; this would bring the passage more into line with the appeals to ancient beliefs in the *De Caelo* (see especially I.9 279a15–29, discussed in the notes on 1072b26–30), and leaves Aristotle free to identify the 'true' objects of their belief as the unmoved movers.[53]

b3–8: 'In the form of a myth' (*en muthou schēmati*): *muthos* has a non-pejorative use as well as a pejorative one, and this phrase may be meant to suggest the idea of the appearance of myth around the enduring truth, while 'mythically' (*muthikōs*) may be more pejorative. It is hard to avoid the conclusion that Aristotle is merely identifying as original the element in the myths which accords with his cosmology, and dismissing the elements which do not as subsequent accretions (cf. Palmer 2000, pp. 200–1)—

[51] See *Cael.* I.3 270b19–20; *Meteor.* I.3 339b16–30 and 14 (which gives some of the science of the cataclysms); *Pol.* VII.10 1329b25–31. For a similar view in Plato, see *Timaeus* 22b–23c, *Laws* III 676a–677d.

[52] Cf. Lloyd, 2000, pp. 268–9, discussed in the notes on b3–8.

[53] It is true that the unmoved movers do not literally 'enclose the whole of nature'; but neither do the stars. Only the heavenly spheres do that.

though at least Aristotle could plausibly argue that anthropomorphic and zoomorphic accounts of the gods are all-too-obviously human inventions.[54] 'For the persuasion of the many and for the benefit of the laws and the common advantage': it is not clear whether Aristotle approves of this or means it as a further criticism.[55] 'These have human form and are like some of the other animals': 'these' refers to the gods mentioned at b2. While anthropomorphic gods are of course common in Greek religion, zoomorphic gods are rare. Lloyd suggests that 'these' might instead refer to the heavenly bodies which he takes to be the referent of 'these' at b3, and hence would be a reference to the identification of constellations with human and animal figures (2000, p. 269); but the objection he himself raises, that the political benefits Aristotle mentions do not arise from these identifications, but rather from the mythologizing of the gods, seems decisive. Ross rightly suggests that Aristotle is thinking of the Egyptians, whose zoomorphic gods were well known to the Greeks.[56] Lloyd objects that Aristotle's talk of the people 'of long ago and of the most ancient times' is unlikely to include non-Greeks without an explicit signal; and he notes that in the final sentence of the passage Aristotle talks of '*our* ancestral beliefs'; but the Egyptians (and Babylonians) would have naturally come to mind as those concerned with the heavens long before the Greeks (cf. *Cael.* II.12 292a7–9; Herodotus II.4), and the final sentence may not only refer to the Greeks: see next note.

b8–14: As noted above, Aristotle need only be ascribing a rather vague belief to the ancients: he is not committed to their possessing the concept of 'primary substance', let alone to their correctly identifying the extension of the term. 'One would think that they

[54] Cf. *Pol.* I.2 1252b24–7 and Xenophanes' criticisms of anthropomorphic conceptions of the gods, frr. 11 and 14–16.

[55] In *Politics* VII Aristotle clearly thinks that an important feature of a well-run state will be temples to the gods, priesthoods, religious rituals, prayers, etc. (VII.8 1328b2–15, 9 1329a27–34, 10 1330a8–9, 12 1331a24–30 and b4–6, 17 1336b14–19. Aristotle does not specify what these 'gods' are, but references to the Delphic oracle (VII.12) and to cultic practices (VII.17) suggest that they are either the traditional Greek gods or at least anthropomorphic in character: for discussion, see Kraut 1997, *ad loc.*, 2002, pp. 203–5; Segev 2017, ch. 2.

[56] Compare the mention of 'barbarians and Greeks' at *Cael.* I.3 270b5–10.

had spoken divinely': Aristotle uses the word 'divinely' of the ancients in another cosmological context at *Cael.* I.9 279a22–3. The inference that the belief about the gods has persisted through the cataclysm has little to be said for it. 'Our ancestral beliefs and those from the first people': Aristotle cannot mean 'first' literally, as he thinks the human race has had no beginning, but has existed through an infinite past time; either he means 'first after the last cataclysm', or it is a loose way of referring to those of a very long time ago. The 'and' might be epexegetic, and signal a gloss on 'ancestral', or it might introduce a separate group—that is, of people who came before the Greeks. Herodotus reports the view that the Egyptians were the oldest (or second oldest) of all the races in the world: see the story of Psammetichus and the children whose first word is *bekos*, the Phrygian word for bread (*Histories* II.1–3).

CHAPTER 9

PROLOGUE

1. *Nous, Noein*, and *Noēsis*

The text of chapter 9 is dominated by the use of the three cognate words *nous, noein*, and *noēsis*: there are thirty-three occurrences of these words in thirty-four lines of text. The verb *noein* is standardly translated as 'to think' (likewise its passive form *noeisthai*, 'to be thought (of)'), and *noēsis* as 'thinking'. I use these translations here, but some caveats and qualifications are called for. First, while a very common usage of 'to think' in English is with an indirect object (that is 'to think that *p*'), and while Aristotle frequently uses *noein* as a partner-term to *aisthanesthai*, 'to perceive', and says that (some of) its objects are true or false, he almost never uses *noein* with an indirect object: he uses it absolutely ('to think'), with a genitive construction ('to think of *x*'), and most commonly with a direct object ('to think *x*'): we see these latter two usages with *noein* and *noēsis* in chapter 9. It might be natural to suppose that one or both of these usages corresponds to another common usage of our 'to think', namely 'to think about *x*', 'to entertain the idea of *x*': but instead they mean something like 'to grasp *x* in thought', 'to think about *x* with full understanding of it'. Thus although his discussion in the *De Anima* is meant to encompass thinking in a very general sense,[1] Aristotle regards the primary objects of thought as, or at least as best exemplified by, forms or essences of a certain kind (*De An*. III.4 429b10–22), and the highest form of *noēsis* is the active understanding of these. We see this idea at work, for instance, in Aristotle's readiness to switch from 'thinking' to 'knowledge' at *De An*. III.4 429b5–9, 5 430a19–21 (= 7 431a1–3), 8 431b20–8; Λ.9 1074b35–1075a5.[2]

[1] See *De An*. III.4 429a23 quoted below; there is a good discussion in Johansen 2012, pp. 221–6.

[2] In this sense thinking *x* is one type of case in which one's knowledge of *x* is active. I discuss this further in section 2 and in the notes on 1074b38–1075a5 and 1075a5–10.

Second, these terms, and *nous* in particular, have a wide range of uses in Aristotle. *Nous* can mean 'good sense', as it can in ordinary Greek, and in this usage Aristotle is happy to ascribe it to animals who in his view cannot, strictly speaking, *think* at all (*De An.* III.10 433a9–14); it can also refer to any operation of practical thought (see Λ.6 1071b36, 7 1072a26–b1; *Phys.* II.6 198a5–13). It has in addition several more rarefied uses: rational thought or understanding in a quite general sense (see on *noēsis* below); practical insight into particular situations (*EN* VI.11 1143a35–b5); the grasp or understanding of the first principles of a science (i.e. of the definitions from which scientific demonstrations proceed (see *An. Post.* II.19, *EN* VI.6; in this sense it is explicitly contrasted with practical thought at *De An.* III.9 432b26ff.); and the capacity for thinking: 'by *nous* I mean that by which the soul thinks (*dianoeitai*) and supposes (*hupolambanei*)' (*De An.* III.4 429a23; cf. I.3 407a20). In this last sense it is usually translated—despite the lack of overt semantic connection with 'thinking'—as 'intellect', because *nous* can refer to an individual item, which can be said to be the subject of thinking in a way in which 'the capacity for thought' cannot easily be.[3] This is very probably the sense in play in most of chapter 9: see section 3 below. In the *De Anima* Aristotle develops this into a technical sense, referring to the faculty of thought possessed only by beings capable of thinking and not thinking: see section 2 below. In a very difficult chapter (III.5) Aristotle contrasts what he calls 'the *nous* which comes to be all things' and 'productive <*nous*>'. It is highly controversial whether the first of these (sometimes called 'passive intellect') is identical with the *nous* which I mentioned in the previous sentence, and more generally whether both of these kinds of *nous* are involved in human thinking, or whether in characterizing 'productive *nous*' (sometimes called 'active intellect' or 'agent intellect') Aristotle has turned to the special case of divine thinking: see section 2.

Aristotle sometimes uses the term *noēsis* in a relatively general sense of 'thinking' or 'reasoning' (*De An.* I.3 407a20, III.10 433a9–14), but he usually uses the verbs *noein* or *dianoein* for this, and reserves *noēsis*

[3] A good example is the *nous* which is responsible for the formation of the cosmos according to Anaxagoras (6 1072a4–6, 10 1075b8).

for the more rarefied idea of being engaged in fully understanding something, and in this sense grasping it in thought (*De An.* III.6 430a26); this usage reflects Plato's use of the term to denote the highest type of understanding in the 'divided line' in *Republic* VI. When we think about what these terms mean in relation to divine thinking, it may be helpful to bear in mind the characterization of divine thinking in *EN* X.7 as 'contemplation' (*theōria*): this is an intensely pleasurable activity, that of fully appreciating—one might say *savouring*—certain objects of thought (we are not told what these objects are). Compare Λ.7 1072b14–18:

> it is a way of life of a kind which is the best possible, if for a short time, for us (for it is thus always, whereas for us that is impossible), since its activity is also pleasure—and this is why waking, perception and thinking are most pleasant, and expectations and memories because of these.

This usage of *noēsis*, which reflects and perhaps explains Aristotle's preference for a direct object or genitive construction, is the one in play in Λ.9.

2. The *De Anima* on Perception and Thought

Aristotle's account of perception and thought in the *De Anima* is much debated.[4] One of the most striking features of this account is the way in which Aristotle takes elements of conceptual machinery developed in quite different contexts and extends their use to apply to quite different things (some would say, stretches them beyond breaking point). In developing his account of perception he relies heavily on notions taken over from the *Physics*—matter and form, alteration, acting on and being acted upon, potentiality and actuality. Perception (*aisthēsis*), he says, 'seems to be a kind of alteration' (*De An.* II.5 416b34–5), and is

> what is able to be receptive of perceptible forms [i.e. the so-called 'proper perceptibles' such as colours, tastes, and sounds] without the matter, as wax receives the seal [of a signet ring] without the iron or the gold. (II.11 424a17–20)

[4] See, among many other important works: Sorabji 1974/9 and 2001; Burnyeat 1992, 1995, 2002, and 2008a; Johansen 1998 and 2012; Caston 1999, 2005, and 2008/9; Charles 2008/9; Shields 2016.

In some sense, the perceiver's sense-faculty (and hence the perceiver herself) becomes like the object perceived: 'when [what is capable of perceiving] has been affected, it has been made like [the object of perception], and is such as that is' (II.5 418a5–6); 'there is a way in which that which is seeing has been coloured; for the sensory organ is in each case receptive of the object of perception without the matter' (III.2 425b22–4). It is controversial whether Aristotle means that perception is a matter of something in the perceiver becoming literally, say, red or bitter—and if so whether this is (i) in the same way that an object's surface or a drink is red or bitter, or (ii) in a related but different way (see Sorabji 2001, who draws an analogy with the way in which the sea can be blue)—or whether (iii) it is a matter of its encoding or representing red or bitter in something more like the way in which a blueprint encodes a house (see Caston 2005), or whether (iv) 'receiving perceptible forms' means no more than being aware of the object's redness or bitterness without referring to any isomorphic alteration (Burnyeat 1992, 1995, 2002; Johansen 1998).[5] Views of these various kinds—(i)/(ii), (iii), and (iv)—are known as 'literalist', 'representationalist', and 'spiritualist' respectively: see Caston 2005 and Lorenz 2007. Corresponding to this taxonomy of views to some extent, but also partly cutting across it, is a controversy as to Aristotle's view of the relation between the psychological and the material. In the *Physics* and elsewhere, 'alteration' means qualitative change. Literalists and representationalists will tend to think that Aristotle means that perceiving is identical in some way or other to a certain kind of qualitative physiological change (or to something akin to such a change) in the perceiver; they may take the perception and the alteration to be independently specifiable and related either reductively or as form and matter (Sorabji 1974/9), or to be essentially interdependent (Charles 2008/9). Spiritualists will tend to hold that perceiving is the purely psychological change of becoming aware

[5] This set of possible views is not exhaustive, as David Charles has pointed out to me. He suggests, for example, that taking on the form of red might be a matter of responding perceptually, but not representationally, to the object's redness; on this view, the perceiver moves to a new cognitive condition not in a process of qualitative alteration, but in something like a 'completion' (*epiteleiōsis*: see *Phys.* VII.3 and Charles 2008/9, pp. 21–6).

of the perceptible quality (and so nothing like an ordinary alteration), and that a physiological change in the perceiver's sense organ is either not required (Burnyeat 2008a, p. 22) or is a necessary but extrinsic condition of perceiving. The situation is complicated by Aristotle's deployment of potentiality and actuality. In the *Physics* and parts of the *Metaphysics* we are introduced to the idea that a thing can be *F* in two ways—potentially and actually (see notes on chapter 2 1069b14–32). In *De An.* II.5 Aristotle introduces a threefold scheme. A perceiver has what we might call a 'first-level potentiality' to perceive before she has suitably-developed sense organs and neurophysiology. When she has these things she has a 'first-level actuality' as a perceiver—the actualization of her first-level potentiality—but she is still only potentially perceiving if she is, for instance, asleep and so not actually perceiving anything. This is a second-level potentiality. When she actually perceives something, this 'second-level actuality' is the exercise or actualization of her second-level potentiality. Aristotle denies that this actualization is a change in the strict sense (II.5 417b6–16), despite his talk of perception being an alteration.[6]

The idea that the perceiver's sense faculty becomes like the object perceived (by which I mean the redness or bitterness) seems to be a component of a further relation of sameness holding between the perception and the object of perception. The actualization of a perceiver's second-level potentiality is due to the object of perception acting on the sense-faculty. On Aristotle's account of what he regards as standard cases, such as teaching and learning, acting on and being acted upon are numerically one but different in being—in the way that, in Aristotle's view, the road from Athens to Thebes and the road from Thebes to Athens are—and take place in the thing which is acted upon (*Phys.* III.3). In *De An.* III.2 he applies this account to perceiving: 'the actuality [*energeia*] of the object of perception and of the perception are one and the same, but their being is different' (425b26–7; cf. 426a15–17). This way of putting it suggests that being perceived is the object of perception's fullest way of being actual.

[6] See Burnyeat 1995 and 2002; Sorabji 2001; Caston 2005; Lorenz 2007; Charles 2008/9.

Aristotle seems to think that perceptible properties such as redness, though they are objective features of physical objects, are also by their very nature perceptible: the full actualization of their nature involves their successful acting on an animal's perceptual capacity.[7] This conception of the nature of perceptibles reinforces the idea that in perceiving we become like the thing perceived, since, on Aristotle's view, its actualization as a perceptible quality takes place in us (just as, he thinks, the actualization a teacher's ability to teach geometry takes place in the learner). These points will be of importance when we come to Aristotle's various claims that thinking is or can be *of itself*.

When he turns to thinking, Aristotle applies or extends his account of perception: 'if thinking [*to noein*] is as perceiving is, it would be being affected in some way by the object of thought or something else of this sort. It must, therefore, be unaffected [sc. in itself], but receptive of the form; that it be potentially of this sort but not be this; and that it be in a similar condition such that as the faculty of perception is in relation to the objects of perception, in this way the intellect [*ton noun*] is in relation to the objects of thought' (*De An*. III.4 429a13–18). On Aristotle's account, human beings have a capacity for thought which he calls *nous*: 'the intellect [*ho nous*] is potentially in some way the objects of thought, but in actuality nothing, before it thinks' (III.4 429b30–1). This *nous* 'can become all things'—that is, all the things we can think—and is actualized when it becomes some object of thought. As with perception, Aristotle regards active thinking as the actualization of a second-order potentiality:

> whenever it becomes each thing in the way in which one who knows in actuality is said to (this happens whenever he is able to move to actuality through himself), even then it is in some way in potentiality—but not in the same way as before learning or discovering. (III.4 429b5–9)

Becoming an object of thought seems to take place already in the move from first-level to second-level potentiality. Before she learns geometry, a thinker has the first-level potentiality to contemplate or to use, for example, the definition of a square;

[7] This is a difficult idea. It may help to think of an imaginary case, a being which by its very nature was a teacher; it might well seem plausible that this being would only fully realize its nature in successful teaching.

understanding the definition and how it relates to other geometrical definitions actualizes that potentiality, and thus puts her in a position to think about it, and this is what it is for *nous* to become (like) this object of thought. Actually contemplating or using the definition is the second-level actualization. Becoming like the object is, once again, a matter of *nous* somehow receiving the form—and again it is unclear whether this means that it takes on the character of the object (so that it or something about it is literally square), or is like it in some more diluted sense (so that it encodes squareness), or neither of these (it is simply aware of the definition, or is intellectually responsive to it): see further below. Whereas in the case of perception the triggering of a second-level actualization normally requires something external—the presence of the appropriate object of perception—in the case of thinking the intellect can (typically) move to this actualization 'through itself'—that is, when the thinker wishes (cf. II.5 417b22–4).

Some passages suggest that the sameness condition for thinking and its objects is just the same as that for perception and its objects (III.4 429a13–18, quoted above, and 8 431b21–3: 'let us say again that the soul is in a sense all the things that are; for the things that are are either objects of perception or objects of thought, and knowledge is in a way the objects of knowledge and perception the objects of perception').[8] But III.4 430a2–7 suggests a stronger view for certain types of thinking:

> [intellect] is itself an object of thought just as other objects of thought are. For in the case of the things without matter what thinks and what is thought are the same; for theoretical knowledge and the object of this kind of knowledge are the same . . . in the case of the things which have matter it is each of the objects of thought in potentiality.

(Cf. III.7 431a1–2: 'actual [or: active] knowledge is the same as the thing'; and Λ.9 1074b38–1075a5, discussed *ad loc*.) The passage can be read in more than one way, but it is plausible to suppose that Aristotle is here distinguishing the thinking of certain things ('the things without matter', the objects of 'theoretical knowledge') from the thinking of other things ('the things which

[8] This view is taken in Sorabji 1982, pp. 301ff., and Lewis 2003, pp. 107–8.

have matter').[9] If this is right, the implication is that a stronger form of sameness holds for some kinds of (more rarefied) thinking than holds in the case of perception (see Modrak 1987, pp. 231–2; Caston 1999, p. 220). Although for Aristotle human thinking is something more active than perception, he still thinks of it, as we have seen, as the actualization of a potentiality (*nous*) by the object of thought, and thinking of any sort is one in number with (though different in being from) being thought (cf. Λ.9 1074b38). We may speculate that, like the proper perceptibles, the objects of thought are themselves most fully actual in being thought. In the case both of perceptibles and of 'the things which have matter' (whatever they are), this full actualization in a psychological state must be compatible with their being enmattered in something external; so the sameness in question—the sense in which they are actualized in the perception or thought—must be, correspondingly, relatively weak. In the case of 'the things without matter' this does not apply: they simply are the sorts of thing whose fullest actualization is, without qualification, to be thought. Aristotle thus may conclude that in some way actual thinking of 'the things without matter' just is the actualization of these objects of thought—though what this means may still seem obscure (for interpretations along these lines, see Kosman 1992; Johansen 2012, pp. 235–9). I return to this in the notes on 1074b35–1075a5.

De An. III.4 discusses how *nous* and/or thinking can be an object of thought at least in the way that it is when we study thinking itself; it is less clear whether it advances the idea, so prominent in Λ.7 and 9, of thinking *thinking itself*. The received text at III.4 429b7 reads: 'and it is then [i.e. when it has learnt or discovered] able to think itself.' Many editors emend the text so that it reads 'and it is then able to think through itself [i.e. at will]' (see Miller 2012, n. 42, p. 332; Shields 2016, *ad loc.*). If we retain the reading of the MSS, as I think we should, it is still open to question whether Aristotle means to claim that all second-level actual thinking is in some sense reflexive, or merely that the soul needs to learn and to make discoveries before it can study itself.

[9] The nature of the contrast is controversial; it might, for instance, be the contrast between grasping the essence of lions and thinking about a particular lion (see further the notes on 1074b35–1075a5).

He does, however, make a very wide-ranging claim of some sort of self-reflexivity at 1074b35–6, as the basis of an apparent difficulty for the view of divine thinking he has just sketched—'knowledge, perception, opinion and reflection always appear to be of something else, and <to be> of themselves only by the way'—and appears to contrast this with a stronger sense of self-reflexivity which applies to a restricted range of cases of thinking. The wide-ranging claim could mean that when one perceives or exercises knowledge or belief one is always aware that one does so. This is an influential, though to my mind unpersuasive, view; in any case, it is hard to see how a claim of this sort could figure as the basis of an apparent difficulty for Aristotle's account. The claim may amount to something like this instead: if seeing red or grasping *X* in thought involves (in some sense) being red or being *X*, then seeing red or grasping *X* in thought is, incidentally, seeing or grasping what one is (note that 'spiritualists' about perception and thought may find it hard to give this sort of account). This claim does justice to Aristotle's qualification 'of themselves *only by the way*'; and it falls short, of course, of any idea that the perceiver or thinker is *aware* of her own state. I shall discuss the idea that a stronger sense of self-reflexiveness applies in some cases of thinking in the notes on 1074b33–5 and 1074b35–1075a5.

The final set of claims about the intellect I shall mention are those in *De An*. III.4–5 concerning its being unmixed with the body, 'separate', and immortal:

> It is necessary, then, since it thinks all things, that it be unmixed . . . consequently, its nature must be nothing other than this: that it is potential. That part of the soul, then, called intellect (and by intellect I mean that by which the soul thinks and supposes) is in actuality none of the things which are before it thinks; nor is it, accordingly, reasonable for it to be mixed with the body. (III.4 429a18–25)

> For the faculty of perception is not without body, but the <intellect> is separate. (III.4 429b4–5)

> And there is one intellect which is such by becoming all things, and another which is such by making [*poiein*] all things, as a kind of disposition, such as light; for light also in a way makes [*poiei*] the potential colours colours in actuality. And this intellect is separate, unaffected, and unmixed, being in substance activity. For what acts is always more worthy of honour than to what is affected. . . . Being separated this alone is just what it is, and this alone is immortal and

> eternal—but we do not remember, because[10] while this <intellect> is unaffected, the affectable intellect is perishable. And without this, nothing thinks. (III.5 430a14–25)

The claim in III.4 that *nous* is not mixed with the body is usually taken to mean that it has no specific organ in the way that the senses do; it is then controversial whether Aristotle offers (or can consistently offer) a hylomorphic account of the human intellect at all: for two quite different answers in the affirmative, see Broadie 1996 and Johansen 2012, pp. 229–37 (see also Shields 1995; Caston 1996; Lewis 2003). The claim that it is separate can be understood in at least three ways: that the (human) intellect can exist without a body (so, e.g., Sisko 2000, p. 178), that it can be defined without reference to bodily states (even if it is nonetheless necessarily embodied), or that it is the kind of psychological capacity which can exist without other psychological capacities, even though it cannot do so in human beings (Broadie 1996; Caston 1996 and 1999, pp. 207–11). The first of these interpretations is very hard to square with Aristotle's claims that human thought requires images (*phantasmata*) in some unspecified adjunct role (III.8 432a7–9; cf. *Mem.* 1 449b33–450a8), and that *phantasmata* require a body (I.1 403a8–10).

III.5, with its distinction of the 'affectable' or passive intellect (*nous pathētikos*) and the active, agent, or maker intellect (*nous poiētikos*), is the most controversial chapter of the *De Anima*. For discussion, see Frede 1992; Kosman 1992; Caston 1999; Sisko 2000; Burnyeat 2008a; Johansen 2012, pp. 237–45; Miller 2012; Shields 2016, *ad loc.*; Jiménez 2017, ch. 4. The most critical—and most divisive—question is about the nature of the active intellect. Broadly speaking, current views are of three kinds. (i) The active intellect is simply a part of human intellect (Robinson 1983; Wedin 1988; Sisko 2000). (ii) It is the divine intellect of Λ.7 with only a highly attenuated role to play in human thought or understanding (Caston 1999). (iii) It is the divine intellect, but with a more substantial role to play in human understanding, for example as an efficient cause (Frede 1992, pp. 105–6; Kosman 1992; Burnyeat 2008a; Johansen 2012, pp. 237–45). An

[10] Caston argues that this should be translated as 'we do not remember that, while . . . ' (1999, pp. 213–15).

important (though not decisive) piece of evidence in favour of (ii) and (iii) is the characterization of the active intellect: 'separate, unaffected, and unmixed, being in substance activity . . . being separated this alone is just what it is, and this alone is immortal and eternal.' This is easy to understand as consonant with the characterization of divine thinking in Λ.6–7 and 9: 'there must, therefore, be a principle of this sort, whose substance is activity [so not the exercise of a capacity]' (1071b19–20); 'its activity, which is activity in itself, is a life best and eternal (1072b26–8); 'a substance which is eternal and unmoved and separate from perceptible things' (1073a3–5); its substance is activity, it is best, most honourable, and thinks eternally (Λ.9).

3. The Subject of Chapter 9

After the relative expansiveness of chapter 8, chapter 9 reverts to Λ's more usual degree of brevity and compression. This compression, and some quite pervasive syntactic and semantic ambiguities, make a number of important questions all the harder to answer. (i) What is the chapter about? Is it concerned with the nature of thinking in general, or with the thinking of immaterial substances in general, or with that of the primary immaterial substance alone? (ii) Is the term *nous* (translated here as 'intellect') used consistently throughout the chapter, and if so, in what sense? (iii) What is the chapter's overall structure? (iv) What is the connection between the idea that something's substance or essence is thinking and the idea that it thinks *itself*? (v) Is 'thinking itself' something different from the way in which human thought is, in Aristotle's view, identical with its object? (vi) What is the content of this highest form of thinking?—is it a 'thin' self-reflexive content (thinking of thinking of thinking of thinking of . . . '), or something richer? I shall deal with questions (i)–(ii) in this section, with (iii) at the start of the notes on the chapter, with (iv)–(v) in the notes on 1074b35–1075a5 and a5–10, and with (vi) in section 1 of the Epilogue. There are good discussions of chapter 9 in De Filippo 1995, Brunschwig 2000, and Beere 2010.

The chapter gives the impression of being a tightly knit set of arguments about a single subject. The strongest evidence for this is also the principal source of difficulty for deciding what this

subject is. The chapter is full of expressions which require us to understand a reference to an unspecified item; on average there is one such expression every one and a half lines, or nearly one per line if we include the third type of case listed below (those involving the definite article). There are sixteen occurrences of verbs which have no explicit subject: their inflexion is the third person singular, so that they mean 'he/she/it . . . ';[11] of these six are instances of the verb to think (*noein*) and one of a related verb *dianoeisthai* (translated as 'reflecting', but not here sharply distinguished from *noein*). There are six occurrences of the pronoun 'he/it' (*autos* in various cases). Finally—a less clear-cut set of cases—another seven expressions denoting either intellect or thinking contain a definite article which can be understood either as 'the . . . ' or as 'his/her/its . . . '. Expressions of the first two kinds, and of the third if construed as 'his/her/its . . . ', normally get their reference from a preceding specification of the thing in question: in all these cases there is no such specification of a possible referent anywhere except the very first line of the chapter (1074b15), where the phrase 'its [or: the] intellect' occurs. The density of these subject-unspecific expressions suggests very strongly that they all have the same reference (though I shall argue below and in the notes on 1075a5–6 that there may be two exceptions), and that this reference is to be understood by way of that initial phrase.

Unfortunately, this initial phrase is itself unclear. It is the first instance of the third kind of case noted above (*nous* with a definite article), so it could mean 'the intellect': if so, that could mean 'human intellect' or 'intellect in general'.[12] Alternatively, it could mean 'the intellect in question' or '*its* intellect': in either case the reference would be determined by a still earlier context—presumably the discussion of divine activity and life in chapter 7. 'The intellect in question' could refer to the Prime Mover's intellect or to the intellect of immaterial substances in general; by the same token the referent of 'its intellect' might be

[11] In principle, they could also have a neutral plural subject, as these take a singular verb in Greek, but this is unlikely here because of the occurrences of pronouns in the singular: see below.

[12] So Lang 1993, pp. 269–70; Brunschwig 2000, pp. 275–7; Kosman 2000, pp. 307–8; Beere 2010, pp. 4–5.

the Prime Mover alone (Ross, p. 397; De Filippo 1995, pp. 550–1) or immaterial substance in general. I shall return to this issue in section 2 of the Epilogue; for the moment I shall usually refer to both of these as 'divine intellect' (though in discussing some other views I shall sometimes follow their suit and speak of the subject of this thinking as God).

Commentators who opt for the first of these three readings usually point to the remark immediately following the initial mention of *nous*, 'it seems to be <the> most divine of the phenomena', as indicating that the reference is to intellect or thought in general, on the grounds that 'the phenomena' ought to be things that we can observe around us. There is strong evidence, however, that 'the *nous*' at b15 refers in some way to divine *nous*—either, as I have said, by meaning 'the *nous* we are concerned with [sc. given what has been said in chapter 7]', or by meaning 'its *nous*'. Later in the chapter Aristotle distinguishes the thinking with which he is concerned from thinking of less good things and even bad things, and argues that the object(s) of the former must be the best one(s), since it is best (1074b29–34). The natural inference is that he is contrasting divine thinking with human thinking, which can be of less good or even bad things. Nothing in the context suggests that the thinking characterized as the best is merely the best or highest form of human thinking. This seems to be confirmed by the contrast drawn at 1074b23–7 between the type of thinking in question and thinking which can be of different things at different times, and which can thus change, and by the final sentence of the chapter (1075a7–10), in which the thinking in question is compared and contrasted with *human* intellect. If we take 'the intellect' in the opening line to refer to human intellect or to intellect in general, we have to suppose that at some point in the course of the chapter Aristotle shifts to talking about divine intellect; but the text offers no hint of a change of subject. It seems much better to take Aristotle to be talking about divine intellect all along. If so, Aristotle is including divine intellect or thinking among the phenomena when he says that it seems to be the most divine of them. As Aristotle uses the term, 'phenomena' are things which appear to us to occur, exist, or be the case, on the basis of either observation or thought; so all Aristotle need mean here is that divine intellect or thinking is one of the things which seem to us to exist.

As we have seen, the term *nous* has a number of senses in Aristotle: what does it mean at the opening of the chapter? (I have so far guardedly glossed it as 'intellect or thinking'.) The word recurs several times in the chapter (1074b21, b30, 1075a4, and a7 ('human *nous*')). At b21 *nous* is explicitly contrasted with thinking (*noēsis*) and implicitly associated with potentiality (see notes *ad loc.*), and this seems to correspond to the notion of the merely potential *nous* which is in itself nothing actual but which can become all things: see section 2 above. On the other hand, the central thesis of the chapter is that divine thinking is *not* the exercise of a capacity of this kind (or of any other kind); so when he introduces the subject of the chapter as 'its *nous*', or 'the *nous* with which we are concerned', he cannot mean this sort of capacity. He might mean 'thinking'—in which case there is a very sharp shift in meaning at 1074b21—or more probably he means something like 'what can think', without any commitment to this involving or not involving potentiality: the idea floated at b21 that *nous* rather than thinking might be its substance would be the same, since the only way in which its ability to think, rather than its actually thinking, could be its substance would be for that ability to involve a potential *nous*. This also fits very well with the occurrence of *nous* at 1074b30, where Aristotle seems to be studiedly neutral as to the nature of divine *nous*. The last two occurrences of *nous* in the chapter are more problematic, since both seem to be referring to actual thinking, and not to 'what can think' (construed as I have suggested). Aristotle's point at 1075a4 is about the identity of certain objects of thought and the thinking of those objects; the reference to human *nous* at a7 is likewise a reference to actual thinking about certain things ('composites'). This is another of Aristotle's standard uses of the term (given that his focus here is on understanding or fully grasping in thought: see section 1 and the notes on 1074b38–1075a5 and 1075a5–10); but this cannot be how the term is being used earlier at 1074b21 or b30, for the reasons given above. Perhaps, having shown that divine *nous* is identical with divine thinking (this is the conclusion reached at 1074b33–5), Aristotle feels no difficulty in now using *nous* to refer to divine thinking; if so, the subsequent use of 'human *nous*' in the same way is understandable even though of course the corresponding identity does not hold. In the translation, I render *nous* as 'intellect' in all these

occurrences, so as to maintain some degree of neutrality on these questions there.

As I said above, the subject of the chapter is introduced by the phrase 'the intellect' or 'its intellect' at 1074b15. Since 'intellect' here most probably refers to what I have called divine intellect, the subject could be that intellect or the being or type of being whose intellect it is, whether we take the phrase to mean 'the intellect in question' or 'its intellect'. (Note that on any construal it seems unavoidable that the subject of 'it seems to be <the> most divine of the phenomena' at the start of the next sentence is the intellect, since it would be either false or banal to say of the divine immaterial substance identified and argued for in chapters 6–7 that it seems the most divine of the phenomena—banal if Aristotle means 'it seems to me', and false if he means 'it seems to many people'. It would be quite possible, however, for the subject of this sentence (b15–17) to be *nous* but thereafter to be the (type of) being whose *nous* it is.) On the one hand, syntax favours the view that the subject is the intellect. While some of the pronouns mentioned above can be masculine or neuter in gender, some are unequivocally in the masculine gender, as is the reflexive pronoun *hauton* at b33–4 ('*Itself*, therefore, is what it thinks').[13] It is natural to take these to be agreeing with the word *nous*, which is also masculine. From a syntactical point of view, one might have expected Aristotle, were he meaning to refer to the (type of) being whose intellect this is, to use either neuter pronouns (referring to 'the thing whose intellect this is') or feminine ones, since the term for substance (*ousia*) is feminine in gender. This consideration is not decisive, however, since Aristotle might have the term *theos* ('God') in mind, which he uses three times in the masculine in chapter 7 (1072b25–30), or might simply not be very rigorous in his use of genders. On the other hand, two closely related remarks suggest that the subject is the being (or type of being) whose intellect it is. At 1074b21–2 Aristotle says 'whether intellect [*nous*] is its substance or thinking [*noēsis*] is, what does it think?' Here *nous* is clearly distinguished from the subject ('its substance'); this remark follows the other relevant

[13] The participial expression *pōs d' echōn* and the word *toioutos* in the phrase at 1074b15 ('in what condition it would be to be such') are also in the masculine, but I have already suggested that in any case the subject of this sentence is *nous*.

passage (b18–20), in which the same distinction is made a little less explicitly: 'if it thinks, but something else is what determines this, then (since it is not this which is its substance, namely thinking, but rather potentiality) it would not be the best substance.'[14] I think that on balance it is more likely that the principal subject of the chapter is this substance, or type of substance, and hence how and what it thinks. For this reason I translate most of the expressions denoting either intellect or thinking which contain a definite article as 'its . . . ' (1074b15, 21, 30, 33, 34, and 1075a10) rather than as 'the . . . '; the exceptions are at 1074b37 (twice)[15] and 1075a2 and 4.

One might suppose that the singular 'it', and the repeated superlatives ('the best substance' (1074b20), 'it thinks what is most divine and most worthy of honour' (b25–6), 'the best thing' (b33), 'the greatest thing' (b34)), mean that we should understand the subject to be the single highest and best immaterial substance (i.e. which acts as the Prime Mover). But Aristotle is happy elsewhere to use the singular to denote a kind or class (as we saw, e.g., in chapter 6, where 'since there were three kinds of substance' at 1071b3 translates Greek which literally means 'since there were three substances'), and these superlatives could also be aimed at immaterial substance as a kind. I do not think that this question can be settled on the basis of the text of chapter 9, but only, if at all, on the basis of speculation about how the thinking of the 'lesser' immaterial substances differs from that of the highest one: see sections 1 and 2 of the Epilogue to this chapter.

COMMENTARY

While it is clear in a general way that what this chapter does is to consider and (to Aristotle's mind) resolve some difficulties about divine thinking, it is less clear exactly what its internal structure is.

[14] These passages also argue against the possibility that when it comes to the subject of this chapter, Aristotle simply does not distinguish between immaterial substance (or the highest one) and its *nous*, understood as its thinking, on the grounds that these are in some way identical in any case.

[15] *to noein* and *to noeisthai*: I translate these simply as 'thinking' and 'being thought'.

There are five principal questions. (i) When dealing with a set of difficulties Aristotle usually lists them and then gives his solution at the end: is that the structure of this chapter? There is a conclusion at the end (1075a7–10), but there is an apparently more general one in the middle—the resounding conclusion reached at 1074b33–5 ('*Itself*, therefore, is what it thinks, seeing that it is the greatest thing, and its thinking is a thinking of thinking.' (ii) There are two expressions which precede this conclusion, each of which might naturally be taken to signal the beginning of Aristotle's response: 'It is clear, therefore, . . . ' at 1074b25, and 'First, . . . ' at b28: does either of these actually signal this, and if so how is the other one to be understood? (iii) How do the arguments introduced by 'First, . . . ' and 'Second, . . . ' (b28 and 29) relate to the difficulties mentioned earlier? (iv) If what I have called the resounding conclusion is his principal response, what is the relationship of the series of further difficulties and responses which follows it to the earlier objections and to the resounding conclusion itself? (v) What is the internal structure of this further series? How many objections are there, are they all answered, and if so where?

Various answers to these questions are possible: I shall briefly state my own preferred answers here; they will be given more explanation and/or defence in the notes below. I think that answers to them ought to do justice to two clear structural features of the chapter: that 1074b17–35 seems to form a tightly-integrated unit, and that its concluding sentence—the 'resounding conclusion'—is stylistically marked as the climax of the chapter, and does much more to address the initial difficulties than the conclusion at the end of the chapter does. The chapter opens with the presentation of two difficulties. The first (1074b17–21) is apparently premised on the supposition—which Aristotle will reject—that divine thinking is, like human thinking, the exercise of a capacity (some difficulties with this reading are discussed in the notes *ad loc.*). The second, which is explicitly said to apply whether or not this supposition about divine thinking is correct, concerns the value of the object of divine thinking; the presentation of this difficulty starts at b21 and concludes either at b25 or (as I shall argue) at b27. At 1074b28–35 Aristotle makes two remarks, introduced by 'First, . . . '—which apparently addresses the first of these difficulties by suggesting that divine thinking

does not involve the exercise of a capacity—and by 'Second, . . . ' —which addresses the second of them by proposing that divine substance thinks about itself. These responses are both summed up in the resounding conclusion. These considerations make it very plausible that the resounding conclusion is Aristotle's principal conclusion (my answer to question (i)), and that the difficulties listed subsequently are residual ones arising from, or not obviously met by, the resounding conclusion alone (my answer to question (iv)). By the same token—to address questions (ii) and (iii)—I take the expression 'First, . . . ' at b28 to signal the beginning of Aristotle's response: on this reading the former expression, 'It is clear, therefore, . . . ', at 1074b25 introduces an intermediate conclusion based on the difficulty raised: see notes *ad loc*. It is also easier to see a different role for this expression if it is not introducing Aristotle's main response than it is for the expression 'First, . . . '. For question (v) see the notes *ad loc*. I think that the overall structure of the chapter, therefore, is as follows:

1074b15–17: introduction

1074b17–21: the first difficulty

1074b21–7: the second difficulty

1074b28–35: Aristotle's solution to these two difficulties ('First, . . . ', 'Second, . . . '), culminating in the resounding conclusion at b33–5

1074b35–1075a10: three residual difficulties:

1074b35–1075a5: the first and second of these difficulties. 'Or . . . ' at b38 introduces Aristotle's response.

1075a5–10: the third residual difficulty. 'Or . . . ' at a6 again introduces Aristotle's response.

1074b15–17

Aristotle introduces the topic of the chapter: it will deal with difficulties which arise from the fact that divine *nous* 'seems to be <the> most divine of the phenomena.' The subject of the sentence appears to be its—that is, divine substance's—*nous* (see the notes at the start of the chapter and section 3 of the Prologue); 'to be such a thing' means 'to be the most divine of the phenomena'. The phrase 'it

seems' might mean 'it seems to me', but more usually in Aristotle it means 'it seems to many people and/or to some earlier philosophers'; if this is the meaning here one could translate it as 'it is thought to be . . . '. Anaxagoras called his supreme god *nous*, but Aristotle need not have anything very specific in mind here beyond the common idea that Zeus and the Olympian gods generally are the highest beings because of their strength and wisdom. In any case, what will matter in the arguments which follow is Aristotle's own idea, which we encountered in chapter 7, that the intellect or thinking in question is that of the best substance—that is, of the best thing (or kind of thing) without qualification (1072a27–b1, 1072b14–30). The two difficulties which follow will reveal that its being best is, principally, a matter of its ontological character (its essential activity is not the exercise of a potentiality) and of the object of its thinking being itself the best thing.

1074b17–21

The first difficulty is dilemmatic in form. The first option (b17–18) is that the immaterial substance thinks nothing—that is, it does not think. In this case, its *nous* will be only a potentiality for thinking: this is the point of the comparison with the sleeper (cf. *EN* I.8 1098b30–1099a7 and X.8 1178b18–21). Aristotle does not spell out why this is unacceptable, but his question 'why would it be the object of reverence?' indicates that the problem is the same as that facing the second option: 'it would not be the best substance; for it is because of its thinking that honour belongs to it.' I discuss the sense in which Aristotle takes this to be true in the notes on b20. The second option (b18–21) is that 'it thinks, but something else is what determines this': this could mean 'determines what it thinks' or 'determines that it thinks', or both. Aristotle must mean something stronger than 'it is thinking about something else', since that is the condition explored in the next difficulty (and it is implied there that this condition does not, or does not obviously, require thinking to be the exercise of a potentiality: see below). As I explained in the notes at the start of the chapter, this first difficulty as a whole rests on the supposition that divine intellect is, like ours, a potentiality which is exercised in actual thinking: it is therefore puzzling that this option spells out an apparently quite different

condition—especially since Aristotle immediately goes on to draw the unacceptable conclusion on the basis of the claim that 'it is not this which is its substance, namely thinking, but rather potentiality.' This last point suggests that Aristotle takes 'something else is what determines this' to entail the potentiality claim; but this would leave two things still unexplained. First, if it is divine thinking's being the exercise of a potentiality which yields the unacceptable conclusion, why does he even mention the other condition, that something else is what determines the thinking? Second, Aristotle will not have dealt with another apparently possible case, namely that in which it thinks but its thought has not been determined by something else. Both of these problems are resolved if Aristotle takes 'something else determines its thinking' to be not only sufficient for its being the exercise of a potentiality but also necessary.

The sufficiency claim might be defended on the grounds that if *Y* determines *X*'s thinking in some way, this must be by way of its activating a potentiality in *X*, since this is for Aristotle the standard way in which a thing can determine the activity of something else. The necessity claim seems harder to justify. Perhaps Aristotle's thought is that for *X* to be in a position to think about something else, *Y*—to have a second-level potentiality for thinking about *Y*—*Y* must have been involved in effecting the transition from *X*'s first-level potentiality: so the objects of the intellect must in some sense be prior to the acquiring of those objects through learning. Whatever we think of this line of thought in general, however, it seems inadequate in the case of the supposed divine *nous*, since that would *never* have learned, and so would always have been in a position to think.

b20: 'It would not be the best substance.' This could in principle mean (a) the determinant of its thinking would be better (because it would be prior in some way), or (b) there would have to be something else better—that is, some other thing whose substance was activity—in order to satisfy the cosmological requirements outlined in chapter 6—or (c) there would be a better state in which it could be (or in which a substance could be). The reason given at b20–1, 'for it is because of its thinking that honour belongs to it' might suggest that the idea is (a): its value derives from its thinking, so if its thinking is dependent on something else,

then it might seem that this other thing would be more valuable. This line of thought leaves little work for 'since it is not this which is its substance, namely thinking, but rather potentiality' to do, and so it may be better to take the idea to be (c) (or possibly (a) and (c)): it derives its value from thinking, but it and/or its thinking would be better if it were not the exercise of a potentiality. Why? Perhaps because its thinking would involve effort and/or be liable to stop: compare Aristotle's response at b28–9. Something like (c) also seems to be at work in the next argument, at b23–7, while an analogue of (a) but involving simply the object of thought is at work in Aristotle's response at b29ff.: see notes *ad loc*. Idea (b) does not seem to appear in chapter 9: see section 3 of the Epilogue.[16] In any case, why is it that it is its thinking which bestows honour on it? Chapter 9 does not say, and in principle this claim might be one which Aristotle accepts, or one of the parts of the difficulty which he will reject: see notes on b33–5 below. In any case, we can construct an answer from materials found in chapter 6. The substance of the highest (kind of) substance is activity (1071b17–20), so this activity is what makes this substance what it essentially is. Lacking matter, this substance is only what it is essentially. Its value, therefore, must derive either from that activity—that is, its thinking—or from something outside itself (either because of some relation of dependence or by satisfying some condition which is good in itself)—but in the latter case it could hardly be the best thing in sense (a) or sense (c). The essential character of its thinking, then, is what makes it the best thing, if it is indeed the best thing.

1074b21–7

The first argument also showed that it must think something: the difficulty introduced here concerns the value of the object of its thinking, and arises whether its thinking is the exercise of a potentiality or not. Given what will be affirmed in the 'resounding conclusion', the appearance at the outset of '<it thinks> either itself or something else . . . ' is unsettling: Aristotle seems somewhat oddly to be putting the solution to the difficulty in place

[16] Menn (2012, p. 446) thinks that it is (b) which is at issue.

before the difficulty is even explained. Nor does he treat the difficulty which follows as one which arises whichever of these we say: it seems to follow from the supposition 'if <it thinks> something else' at 1074b23. There are two ways of dealing with this problem. One is to suppose that at b22–4 Aristotle is simply setting out all the options available in principle without yet taking a view about any of them, and then begins to rule them out one by one:

> If it thinks something it must either (A) think itself or (B) think something else; if (B) it must either be (Bi) always the same thing or (Bii) different things.[17] It must think the best thing, so (Bii) is ruled out. This leaves (Bi)—and (A)—still in the running. (The response to the difficulty at b29ff. rules out (Bi) and claims that (A) is the answer.)

The other is to suppose that at this stage the idea that it thinks itself is being treated as a non-starter, to be mentioned only to be dismissed. In that case, we would expect some explanation of why this appearance of being a non-starter is mistaken: see notes on 1074b38–1075a5. On the first reading, two options are still in play by the end of the passage; on the second, only (Bi) will seem to be, and, somewhat as with the idea that its *nous* is a potentiality in the first difficulty, we are being invited to conclude for ourselves that there is a problem with this option.

On either reading, b23–7 offers an argument that it must think 'what is most divine and most worthy of honour' (note that 'most divine' gives a hint that it will turn out to think itself). There are two ways to take 'or is its reflecting on some things absurd?' The first way is as supporting the interim conclusion that the value of the object of its thinking does matter: if it did not matter, then it would have to be acceptable to suppose that it thought about trivial or evil things (cf. 1074b31–3)—and that is absurd. On this reading no argument is given for the passage's final conclusion, that it thinks the best thing: perhaps it is meant to seem obvious that, once it is agreed that the value of the object of its thinking

[17] Brunschwig thinks that Aristotle ignores the possibility that if it thinks itself it could think different things at different times by thinking of different parts of itself (2000, p. 283): Aristotle presumably thinks that this possibility would be ruled out on the grounds that thinking of a part of itself would not be as good as thinking of the whole of itself.

matters, it must think the best since if it thought something less than the best, it would not be as good as it could be. The second way is to suppose that 'or is its reflecting on some things absurd?' actually has the force of 'it is absurd that it thinks of anything but the finest thing.' The conclusion that it thinks the best thing then follows immediately, but Aristotle will still have to be able to say why it is absurd; the natural reason will be the one just given, that if it thought something less than the best, it would not be as good as it could be. The first of these readings seems slightly preferable, as it makes explicit the argument that the value of the object matters.

b25–7: As I suggested in the notes at the start of the chapter, this conclusion is part of the framing of the difficulty, and not (as we might perhaps expect) part of the response. Presumably this is because it is not yet clear (as far as the argument of this chapter goes: see section 3 of the Epilogue) *how* it can think the best thing. The idea that if God is in the best state any change must be for the worse is found in Plato's *Republic* (II 381b–c): it reflects the assumption that there is only one perfect state that God can be in. Aristotle's terminology is interesting: when he says '[it] does not change; for the change <would be> for the worse' he uses *metabolē*, his most general word for change (see section 5 of the Prologue to chapters 6–7) and the cognate verb *metaballei*; when he says 'and such a thing <is> already a motion' he uses *kinēsis*, which is cognate with the term he used for the Prime unmoved mover in chapter 6: he means to imply that it must in any case always think the same thing(s), since, as he argued there, immaterial substance is completely unchanging.

1074b28–35

As I said in the notes at the start of the chapter, the response introduced by 'First, . . . ' addresses the difficulty presented at 1074b17–21, while that introduced by 'Second, . . . ' addresses the one presented at b21–7. Their extreme brevity aside, it is striking that Aristotle presents each response in a curiously negative fashion, by stating what is *not* the case, and leaving us to infer what must be the case: perhaps the explanation is that he wishes to build up to the resounding conclusion (b33–5).

b28–9: The claim that if it 'is . . . potentiality, it is reasonable <to suppose> that the continuity of its thinking is burdensome to it' is strikingly similar to a remark about the heavenly bodies at Θ.8 1050b22–8:

> that is why the sun and the stars and the entire heaven are always active and there is no fear that they might at some time stop, which those who write on nature fear. Nor do they tire in doing this; for the motion is not for them related to the potentiality for the contradictory, as it is for perishable things, so that the continuity of the motion is burdensome; for the cause of this [i.e. being burdensome] is the substance, which is matter and potentiality, not actuality.

The meaning of the Θ passage as a whole is controversial,[18] but what matters for us here is the clear linkage between the continuity of *X*'s activity being burdensome to *X* and *X*'s substance being potentiality. We should therefore understand 'if it is not thinking [*noēsis*] but potentiality' as 'if its substance is not the activity of thinking but (rather) potentiality.' The clear though unstated implication is that Aristotle's response to the difficulty is that the substance of the subject of divine thinking is the activity of thinking (*noēsis*). How is the point about being burdensome related to the corresponding initial difficulty? As I suggested earlier, although the notion of being burdensome is not mentioned there, the difficulty (or part of it) was indeed that if the thinking in question were the exercise of a potentiality, it would be a less good form of thinking than it could be, since it would either involve effort or be liable to cease (or both): and so the substance in question would not be as good as a substance whose thinking was not defective in this way—that is, a substance whose substance was the activity of thinking. Despite the unheralded appearance of the term 'burdensome', Aristotle's grounds turn out to match those of the original difficulty.

b29–33: I translate *ho nous* at b30 as 'its intellect': we should regard this usage here as (deliberately) neutral as to the nature of divine intellect (compare the occurrence of *ton noun* at 1074b15): see section 3 of the Prologue. How is the line of thought here

[18] For discussion, see Makin 2006, *ad loc.*; Beere 2009, pp. 314–24; Judson 2016, pp. 153–8.

related to the corresponding original difficulty? That difficulty concluded that '[if it thinks something else,] it thinks what is most divine and most worthy of honour.' I think that we should understand b29ff. as continuing this line of thought—that is, 'it is clear that something else would be more honourable than its intellect, namely what is thought' depends on the condition 'if it thinks about something else'. This of course is the condition which Aristotle is about to reject. What follows is, as in the case of the first response, a repeat in slightly different terms of part of the original argument. Aristotle is supposing that someone might argue that, even if immaterial substance thinks about something else, and that thing is the best object of thought, immaterial substance will still be the best thing, because what bestows value on it is simply the fact that it thinks (this makes it better than the sleeper of b18, for instance). Aristotle's reply is that in some cases (those in which *Y* is very bad) *X*'s *not* thinking of *Y* is more valuable than *X*'s thinking of *Y*; he deploys an *a fortiori* argument from the case of seeing to support this. 'If this is to be avoided' means 'if we are to avoid the (false) conclusion that *X*'s thinking of *Y* is always better than *X*'s not thinking of it': we are left to draw the inference that the value which thinking bestows is not simply the value of thinking rather than not thinking, and thus that the value bestowed by thinking is wholly or principally a function of the value of its object. Why does it follow from this that if it thinks of something else, that thing 'would be more honourable'? Presumably the idea is that the thing which is the source of a certain value must be more valuable than the recipient of it—an analogue of idea (a) mentioned in the notes on b20. Finally, when the intermediate argument has been about 'the one who is thinking', why are both the conclusion stated at the outset, and the final inference at b33, put in terms of thinking ('its thinking [*hē noēsis*] would not be the best thing')? It may be that these are simply an intermediate step on the way to the conclusion that the immaterial substance which engaged in this sort of thinking would not be the best thing; or (more probably) it may be that Aristotle is about to identify the substance with which he is concerned with its activity of thinking.

b33–5: The resounding conclusion has two parts. The first—'*itself*, therefore, is what it thinks, seeing that it is the greatest thing'—responds to the second difficulty. Despite the convolutions of the

preceding arguments, the essential line of thought is simple and even elegant. The object of the best substance's thinking must be the best thing, since otherwise the substance (or another substance) could be in a better state than it is. If the object is something distinct from the best substance, then either it is better than the substance—so the substance is not the best thing—or it is worse, and so it is not, after all, the best thing. Thus the only way in which the best substance can think of the best thing is for it to think of itself. (Aristotle gives no reason why there could not be two equally good things, one the subject and one the object of divine thinking: but see the notes on b29–33.) The idea that it 'thinks itself', on the other hand, is quite opaque, and is not further explained by Aristotle, except, perhaps, by the famous second half of the resounding conclusion, 'its thinking is a thinking of thinking' (see below) and by what he says in the discussion of the three residual difficulties at 1074b35–1075a10.

There are five main types of interpretation of the claim that it thinks itself, which I shall label DT1–5. DT1 is the deflationary view advanced by Norman:

> when Aristotle describes the Prime Mover as 'thinking itself', he is not referring to any activity which could be called 'self-contemplation' . . . in so far as [active intellect, in the Prime Mover and in the human mind] has become the objects of thought it thinks itself incidentally when it thinks the object of thought. But it does not think itself *as such*.
>
> (1969/79, pp. 96 and 100)[19]

According to DT1, 'God thinks itself' does not specify the content of its thought at all: '*X* thinks itself' is simply a technical term referring to a particular *kind* of thinking, viz. abstract, contemplative thinking—the kind which constitutes the highest type of human thinking. DT1 thus restricts the claim that God (or immaterial substance) thinks itself to something like the weak claim made for all thought in the *De Anima* that in thinking an object the intellect is—incidentally—thinking itself in the sense that it is thinking of something which it itself is.[20] This view is very hard to

[19] Although he disagrees with Norman's view that divine thinking is very like human thinking, De Filippo's view of God thinking itself is analogously deflationary (1994, pp. 407–9, and 1995, pp. 556–8).

[20] In discussing *De An.* III.4 in section 2 of the Prologue I called this 'the wide-ranging view', and took it to apply to perception as well as to thought; Norman interprets III.4 differently, and takes this claim to be restricted to abstract thinking.

accept for at least two reasons.[21] First, later in chapter 9 Aristotle goes on to recognize a sense in which cognition is of itself only incidentally: 'knowledge, perception, opinion, and reflection always appear to be of something else, and <to be> of themselves only by the way' (1074b35–6). This is a sense of 'of itself' which he contrasts with a more robust sense which he thinks applies, possibly to certain forms of human thinking, but certainly to divine thinking (see notes on 1074b35–1075a5). Second, the problem to which Aristotle is responding concerns what divine thinking is *about*: this will simply not be addressed by the claim that, whatever it thinks about, its thinking will also, in a quite different sense, be 'of itself'.

DT2–5 all accept that God's thinking is about itself in a more substantial sense than this, but involve different views of what this amounts to. DT2: divine thinking is vacuously and/or narcissistically self-reflexive: it is thinking about a being whose essence is simply to think about a being whose essence is . . . , or, for short, it is thinking about thinking about thinking about . . . (Ross 1924, I, cxli-cxliii; Guthrie 1981, pp. 260–3; Modrak 1987, pp. 228–33; Brunschwig 2000). DT3: divine thinking is simply self-reflexive, but is neither vacuous nor narcissistic (Wedin 1988, pp. 229–45; Beere 2010, pp. 21–30 (though he thinks that in thinking himself God is not in any sort of relational state, even a reflexive one); Liatsi 2016: 'it is the plain consciousness of itself, nothing more, without any particular content'). DT4: divine thinking has more substantial content than this, but the nature of this content is in principle inscrutable (Oehler 1974; De Filippo 1995, p. 560). DT5: the subject of divine thinking has some determinate content which (though we may not be able to specify it exactly) is of the same general type as the content of high-level human thinking—for Aristotle, as we shall see, the steady contemplation of essences of various sorts (and possibly certain eternal truths as well)—and it is *of itself* because it is in some way *constituted by* these intelligible objects: in grasping itself in thought divine thinking is grasping these and vice versa (Kahn 1985a, pp. 326–8; Lear 1988, pp. 295–309; Burnyeat 2008a, pp. 37–43).

[21] For further criticism, see Brunschwig 2000, p. 288, n. 45.

Of these four views, DT2 seems the least attractive; and its proponents tend to portray Aristotle as simply driven to it by the logic of his argument about the candidates for the object(s) of divine thinking. On the other hand, DT3 may seem to avoid this problem simply by fiat. One could reasonably wonder, at least, whether on these readings we have been given any grounds for taking divine thinking to be good rather than bad or indifferent: by Aristotle's argument these grounds ought not to be that the object of this thinking—God or immaterial substance—is good for *other* reasons (e.g. being eternal, unchanging, etc.). Beere tries to meet this worry by arguing that the metaphysical simplicity of God's thinking is precisely what its 'sublime goodness' consists in (2010, pp. 28–30), and this may be the best that can be done for this reading. DT4 only offers an unattractive 'a something I know not what' answer to the problem, and there are no grounds in the text to prefer it to DT3 or to DT5. DT5 is the most attractive interpretation: it gives us a clear handle on the goodness of divine thinking, since that turns out to be of, and hence to *be*, the most intelligible object(s). It also does justice to the parallels between God and the active or agent intellect of *De An.* III.5 noted in section 2 of the Prologue, and offers a reasonably straightforward basis for the way in which divine thinking is in some ways like ours.[22] Two passages at the end of chapter 9 (1075a4–5 and 5–10) also seem to me to make best sense if Aristotle accepts DT5 (see notes *ad loc.*), but neither passage is decisive evidence for this. Other arguments given for DT5 are unsatisfactory. (i) At B.4 1000b3–6, Aristotle objects to Empedocles' account on the grounds that it leaves God ignorant of Strife—a fundamental item in Empedocles' cosmos—whereas God should know all things. His objection may only be *ad hominem*, however; even if it is not, Aristotle's own position on a particular question is sometimes very similar to one he criticises, differing only on the basis of some carefully drawn but quite fine distinction. (ii) At A.2 982b28–983a11 Aristotle characterizes wisdom, the knowledge of

[22] Neither of these points is sufficient to *prove* the correctness of DT5, however, since the appeal to *De An.* III.5 runs the risk of explaining the obscure by the more obscure, and Aristotle's various claims that our thinking is at its best like God's do not, as is sometimes claimed, *require* DT5: see section 3 of the Epilogue.

the first principles and causes, as belonging only or most fully to God; but Aristotle may only be appealing here to an *endoxon*, a common opinion, and if he is not, there is more than one way to square this with interpretations DT2–4—see, e.g., Wedin 1988, pp. 244–5; Broadie 2012, pp. 64–7.

DT5 is not without its own problems. In what way can divine thinking, thus construed, think itself? What exactly is the range of intelligible objects it thinks? How can its thought be a unity if it thinks a plurality of items? Are we identical with God if we think one of the same items? I discuss the first of these problems in the notes on 1074b35–1075a5, and the rest in the notes on 1070a5–10 and section 1 of the Epilogue. The question as to how, if at all, the thoughts of the subordinate unmoved movers differ from the thought of the Prime Mover and from each others' is discussed in section 3 of the Epilogue.

The second part of the resounding conclusion is the famous and enigmatic phrase 'its thinking is a thinking of thinking' (*hē noēsis noēseōs noēsis*).[23] Both the syntax and the meaning of this are unclear. The genitive 'of thinking' (*noēseōs*) could indicate that thinking is the object or content of its thinking (the standard view), or it could be a possessive genitive: 'its thinking is *thinking's* thinking'; this reading was first advanced by De Filippo (see 1995, p. 557) and is also endorsed by Beere (2010, p. 18).[24] On the standard view 'its thinking is a thinking of thinking' repeats or expands the point that it thinks itself: since its essence is thinking, to think about itself is to think about thinking (this is neutral between the interpretations DT2–5). This reading would mean that Aristotle makes no obvious response to the first of his original difficulties, as to whether divine thinking is the exercise of a potential *nous*, since 'it thinks itself' responds to the second difficulty, about the object of divine thinking. It would be better if this part of the conclusion is, at least partly, a response to the first difficulty, and I agree with De Filippo and Beere that for this

[23] There is no explicit indefinite article in the Greek, and it can also be translated as 'its thinking is thinking of thinking'. See also the next footnote.

[24] The phrase could also mean 'the thinking of [i.e. about] thinking is thinking' or 'thinking's thinking is thinking': these would have to be taken as claims that thinking about thinking—or: thinking's thinking—is thinking par excellence. These readings seem unlikely.

reason we should understand the phrase as indicating that divine thinking is thinking's thinking—that is, it is thinking by something which is essentially an activity of thinking. It may also hint at an amplification of Aristotle's response to the second difficulty, since it is part of what makes possible the strongest form of identity of thinking and object: see notes on 1074b38–1075a5. For different readings, see, e.g., Wedin 1988, pp. 238–9; Brunschwig 2000, pp. 288–90.

1074b35–1075a5

The first two of the three residual difficulties.

b35–6: The first objection is not fully spelled out. The idea seems to be that all forms of cognition appear to be 'of themselves' in a way which does not exclude their objects being something distinct: this is presumably the force of 'only by the way'. The objection is, then, that the fact that divine thinking is of itself does not exclude its object(s) being something distinct.[25] We encountered the idea that certain types of human cognition are of themselves incidentally in section 2 of the Prologue. According to Aristotle, when a subject *S* perceives red, or thinks of a stone, she receives 'the form without the matter'. *S*, or the faculty involved, becomes (like) the colour or the stone only in a quite attenuated sense, since the object of her cognition is a particular compound of form and matter—a coloured surface or a particular stone. The way in which her seeing red or thinking about the stone is, incidentally, seeing or thinking *about what she is* is correspondingly attenuated. If this is the most that can be said about divine thinking's thinking itself, Aristotle will not have solved the second of his original difficulties, about the object of divine thinking. It is unclear, and controversial, how much of the starting-point of this objection Aristotle himself accepts: I shall

[25] Beere (2010, pp. 21–2) thinks that a quite different problem is being silently raised, namely what the *content* of God's thinking must be if it is to avoid being only of itself 'by the way'. Beere's answer: the content must be God (interpretation DT3).

return to this question when we come to Aristotle's response at 1074b38–1075a5.

b36–8: The second objection is also compressed. (Note that at b38 *nooumenōi*, the passive participle of the verb *noein* ('to think'), is clearly meant to have the same meaning as the passive infinitive with a definite article in the previous line, and that means 'being thought of' (i.e. the condition of being the object of some thinking), since it is correlative with the active infinitive with a definite article in the same line ('thinking'). There are three further instances of this passive participle at 1075a3–4, a5, and a6, all with the definite article added: these all seem to mean 'what is thought of'—that is, the object of the thinking.)

Since Aristotle gives a combined response to the two objections, we should expect the second either to be based on the first, or to be solved along with it in some other way. Thus it could be the problem that, if the object of divine thinking is, after all, something distinct, it ought to be what bestows value on the thinking; but if that thinking is the best thing, it cannot owe its value to something distinct. This is uncomfortably close to the second of the initial difficulties which are addressed in the resounding conclusion, and I prefer to think that Aristotle's point is rather that there is a threat of vacuity in the account of the goodness of the best substance: it is good because of its activity of thinking, and this activity is good because of the goodness of its object, and this object is the substance in question or its activity of thinking. His response will then be to show that divine thinking can have substantive content while still being of itself. Defenders of DT2 and DT3 will have to give a different interpretation of the objection.

b38–1075a5: As often in Aristotle, 'Or is it that . . . ' introduces his response. His main explicit move is to claim that in some cases of knowledge, *S* becomes the object of her cognition in a stronger sense than in the case of perception and some other cases of knowledge; the inference is, presumably, that in these cases she grasps what she is in a less attenuated way than in the other cases.[26]

[26] Note that in the sentence, 'since what is thought and the intellect are not, then, different, in respect of things which have no matter, <they> will be the same thing,' at a3–4, 'intellect' (*nous*) must mean '(human) thinking'.

De An. III.4 430a2–9 seems to say something similar in a no less obscure way. What is this stronger account, and in which types of case does he think it applies? The key issues are (i) what types of human cognition does Aristotle take the 'only by the way' claim to be true of, what are the forms of human cognition to which the stronger account applies, and how do these compare to divine thinking? (ii) How should we understand 'without matter'? As regards the first issue, there are four possibilities. OW1: Aristotle accepts the 'only by the way' claim for all human cognition and for divine thinking too (so Norman 1969/79, p. 100): this seems highly implausible, as Aristotle introduces the claim as a difficulty for his view, not a consequence of it. OW2: he accepts that all human cognition is of itself only by the way except for *noēsis*, which is not mentioned, and thinks that some stronger claim applies for both human and divine thinking (so De Filippo 1995, p. 561). There are two difficulties with this. First, Aristotle's response at 1074b38ff. seems to begin by rejecting or qualifying the 'only by the way' claim for some types of *knowledge*, which is mentioned in the initial list; second, he does not in any case appear to draw a sharp distinction, in this context, between knowledge of *X* and thinking *X*: see 1074b38–1075a3. OW3: he denies the claim for some cases of human cognition and holds that divine thinking is 'of itself' in just the same way as those cases are. OW4: he denies it for some cases of human cognition and holds that divine thinking is 'of itself' in a yet stronger way. I think that OW3 and OW4 are the most plausible interpretations, and of these two I prefer OW4: see below. Each of DT2–5 is compatible with OW2, OW3, and OW4; but defenders of DT2–4 will tend to prefer OW2 or OW4, while defenders of DT5 will tend to prefer OW3 or OW4.

What the stronger claim(s) amount(s) to depends on the second issue, how to understand 'without matter'. This phrase occurs immediately after 'the productive <sciences>', and in terms of its position more naturally qualifies that than 'the substance and the essence'. But it is very hard to see what the distinction between productive sciences with matter and those without matter could be, and when the point is picked up at a3–4 ('in respect of things which have no matter'), the reference is to objects of thought, not to sciences. For this reason I take it to qualify 'the substance and the essence' (so also Brunschwig 2000, pp. 295–6). There are three main interpretations of this

qualification, which involve increasing degrees of remoteness from matter. (a) The sense is the one we have already encountered in the idea of receiving the form without matter in Aristotle's account of perception. This is clearly too weak to be the sense intended here because it applies to cases on both sides of the contrast. (b) The contrast is between thinking of particulars (e.g. a house or a lion) and thinking of essences—for example, what it is to be a house or a lion (so [Alexander], 713.17–24). If *S* grasps an essence (e.g. what it is to be a stone) in thought, her *nous*, according to Aristotle, becomes (like) that essence, and so she grasps what she is in a less attenuated way than she does when she sees a red surface or thinks about a particular stone. She is still not *identical* with this essence, of course: neither she nor her *nous* is a stone, nor is she identical with others who also grasp this essence (see below). So it might be reasonable to say that in this case too she grasps what she is only incidentally. This could nonetheless be the contrast which Aristotle has in mind here between cases of cognition which are of themselves 'only by the way' and the kinds of knowledge in which 'the knowledge is the thing': what is known is (albeit incidentally) exactly what the *nous* is like. This account does not invoke a sharp distinction between knowledge and human *noēsis* in the sense of high-level grasping in thought (understanding), and I do not think that Aristotle invokes such a distinction here either (though some commentators do: see De Filippo 1995, p. 561; Beere 2010, p. 25). In the case of productive knowledge the contrast would be that between knowledge of a particular house (or perhaps how to make a house out of these particular materials) and knowledge of what it is to be a house (or how to make houses in general);[27] presumably Aristotle would draw the corresponding distinction in the case of theoretical knowledge, though he does not spell that out here. On this reading 'without matter' qualifies 'the substance' in a straightforward way, but 'the essence without matter' is pleonastic, so has to be read as something like 'the essence (lacking matter)'; thus there is a slight awkwardness about the phrase as a whole. (c) The

[27] This is probably the sense of 'without matter' which Aristotle has in mind in chapter 3 (1070a13–18).

contrast is between essences which do and those which do not include a reference to matter. Thus a house can be defined as a shelter for people and goods made of timbers, bricks, and the like, or simply as a shelter for people and goods: grasping the latter would be grasping the form without the matter in a stronger sense than that specified in (b). It is highly controversial whether Aristotle thinks that the forms of natural substances can be satisfactorily grasped 'without the matter' in this sense (see *Phys.* II.1, *De An.* I.1 403a3–b19, *Met.* Z.6 and 10–11; Frede 1990, Lennox 2008, Charles 2008/9 and 2009, Caston 2008/9, Devereux 2010/11, Peramatzis 2011, ch. 5, and 2014).

Assuming that Aristotle has (b) or (c) in mind, what does it mean to say that knowledge or thinking (i.e. grasping in thought) 'is the thing'? As we saw in the Prologue, Aristotle may think that being perceived is the fullest way in which the proper objects of perception (e.g. colours) can be actualized. Even so, one could not say that the perceiving *is* the object, presumably because the object can only be actualized in this way so long as it is also in something external which is acting causally on the sensory organ. Perhaps Aristotle's view of knowledge or thinking of essences without matter is that in this case too, the object is fully actualized in being known or grasped in thought, but that this does not require its being enmattered and acting causally from the outside.[28] Thus there is no need to distinguish the object which is known or grasped from its actualization in the knower in the same way. In the case of human knowledge and thinking, its relationship must fall short of identity with or being constituted by 'the thing', for one or more of the following reasons (see Lewis 1996): we can grasp different sets of things at different times while retaining the same intellect; we can think the same set of things as someone else without our intellects becoming one; our thinking is the exercise of a potential *nous* which maintains its character as such while actively thinking.

Divine thinking could be related to its object(s) in just the same way as this. But this would seriously undermine the role which 'thinking itself' is supposed to play in solving the problem of the

[28] In the case of human thinking this may presuppose some earlier action by an enmattered essence, but once the subject has learnt it this is no longer required.

value of what it thinks (and to which we are about to return at a4–5). For this reason we should prefer interpretation OW4: Aristotle intends what he says about these cases of (human) knowledge and thinking to show that the 'of themselves only by the way' claim is not true of higher forms of cognition, but has a yet stronger claim of identity in mind for divine thinking's being of itself. I suggest that Aristotle expects us to see that none of the reasons which prevent human thinking from being strictly identical with or constituted by its object(s) applies to divine thinking. This is straightforward if we accept DT2 or DT3, but is also plausible if we accept DT5: on this view, divine thinking is about a set of intelligible objects which cannot change, cannot be shared by more than one subject (though other intellects can think about proper subsets of this set: see sections 1 and 2 of the Epilogue), and is not the exercise of a potential *nous*.

An alternative, and to my mind less satisfactory, reading of the passage—one which is favourable to DT2 and DT3—is as follows. The sentence 'the substance and the essence without matter <are the thing>, while in the case of the theoretical <sciences>, the account and the thinking <are> the thing' at a1–3 could also be translated as '<the knowledge is> the substance and the essence without matter, while in the case of the theoretical <sciences>, the account <is> the thinking and the thing' (Menn offers a translation along these lines (2012, pp. 443–4)). This seems a less plausible way to understand the sentence, since it destroys the parallelism with the opening: 'or is it that in some cases the knowledge is the thing?' If we accepted this translation, Aristotle would have to be saying that the stronger claim applies only to *some* 'productive' knowledge, but to *all* 'theoretical' knowledge.[29] This would have a serious consequence for what Aristotle is counting as a theoretical science here. He normally divides sciences (or rather systematic bodies of knowledge more generally) into three kinds (see E.1 1025b25): theoretical (first philosophy, mathematics, and natural philosophy), practical (ethics and politics), and productive (rhetoric, poetics, and the crafts). It is natural to take the twofold classification here to combine practical and

[29] The translation I prefer is compatible with this reading too; but it is also compatible with Aristotle's saying that the with/without matter distinction applies to cases of theoretical knowledge as well: this is the reading I prefer.

productive sciences under the heading 'productive'. Beere (2010, p. 25, n. 41) and Menn (2012, p. 444) take Aristotle to be categorizing the sciences which are parts of natural philosophy (cosmology, biology, psychology, meteorology, element theory, etc.) as productive sciences, because they take him to be contrasting sciences whose objects involve matter with those whose objects involve no matter. This seems a desperate strategy, and it is not required if we adopt the reading I suggested above, in which Aristotle means the with/without matter distinction to apply to the objects of theoretical sciences as well as to those of productive ones. On the Menn/Beere reading, 'without matter' will have a more rarefied sense than the ones given above: beings without matter will simply be immaterial substances (they might also include mathematical items, which are in a way without ordinary matter; but Aristotle sometimes obscurely says that they have 'intelligible matter' (Z.10 1036a9–12, 11 1036b32–1037a5; H.6 1045a33–b7). It will, of course, be hard to avoid DT2 or DT3 if the object of divine thinking is only the essence(s) of immaterial substances (this is the view of A.C. Lloyd 1981, pp. 17–20).

As I have suggested, the final clause, 'its thinking <will be> one with what is thought' at a4–5, must not only conclude Aristotle's response to the first residual difficulty but also indicate his response to the second. The identity of divine thinking and its object does not obviously meet this second difficulty by itself. Ross (p. 398) thinks the solution is that it shows that the question is 'unmeaning'; but this is far from obvious (Beere defends a view of this kind on the grounds that in this case thinking and being thought are not different in being (2010, p. 28); but this seems implausible). Brunschwig, who endorses DT2, says that the answer is plainly that divine thinking is good because it is thinking (2000, pp. 292–3); but this too is far from obvious. Kosman thinks that Aristotle rejects the idea that value comes from the object (2000, pp. 316–17); but his argument is simply that otherwise divine thinking is not going to be the best thing, which leaves Aristotle begging the question. I think that Aristotle's response is to have shown that divine thinking's having substantive content—the most intelligible objects—is compatible with its thinking itself in the strongest sense possible, namely that it is constituted by these objects. It can owe its value to the value of these objects, therefore, without owing it to anything distinct

from itself. This seems to be a further argument in favour of DT5. (This may also explain why Aristotle could treat the possibility of *nous* thinking itself as an apparent non-starter at 1074b21–7 (see notes *ad loc.*): this makes sense if the problem can only be solved if divine thinking is of itself in a way which is only possible if its substance is *noēsis* rather than *nous*.)

1075a5–10

The third of the residual difficulties. In Θ.10 and *De An.* III.6 Aristotle distinguishes composite, or combined, and incomposite, or indivisible, objects of (human) thought. Composites are items with predicational structure which are capable of truth and falsity in the standard way. Incomposites are, or are paradigmatically, essences and immaterial substances (*De An.* III.6 430b27–30 (essences; cf. E.4 1027b25–8); Θ.10 1051b25–33 (essences and 'incomposite substances')). While a grasp of an incomposite can in some way be true, Aristotle holds, it cannot be false (*De An.* III.6 430a26–8 and 430b26–30; Θ.10 1051b17–1052a4). The idea seems to be that one either succeeds in grasping the essence of *X*, in which case one has succeeded in 'making contact with' or 'touching' *X* (*thinganein*: 1051b24–5; cf. Λ.7 1072b20–1), or one fails, in which case one has simply missed *X* altogether—with no grasp of *X* at all one cannot be said to *misunderstand* it. The standard view is that incomposite items are non-propositional, and in this sense like concepts (but Aristotle does not regard them as the creation of or dependent upon human ways of thinking); for the view that they are essential definitions, see Sorabji 1982 (discussed in Crivelli 2004, ch. 3; Makin 2006, pp. 253–60). In one passage in the *De Anima*, Aristotle associates the idea of being an incomposite with being 'without matter' (*De An.* III.6 430b30; cf. III.4 429b10–22), but it is unclear whether or not this phrase has the same meaning as at 1074b38–1075a5 and the present passage. *De An.* III.6 (430b6–20) distinguishes an object of thought's being 'actually indivisible' from its being 'potentially indivisible'. Aristotle's example is a length, which can be thought of as a whole (in which case it is an indivisible object of thought) or one part at a time. This significance of this is left somewhat unclear by the fact that a length is neither an essence nor something with a

predicational structure; but it seems to suggest that whether a thought is 'of a composite' or 'of an incomposite' may, in some cases, depend on *how* it is being thought of. I return to this in the notes to a6–10.

a5–6: The subject of 'for it would change in the parts of the whole' is perhaps more naturally taken to be (divine) thinking, rather than God or immaterial substance generally, since it is the thinking which would have parts as its objects. The objection rests on the idea that grasping a composite requires going through it one part at a time (though this may or may not imply that this is all that grasping a composite consists in: see next note). As we shall see, the point of raising this difficulty might be merely to introduce the idea (whatever it amounts to) that the object of divine thinking is in fact incomposite—in which case Aristotle's procedure is rather laborious. Or it might be that the object of divine thinking is, prima facie, *composite*, so that the point of Aristotle's reply is to explain how it is in fact incomposite and unchanging. Defenders of DT2–4 will prefer the first reading; defenders of DT5 might adopt either.

a6–10: As at b38, 'Or is . . . ' introduces Aristotle's response, which is somewhat obscure. There are two main ways to take it. (i) His reply at a6–7 might simply be the retort that the object of divine thinking is *not* composite (note again the association with 'without matter'—but note also that the term he uses is 'indivisible', not 'incomposite'). This would seem to be a quite straightforward move in its way, but (a) it would make the objection very flat-footed (see the previous note); (b) the continuation at a7–10 would be puzzling, since Aristotle seems to compare divine thinking with human thinking[30] of composites, not incomposites. [Alexander] supposes that '<the intellect> of composites' means the intellect *belonging to* composites—that is, to beings which are matter/form compounds (714, 16–17; so also Ross, 398–9, and De Filippo 1995, p. 562)—and this would avoid problem (b). It would, however, require an intolerably harsh switch in the sense of 'composite' between a5 and a8, and a distinction between

[30] As at a4, 'intellect' at a7 probably means 'thinking'.

human intellect and that of 'composite beings' would be very strange, since for Aristotle the only composite beings which can engage in thinking are humans. A better way to avoid problem (b) would be to suppose the continuation at a7–10 is making a separate point about the relation of divine thinking to time (see below). (ii) As I suggested in the previous note, Aristotle may be starting from the worry that, if DT5 is correct, the object of divine thinking seems to be composite because it is a plurality. On this reading, Aristotle's response must be that thinking something 'indivisible' is to be understood as thinking something *indivisibly*—that is, as simply grasping it altogether as a whole (compare the example of length in the note on a5–10 above), and not by way of a succession of parts. If this is a way in which thinking can be 'of an incomposite', then there could be thinking of an incomposite constituted by a plurality of objects, and Aristotle is on the way to solving the difficulty: divine thinking can be of a plurality of objects, provided that these are grasped together as a whole (so Lear 1988, pp. 304–6), and hence 'indivisibly'. On this reading, 'everything which has no matter is indivisible' means 'everything which has no matter can be thought of indivisibly.' This reading makes good sense of the comparison with human thinking about composites, as we shall see.

Even independently of this issue, it is hard to see what the strategy of Aristotle's response at a6–10 as a whole is if it is not to compare a certain achievement of human thinking with respect to composites to divine thinking, which is in some way 'of an incomposite'. Aristotle's wording leaves his meaning unclear, but it might be this. In thinking a composite, the human mind must *first* go over its parts one at a time; but successful thinking of the composite ('the good') is not the grasp of any of these parts on their own ('it does not have the good in this or in that'), but in then being able to grasp them as a whole ('it <has> the best in some whole'). Human thinking of this kind is, as we have seen, of itself, but (at least on some interpretations) this is in a weaker way than that in which divine thinking is of itself: this is why Aristotle can say here that human thinking is of something other than itself, whereas divine thinking is 'itself of itself'. Note that Aristotle both likens (some aspect or kind of) human thought to divine thought ('as . . . in <this> condition . . . so . . . in this condition . . . ') and differentiates them ('being something other . . . itself of itself'):

see section 3 of the Epilogue. The contrast he draws in terms of time is usually taken to be making the point that the condition which human thinking can manage to be in for short periods of time is the condition which divine thinking is in throughout all time (cf. 7 1072b14–16 and 24–6). If so, it is once again strange that he appeals to human thinking of *composites*, since the parallel should now be with the case of our thinking of incomposites; and 'is in this condition in some period of time' is a very awkward expression to convey the meaning 'is in this condition *for* a period of time'. I suggest that the point is rather that we can achieve this condition of thinking of the composite as a whole only *in* a period of time which also includes the earlier movement from part to part: even though it is of something which might seem to be a composite, divine thinking is always in the unchanging and better state. I do not myself see a good interpretation of this passage for a defender of DT2 or DT3: Brunschwig offers a tentative attempt in 2000, pp. 297–301.

EPILOGUE

1. What is Divine Thinking About?

In the notes on 1074b33–5 I distinguished five types of view of what it is for divine thinking to think itself:

DT1: the deflationary view that divine thinking is of itself merely in the way that any instance of thinking whatsoever is of itself.

DT2: divine thinking is vacuously and/or narcissistically self-reflexive.

DT3: divine thinking is simply self-reflexive, but is not vacuous or narcissistic.

DT4: divine thinking has a substantial content, but the nature of this content is in principle inscrutable.

DT5: the subject of divine thinking has some determinate content which is of the same general type as the content of some high-level human thinking; it is *of itself* because it is in some way constituted by this content.

If we accept DT2, DT3, or DT4, there is nothing more to say about the content of divine thinking, while DT1 offers no constraints on what divine thinking might be about. I shall therefore focus on DT5 (which is in any case the most plausible view to ascribe to Aristotle, as I have suggested).

It would be very strange were divine thinking to be about a single item, unless that were construed along the lines of DT2–4, and in the notes on 1075a5–10 I suggested that the problem Aristotle deals with there arises because divine thinking is in some sense about a plurality of objects. There are two closely related constraints on what the range of this plurality might be: the requirement that these objects are 'without matter' and the fact that they are identical with, or constitute, divine thinking and its subject. These constraints were discussed in the notes on 1074b38–1075a5. Even though human thinking about particulars is in a sense 'without matter', the identity/constitution constraint rules out particulars as objects of divine thinking. Aristotle's accounts of human thinking clearly suggest that its highest form is grasping essences (*De An.* III.4 and 6, Θ.10), and it is therefore reasonable to suppose, if we accept DT5, that the objects of divine thinking are (or include: see below) essences; the two stronger senses of 'without matter' identified in the notes allow these objects to include the essences of natural things (the weaker of the two senses will be required for this if we take such essences to involve ineliminable reference to matter). They will also allow the inclusion of mathematical essences if these do not have, or make no reference to, 'intelligible matter', or if that does not count as matter at all for these purposes.

Thus far we have the following possibilities for the objects of divine thinking:

(i) All essences—those of natural substances and related non-substantial things, mathematical essences, and the essences of immaterial substances.[31]

[31] Aristotle's discussion of definitions of non-substantial items in Z.4 suggests that such items can be regarded as having essences in a secondary way. Note that Burnyeat seems to argue that knowledge of substantial essences involves knowledge of non-substantial essences too (2008a, pp. 24–8): so (i) seems to be his view.

(ii) The essences of natural substances, mathematical essences, and the essences of immaterial substances (so Lear 1988, pp. 293–309).

It is also possible to take the 'without matter' constraint in a stronger way, so that it only allows objects which lack matter altogether. This may still allow:

(iii) Mathematical essences and the essences of immaterial substances.

—on the grounds that, although mathematical properties are, according to Aristotle, the properties of physical objects, they are not in themselves matter-involving. If these are excluded as well, either because they are, nonetheless, properties of things which have matter, or because of 'intelligible matter', then we are left only with:

(iv) The essences of immaterial substances.

If we accept (iv) as specifying the objects of divine thinking, however, and accept that it is the essence of all immaterial substances to think, it will be hard to resist DT2 or DT3. Not surprisingly, (iv) is advocated by some proponents of DT2: see Beere, 2010, pp. 25–6; Menn 2012, pp. 443–4 (discussed below); Liatsi 2016, p. 234. Aristotle gives us no clear grounds for preferring any one of (i)–(iii), though since in general he seems to rank the pure mathematical sciences below the natural ones, I think (iii) is less attractive than (i) or (ii), so these seem to be the best options for defenders of DT5.

Some problems remain to be dealt with no matter which of these we choose. First, if any given immaterial substance, and hence any case of divine thinking, is a unity, how can it think a plurality of objects? We encountered Aristotle dealing with something rather close to this problem at 1075a6–10, in asking how divine thinking can be (as the best human thinking is) of an 'incomposite'. The essence of a natural substance is itself a plurality of parts: Aristotle argues that this is no bar to its being a genuine unity (see Z.11–12 and 17; H.6). So the natural answer for him to give to the present problem is that the essences in question, taken together, form a unity, and as such can be thought of indivisibly.[32]

[32] Menn's view that any sort of plurality in the object of divine thinking would make it composite (2012, p. 443 and p. 459, n. 35; cf. Wedin 1988, pp. 241–2)

Second, if the objects of God's thinking are the same as those of some human thinking, will we not be identical with God when we contemplate one of those objects? There are two things to say in reply to this. First, God will not be identical to, or constituted by, any one (or by any proper subset) of the objects of its thinking (pace Lewis 1996), but only to or by the totality of these objects; so the threat would only arise if we could think of the whole totality at once. Second, in any case, the sense in which we are the same as the objects of our thought is, as I have said, weaker than the sense which applies to divine thinking: it falls short of identity or constitution (see the notes on 1074b38–1075a5). A similar question arising for the lesser unmoved movers will be addressed in section 2.

One might speculate that this account of the objects of divine thinking could be extended to include eternally true predicational propositions, and even to proofs made up of necessary propositions, provided that these (a) are 'without matter' in the relevant sense, (b) can each be thought 'indivisibly' (i.e. as a whole),[33] and (c) can, together with the essences in question, form a unity. It has to be said that Aristotle does not make any concessions in this direction in his discussions of the human thought of incomposites in *De An.* III.6 and Θ.10, but those discussions do not absolutely rule this possibility out when it comes to divine thought. (That God thinks of certain eternal truths is suggested by Frede (2000a, pp. 41–3).)

2. How are Immaterial Substances Individuated? Does Chapter 9's Account of 'Thinking of What is Best' Apply to All Immaterial Substances?

The question of how the lesser unmoved movers are individuated from the Prime Mover and from each other arose in the notes to chapter 8 1074a31–8, where I suggested that there were three

seems to ignore this possibility and/or to trade on different meanings of 'incomposite'.

[33] In the notes on 1075a5–10, I suggested that Aristotle thinks that even humans do this, in a way, once they have gone through each part of the proposition or proof; but nothing here hangs on the truth of that suggestion.

main possibilities, of which the third is the most appealing: (i) the unmoved movers differ in virtue of what they act on—the heavenly spheres; (ii) they differ intellectually in virtue of each thinking about the particular motion which it inspires; (iii) they differ intellectually in virtue of some other difference in the contents of their thinking, unconnected with the spheres. If Aristotle accepts DT2 or DT3, he will have to settle for possibility (i), which is highly unattractive; if he accepts DT4, he can opt for (i) or for (iii)—but in the latter case only by dogmatic fiat, since DT4 says that the content of divine thinking is in principle inscrutable. If he accepts DT1 or DT5, he can opt for any of the three possibilities; but (ii) would require each of the lesser immaterial substances to think about a particular, and hence to think of something 'with matter' in the weakest sense of the phrase (recall that some of the heavenly motions have the same general character).[34] The most promising idea is (iii): this means that each of them must think about a different proper subset of the objects of the Prime Mover's thinking. Even though the totality of these objects is identical with, or constitutes, the highest immaterial substance, the subordinate ones will not, in thinking about some of these objects, be identical with that substance (or with each other), since in each case the set of intelligible objects which they are thinking of is a distinct set. Two analogies may illustrate this—though it needs to be stressed that they exhibit important disanalogies too. The first is the case of the hand and the whole body. The former is constituted by some of the matter which constitutes the latter, but the two are distinct. Here the points of disanalogy are that intelligible objects are not matter and that the subordinate immaterial substances are not parts of the highest one. The second analogy is that of the Berlin Philharmonic Orchestra,

[34] Menn thinks that the lesser movers are identical with 'the [sc. specifically different] arts or intellectual virtues which enable the celestial souls to move their respective spheres' (1992, p. 566). Given Menn's view that the subject of divine thinking must be incomposite in the strongest possible sense (see above), this seems to amount to no more than a DT3-style claim that lesser immaterial substances just *are* different from each other, and so in thinking themselves have different thoughts. The alternative idea, that each such substance thinks the generalized 'blue-print' of its sphere's motion (cf. Broadie 1993), would be a variety of the DT5-style view I suggest below (though it is a variety which would fail to distinguish the movers of spheres which have specifically the same motion).

which is constituted by its players, and the Berlin Philharmonic Octet which is (let us suppose) constituted by eight of those same players. Here the disanalogy is that for Aristotle it is the individual players, not the groups, who are the substances; even so, it is plausible that the Octet is not merely a part of the Orchestra, but a distinct entity (thus, for example, it might have the capacity to be a separate legal person). Whether Aristotle could spell out an account of this sort for the immaterial substances while doing justice to these disanalogies is not clear.

One advantage of such an account would be that it may offer a relatively straightforward sense in which the lesser immaterial substances are dependent upon the highest substance. Aristotle could hold that it is the highest immaterial substance's thinking all the most intelligible objects which makes it possible for the other immaterial substances to think them—it is their existence in its thinking which makes them available for other divine thinking.[35] Perhaps this is what makes them available for human understanding too (the view of Lear (1988, pp. 293–309), and Burnyeat (2008a), who reads *De An*. III.5 this way; but that is another question). This would give a good sense in which the subordinate immaterial substances are dependent on the highest one; and its influence on the world would not only be by way of the motion of the fixed stars, as is often thought, but also (via these subordinate substances) by way of all the other heavenly motions as well. See section 2 of the Prologue to chapter 10.

If this is Aristotle's view of how immaterial substances are individuated, does this answer the question posed in section 3 of the Prologue, whether chapter 9 is concerned with the thinking of all immaterial substances or only with that of the highest one (the Prime Mover)? This view of their individuation presupposes that the account of divine thinking as involving identity with or constitution by its objects, which I think is to be found in chapter 9, applies in at least general terms to the thinking of all immaterial substances—and it would in any case be very strange if it did not. This does not settle the present question, however, for that relates to chapter 9's specific worries about what the best substance will

[35] The parallel with the Berlin Philharmonic would be the idea that membership of the Orchestra is a requirement for membership of the Octet.

think, and to the claim that it thinks 'what is most divine and most worthy of honour'(1074b25–6). If Aristotle were raising these worries in relation to immaterial substances generally, we could make sense of his response if we suppose that, even though they think different things, each such substance thinks the best in the sense that it thinks itself and that it is as good as it could possibly be (so Beere 2010, p. 14, n. 25); and it is certainly true that Aristotle thinks that each of these substances 'has attained the best' (8 1074a19–20). But on the account I have been advancing, that the highest immaterial substance thinks all of the highest intelligible objects while other immaterial substances only think some of them, this seems a less plausible reading of chapter 9 than that according to which only the highest substance thinks 'what is most divine', and thus that Aristotle's principal concern in chapter 9 is with that substance alone.

3. The Relationship of Chapter 9 to Chapters 6–7

A number of commentators see a sharp divergence or even an incompatibility between the views of divine thinking presented in chapters 6–7 and chapter 9. Broadly speaking, the issue is this. (i) In Λ.7 Aristotle emphasizes the similarity between human thinking and divine thinking: 'it is a way of life of a kind which is the best possible, if for a short time, for us (for it is thus always, whereas for us that is impossible)' (1072b14–16); 'if, then, God is always, as we are sometimes, in this good state, that is wondrous; and if its state is better, that is still more wondrous' (1072b24–6). (ii) At 1072b18–24 he gives a highly compressed account of the nature of thinking as the actualization of a (sc. potential) *nous* and of how value attaches to it, but he gives no hint there that divine thinking might fail to conform to this model. (iii) When he opens chapter 9 by talking about *nous*, it might seem that he is introducing his account of human thinking, only to deny later in the chapter that it applies to the case of God (or immaterial substance generally). (iv) Divine thinking in chapter 9 thus turns out to be quite unlike human thinking. Does this represent a significant difference of view between the two chapters? De Filippo (1995) thinks that chapter 7 presents divine thinking as like ours in being the exercise of a potential *nous*, a view which is discarded in

chapter 9; Beere offers a broadly similar account (2010, pp. 9ff.). This reading depends on taking the remarks about thinking as the actualization of potential *nous* at 7 1072b18–24 as meant to characterize divine as well as human thought; but this is highly implausible, since Aristotle has already argued that the Prime Mover has no potentiality and that its substance is activity (1071b17–22, 1072a4–6). Brunschwig (2000, pp. 301–4) agrees that 1072b18–24 is a characterization of human rather than divine thinking. He nonetheless takes it (a) that the model of self-thinking which it supplies for divine thinking is closer to the modest one outlined in *De An*. III.4, and (b) that this yields a theology in which God thinks of himself merely by thinking of all the objects of thought; whereas he supposes (c) that chapter 9 has a 'Narcissus-like theology' according to which God only thinks narrowly about himself. He conjectures that chapter 9 is 'a provisional draft, later on supplanted by Λ 7' (p. 304; cf. Beere 2010, p. 9). As before, there simply seems to be no need to read this incompatibility into the two chapters: it disappears if we take Aristotle to reject any one of (a)–(c). I would take him to reject all three: see notes on 7 1072b18–26 and 9 1074b28–1075a10.

As for point (i), while Aristotle does stress the similarity of God's thinking and human thinking in chapter 7 (as he does elsewhere: see *EN* X.7–8), it is worth noting that at 1072b24–6, quoted above, he explicitly flags up the possibility that it might not be the same; see also the notes on 1075a6–10. As for point (ii), chapters 6–7 have already argued, as I have said, that God has no potentiality and that its substance is activity: although Aristotle does not draw this conclusion explicitly in chapter 7, it should already be clear that divine thinking is not the actualization of a potential *nous*. In this sense chapter 9 simply spells out something to which Aristotle is already committed in the earlier chapters. Point (iii) has already been dealt with in section 3 of the Prologue. As for (iv), there is simply no inconsistency in supposing that God's thinking is like (the best of) ours in some ways—not least, so that they both count as thinking—but unlike it in others.

There remains one question about how the arguments of chapter 9 relate to those of chapters 6–7. It is striking that chapter 9 does not argue that the highest substance must lack potentiality if it is to play the role of the Prime Mover, nor that its substance must be activity since otherwise it might fail to think.

Instead it reaches these conclusions entirely on the basis of its being the best thing. In this sense Aristotle is constructing an independent argument for some of the conclusions already reached in chapters 6–7. Note, however, that chapter 9 has not been written independently of the material in chapters 6–7: the claim that the Prime Mover is the best thing was argued for in chapter 7 (so that chapter 9's opening claim that '[divine *nous*] seems to be <the> most divine of the phenomena' plays no more than a supporting role, as I said in the notes on 1074b15–17), and chapter 9 uses the earlier chapters' machinery of 'the substance of *X* is potentiality/activity', and the premise that God (or immaterial substance generally) is unchanging: see in particular the notes on 1074b25–7, a passage which perhaps refers back to chapter 6.

CHAPTER 10

PROLOGUE

1. Cosmic Goodness

Chapters 6–8 develop an account of the principal way in which the world depends on the Prime Mover. Its direct action is on the heavenly spheres, and most plausibly on the outermost sphere alone: the way in which the Prime Mover affects other things such as natural substances in the sublunary world is, as far this account goes, only indirect, through the motions of the heavenly spheres. This dependence of the world on the Prime Mover involves the latter's goodness through its being the object of desire of the outermost heavenly sphere.[1] In the first part of Λ.10 Aristotle introduces an apparently distinct way in which 'the good and the best' in the cosmos depends on the goodness of the Prime Mover. Here I shall discuss a number of other passages in which Aristotle also appears to invoke a further relation between the good of things in the sublunary world and that of divine things. The key question both for these passages and for Λ.10 is whether Aristotle endorses the view that the world contains—or even is—a unitary teleological structure, in which all goals and ends are for the sake of, or otherwise contribute to, an overarching end or good. Views of this kind are advanced by Kahn (1985b) and Sedley (1991, 2000, especially pp. 328–36, and 2010); at the other end of the spectrum are deflationary views of any idea of teleology extending beyond the local teleology of natural organisms (see Caston 1999, p. 217; Charles 2012, especially pp. 250–3). I adopt a middle position in this debate: as I have argued in section 2 of the Prologue to chapters 6–7 and in the notes on chapter 8, I think that Aristotle is wholeheartedly committed to supralunary teleology, but—as I shall argue here—I do not think that he accepts any form of unitary or overarching teleology (for further discussion

[1] For the subordinate unmoved movers' dependence on the Prime Mover, see section 2.

of these issues, see, e.g., Judson 2005 and 2015, section 6; Bodnár 2005b; Scharle 2008).

There are a number of passages in which Aristotle speaks of sublunary things 'imitating' heavenly things: the dry/wet cycle of seasons imitates the cycle of the sun (*Meteor*. I.9 346b36–347a6); the simple bodies imitate the circular movement of the heavens (*GC* II.10 336b34–337a7); and the perishable elements imitate the eternal activity of the imperishable heavens (*Met*. Θ.8 1050b22–30). It is very plausible that imitation of *X* in these contexts is not an intentional matter—that it involves no more than being caused, in some appropriate way, by *X* to be in the relevant respects like *X*. Nothing in these passages, therefore, requires any further relation between the heavenly bodies and the Prime Mover, on the one hand, and the sublunary world, on the other, than the argument of chapters 6–8 requires. Two famous passages, however, might seem to require just such a further relation: *De An*. II.4 415a26–b7 and *GA* II.1 731b18–732a12. Here is the *De Anima* passage:

> It is the most natural function in living things—those which are perfect and which are not deformed or have spontaneous generation—to produce another thing like themselves, an animal to produce an animal, a plant a plant, in order that they may partake of the everlasting and divine in the way in which they are able; for all desire that [i.e. to partake of the everlasting and divine], and for the sake of that they do whatever they do in accordance with nature .... Since, then, they cannot share in the everlasting and divine by being continuous ... they share in them in the way in which each is able, some more and some less; and what persists is not the thing itself but something like itself, not one in number but one in form.

Aristotle appears to ascribe to animals and plants a desire for, and hence awareness of, the everlasting and divine—the heavenly bodies or the unmoved mover(s). The appeals to desire here and in the *GA* passage cannot be meant literally, however, since—whatever we might think of the idea that animals of all kinds are aware of the everlasting and divine—Aristotle does not think that plants are capable of any desire whatsoever (*De An*. II.3 414a29–b1). So the ascription to animals and plants of desires to partake in the everlasting and the divine is a figure of speech—in the same way as the remarks about nature's desire for what is better, and about God, in another famous passage, *GC* II.10 336b25–34:

> Coming to be and ceasing to be will always, as we have said, be continuous, and will never give out, through the cause we have mentioned. This happens with good reason; for we say that in all cases nature desires what is better, and that being is better than not being (and in how many ways we speak of being has been stated elsewhere). And since this [i.e. being] cannot exist in all things, since some are too far removed from the principle, God has filled up the whole in the only way that remained by making coming into existence perpetual; for in this way being would be most connected together, since always coming to be and generation are nearest to being.

How then are we to cash out this figure of speech? One prominent view is that of Kahn (1985b) and Sedley (2000, pp. 328–36). Kahn's suggestion is that the Prime Mover has a *direct influence* on every changing being, because it is needed to activate each of their potentialities; in a similar vein Sedley says '[the Prime Mover] is the ultimate cause which, directly or indirectly, inspires all beings to achieve the maximum actuality within their power' (2000, p. 327). The weight of Kahn's argument rests on *Met.* Θ.8 1050b3–6:

> in accordance with this argument it is clear that actuality is prior to potentiality in substance, and [in time since] as we said, one actuality always precedes another in time right back to the actuality of the eternal prime mover.[2]

Kahn thinks that if the Prime Mover's only direct influence is on the heavenly sphere(s)—the picture I sketched at the beginning—it cannot figure in chains of efficient causation: the chains will simply go back from offspring to parent, to grandparent, and so on. It can only figure in these chains if it has a further role, namely to be required to activate each potentiality for sublunary change. A passage in Λ.5, however, makes it clear that Aristotle can and does bring the Prime Mover into chains of efficient causation in a way which does not require this further role:

> . . . as a cause of a human being is the elements, fire and earth as matter and the proper form, and, further, something else outside, for example the father, and besides these the sun and the oblique circle, which are neither matter nor form nor privation nor the same in form, but which are *movers*. (1071a13–17)

[2] Some commentators understand the final clause quite differently, as containing no reference to the Prime Mover: see Makin 2006, *ad loc.*

Thus Aristotle can think that the Prime Mover is the efficient-cause origin of the actuality of an individual human being via its effect on the heavenly spheres and thus upon the motion of the sun (for further discussion, see the notes *ad loc*. and section 2).

Kahn and Sedley also suppose that the only good way to cash out the metaphors of imitating and desiring to participate in the divine is in terms of 'an unconscious urge or directedness towards goals', or 'behavioural inclinations' which are an 'attenuated counterpart' of desire.[3] It is clearly not enough, however, to suppose that the Prime Mover's direct involvement in the world is a matter of its being the *object* of these 'inclinations' or 'urges': that would simply be to repeat the metaphor of desire, not to cash it out. This may be why Kahn takes the Prime Mover's involvement to consist in the fact that it is required as a cause of the *realization* of these tendencies and potentialities. But this is precisely the point at which the Prime Mover should not be invoked. These capacities and potentialities simply are the potentialities to be or to become *F*, or to bring about a change, or to engage in an activity, when the conditions are favourable. When the conditions *are* favourable, to appeal to the Prime Mover to explain why the potentiality is activated is to offer one explanation too many: there is simply no explanatory gap left to be filled—as if one should ask 'the conditions were favourable, and so on, but why, even given all that, was the potentiality activated?' We should take 'desiring to participate in the divine' to consist in something else.

I suggest that it should be taken in a way which conforms to Aristotle's 'teleological axiom' (see notes on 8 1074a24–31). The natural way to understand it in that light is one which is analogous to the understanding of the heavenly spheres sketched in those notes. This involves thinking that it is good for the animal or plant *itself* for it to persist in its offspring. This is parallel to the idea that it is part of my good that my offspring survive and flourish, and more generally the idea that my good includes the endurance on into the future of what I have done or achieved.[4] Now we might be tempted to suppose that these things are part of

[3] Kahn 1985b, pp. 194 and 200; Sedley 2000, p. 334.
[4] Aristotle discusses these ideas in *EN* I.10–11.

our good because we desire them. But for Aristotle it is, plausibly, the other way round: we naturally desire these things because they are part of our good. Apart from any general Aristotelian considerations (see notes on 7 1072a29), we can see that this is so because, as noted above, Aristotle applies the claim in the *De Anima* to plants too: the teleological pattern here is one which does not require *desires* about the future, or even desires for offspring, since Aristotelian plants have no desires. The teleological structures of reproduction in plants serve the good of the plant because it is good for the plant to survive in its offspring. Why is it good? Because being is better than not being, as Aristotle says in the passage from *GC* II.10 quoted above; and being unchangingly is better than changing. Plants' behaviour is like the Prime Mover's activity just in the sense that their good—their own, local, teleologically served good—includes things which are pale reflections of the Prime Mover's good: pale reflections, that is, of eternally active, unchanging being. And that is the end of the story: the Prime Mover simply has no other teleological role to play in relation to plants. Animals imitate the Prime Mover in just the same sense; and so, even, may the lower heavenly spheres—the ones below the sphere of the fixed stars, since what each strives to emulate in a more substantial sense is its own unmoved mover.[5]

Aristotle's account in Λ.10 is, I think, the same. In particular, just as behaving like the Prime Mover is not a single activity directed at a unitary goal, the analogy with the household in chapter 10 does not commit Aristotle to the idea that there is a single activity in which all participate to varying degrees, or a single goal to which all contribute. Heavenly spheres, human beings, plants, birds, and fish are all teleologically structured in conformity with the teleological axiom: that is, they are structured in such a way as to realize their own perfection

[5] The *GC* passage quoted above suggests that being, activity, and unchangingness are better than non-being and change for the simple bodies too: their unchanging cycle of transformation is better for them than a linear process leading to permanent destruction, and this unchanging cycle is what perfection consists in for them. Needless to say, the case of the elements presents a number of further difficulties which cannot be discussed here; but I think that these difficulties would arise on any account of what it is for the elements to imitate the Prime Mover.

(if nothing interferes).[6] What that perfection consists in is a condition of being, persistence, unchangingness, and activity; it imitates or shares in the divine only in the sense that the Prime Mover's condition is the only truly or unqualifiedly perfect condition. The Prime Mover does not cause the lesser beings in the universe to be teleologically structured in this way: how could it? Nor—except through its effects on the heavens—does it cause the world to have the connections which enable these conditions of lesser perfection to be realized, as Kahn and Sedley in various ways suggest. To imitate the Prime Mover is to have a teleological nature whose end is the perfection of the being in question—no less, but also no more.

2. The Priority of the Prime Mover and the Unity of the Cosmos

If the Prime Mover's relation to the rest of the world is of the relatively minimalist kind for which I have just argued, a number of questions arise. (i) Do the motions of all the heavenly spheres actually depend on the Prime Mover? (ii) Even if they do, how robust or substantial is the primacy of the Prime Mover, given that, as we saw in chapter 8, the motions of the stars and planets which bring about elemental and seasonal change in the sublunary world are more like 'team efforts' stemming jointly from all the unmoved movers?[7] (iii) Can Aristotle avoid the charge that the motions of the heavenly bodies and the changes which take place in the sublunary world are, metaphysically speaking, only accidentally related to the activity of the Prime Mover?[8] These questions relate both to Aristotle's claim in chapter 7 that 'on such a principle, then, depend the heavens and nature' (1072b13–14), and to his implicit claim in chapter 10 that he avoids the problem facing those with accounts like Speusippus': they 'make the substance of the totality of things a series of episodes (for one contributes nothing to another, whether by being or not being), and they make many principles' (1076a1–3: see notes on 1075b37–1076a4).

[6] I ignore the complexities which arise in connection with the human beings' rational capacities.

[7] Cf. Horn 2016, p. 275.

[8] See Broadie 2002.

Question (i) arises because of the reduplication of spheres, in Aristotle's system, which rotate in the same way as the sphere of the fixed stars (see the notes on 8 1073b17–22 and 1073b38–1074a5): if the first sphere in any planetary 'set' has this motion, then it seems that it may be that sphere, not the sphere of the fixed stars, which bestows that motion on the other spheres of the set and hence on the planet. If this is right, then the Prime Mover's role does not extend below the sphere of the fixed stars. One type of reply is to say that Aristotle's system can easily be tidied up so as to remove this problem (and indeed it can: simply remove the first sphere from each planetary set). This does not address the question, of course, as to what *Aristotle* thought was the solution. It may be that the problem did not occur to him any more than other problems relating to the reduplication of spheres, but it would be more satisfactory to think that the Prime Mover's more extensive role is secure in any case. It will be secure if, as I suggested in section 2 of the Epilogue to chapter 9, Aristotle thinks that the other unmoved movers are dependent on the Prime Mover in the sense that they can only think what they think because the Prime Mover's thinking makes these objects available for thinking. If this is right, all heavenly movements will depend on the Prime Mover via the subordinate unmoved movers. It will also be the case that *everything*—not only the natural world, but the other immaterial substances too—would depend on the Prime Mover, although this is not a claim that Aristotle makes explicitly.

This will provide an answer to question (ii) as well. Even supposing Aristotle's system of heavenly spheres to be tidied up in the way mentioned above, the motion of each planet—and most notably, of the sun—is the joint product of the motion of several spheres, and hence is due jointly to several unmoved movers. What makes the role of the Prime Mover special? The motion of the sphere which it inspires (the sphere of the fixed stars) will be the primary motion (see the notes on 7 1071b31–1072a3), in the sense that, in a tidied-up system, it will be a contributor to all the compound motions to which lower spheres are subject, while its sphere is not subject to any other motion; and it will also be true that 'in addition to these things there is that which as first of all things moves all things' (4 1070b34–5)—and nothing else will do this, since nothing else moves the outermost heavenly sphere. Perhaps this is already sufficient. But if

each heavenly motion individually also depends on the Prime Mover because its own unmoved mover does, there will be a stronger and more satisfying sense in which the heavens and nature depend on the Prime Mover—and hence in which there is, as Aristotle puts it at the very end of Λ, 'one ruler'.[9]

(iii) Broadie 2002 objects that it is a consequence of the system outlined in Λ.8 that sublunary changes are only the accidental effects of heavenly motions, and that the principles of heavenly motion are for that reason not really principles of sublunary things at all (she detects just this worry in Theophrastus, *Met.* 5b10–26; see also Kukkonen 2014, p. 344). Her key premiss is that, as far as Λ.8 is concerned, 'it is not of the essence of the sun [sc. nor of the other heavenly bodies] to be a source of sublunary change' (p. 308).[10] In Aristotle's world, however, there are many non-accidental regularities caused by *X*s which it is not of the essence of *X*s to bring about: it is their speed which makes the slowest antelopes the ones usually eaten by lions, ice on the ground regularly makes us slip, and rain regularly causes plant growth. Aristotle's distinction of per se and accidental causation only comes into play in relation to the activities of a single substance or kind (for discussion, see Judson 2005). In the case in question, it is, for Aristotle, an occasion for awe at the orderliness of the world, not for metaphysical bafflement, that sublunary beings are of a nature to be able to be moved in regular ways by regular changes in heat and light, while at the same time the sun and its set of spheres are such as to produce such changes—just as it is that camels are of a nature to be able to digest thorny plants when at the same time the conditions around them are such as to bring about the growth only of thorny plants.[11]

[9] Another possibility, based on a suggestion made in a different context by István Bodnár (personal communication), might be that the lower spheres desire to emulate their own unmoved mover as a way of emulating the Prime Mover—so that the latter is the ultimate mover of all the spheres. The worry here would be that the necessity for the 'intermediate' unmoved movers would disappear.

[10] She thinks that this is not true of Λ.6–7, nor of the account of the sun's motion as responsible for elemental transformation given in *GC* II.10. If her charge against Λ.8 is misplaced, we will not have to see a major inconsistency between it and these other passages.

[11] I would add that if Broadie's premiss did yield her conclusion, then (in my view, though admittedly not in Broadie's: see her 1993) the heavenly motions would only be accidental effects of their unmoved movers' activity, and so the

3. Presocratic and Platonist Principles

In the second and much longer part of chapter 10 Aristotle lists a number of difficulties which he thinks rival world-views face. Among these rivals are the views of the Presocratics, especially Empedocles and Anaxagoras, and a variety of Platonist views. Aristotle sets out how he sees the Presocratics' and Platonists' accounts of principles, in terms of his own doctrine of the four causes, in *Met.* A. The patronizing conclusion in A.10 is revealing:

> It is clear then . . . that everyone seems to seek the causes specified in the *Physics*, and that we cannot specify any beyond these; but they seek these vaguely; and although in a way they have all been specified before, in a way they have not been specified at all. For the earliest philosophy is, on all subjects, like one who lisps, since it is but a child. (993a11–16)

In line with this summary, Book A's criticisms of the Presocratics—and to some extent of the Platonists too—principally take the form of arguments that while they were on the right lines in identifying one or more of the four causes as principles, their understanding of these causes was deficient and unsophisticated. In Λ.10 Aristotle largely takes a different tack, which reflects the different approach to principles found in the first half of Λ (and in *Phys.* I), namely as the principles of *substance*. He focuses on what he sees as the Presocratics' over-reliance on opposites as principles, arguing that they overlook the need for *matter* (this is somewhat in tension with the picture painted in A of the Presocratics' success in identifying the material cause). Not surprisingly given its opening section, Λ.10 is also very much concerned with what Empedocles and Anaxagoras can and cannot say about goodness and badness in the cosmos: there is only very slight discussion of this in A (984b8–985a10).

We cannot be certain of the precise nature of the Platonist views discussed in Λ.10, mainly because our chief sources for them are Aristotle's criticisms (principally here and in

unmoved movers would be principles of nothing. This is because the unmoved movers cannot think about the particular motion they cause if their thinking is to be 'without matter': see the notes on 9 1074b38–1075a5.

Books A, M, and N),[12] and the works of Aristotelian commentators—and Aristotle's accounts are themselves highly obscure.[13] A good deal of books M and N is given over to what we might call philosophy of mathematics, but as Burnyeat (1987) has argued, their primary focus is the Platonist ideas that numbers (and Forms) are 'substances and the principles of things that are' (M.1 1076a30–1). It is thus not surprising that there are very close connections between the criticisms of the Platonists' accounts of principles in Λ.10 and those in N. The common threads identified by Aristotle in these Platonist accounts are (i) that mathematical entities such as numbers are in some way the explanatory principles of all things, and (ii) that numbers themselves have two principles, variously called the one and 'the great and small', the equal and the unequal, the one and the indefinite two (or indefinite dyad), and even the one and the many (cf. 1075a33). How these were supposed to work as the principles of numbers is unclear. In some places, including Λ.10, Aristotle draws a parallel between the roles of the one and the indefinite two and form and matter respectively, suggesting that some Platonists thought of numbers and other mathematical entities as generated by the imposition of some definite form or structure on some indefinite material or quantity.[14] In other places, however, he seems to suppose that (some) numbers are formed one after the other, as it were, by the indefinite two doubling each earlier number (M.8 1083b36–1084a7: see Annas 1976, pp. 52–4)—which presumably gives the indefinite two a more formal role. With the exception of Speusippus (see on notes on 1075b37–1076a4), the Platonists whom Aristotle has in mind took these principles of number somehow to serve also as the principles of geometrical magnitudes, and hence of geometrical lines, planes, and solids (see Annas 1976, pp. 55–62). Λ.10 has a little to say about the Platonic Forms, but focuses more on the idea that numbers and other mathematical entities are the principles. Perhaps this is because Aristotle is inclined to see the Platonists as taking numbers to be

[12] There is also relevant material in Plato's own works, especially the *Philebus* and the *Timaeus*.

[13] For discussion, see Annas 1976; Burnyeat 1987; Mueller 1987.

[14] See, e.g., *Phys.* I. 4 187a17–18; *Met.* A.6 987b20–3, M.9 1085a9–b34, N.1–2, especially 1087b4–12, and the notes on 10 1075b34–7.

the most fundamental principles (cf. 8 1073a17–22); but more probably it is because he thinks that Platonists who believe in Forms think that the Forms of numbers are the most fundamental (cf. Burnyeat, 1987, pp. 235–40).

For both Pythagoreans and Platonists, the essential idea is the connection they see between mathematics and *intelligibility*. The Pythagoreans, Aristotle tells us in A.5, were inspired by the discoveries of mathematical structure underlying musical harmonies to suppose that mathematics explained all harmony and order. Plato's commitment to the mathematical nature of order pervades the metaphysics and epistemology of the *Republic,* and seems to have been the subject of his famous lecture on the Good.[15] In the *Timaeus*, the world soul and—in consequence—the cosmos as a whole have a structure determined by a set of mathematical ratios corresponding to harmonic intervals (35b–36d). At the other end of the scale, as it were, the Demiurge bestows intelligibility on the four elements by giving them the forms of the first four regular solids, each composed in some sense either of half-equilateral triangles or right-angled isosceles ones (53c–55c): the nature of the elements is a function of the geometrical properties of these triangles. At 31b–32c the elements are further linked (in an obscure way) by a geometrical proportion. For Plato, understanding things is grasping their goodness and order, and this is, or is bound up with, their mathematical structure—the ultimate good which they imitate, the Form of the Good, is *the One*. For Aristotle, by contrast, as we have seen, the ultimate good which other things imitate is not unity, but the unchanging activity of the Prime Mover.

COMMENTARY

The chapter has two main sections: 1075a11–25 discusses the goodness of the universe, while the rest of the chapter sets out various respects in which the account given in Λ as a whole solves problems which Aristotle claims his predecessors' theories could

[15] Aristoxenus, *Elementa Harmonica* II.30.5–31.15, discussed in Gaiser 1980 and Burnyeat 1987, pp. 232–4 and 238–40.

not solve. This concluding section is highly compressed even by Λ's standards, is stylistically disjointed, and has all the appearance of a series of rapidly jotted-down notes.

1075a11–12

'The nature of the whole' is simply an elaborate way of saying 'the whole' (cf. *Cael.* I.2 268b11, where Aristotle asks whether 'the nature of the whole' is finite or infinite); for an alternative view see note on a17–25. There remains a question of the extent of this whole; is Aristotle referring to everything there is, or does the reference to the Prime Mover as something 'separate' suggest that the whole here is the whole of the sensible world? 'The good and the best' is perhaps best understood as meaning 'the good, that is to say, the best': Aristotle seems not to be concerned with all the ways in which the world or its parts are good, but only with the way(s) in which it achieves its highest good.

1075a12–15

The phrase 'something separate and itself by itself' has a Platonic ring to it, but the reference is clearly to the Prime Mover. Perhaps Aristotle chooses this form of words to draw attention to the fact that the Prime Mover can both be the highest good and that on which the good arrangement of the cosmos depends, while (in Aristotle's view) the highest good in the Platonic scheme, the Form of the Good, cannot.[16] The phrase 'or is it . . . ' in Aristotle usually means 'my view is that it is . . . ', and that is plainly how it is used here (cf. 9 1074b38–1075a5 and 1075a6–10). What are these two ways in which the whole possesses the good and best? First, simply by containing, or having a relation to, the Prime Mover ('something separate and itself by itself'[17]), which is the best thing that there could be (see notes on 7 1072a26–b1 and b14–30). Second, by its 'arrangement' (*taxis*): since this is a distinct way, this arrangement must be something good in its

[16] For Aristotle's criticisms of the Form of the Good, see *EN* I.6.
[17] On being separate, see the notes on 1 1069a24 and 5 1070b36–1071a18.

own right and not merely good because it depends on the Prime Mover. Nonetheless Aristotle identifies this arrangement as something due to the Prime Mover (a14–15; cf. K.2 1060a26–7), so he cannot have in mind what we might call the structural arrangement of the cosmos—its spherical shape, the numbers of the heavenly spheres for each planet, the nature and general distribution of the sublunary elements, etc.—since the Prime Mover is not responsible for any of this. Rather he must be thinking of the orderly behaviour of the parts of the cosmos, which is due, ultimately, to the Prime Mover—or at least of some aspects of that behaviour. This is confirmed by a16–25, in which the claim that everything is 'arranged together' (*suntetaktai*—a verb cognate with *taxis*: see the next note) is cashed out in terms of activity rather than structure: see notes *ad loc*. Aristotle's idea at a13–14, 'its being well is . . . especially him', is that in a very good army a very good general is the most important thing, since such a general could achieve a great deal even with poor troops, but not vice versa; nonetheless there is a difference between an army with poor troops and one with good troops, even if they have the same general and even if any goodness that the troops display is a result of the general's leadership. Aristotle refers to the relevant good feature(s) of the troops as the army's *taxis*: we might naturally take this to be how it is arranged or deployed, but the point made above suggests that the *taxis* in question here must be something to do with the soldiers' activity rather than how they are arranged on the battlefield—perhaps their disciplined behaviour, or their degree of cohesiveness in action. 'He' at a15 could be the general or the Prime Mover—it does not really matter, since Aristotle wishes to make the same point about both. 'He is . . . the arrangement is . . . ' is also ambiguous: Aristotle might mean 'exists' or 'is (good)', and both make sense in the context.

1075a16–25

The structure of the passage, and in particular the relationships between the three claims made about the ways in which things are arranged, is a little unclear. The easiest reading seems to be to take the third claim, 'for everything is arranged together in relation to one thing, but as in a household . . . ' at a18–25, to be

intended to amplify the first, that 'everything is arranged together in some way, but not in the same way' (a16). The second claim, 'and they are not in such a condition . . . ' (a17–18), is on this reading intended to stress that the fact that different things are 'arranged together' in different ways does not mean that they are disconnected from each other. A further question is about the force of 'together' in the term 'arranged *together*' (*suntetaktai*: this is formed from a verb cognate with *taxis* and a prefix meaning 'with' or 'together'): are we to understand this as 'with each other' or 'with some one thing (i.e. the Prime Mover)'? The claim that everything is arranged together in relation to one thing suggests (though it does not require) that the idea is that all things are arranged together with (i.e. connected to) each other *because* they are related to one thing—the Prime Mover (see also section 2 of the Prologue).

a16–17: The phrase 'fishes and birds and plants as well' seems to suggest that there are some things whose being 'arranged together' is unproblematic or only to be expected, and that this is not the case for animals and plants; the unproblematic cases are presumably the eternal heavenly bodies (see the notes on the household analogy in a17–25 below).

a17–25: Before considering the household analogy we must look at a22–3: 'for nature is this sort of principle for each of them.' Sedley argues that this must be understood as referring to a global or cosmic nature; although he agrees that 'the nature of the whole' at a11 need mean no more than 'the whole', he thinks that if a22–3 refers to a cosmic nature, so does a11. The idea that Aristotle believes in an overarching cosmic nature is highly controversial: see section 1 of the Prologue. The present passage need not be read in the way Sedley suggests, however: it is characteristic of Aristotle to make 'collective' remarks about nature with no implication of an overarching Nature, such as his famous statement that 'nature does nothing in vain' and many of his statements in the biological works of the form 'nature devises/makes/uses . . . ' (cf. Lennox 2001c, pp. 144–5). Of particular relevance is the sort of usage found at *GA* II.1 731b31–2, 'for since the nature of such a kind cannot be eternal . . . .', where Aristotle clearly means that the nature *of each member of* the

kind cannot be eternal, not that the 'global' kind-nature cannot be. In the present passage Aristotle simply means 'this is the sort of principle of each of them which nature—that is, the nature of each of them—is' (cf. Bodnár 2005b, pp. 18–19; Charles 2012, p. 251).

The household analogy is not straightforward. As I said above, I take its aim to be to illustrate the twin ideas that all things are connected to each other by being related to the Prime Mover, and that this relation has a different character for different things. It is plausible that those who are free, on the one hand, and the slaves and beasts on the other, are analogues of the heavenly bodies and (some or all) sublunary beings respectively (see below); what is less clear is what the contrast between them is meant to be, and what Aristotle means by 'what is common'. Sedley rightly argues that the contrast cannot be the extent to which what they do serves *the common good*, since both classes to a large extent serve this good:

> [slaves and beasts] may arguably not contribute much to [the common good], but it would be strange for [Aristotle] to deny that most of what they do is *a* contribution to it. Rather, I imagine, he is speaking of their degree of sharing or participation in the household's *joint* activity.
>
> (2000, p. 332)

The point of the analogy, Sedley thinks, is that natural beings share to different extents in a single, goal-directed activity, which he identifies with the imitation of the Prime Mover (for discussion of this idea in other texts, see section 1 of the Prologue). I agree with most of this, but there is no reason to suppose that 'what is common' in the household is a *single activity* rather than a set of activities. Indeed, it is hard to see what this single activity would be in the case of the household: we would expect even the higher-level activities and goals of a household to be a plurality. If this is right, then there is no reason to infer that the imitation of the Prime Mover is itself a single activity either: see below. What Aristotle stresses is the different degrees to which the actions of the members of the household are *fixed* by these higher-level goals: I suggest his thought is that in a well-run household the free members *must* act in certain determinate ways in given circumstances.[18] In the case of

[18] Compare Aristotle's criticism of what he calls the democratic conception of freedom as 'doing whatever one wishes' (*Pol.* V.9 1310a31–2), and his remark in the *Nicomachean Ethics*: 'it is possible to go wrong in many ways . . . but to be

the slaves, by contrast, there is great latitude in what actions of theirs will contribute to the goals of the household: just what food is cooked, or the order in which the dishes are washed, does not (in principle) matter at all. How does this apply to the universe? I suggest that what Aristotle has principally in mind is the *unvaryingness* of the Prime Mover. Everything 'is arranged together in relation to one thing'—the Prime Mover—because in some way or other everything imitates the Prime Mover's unchanging activity. The point Aristotle seems interested in here is the extent to which one can identify things which happen unvaryingly: 'I mean, for example, that it is necessary that all things to come to be dissolved, at least.' Sedley suggests that this is an oblique reference to the unceasing activity of the elements (see *Met.* Θ.8 1050b22–30; *GC* II.10 336b34–337a7). But we need to explain Aristotle's claim that 'everything is arranged together in some way, but not in the same way', since it is this contrast which the household is introduced to illustrate. The contrast he has in mind, as I have suggested, is probably that between beings whose actions in imitation of the Prime Mover are unvaryingly regular and beings whose actions are not unvaryingly regular in this way. Thus the beings who are parallel to the free members of the household are indeed the heavenly spheres, and the beings who are parallel to the slaves and the beasts are some or all of the beings of the sublunary world; these may include the elements—this is unclear—but certainly must include the animals and plants referred to at a16–17. Even these latter beings display some unvaryingness—such as the inevitability of their death—although there are other ways in which they may be said to imitate the Prime Mover, such as the generation of offspring, which are liable to some degree of variation and irregularity (e.g. because some members of the species generate no offspring, and some generate offspring not true to kind).

1075a25–1076a4

The final section, a coda to book Λ as a whole, is uncharacteristic in a number of ways. Λ is unique in *concluding* with a survey of his

correct in only one way—which is why the former is easy and the latter hard' (II.6 1106b28–33).

predecessors' views. Aristotle often begins a discussion of a problem with a survey of earlier views; this is an integral though by no means invariable part of his methodology. He thinks that what he calls the *endoxa*—the views of 'the many and the wise'—are likely to contain at least a germ of truth (see, e.g., α.1). These views are often in real or apparent conflict with each other and/or with how things seem to be; so an adequate account of the issue in question should articulate the ways in which these *endoxa* succeed and fail in hitting the truth, and should explain or dissolve these conflicts. Sometimes an engagement with rival views permeates the whole of a discussion, rather than preceding it (e.g. the critiques of atomism in *Phys.* V–VI and of a variety of Platonists in *Met.* M and N); but nowhere else does the discussion of other views come at the end.

The Λ survey is also uncharacteristic in being brusquely negative: Aristotle does no more than list a series of difficulties which he thinks his predecessors' views cannot avoid and problems they cannot solve, all of which, he thinks, are dealt with, or do not arise, on his own account. This may explain its position at the end of the book, since such a list would be hard to make sense of if placed before his positive discussion. It is worth noting that Aristotle does give a more characteristic, 'germ of truth' account of these rival views at the start of A; so it may be that he is presupposing familiarity with this discussion and sees no need to repeat it at the beginning of Λ. Certainly some of his objections echo those made in A.

Finally, the passage barely qualifies as continuous prose. It is essentially a series of related but separate points, rarely developed and often linked only by the blandest of sentential connectives (*de*—'and' or 'but'). There are very few structural pointers and relatively little discernible organization; this is exacerbated by the repeated use of unspecific expressions such as 'they', 'some', and 'everyone'.[19] Many of the points made in this section are also found elsewhere in Aristotle's work, especially in *Met.* A and N; there are also connections with some of the *aporiai* outlined in B.

[19] Burnyeat links the placing of the passage with this evident haste, and conjectures that Aristotle was hurrying, at the very end of his life, to set down the advantages of his account (2001, pp. 148–9); but we should be agnostic about questions of the chronology of the composition of Λ: see Introduction, section 2, and the Prologue to chapter 8, section 1.

For the reasons just given, it is difficult to detect a clear structure in this coda, and also difficult to be sure just what many of the objections amount to. Sedley thinks that it divides into two main sections, 1075a25–b34 focusing in his view on 'the failure of earlier theories to account for cosmic good' (2000, p. 327), and 1075b34–1076a4 on their failure to account for unity. Aristotle does find it quite natural to link discussions of unity or 'the one' with discussions of the good, and Sedley is clearly right about the focus of the latter passage; but things are less clear in the case of a25–b34. This is because not all the problems Aristotle mentions are concerned with the good—the first, about the need for a 'third thing' (matter) in addition to the opposites, being a case in point. See notes on a28–32 and b13–20.

a25–7: 'more cleverly': also used of Aristotle's own approach at K.2 1060a25 (just before a reference to a *taxis* which depends on an eternal separate substance—see the notes to a12–15 above).

a28–32: This adverts to the argument of *Phys.* I, also rehearsed in Λ.2 and N.1 1087a29–b4 (see Prologue to chapter 2, and notes on 1069b3–9). As Ross suggests, Aristotle's criticisms are (i) that not *everything* comes to be (the opening of the N.1 passage suggests that his point is that there are eternal things which do not come into existence at all, rather than the more technical point made in Λ.3 that matter and form do not undergo a process of coming to be); (ii) that those things which do come to be do not do so from opposites alone, but from opposites and matter; (iii) that opposites are (something like) properties, and as such are not the right sort of things to be changed—it is the subjects of these properties which can be changed. The 'third thing' at a31, which solves at least problems (ii) and (iii), is Aristotelian matter. It may also contribute towards solving (i) in the sense that the difference between eternal beings and transient ones—and that between different types of eternal beings—is to be understood partly in terms of the presence/absence of, and differences in, matter: see chapters 2 and 6. To whom are these criticisms addressed? Sedley thinks that 'everyone' cannot include the earlier Presocratics, since Aristotle acknowledges in *Phys.* I and elsewhere that they introduced something like matter as well as the

opposites; he thinks this shows that Aristotle's interest in the Presocratics here only extends to those who introduced something which might be regarded as a distinct principle of goodness (Empedocles and Anaxagoras, the only ones whom Aristotle mentions explicitly in chapter 10). But in *Phys.* I Aristotle includes Empedocles and Anaxagoras among those who used something like matter, so this cannot be the explanation. Either 'everyone' only refers to Aristotle's Platonist opponents, or, more probably, his point is the looser one that earlier introductions of matter were too vague or unspecific to count as solving the problems in the way that (he thinks) his own matter does. Perhaps the point is that, even when they introduce matter, his predecessors do not (or do not clearly) give an account of the opposites as the properties of matter and/or of matter/form compounds: this seems to be his main criticism in *Phys.* I.

a33–4: 'they': if the reference of 'everyone' at a28 includes the Presocratics as well as the Platonists (see previous note), it is not obvious that all of them made one of the opposites matter. Possibly Aristotle thinks that in some way anyone who makes everything from opposites is committed to making one of them matter, whether they realize this or not, but more probably he is using 'they' as a term of art to refer to the Platonists whose accounts are mentioned in the 'e.g.' clause which follows, as he seems to in the parallel sentence at N.1 1087b4–6 (for a similar usage, see 1075b38); an alternative is to translate 'they' as 'some', or 'others', as Sedley suggests (2000, p. 338). On the Platonist theories referred to in the next clause, see section 2 of the Prologue. Even if Aristotle is right to characterize these theories as using their 'opposites' in a way similar to Aristotle's form and matter, it is unclear what his objection is to their doing this. Perhaps he thinks that one and the same thing cannot play the role of 'opposite' and of matter (cf. his objection at b4–6)—but if so he does not explain why not. This does seem to be his objection in N.1 1087b29–1087a4: the opposites are features of, and so posterior to, the substance(s) to which they belong, and so cannot be the ultimate principles of everything (for discussion, see Annas 1976, pp. 193ff.). If this is right, then Aristotle's own avoidance of the problem hinges not merely on the introduction of matter, but on the idea that one of his own 'opposites', form, is itself

a substance and is not (he thinks) posterior to some further underlying thing, not even to its underlying matter.

a34–7: The first mention of problems involving goodness and badness. The argument seems to be: if the opposites are principles of everything else, then everything else will share in both opposites; so if the bad is (in) one opposite, everything except the other opposite ('the one') will share in the bad. This presupposes that the principles are something like elements (indeed 'elements' replaces 'principles' at a36), and in the parallel passage in N.4 (1091b30–7) Aristotle ascribes just this view of principles to his opponents. What is less clear is whether this makes the objection merely *ad hominem*, or whether Aristotle thinks that holding that the opposites are the principles of everything commits one to this view of principles as elements. Once again Aristotle does not specify who his opponents are: it is reasonable to take the opponents to be Platonists, as they clearly are in N.4. In that chapter he speaks, not of 'others' who do not make the good and the bad principles, but of one studiously unnamed person who did so precisely to avoid the objection: this is probably Speusippus (cf. Λ.7 1072b30–4). It may be that Aristotle thinks his present criticism extends also to others who, to his mind, took good and bad to be principles, such as Empedocles (see 1075b1–7) and the Pythagoreans (A.5).

a38–b1: 'They were right': presumably these are the Platonists criticized at a36–7 (for some discussion of the criticism in connection with Plato himself, see Fine 1987/2003, pp. 393–6). It is unclear whether the criticism here is merely that the Platonists do not say which sort of principle the good is, or the stronger claim that their position is such that they *cannot* say. If the latter, presumably the idea would be that in some way they cannot allow a principle to belong to more than one kind: this idea figures in the next objection, addressed to Empedocles. Note that in any case Aristotle assumes that the principles figuring in any theory must belong to (at least one of) the kinds of principles or causes which he himself recognizes.

b1–7: Criticisms of Empedocles. According to Empedocles there are four 'roots' or elements of all things—earth, water, air,

and fire. The universe also contains Love and Strife, which are respectively unifying and destructive forces. Although Empedocles sometimes uses spatial language in relation to Love and Strife, as if they were material elements like earth and water (frr. 17, 35, 36), Aristotle's claim that he makes Love part of the matter of the universe (repeated at N.4 1091b11–12; cf. *De An*. I.5 410b4–7) seems to be at best uncharitable. Empedocles sharply distinguishes between the four roots as the ingredients of compounds and Love as the agent which unifies them to form the compound (see frr. 96 and 98), and his spatial talk can be understood simply as referring to the location and extent of the causal influence of Love and Strife. 'The same . . . but not the same in being': it is not clear whether Aristotle has in mind his standard contrast exemplified by teaching and learning which are, he thinks, one and the same process even though what it is to teach is not the same as what it is to learn,[20] or some weaker case of 'sameness' such as accidental unity (for examples of such cases, see Castelli 2010, Appendix B). Since Aristotle himself is happy to locate and articulate certain sorts of duality within one and the same thing, one might wonder why he does not allow Empedocles to avail himself of the same tools in the case of Love. More importantly, Aristotle himself is committed to one and the same ultimate principle—the Prime Mover—being both an end and a mover (see section 2 of the Prologue to chapters 6–7); quite generally, he sees no difficulty in one thing's being a formal, final, and efficient cause (see *Phys*. II.7 198a24–7; notes on b8–13 below). Why then does he make this objection to Empedocles? Aristotle cannot think that the problem he identifies makes Empedocles' position incoherent, or irremediably inadequate, because his own theory has just the same feature: so he must think that incoherence or inadequacy could be avoided with sufficient further machinery. Equally, however, it ought not to be that Aristotle is merely complaining that Empedocles did not take any steps to refine his theory and make it adequate. If that were Aristotle's objection, his claim that his own theory is the only one to solve these problems would be disingenuous: it would

[20] *Phys*. III.3; cf. Λ.9 1074b36–8. For discussion, see Hussey 1993, pp. 69–71; Charles 1984, p. 14; the Prologue to chapter 9, section 2.

at best capture a contingent historical truth, but would not show that Empedocleanism *could not* solve these problems too (cf. Sedley's comments on b8–13, 2000, pp. 340–1). Aristotle must think that the only way to develop and refine things so as to avoid inadequacy or incoherence is his own way (see 7 1072 a19–26 and notes *ad loc*.)

Aristotle next objects that Empedocles should not have made his bad principle, 'Strife', imperishable. Perhaps the problem is not so much that this principle ought to be perishable (whatever that might mean) as that in Empedocles' system, as Aristotle sees it, the good has no form of priority over the bad; there is just an unending cycle of alternating cosmic dominance by Strife and Love. On the Platonist theories considered earlier, the good as form seems to have some prospect of priority over the bad as matter, even if the latter is imperishable.

b8–13: Criticisms of Anaxagoras. Anaxagoras held that the ordered cosmos came to be as a result of a rotational motion started in the pre-existing mixture of elements by divine intelligence or 'Intellect' (*nous*: the term Aristotle uses in connection with the Prime Mover as thinker at the start of chapter 9). Anaxagoras' conception of this divine Intellect is quite opaque (see fr. 12 and Schofield 1980, ch. 1); nonetheless Aristotle's first point seems reasonable—to ascribe the initial rotation to *nous* however construed is to suggest that it (and perhaps its cosmological consequences) was something deliberatively rational. So, although Anaxagoras does not say so, it is natural to take Intellect to have acted for the sake of some good (see Plato, *Phaedo* 97b8–99c6). Aristotle's objection is expressed very elliptically: 'so that something else' could mean 'so that something else [that for the sake of which Intellect acts] is a principle [or: the good]', 'so that [this goal] is another good', or 'so that [Intellect] is something distinct from the good'. In any case, his objection seems to be that Anaxagoras is committed to two quite distinct accounts of how goodness figures as a principle—as the efficient cause (Intellect) or as the final cause (that for the sake of which Intellect intervenes in the world (cf. A.7 988b7–16; note that at A.3 984b8–22 Aristotle praises Anaxagoras for his introduction of Intellect as an efficient cause). The contrast is not with the fact that Aristotle's divine intellect does not deliberatively intervene in

the world at all, and hence can in a rather special way be both an efficient and a final cause, but with the fact that even in cases of deliberative action Aristotle himself is somehow able to allow that the efficient and final causes of something can be the same thing. 'Medicine is, in a way, health' expresses this idea: the doctor's knowledge of health—what will make the patient healthy—is the efficient cause of the treatment, while the treatment is aimed at the patient's being healthy. Aristotle uses similar language at 4 1070b33 (cf. 3 1070a29–30) to express the idea that the efficient and formal causes can be the same thing: see notes on b1–7 above. As with the criticism of Empedocles, Aristotle must think that his own way of avoiding the problem is the only way of avoiding it. It is striking that Aristotle does not mention here Plato's *Timaeus*, in which the Demiurge is portrayed as a divine and rational moving cause.

The next criticism (b10–13) invites the rejoinders that Aristotle insists that his own divine 'intellect' has no opposite, on the grounds that it is a substance (*Cat*. 5 3b24–32), and that he does not make the bad a principle (cf. Θ.9 1051a15–21): see Sedley 2000, pp. 39–41. It seems that he is holding Anaxagoras to the idea that the principles are *opposites*: 'but everyone who speaks about opposites fails to use the opposites, unless someone puts <their accounts> into proper shape' suggests that Anaxagoras is damned if he makes all the principles opposites and damned if he does not.[21] Once again Aristotle must think (though again he does not argue) that only his own way of dealing with this could provide a coherent escape route.

b13–20: Four briefly stated objections, with no immediate connection to goodness as a principle.

b13–14: Aristotle's claim is that without his notions of matter, potentiality, and actuality no explanation could be given of how the universe contains both perishable and imperishable things. (His own account relies, in addition, on his conception of unvarying circular motion and on the sun's oblique orbit along the

[21] For the idea of putting predecessors' accounts 'into proper shape' Ross rightly refers to A.4 985a4–5 and 8 989a30–3.

ecliptic: see notes on 6 1072a9–18.) See also B.4 1000a5–1001a3 and N.2 1088b14–28.

b14–16: The 'others' who make all things one are the Eleatics—Parmenides and Melissus—who argued that reality was one unchanging thing, on the grounds (*inter alia*) that any change or plurality would involve 'what is not' and that reference to what is not is incoherent (see *Phys.* I.8 191a23–33). Who are the thinkers who 'make the things that are from what is not', and what is wrong with their view? One possibility is that they are everyone except the Eleatics (and even Parmenides when he turns his hand to cosmology: see A.5 986b30–987a2): Aristotle's claim would then be that only he makes the necessary distinctions between being and not being potentially and actually (see notes on chapter 2 and *Phys.* I.7–9). Another possibility is Sedley's suggestion (2000, p. 342) that Aristotle is referring to a naive, non-philosophical view on which all one can say is that first there was nothing, and then the world came into existence.

b16–17: 'Why there will always be coming to be': 'coming to be' is probably meant in a very broad sense, equivalent to 'change'. At 6 1071b12–1072a3 Aristotle argues that the only way of accounting for perpetual change is to suppose the existence of a substance whose essence is activity (see also *GC* I.3). '[No one says] what the cause of coming to be is' may just make the same point, since Aristotle thinks that if there is any coming to be at all there must be perpetual coming to be (see notes on 1071b5–11). If it makes a fresh point, it would be that no one incorporates efficient causation in their account in a satisfactory way. This would be rather sweeping, and in A Aristotle gives some credit to Empedocles and Anaxagoras on this score; perhaps Aristotle's mind is on the Platonists whom he is about to criticize (b19–20) on the familiar grounds that Platonic Forms are unsatisfactory as efficient causes.

b17–20: This continues criticisms relating to coming to be. The ones who posit two principles are the Platonists with their one and the indefinite dyad, the one and the great and small, etc.: see a33–4 and section 2 of the Prologue. Aristotle's point is that principles of this sort do not seem to be capable on their own of acting so

as to bring about particular changes at particular times: thus the Platonists need a further principle to explain such intermittent operation. The same holds for theories which make the Forms further (or replacement) principles: Forms, Aristotle thinks, explain by way of things participating in them, so some additional principle is required to explain why participation occurred at one time but not another.[22] In Aristotle's own system, of course, intermittent change is not brought about by the intermittent operation of higher principles, but by the varying effects of unvarying changes; the latter are brought about, ultimately, by the inspiration of the Prime Mover—a different type of efficient causation which Aristotle thinks Platonic Forms also incapable of, as they are not active (see notes on 6 1071b12–21).

b20–4: 'The others' here means 'everyone apart from us', not 'everyone apart from the Platonists'. The objection, which recalls the criticism of Anaxagoras at b10–11, is puzzling: it seems to require that Aristotle's opponents treat (or are committed to treating) wisdom as a principle—but they do not seem to do so. It is hard to avoid the conclusion that Aristotle is thinking 'they need to include wisdom as a principle because it is a principle in my (successful) system', and can then complain that including it is inconsistent with making all principles opposites. 'All the opposites have matter' must mean, as Ross says, 'all the things which are characterised by an opposite have matter': this is plausible in the case of typical Presocratic opposites such as hot and cold, but a Platonist who allowed that the one and 'the great and small' were opposites would, presumably, deny it. 'These things are in potentiality' could refer to things which have matter, or back to things which are opposites; in either case the contrast is with Aristotle's Prime Mover. 'And error, which is the opposite <state>, is into the opposite' is obscure, but seems to mean 'the state of being wrong is itself an opposite state, and it takes one to an object which is also an opposite—namely the opposite of the object of the corresponding knowledge' (cf. *EE* II.10 1227a31–5 and Woods 1992, p. 150). Since nothing is opposite to the first

[22] Aristotle makes much of this point at *GC* II.9 335b7–24, and at *Met.* A.9 991a8–11, 991b3–9 (≈ M.5 1080a2–8), M.5 1079b12–15; for discussion, see Annas 1982 and Fine 1987/2003.

thing, the sort of wisdom it has (or is: see 9 1074b33–1075a5 and notes) has no opposite: so there is no such thing as being in error about its objects—and this is indeed Aristotle's view (see notes on 9 1075a5–10).[23]

b24–7: Aristotle is here referring to his arguments for a Prime unmoved mover (see notes on chapter 6). Perceptible things, he thinks, are all subject to change (cf. 1 1069b3), so cannot fulfil the requirements which the unmoved mover must fulfil. Without such a mover there will be no ultimate principle of change, and hence, in his view, no nature, no orderly change in the sublunary world, and no regular celestial movements (Ross rightly suggests that this is what 'what is in the heavens' refers to here). So when Aristotle goes on to claim that without an imperceptible unmoved mover each supposedly ultimate cause of motion would require some prior cause of its motion ad infinitum, he is not adverting to what he regards as a real (if unsatisfactory) possibility; rather he is spelling out in another way the impossibility, as he sees it, of a world without the unmoved mover. 'As for all the writers about the gods and the natural scientists': cf. chapter 6 1071b26–8. If he means to include Anaxagoras, Aristotle is now ignoring his use of Intellect as a cause of motion—or, as Menn suggests in a related context (2009, p. 215), he may be thinking that, since Anaxagoras' Intellect is first inactive and then active, it would not in fact generate the cosmos without a further activating cause.

b27–30: Aristotle now turns to the Platonists, presumably because they do posit imperceptible principles (cf. Sedley 2000, p. 343). It is unclear whether his first objection (b27–8) goes beyond the points raised by b17–20. His second objection (b28–30) is also opaque. Sedley takes 'number will not act upon things so as produce what is continuous—neither as mover nor as form' to mean 'number will not produce a continuous motion by being its moving cause, nor will it produce a (thing with a) continuous magnitude by being the thing's formal cause' (see 2000, pp. 343–4). On this reading the 'moving cause' objection might be that things

[23] The idea that good as a principle has no opposite is defended obscurely in Θ.9: for discussion see Makin 2006, *ad loc*., and Beere 2009, ch. 14 (see also the obscure passage in *Phys.* I.9, 192a13–25).

without magnitude cannot (in Aristotle's view) be the subject of motion, and so cannot be the ultimate cause of the transmission of motion. This consideration does not, of course, rule out their causing motion in the way that the Prime Mover does: see section 2 of the Prologue to chapters 6–7. It seems easier, however, to take 'what is continuous' to have a single reference, to a thing which possesses a continuous magnitude. The 'formal cause' objection seems to be that on Platonist accounts *all* principles are immaterial. It may be that as a thing's formal cause, numbers cannot be responsible for its being extended, but that only seems to be a difficulty if matter is not itself also a principle. Perhaps Aristotle would reply that the role of 'matter' in Platonist accounts is occupied by another abstract or immaterial principle, 'the great and small', or the indefinite dyad: see Prologue, section 2. Once again it is striking that Aristotle ignores the account in the *Timaeus*, in which matter is assigned at least a kind of existence independently of the Forms, and extension in the form of the 'receptacle' is very definitely independent of them. The 'moving cause' objection is probably the similar point that without matter to work on, numbers could not generate an extended thing.

b30–4: Here 'act upon things' and 'able to act upon things' translate the verbs *poiēsei* and *poiein* at b29 and 32, and the adjective *poiētikon* at b31. This is how the term *poiētikon* is best understood here, and I translate it in line with this at 6 1071b12 (see below). (It is hard to avoid translating the verb at 1075b29 as 'produce', and so there I have used the somewhat cumbersome translation 'act upon things so as to produce' in order to show the link.) Sedley is right to suggest (2000, p. 344) that this highly compressed argument should be filled out with materials from 6 1071b12–26. An opposite can fail to be, by giving way to its opposite; this means that opposites have the potentiality for being and not being, and hence, if able to act on things or to cause motion, must have the potentiality for being able to act in these ways and not to act. In turn this means that any such acting is posterior to the potentiality in question: in chapter 6 Aristotle argues that this means that the cause in question cannot be the cause of eternal motion, on the dubious grounds that what is potentially can fail to be active. Since there are eternal things which change eternally (also argued for in chapter 6, 1071b3–11),

something in this account has to be rejected—namely the idea that all the principles are opposites.

Sedley also raises the question of the significance of the appearance of 'able to act upon things' or 'productive' (*poiētikon*) at b32 ahead of 'able to cause motion' (*kinētikon*), noting that *poiētikon* and *kinētikon* also appear together in chapter 6 (1071b12). Sedley's view has three components (2000, p. 344): (i) that Aristotle is drawing a sharp distinction in chapter 6 between *kinētikon* and *poiētikon*; (ii) that while *poiētikon* here does mean something like 'able to act upon things' (see above), Aristotle is using it to refer to causal responsibility for a thing's *existence*, and is using *kinētikon* to refer to the causing of *changes*; (iii) that although in chapter 6 Aristotle does not say that the Prime Mover must be *poiētikon* as well as *kinētikon* (there he says that there must be something which is eternally '*kinētikon or poiētikon*'), the present passage makes it clear that he thinks it must be both. The first two points, at least, are problematic. In the previous paragraph Aristotle seems to allow being a cause of motion as one way of being a cause which acts upon things ('number will not act upon things so as to produce what is continuous—neither as mover nor as form'); and it is very hard to suppose that if Aristotle draws a sharp distinction between being a cause of eternal existence (*poiētikon*) and a cause of eternal motion (*kinētikon*), he should say '*kinētikon* or *poiētikon*' in chapter 6, as if only one or other of these different causes is needed. It seems more plausible that Aristotle is not in either passage drawing a sharp distinction between being *kinētikon* and being *poiētikon*. Moreover, what Aristotle says here does not really commit him to any particular view of the Prime Mover's mode(s) of causation—indeed, it would be surprising if a significant commitment about this which could easily have been made in Λ.6, but was not, were being insisted on here.

b34–7: Objections to the Platonists' accounts of the unity of various things. 'As to what makes the numbers one . . . no one says anything' (cf. A.9 992a1–2): there are elusive affinities between this passage and the discussion of what makes substances unities in H.3 and 6 (there is another less closely connected discussion in Z.12). In H.3 Aristotle makes a similar complaint about Platonist numbers:

> A number must be something in virtue of which it is one, though as it is they [unspecified] cannot say what it is in virtue of which it is one, if indeed it is one. For either it is not, but is like a heap, or if it is, then it should be said what it is that makes it one out of many. (1044a2–6)

H.6 tries to answer the 'difficulty concerning both definitions and numbers: what is the cause of their being one?' (1045a7–8). A definition is a unity if its object is, so in the rest of the chapter Aristotle focuses on the question of the unity of these objects; numbers are not mentioned again. It is controversial whether the discussion which follows is concerned with the unity of individual compound substances alone, or with these and with the unity of their substantial forms (see Harte 1996): the former issue is closer to the concerns of our passage. Unfortunately Aristotle's answer admits of three quite different interpretations (see Gill 1989, ch. 5; Charles 1994). He writes:

> There no longer appears to be a difficulty, because the one is matter and the other form. What, then, is the cause of this—of what is potentially being actually—beyond the productive cause in the case of things to which coming to be belongs? For there is no other cause of what is potentially a sphere being actually a sphere, but this was the essence for each. (1045a29–33; cf. the conclusion at 1045b17–24)

Clearly he thinks that understanding the objects in question in terms of matter and form is the key, but it is much less clear whether he thinks (i) that this understanding *dissolves* the question of what makes them a unity, so that there is simply no need for a cause of this; (ii) there is such cause, and it is to be found (somehow) in the interlocking nature of matter and form as potentially *F* and actually *F*; or (iii) the cause of their unity is the efficient cause which actualizes the form in the matter. Of these (iii) is the least convincing, as it seems an unpromising answer to the question of what makes a form-matter compound a genuine unity rather than a heap. By the same token, the appearance of the efficient cause as the solution in the Λ passage suggests that Aristotle's point here is a different one: whatever the explanation of what it is for the compound to be unified, we need an explanation of why it comes to be unified in the first place. Note that some of Aristotle's own form-matter compounds—the heavenly bodies—are eternal, and so lack efficient causes of their coming into existence.

The question of the unity of each number sounds very odd. It arises because numbers are thought of by the Platonists as sets of particular ideal units (see Burnyeat 1987, pp. 221 and 235–7): this view faces, or might reasonably be thought to face, questions of the form 'in virtue of what do *these* seven units form one definite thing—the number seven—whereas *those* seven units form the numbers three and four?' One might recast this in terms of the imposition of a definite form (being seven or being three) upon an indefinite matter (units)—cf. section 2 of the Prologue—and this explains why Aristotle regards his question as a case of the more general question about what brings form and matter together, and also why the case of numbers might seem more problematic than that of the heavenly bodies. Aristotle's own view of numbers is very different from the Platonists': first, they are not principles; second, he thinks of them not as ideal objects (and still less as sets of ideal units), but as ordinary collections of things such as dogs or sheep considered in a certain way. These differences may explain why, despite raising the question of the unity of numbers in H.3 and 6, he does not go on to answer it: the need to distinguish them from mere heaps applies to the Platonists, but not to his own account. Likewise the claim that one needs an efficient cause to explain unity is true for perishable form-matter compounds in Aristotle's system, but he need not think that it is true for numbers as he conceives them.[24]

b37–1076a4: Aristotle is thinking of Speusippus: 'Speusippus made still more kinds of substance, beginning with the One, and making principles for each kind of substance, one for numbers, another for spatial magnitudes, and then another for the soul' (Z.2 1028b21–4). He seems to have agreed with the other Platonists discussed here that the principles of mathematics were metaphysically fundamental, but denied that they were in turn underpinned by Forms, and also denied that the principle of all things could be reduced to (the principles of) numbers; hence he denied that there were any principles of all things (see Burnyeat 1987, pp. 237–8). This prompts Aristotle's complaint that

[24] Note that it is highly uncharacteristic of Aristotle to refer to the matter, rather than as the form-matter compound, as 'the thing' (*pragma*), as he does at b35.

Speusippus' world is 'a series of episodes'—a series of unconnected sets of items like the scenes in a poorly constructed tragedy.[25] Λ.4–5 argued that the principles of all things are (in a way) the same (see Prologue to chapters 4–5, section 1, and Introduction, section 4). This already puts some distance between Aristotle and Speusippus; but Aristotle's world might still seem episodic, divided as it is into three radically different kinds of substances (see 1 1069a30–6). Even the natural world divides into two very different parts: the celestial region (from the sphere which carries the moon upwards) displays necessity and invariance in a way not shared by the sublunary world, and it is composed of an element which cannot be acted on by, or transformed into, any of the sublunary ones; its matter is of a special sort which has no potentiality other than for change of place (see notes on 2 1069b24–6). It is for this reason that Aristotle here focuses on the role of the 'one ruler'—the Prime Mover. As the principle of all things, the Prime Mover bestows unity on the totality of things in two ways. First, the cosmos forms a causally connected structure because of the way in which the eternal motions of the heavenly spheres bring about the sublunary cycles of elemental transformation and of the generation of animals and plants:[26] see Prologue to chapters 6 and 7, section 1; Prologue to chapter 8, section 2; *GC* II.10 337a16–22; *Meteor.* I.2. These eternal motions are ultimately caused by the Prime Mover (at least if the activity of the subordinate unmoved movers in some way derives from or is dependent on it: see Prologue, section 2, and section 2 of the Epilogue to chapter 9). Second, as Aristotle claimed at 10 1075a11–25, everything in the cosmos is connected together because each thing, in its own way, imitates the perfection and goodness of the Prime Mover. In both efficient-causal and teleological ways, then, the things which make up the natural world are connected not only with each other, but also with the third and most important kind of substance in the totality of things—unmoved substance.

[25] Cf. *Poet.* 9 1451b33–1452a1; N.3 1090b13–20, quoted in the notes on 1 1069a19–21; Annas 1976, p. 74; Katz 2017, pp. 61–6.

[26] The connection is only 'one-way' because the celestial spheres are not reciprocally affected by sublunary processes.

a4: 'To have many rulers is not good: let there be one ruler' is a quotation from the *Iliad*: it is part of what Odysseus says as he urges the Greeks not to leave Troy after Agamemnon's foolish attempt to test their resolve by telling them to go home:

> Surely we Akhaians cannot all be kings here. To have many rulers is not good: let there be one ruler, one king, to whom the son of Kronos crooked in counsel [i.e. Zeus] gave the sceptre and the right of making judgements, to come to decisions for the rest. (II.203–5)

Aristotle quotes the first part of the line again at *Pol.* IV.4 1292a13, in the course of discussing forms of democracy (and the line is quoted with heavy approval by the Oligarch in Theophrastus' *Characters* (26.2)). Part of the point of this final sentence is simply that there is a single ultimate principle of all things; but while the reference to a single ruler is not specifically military, it is, as Sedley says (2000, p. 350), meant to remind us of the opening section's claim that the goodness and unity of the world depends on its leader, the highest unmoved mover.

NOTES ON THE TEXT

Footnotes to the translation indicate all divergences from Jaeger's *Oxford Classical Text* (Jaeger 1957), except for minor differences in punctuation and the removal of the three sets of Jaeger's ⟦ ⟧ signs, which he used to indicate his judgement that the passage was a later addition by Aristotle (1069b26–8, 1070a24–6, 1070b7–8). I have focused on cases which have some philosophical significance, and have not attempted a complete revision of Jaeger's text. I discuss the more important and/or problematic of these divergences, as well as some of my decisions to accept Jaeger's text in particular cases, in the notes below.

Since the publication of Jaeger's text, a great deal of work has been done on the manuscript tradition of the *Metaphysics* and also on the text of Λ: see in particular Walzer 1958 (for important evidence from Arabic translations of the *Metaphysics*), Harlfinger 1979, Frede and Patzig 1988, pp. 13–17, Frede 2000b, pp. 66–7, Bydén 2005, Luna 2005, Burnyeat 2008b, pp. 224–33, Fazzo 2010, 2012 (a new edition of the text of Λ) and 2014b, Primavesi 2012, Alexandru 2014 (also a new edition of the text of Λ); Primavesi is preparing a new *Oxford Classical Text* of the *Metaphysics*. For further bibliography, see Primavesi 2012 and Fazzo 2014b. It is generally agreed that the manuscripts of the *Metaphysics* represent two distinct traditions or even two versions (Frede and Patzig 1988; Primavesi 2012), which are labelled α and β—though manuscripts belonging to each of these groups show signs of contamination from the other (for a somewhat sceptical view of the sharpness of the α/β distinction in the light of this fact, see Fazzo 2014b). Whereas Jaeger tended to regard the β tradition as superior, more recent work has tended to argue that (with important reservations), the α tradition is superior, on the grounds that the β version appears to incorporate many editorial 'improvements' aimed at smoothing out difficulties of various kinds (see Primavesi 2012 for more detail). Like Ross (1924), Jaeger largely relied on three manuscripts, A^b, which he tended to favour as representing the β tradition, and E and J (both representing the α tradition). Subsequent work has revealed the importance of other manuscripts which are independent of these, and in particular C, M, and V^k, all belonging to the β tradition (all show some contamination from the α tradition, C apparently more than the other

two). In the case of Λ things are more complicated. (i) From Λ.7 1073a1 onwards manuscript A^b is written by a much later hand and the text belongs to the *α* tradition instead of the *β* tradition, and for the earlier part of Λ, A^b is quite highly contaminated by the *α* version (Primavesi 2012, pp. 393–6); Fazzo believes that A^b belongs to the *α* tradition for the whole of Λ (2010; 2012, pp. 113–18). (ii) V^k has only recently been discovered (by Alexandru) to include a substantial amount of the text of Λ, in the form of disjointed sections amounting to less than half of the book (but with a much higher proportion of the text from 1073a1 onwards): see Alexandru, ch. 1. (iii) Alexander's commentary on the *Metaphysics* (second to third century CE; Hayduck (ed.) 1891), which—used with caution—can provide an important check on the direct tradition, is lost for Λ (except for fragments in an Arabic translation); the commentary by [Alexander]—probably the twelfth-century commentator Michael of Ephesus—does not have the same value.

1069a21: reading *εἶτα τὸ ποιόν ἢ ποσόν* with EJMC (and one Arabic translation; the other translates *καί* (Walzer 1958, p. 228)), instead of *εἶτα τὸ ποιόν, εἶτα τὸ ποσόν* (A^b). For discussion of the text, see Frede 2000b, pp. 66–7, and Fazzo. If we retained the second *εἶτα* (with Ross and Jaeger), the translation would be 'substance is primary, and after it quality and then quantity.' This invokes an ordering among non-substantial items which is problematic for at least two reasons: Aristotle does not elsewhere introduce any such ordering (though he does order quantity first and then quality, in relation to measures, at I.1 1053b4–6), and it is far from clear why the view that things are 'in succession' is committed to this or any other ordering. It could be that Aristotle thought that his opponents were committed to the ordering anyway, but arguments to this effect are not easy to find. If we suppose that Aristotle is focusing on the idea of causal (un)connectedness, and deploying what in the commentary is labelled argument (i) for the priority of substances, the ranking of items in the other categories would reflect the importance assigned by Aristotle to qualitative explanations over quantitative ones, in physics as well as in zoology. (Note, however, that his interest in quantitative explanations has often been underestimated: examples of this are Lloyd 1987, ch. 5, and Wardy 1990, chs 6 and 8; by contrast, see Hussey 1991.) If he were deploying argument (ii), the ordering of qualitative over quantitative explanations might be a reasonable consequence to draw for some scientific systems (e.g. Empedocleanism and Anaxagoreanism), but not obviously for others—in particular for atomism. The first line of thought provides a

strong basis for the ranking of quality over quantity, but only works on the assumption that Aristotelian science would hold in a non-Aristotelian successive cosmos; the second avoids this weakness, but does not yield a good argument for the ranking of the other categories. If we suppose the focus to be on metaphysical (un)connectedness, it is hard to see any argument for the ordering which Aristotle might accept.

1069a22: reading *ἀλλὰ* with the MSS and the Arabic translations (Walzer 1958, p. 227), instead of Jaeger's *οἷον* (so Ross, Bydén 2005, Fazzo, and Alexandru). Jaeger emends the text because otherwise it appears, absurdly, to claim that all non-substantial items are qualities or processes (*κινήσεις*). Ross thinks that Aristotle may be trying to divide the non-substantial categories into groups: acting and being acted on, for example, could obviously be grouped together as 'processes'—and they are apparently so treated at *Z*.4 1029b25 (see Ross pp. 349 and 169). But while it is reasonable to see 'processes' as a shorthand for acting and being acted on, the word translated here as 'qualities' (*ποιότητες*) would be an odd label to choose for a group of categories of which 'quality' was but one (it is not the word Aristotle standardly uses for the category of quality (*ποιόν*), but it is simply the abstract noun formed from it, and it is used by Aristotle at least once to denote items within this category: *Z*.1 1028a19). And as Ross concedes, it is hard to imagine how all the non-substantial categories could be grouped under these two headings. It seems much easier to suppose that Aristotle just means to begin a list of the non-substantial categories: 'they are not beings without qualification, but <instead> qualities, processes (i.e. actions and passions), <and so on>.' Note that at 1071a1–2 Aristotle says 'attributes and processes' where we would again expect a reference to all non-substantial items.

1069a30–3: reading the same wording as Jaeger's text, but with different punctuation, and without *ἡ δ' ἀΐδιος* (which Jaeger marks for deletion) at a32. For discussion of the text, see Frede 2000b, pp. 78–80. At 1069a30–3 most MSS read: *οὐσίαι δὲ τρεῖς μία μὲν αἰσθητή, ἧς ἡ μὲν ἀΐδιος ἡ δὲ φθαρτή, ἣν πάντες ὁμολογοῦσιν, οἷον τὰ φυτὰ καὶ τὰ ζῷα ἡ δ' ἀΐδιος ἧς ἀνάγκη τὰ στοιχεῖα λαβεῖν*. There are two problems: the convoluted way in which the list of three types of substances is presented (see commentary), and the two occurrences of *ἡ ἀΐδιος*. This latter duplication clearly represents an error in the received text; MCV^{k} omit the first occurrence (*ἡ μὲν ἀΐδιος*); the genuine Alexander knew texts with and without the second occurrence. It is quite plausible that a marginal note *ἡ ἀΐδιος*, with or without *μέν* or *δέ*, which aimed to gloss something in the text or to make sense of something garbled, made its way into the text—and

indeed in C, while *ἡ μὲν ἀΐδιος* is not in the text at a30–1, *ἀΐδιος ἡ δέ* does appear in the margin. Ross and Jaeger, as often, cite various Greek commentators as supporting various readings of the text, but we need to use caution here: the commentators' different paraphrases may reflect different readings in the commentators' texts at this point, but they may equally reflect the commentators' different attempts to make sense of an obscure or apparently inept text, or even editorial decisions as to what text to read (as noted above, we know that Alexander had seen different readings in different MSS, and that his reading of the text was an editorial choice: see Frede, 2000b, p. 79). Frede identifies three main options, each involving the deletion of one occurrence of *ἡ ἀΐδιος*.

(i) *μία μὲν αἰσθητή, ἣν πάντες ὁμολογοῦσιν, ἧς ἡ μὲν φθαρτή, οἷον τὰ φυτὰ καὶ τὰ ζῷα, ἡ δ' ἀΐδιος· ἧς ἀνάγκη* .... This text follows the paraphrase given by [Alexander] (but as I have said, this paraphrase may reflect either the text he had in front of him, or his understanding of what the text means to say, or an editorial decision about emending the text).

(ii) *μία μὲν αἰσθητή, ἧς ἡ μὲν φθαρτή, ἣν πάντες ὁμολογοῦσιν, οἷον τὰ φυτὰ καὶ τὰ ζῷα, ἡ δ' ἀΐδιος· ἧς ἀνάγκη* .... This is the text of MCV^{k} (it is read by Fazzo).

(iii) *μία μὲν αἰσθητή, ἧς ἡ μὲν ἀΐδιος, ἡ δὲ φθαρτή· ἣν πάντες ὁμολογοῦσιν, οἷον τὰ φυτὰ καὶ τὰ ζῷα, ἧς ἀνάγκη* ... .

There are also:

(iv) *μία μὲν αἰσθητή, ἧς ἡ μὲν ἀΐδιος, ἡ δὲ φθαρτή, ἣν πάντες ὁμολογοῦσιν, οἷον τὰ φυτὰ καὶ τὰ ζῷα, ἧς ἀνάγκη* ...

(v) *μία μὲν αἰσθητή, ἣν πάντες ὁμολογοῦσιν—ἧς ἡ μὲν ἀΐδιος ἡ δὲ φθαρτή, οἷον τὰ φυτὰ καὶ τὰ ζῷα, ἧς ἀνάγκη* ... (read by Alexandru, following the paraphrase of Themistius, which survives in a Hebrew translation and (partially) in an Arabic one).

Reading (iv) differs from (iii) only in the punctuation which we add to the text between *ἡ δὲ φθαρτή* and *ἣν πάντες*. Frede prefers reading (i), which yields the translation 'One is perceptible (which is acknowledged by everyone), of which one is eternal and one perishable—e.g. plants and animals. Of this we must grasp the elements ... .' Frede rejects (ii) and (iv) on the grounds that we would expect Aristotle to mean to say that perceptible substance *in general* is acknowledged by everyone, and not that (only) perishable perceptible substance is; reading (iii) manages to achieve this sense, but at the cost of being 'intolerably clumsy'. I agree about (iii); and while (ii) has MS support, it is unattractive because it is very hard on this reading to understand the final *ἧς* as referring back to

perceptible substance, which it plainly needs to (for a contrary view, see Fazzo). (v) is quite a long way from the text as we have it, and the value of the Themistius paraphrase as a basis is highly uncertain. I think that the choice is between (i) and (iv). I agree with Frede about the merits of (i); on the other hand, (iv) has MS support which (i) lacks. Reading (iv) is thus the cautious reading, and I adopt it here.

1069b2: retaining *κοινή*, the reading of EJA^{b}, rather than the variant found in some MSS (most notably M and C), *εἰ μηδεμία αὐτοῖς ἀρχὴ κινήσεως*. For discussion, see Frede 2000b, p. 74, and the commentary on 1069a36–b2. For the reasons Frede gives, I do not think that we should adopt the reading of M and C.

1069b5: Jaeger adds *καί* before *ἡ φωνή*. I follow the MSS, Ross, Fazzo, and Alexandru in omitting this.

1069b21–4: I retain Jaeger's text, but without much confidence. At b23 EJA^{b}C, as well as the Arabic translations (Walzer 1958, p. 227), read *ἦν ἡμῖν πάντα δυνάμει ἐνεργείᾳ δὲ οὔ*. M and a scribal alteration in E have *ὁμοῦ* instead of *ἡμῖν*. Jaeger emends *ἡμῖν* to *μέν*. On any of these readings the passage is awkward: the phrase 'and what Democritus says' (*καὶ ὡς Δημόκριτός φησιν*) standing on its own is infelicitous, and leads us to expect a quotation or report of Democritus so as to explain why he too had some grasp of matter or potentiality. It is quite plausible that something has dropped out of the text, and that both *ἡμῖν* and *ὁμοῦ* represent attempts to make sense of the result. There is a good discussion of this in Charles 2000 (pp. 106–10), and his suggestion is quite attractive —that *ἦν … πάντα* is a Democritean remark or paraphrase, with something between *ἦν* and *πάντα* (such as *αἰεί* or *ὁμοίως*) having become corrupted into *ἡμῖν* or *ὁμοῦ*, and that *γὰρ* has dropped out between *δυνάμει* and *ἐνεργείᾳ* (making *δυνάμει <γὰρ> ἐνεργείᾳ δὲ οὔ* Aristotle's own comment). He thus suggests printing: *καὶ τοῦτ' ἔστι τὸ 'Αναξαγόρου ἓν (βέλτιον γὰρ ἢ ὁμοῦ πάντα) καὶ 'Εμπεδοκλέους τὸ μῖγμα καὶ 'Αναξιμάνδρου, καὶ ὡς Δημόκριτός φησιν "ἦν *** πάντα" (δυνάμει γάρ, ἐνεργείᾳ δὲ οὔ)*.

1070a19: reading *ἄλλα τούτων* rather than Jaeger's *ἀλλ' οὐ τούτων* (which follows a suggestion of Christ's, based on erroneously supposing that J reads *ἄλλου*). J reads *ἀλλα*, while EA^{b}MVC read *ἀλλὰ*. Ross takes *ἄλλα τούτων* ('other than these') to mean 'distinct from the things here' (so also Fazzo), and supposes, with [Alexander], 677.16–26, that the words 'as fire, flesh … substance especially' are misplaced, and originally came after 'matter and what underlies' in a11—a significant dislocation

of the original. If we keep these words where they are in the MSS, we have to take the sense to be 'Plato spoke well—at least if there are [i.e. if Plato thought that there are] Forms other than such things as fire, flesh, and head [i.e that there are Forms of human being, horse, etc.]. This is awkward, it has to be said. (Jaeger's *ἀλλ' οὐ τούτων* (treated as an emendation) would yield an easier sense, but the thought would still be extremely compressed: 'Plato did not speak badly when he said that there are as many Forms as there are natural things … but <this is> not <the case for his claim that there are Forms> of such things as fire, flesh, head; for they are all matter.')

1070a36: reading *οὐσίαι* with E, J (correction), MC, and Fazzo, rather than Jaeger's *ἡ οὐσία* (J (before correction), A^b, and the Arabic translations (Walzer 1958, p. 226)) or Ross's *αἱ οὐσίαι*.

1070b7: reading *στοιχείων* with EJMC; A^b has *στοιχεῖον ἐστιν* (read by Ross); Jaeger reads *στοιχεῖον*. See Crubellier 2000, pp 146–8. Any of these readings yields an awkward expression and an opaque argument; if we read *στοιχεῖον* the sentence must be an aside (Jaeger supposes it to have been a note added later by Aristotle): '(Nor, for that matter, can <any> of the objects of thought be an element—e.g. being or unity; for these belong to each of the composites as well.)'

1070b20: reading *χρώματι* with EJ, the Arabic translations (Walzer 1958, p. 227), and Ross, Fazzo, and Alexandru, rather than *χρώμασι* with A^b and Jaeger.

1070b23–5: I put a semi-colon after *ἀρχὴ καὶ στοιχεῖον*, retain *καὶ εἰς ταῦτα διαιρεῖται ἡ ἀρχή*, and read *ἀρχή τις καὶ οὐσία* with A^b (not A^bC, as reported by Crubellier) and Ross, Fazzo, and Alexandru, rather than the reading of EJMC, *ἀρχή τις οὖσα* (so Jaeger, who supposes a lacuna after *οὖσα*, to be filled by <*οὐκ ἔστι στοιχεῖον*>). For discussion, see Crubellier 2000, pp. 153–5.

1070b31: reading *ἀνθρώποις ἄνθρωπος* with EMCV^k, and Fazzo, rather than Jaeger's and Ross's *ἀνθρώπῳ ἄνθρωπος* (read by J^b); JA^b simply read *ἄνθρωπος*. *ἀνθρώποις ἄνθρωπος* is the better supported reading, and also the *lectio difficilior*.

1071a1: reading *ταὐτά* with all recent editors. The MSS have *ταῦτα*, but since Aristotle's original would in either case have read *TAYTA*, we are free to choose. Reading *ταῦτα* yields the sense 'And for this reason these

things [i.e. substances] are the causes of all things'; on this reading Aristotle's claim is that it is substances which are the causes of all things, whereas with *ταὐτά* the sentence is most naturally read as claiming the *causes* of substances are the causes of all things. There is nothing wrong with either of these claims in themselves, but the *ταῦτα* version leads to two problems which *ταὐτά* avoids. (i) It requires the things listed in the next sentence ('Then soul, perhaps, and body, or intellect and desire and body, will be these') to be introduced as *substances*; this seems awkward enough for body—though of course Aristotle has claimed in chapter 3 that matter is a substance—but it is very hard indeed to accept for desire. (ii) The summary of this passage at the end of chapter 5 speaks in terms of the causes of substances as the causes of all things (1071a34–5)—that is, in terms of the claim which reading *ταὐτά* suggests. (Cf. Code 2000, p. 165.)

1071a24: reading *ἔπειτα τὰ εἴδη τὰ τῶν οὐσιῶν. ἄλλα δέ ἄλλων …* (with Christ) rather than Ross's *ἔπειτα, εἰ δὴ τὰ τῶν οὐσιῶν, ἄλλα δέ ἄλλων …*, or Jaeger's *ἔπειτα ἤδη τὰ τῶν οὐσιῶν* (*ἄλλα δέ ἄλλων*). The principal MSS are divided between *ἔπειτα εἴδη* (E before correction, a second hand in J, A^b), *ἔπειτα τὰ εἴδη* (MCV^k and the Arabic translations (Walzer 1958, p. 227)), and *ἔπειτα ἤδη* (E after correction, first hand in J). Ross (followed by Fazzo and Alexandru) reads *ἔπειτα, εἰ δὴ τὰ τῶν οὐσιῶν, ἄλλα δέ ἄλλων αἴτια καὶ στοιχεῖα …*, and understands the sentence as: 'And then, if the <causes and elements> of substances <are the causes of all things>, yet they are different causes and elements for different things—of the things which are not the same in genus, colours, sounds, substances, quantity—except by analogy.' This reading faces a number of difficulties. (i) The sentence as a whole has a rather unsatisfactory sense. (ii) *τὰ τῶν οὐσιῶν* is very awkward on this construal; Ross's supplement '<are the causes of all things>' is especially hard. (iii) It is very hard to take the phrase *ἄλλα ἄλλων* as forward-looking and as governed by *αἴτια καὶ στοιχεῖα*. Jaeger avoids these problems by reading *ἔπειτα ἤδη τὰ τῶν οὐσιῶν* (*ἄλλα δέ ἄλλων*) *αἴτια καὶ στοιχεῖα …*; this would mean 'And then thereby the <causes and elements> of substances—different for different things—are the causes and elements of the things which are not the same in genus—colours, sounds, substances, quantity—except by analogy.' But the 'except by analogy' clause must pick up a preceding assertion of difference (the principles are different except by analogy), but it is very hard to see how the 'except' clause can be picking up Jaeger's parenthesised *ἄλλα δέ ἄλλων*. (One could add that Jaeger's reading also requires that the passage as a whole be subordinate to the point made at the start of the chapter that the principles of substances are in a way principles of all things; and this seems less satisfactory than taking

it to be coordinate with that point: see commentary on 1070b36–1071a29.) I suggest that we follow MCV^{k} (and the Arabic translations: see Walzer 1958 p. 227) and read *ἔπειτα τὰ εἴδη τὰ τῶν οὐσιῶν. ἄλλα δέ…*, and understand the first sentence as 'and then <the same is true for> the forms of substances'—that is, 'the argument in a20–4 applies to formal causes as well as to efficient ones.' The second sentence is then straightforward. It is easy to see how the MSS variants could have arisen if it was not understood that there were *two* sentences here, with the first ending at *οὐσιῶν*. (Christ conjectured this reading without knowing about the testimony of MCV^{k}.)

1072a5–6: reading *ἐνεργείᾳ* with Fazzo rather than *ἐνέργεια* with Ross, Jaeger, and Alexandru. The principal MSS are divided, but favour *ἐνεργείᾳ* (MC: *ἐνέργεια*; EJA^{b}: *ἐνεργείᾳ*), especially since we cannot rely on iota adscripts being included in the early transmission of the text (cf. the note on 1072b5).

1072a11–12: reading *ἄλλο δεῖ ἐνεργοῦν εἶναι* with EJ and Fazzo, rather than Jaeger's *ἄλλο δεῖ εἶναι ἀεὶ ἐνεργοῦν* (MC have *ἄλλο δεῖ ἐνεργοῦν*; A^{b} has *ἄλλο δεῖ εἶναι αἰεὶ ἐνεργοῦν*); the one Arabic translation omits *ἀεὶ* (Walzer 1958, p. 227). It seems the more cautious option to suppose that a scribe added *ἀεὶ*/*αἰεὶ* to pick up the *ἀεὶ* at a10 (and perhaps in the process moved the *εἶναι*) than that A^{b} alone of these MSS preserves an original *ἀεὶ*. (There is some discussion of this by Golitsis and Fazzo in the *Bryn Mawr Classical Review* for 2013.)

1072a24–5: reading *ἐπεὶ δὲ τὸ κινούμενον καὶ κινοῦν μέσον, κινοῦν ἔστι* in place of Jaeger's *ἐπεὶ δὲ τὸ κινούμενον καὶ κινοῦν καὶ μέσον … τοίνυν ἔστι* (so Barnes (ed.) 1984, II, 1694, following a suggestion by Ross). (i) J, second hand in E, and A^{b} read *ἐπεὶ δὲ τὸ κινούμενον*; the first hand in E before correction and MCV^{k} read *ἐπεὶ δὲ κινούμενον*; so the MS evidence for and against *τὸ* is divided. (ii) EJC and A^{b} before correction read *καὶ κινοῦν καὶ μέσον*; V^{k} and A^{b} after correction read *καὶ κινοῦν μέσον*: so the MS evidence for the second *καὶ* is stronger. (iii) EJCA^{b} read *τοίνυν ἔστι*; MV^{k} have a small lacuna covering this phrase, so the MS evidence for *τοίνυν ἔστι* is unequivocal; on the other hand, the position of *τοίνυν* as first word in the clause is difficult to accept. Fazzo disagrees with this last point, and reads *ἐπεὶ δὲ κινούμενον καὶ κινοῦν καὶ μέσον, τοίνυν ἔστι*. Alexandru reads *ἐπεὶ δὲ τὸ κινούμενον καὶ κινοῦν μέσον, ἔστι τοίνυν* (following another suggestion by Bonitz and Ross; so also De Filippo 1994, p. 396); this yields a similar overall sense to the text I read.

1072b2–3: retaining Jaeger's <καὶ> τινός, even though the weight of MS authority is strongly against A^b's τινός (EJCV^k omit it; M omits two lines of text ('among … *of* something')), making the status of Jaeger's text close to that of an emendation. The omission of καὶ is defended by Fazzo (2002 and 2012), but the Greek is very hard without it (she translates 'what is an end, in fact, is such in respect of another being'), and the resulting line of thought is somewhat lame.

1072b4: reading κινουμένῳ δὲ τἆλλα κινεῖ, following Jaeger, Fazzo, and Alexandru; this is the reading of most MSS including EJMV^k and the Arabic translations (Walzer 1958, p. 226). With Ross's conjecture κινούμενα for κινουμένῳ the sense would be a little more straightforward: 'it causes motion as something beloved, while it is by being moved that the other things cause motion.'

1072b5: reading ὥσθ' ἡ φορὰ ἡ πρώτη καὶ ἐνεργείᾳ ἐστιν ᾗ κινεῖται· ταύτῃ δὲ ἐνδέχεται rather than Jaeger's ὥσθ' ἡ φορὰ ἡ πρώτη εἰ καὶ ἐνεργείᾳ ἐστιν, ᾗ κινεῖται. ταύτῃ γε ἐνδέχεται (see Fazzo, pp. 284–7; Laks 2000, pp. 209 and 228–30; for a different view, see Alexandru, pp. 141–2). This represents a relatively conservative reading (except for ἐνεργείᾳ rather than ἐνέργεια) given the testimony of the MSS, though it may well be that something has gone awry with the text. Note that we have to decide between ἐνέργεια and ἐνεργείᾳ on the basis of sense, since we cannot rely on iota adscripts being included in the early transmission of the text; both here and at b8 I prefer ἐνεργείᾳ. At b5 ἐνέργεια might seem preferable, since the point is sharper if Aristotle is playing on the apparent tension between being an actuality (rather than merely being in actuality) and being able to be otherwise; but 'the first motion' is better construed as a metonomy for 'the subject of the first motion', since it is the subject of κινεῖται and ἐνδέχεται in what follows (see commentary), and it is easier to see Aristotle saying that this subject is, insofar as it is motion, in actuality than that it *is* actuality. At b8 ἐνέργεια ὄν would be rather awkward, whereas ἐνεργείᾳ ὄν is not.

1072b23: retaining the reading of the MSS, ὥστε ἐκεῖνο μᾶλλον τούτου (with Laks 2000, p. 235, n. 72, and Fazzo; the MSS divide between ὥστε and ὥστ'); Ross, Jaeger, and Alexandru emend to ὥστ' ἐκείνου μᾶλλον τοῦτο. Ross understands the emended text to mean 'it is the activity of thinking [τοῦτο: 'the latter'] rather than being receptive [i.e. potential—ἐκείνου: 'the former'] which seems to be what is divine about the intellect.' He rightly takes Aristotle to be concerned with human intellect (see

the commentary), and so rejects interpretations according to which the contrast is between human and divine thinking: the difficulty with the MSS reading is how to understand it without invoking such a contrast. Laks takes 'for that which is receptive of the object of intellect, i.e. of the substance, is intellect, and it is active when it possesses <the object of thought>' as parenthetical; this makes it possible to take 'the former' to refer back to intellect thinking itself at b19–20, and 'the latter' to intellect's grasping its object (Fazzo takes a similar view). One difficulty with this is that Aristotle appears to be appealing to a more widely shared view about the intellect, rather than to his own very distinctive view about intellect thinking itself. It seems preferable to take 'the former' to refer to intellect's being active and 'the latter' to the object of thought: this provides the basis for something closer to Ross's view without emending the text (see the commentary).

1072b27: reading EJMC's *ἐκεῖνο* with Fazzo, rather than A^b's *ἐκεῖνος* (so Ross, Jaeger, and Alexandru). Jaeger's text yields the translation 'for the activity of the intellect is life, and it [*ἐκεῖνος*] is that activity.' This 'it' (and in consequence the 'its' (*ἐκείνου*) at b28) could refer to God or to intellect: for discussion, see Laks 2000, pp. 236–7, Fazzo 2016, pp. 195–6 (for a similar issue in chapter 9, see section 3 of the Prologue to that chapter). On the text adopted here, the sense is quite different: 'for the activity of the intellect is life, and <its> activity is that [*ἐκεῖνο*: i.e the activity of the intellect]. On this reading '<its> activity [*ἡ ἐνέργεια*]' must refer to God's activity, and so the 'its' (*ἐκείνου*) at b28 must also refer to God. For discussion, see the commentary.

1074a13: retaining the MSS reading *ἑπτά* with Ross and Fazzo. Jaeger obelizes *ἑπτά*; Alexandru reads *ἐννέα*. One Arabic translation has 'seven' corrected to 'nine' (Walzer 1958, p. 224–5). For discussion, see the commentary.

1074a20: reading *τέλος* with Ross, Jaeger, Fazzo, and Alexandru, against EJA^bMC, which have *τέλους*: the latter gives a sense ('… every substance which is unaffected and which has in virtue of itself attained the best end is [i.e. exists]') which is very hard to fit into the argument.

1074a38: reading *ἓν μόνον* after *συνεχῶς* with Fazzo and Alexandru. This is the reading of EJMCV^k and an Arabic translation (Walzer 1958, p. 227). Jaeger and Ross follow A^b in omitting these words.

1075a22–3: reading *ἑκάστου ἀρχή* with the MSS, Ross, Sedley (2000, pp. 328–9), Fazzo, and Alexandru. Jaeger's emendation *ἀρχὴ ἑκάστου* would give the sense 'for each thing's nature is a principle of this sort.' For discussion, see the commentary.

1075a34: reading *ἡ γὰρ ὕλη ἡ μία οὐδενὶ ἐναντίον* with EJA^{b} (so Ross and Fazzo); MCV^{k} read *ἡ γὰρ ὕλη ἡμῖν ἐστιν οὐδενὶ ἐναντίον* (this text is read by Alexandru). Jaeger's *ἡ γὰρ ὕλη ἡμῖν οὐδενὶ ἐναντίον* is somewhat less likely, though it gives what is perhaps a better sense: 'for matter for us is not an opposite of anything.'

1075b19: reading *ἔτι ἄλλη ἀρχὴ* with Ross and Alexandru (following a suggestion by Bonitz (II, 523)); the MSS, followed by Jaeger and Fazzo, have *ὅτι ἄλλη ἀρχὴ*. The problem with the received text is that the two datives ('for those who make two principles … for those who make the Forms principles') do not form parallel expressions; Fazzo translates as 'and for those who posit the Forms also need to say that there is another, stronger principle.'

1076a4: the book ends with a quotation from Homer: *οὐκ ἀγαθὸν πολυκοιρανίη· εἷς κοίρανος ἔστω, εἷς βασιλεύς* (*Iliad* 2.204–5). Almost all of the MSS of Λ, followed by Jaeger and Fazzo, end the quotation at *κοίρανος*. Ross and Alexandru add *ἔστω*, but omitting it is perhaps the *lectio difficilior*.

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GLOSSARY

ENGLISH–GREEK

account	λόγος	*logos*
on our account	ὡς ἡμεῖς λέγομεν	*hōs hēmeis legomen*
act upon so as to produce	ποιεῖν	*poiein*
able to (can) act upon	ποιητικός	*poiētikos*
(to be) active	ἐνεργεῖν	*energein*
activity	ἐνέργεια	*energeia*
actuality	ἐνέργεια; ἐντελέχεια	*energeia*; *entelecheia*
in actuality	ἐνεργείᾳ; ἐντελεχείᾳ	*energeiāi*; *entelecheiāi*
analogy	ἀναλογία	*analogia*
analogically	κατ' ἀναλογίαν	*kat' analogian*
by analogy	τῷ ἀνάλογον	*tōi analogon*
appetite, object of	ἐπιθυμητόν	*epithumēton*
arrangement	τάξις	*taxis*
art	τέχνη	*technē*
attribute	πάθος	*pathos*
bad	κακός	*kakos*
badly	κακῶς	*kakōs*
beings	ὄντα	*onta*
beloved	ἐρώμενος	*erōmenos*
better	βελτίων; κρεῖττων	*beltiōn*; *kreittōn*
body	σῶμα	*sōma*
burdensome	ἐπίπονος	*epiponos*
cause	αἴτιον	*aition*
ceasing to be (noun)	φθορά	*phthora*
chance	τὸ αὐτόματον	*to automaton*
change (noun)	κίνησις; μεταβολή	*kinēsis*; *metabolē*
subject to change	μεταβλητή	*metablētē*
change (verb)	μεταβάλλειν; κινεῖν	*metaballein*; *kinein*
able to (can) cause change	κινητικός	*kinētikos*
initiate change	κινεῖν	*kinein*
chaos	χάος	*chaos*
choice, object of	αἱρετόν	*haireton*
colour	χρῶμα	*chrōma*
column of opposites	συστοιχία	*sustoichia*
coming to be	γένεσις	*genesis*
composite	σύνθετος	*sunthetos*

contemplation	θεωρία	*theōria*
continuous	συνεχής	*sunechēs*
continuously	συνεχῶς	*sunechōs*
desire (noun)	ὄρεξις	*orexis*
desire (verb)	ὀρέγεσθαι	*oregesthai*
desire, object of	ὀρεκτόν	*orekton*
divine	θεῖος	*theios*
element	στοιχεῖον	*stoicheion*
end	τέλος	*telos*
essence	τὸ τί ἦν εἶναι	*to ti ēn einai*
eternal	ἀΐδιος	*aïdios*
fine	καλός	*kalos*
finest	κάλλιστος	*kallistos*
finite	πεπερασμένος	*peperasmenos*
first	πρῶτος	*prōtos*
force	βία	*bia*
form	εἶδος; σχῆμα	*eidos*; *schēma*
generable	γενητός	*genētos*
genus	γένος	*genos*
God	ὁ θεός	*ho theos*
gods	θεοί	*theoi*
good	ἀγαθός; καλός	*agathos*; *kalos*
greatest	κράτιστος	*kratistos*
(the) heaven; the heavens	οὐρανός	*ouranos*
what is in the heavens	τὰ οὐράνια	*ta ourania*
human being	ἄνθρωπος	*anthrōpos*
the Ideas	αἱ ἰδέαι	*hai ideai*
impassive	ἀπαθής	*apathēs*
imperishable	ἄφθαρτος	*aphthartos*
impossible	ἀδύνατος	*adunatos*
impossibility	τὸ ἀδύνατον	*to adunaton*
impulse	ὁρμή	*hormē*
incidentally	κατὰ συμβεβηκός	*kata sumbebēkos*
indivisible	ἀδιαίρετος	*adiairetos*
infinite	ἄπειρος	*apeiros*
in itself	καθ' αὑτό	*kath' hauto*
intellect	νοῦς	*nous*
intelligible	νοητός	*noētos*
investigation	θεωρία	*theōria*
kind	γένος	*genos*
knowledge	ἐπιστήμη	*epistēmē*
last	ἔσχατος	*eschatos*
life	ζωή	*zōē*

lifetime	αἰών	*aiōn*
living being	ζῷον	*zōion*
locomotion	φορά	*phora*
Love (noun)	φιλία	*philia*
luck	τύχη	*tuchē*
magnitude	μέγεθος	*megethos*
make	ποιεῖν	*poiein*
matter	ὕλη	*hulē*
menstrual fluids	ἐπιμήνια	*epimēnia*
motion	κίνησις; φορά	*kinēsis*; *phora*
cause motion	κινεῖν	*kinein*
move (tr.)	κινεῖν	*kinein*
move (intr.)	κινεῖσθαι	*kineisthai*
be moved	κινεῖσθαι	*kineisthai*
(being) moved	κινούμενος	*kinoumenos*
mover	κινοῦν	*kinoun*
myth	μῦθος	*muthos*
mythically	μυθικῶς	*muthikōs*
natural	φύσει; φυσικός	*phusei*; *phusikos*
natural science	φυσική	*phusikē*
natural scientists	οἱ φυσικοί	*hoi phusikoi*
natural things	ὁπόσα φύσει; τὰ φυσικά	*hoposa phusei*; *ta phusika*
nature	φύσις	*phusis*
by nature	φύσει	*phusei*
the works on nature	τὰ φυσικά	*ta phusika*
(it is) necessary (for), (to)	δεῖ	*dei*
necessary (that)	ἀναγκαῖον; ἀνάγκη	*anangkaion*; *anangkē*
the necessary	τὸ ἀναγκαῖον	*to anangkaion*
necessity	τὸ ἀναγκαῖον	*to anangkaion*
of necessity	ἐξ ἀνάγκης	*ex anangkēs*
there is no necessity	οὐδὲν δεῖ	*ouden dei*
night	νύξ	*nux*
number	ἀριθμός	*arithmos*
oblique circle	λοξὸς κύκλος	*loxos kuklos*
opinion	δόξα	*doxa*
opposite	ἐναντίον	*enantion*
opposite condition	ἐναντίωσις	*enantiōsis*
over and above	παρά	*para*
part	μέρος; μόριον	*meros*; *morion*
partless	ἀμερής	*amerēs*
particular	καθ' ἕκαστον	*kath' hekaston*
perceptible	αἰσθητός	*aisthētos*

perception	αἴσθησις	*aisthēsis*
perfect	τέλειος	*teleios*
perish	φθείρεσθαι	*phtheiresthai*
perishable	φθαρτός	*phthartos*
the phenonema	τὰ φαινόμενα	*ta phainomena*
give the phenonema	τὰ φαινόμενα ἀποδιδόναι	*ta phainomena apodidonai*
place	τόπος	*topos*
planets	πλάνητες	*planētes*
it is possible	ἐνδέχεται	*endechetai*
potentiality	δύναμις	*dunamis*
potentially	δυνάμει	*dunamei*
primary	πρῶτος	*prōtos*
prior	πρότερος	*proteros*
principle	ἀρχή	*archē*
privation	στέρησις	*sterēsis*
process	κίνησις	*kinēsis*
productive	ποιητικός	*poiētikos*
reasonable	εὔλογον	*eulogon*
reflect	διάνοεῖσθαι	*dianoeisthai*
reflection	διάνοια	*dianoia*
relative	πρός τι	*pros ti*
science	ἐπιστήμη	*epistēmē*
seed	σπέρμα	*sperma*
seek	ζητεῖν	*zētein*
semen	γονή	*gonē*
separate	χωριστός	*chōristos*
set against each other (adj.)	ἀντικείμενα	*antikeimena*
setting	θέσις	*thesis*
shape	σχῆμα	*schēma*
simple	ἁπλοῦς	*haplous*
soul	ψυχή	*psuchē*
sphere	σφαῖρα	*sphaira*
spherical	στρογγύλος	*strongulos*
star	ἄστρον	*astron*
the unwandering stars	τὰ ἀπλανῆ ἄστρα	*ta aplanē astra*
the wandering stars	τὰ πλανώμενα ἄστρα	*ta planōmena astra*
starting-point	ἀρχή	*archē*
Strife	νεῖκος	*neikos*
substance	οὐσία	*ousia*
(in) succession	τῷ ἐφεξῆς; ἐχομένην	*tōi ephexēs*; *echomenēn*
superior	κυριώτερος	*kuriōteros*

synonym	*συνωνύμον*	*sunōnumon*
thing	*πρᾶγμα*; *χρῆμα*	*pragma*; *chrēma*
think	*νοεῖν*	*noein*
thinking (noun)	*νόησις*; *τὸ νοεῖν*	*noēsis*; *to noein*
this something	*τόδε τι*	*tode ti*
thought	*διάνοια*	*dianoia*
grasping in thought	*νόησις*	*noēsis*
to grasp in thought	*τῇ διανοίᾳ ὑπολαβεῖν*	*tēi dianoiāi hupolabein*
object of thought	*νοητός*	*noētos*
what is thought	*τὸ νοούμενον*	*to nooumenon*
timber	*ὕλη*	*hulē*
time	*χρόνος*	*chronos*
totality of things	*τὸ πᾶν*	*to pan*
unceasing	*ἄπαυστος*	*apaustos*
unchanging	*ἀκίνητος*	*akinētos*
universal	*καθόλου*	*katholou*
universally	*καθόλου*	*katholou*
the universe	*τὸ πᾶν*	*to pan*
unmoved	*ἀκίνητος*	*akinētos*
voice	*φωνή*	*phōnē*
way of life	*διαγωγή*	*diagōgē*
what underlies	*ὑποκείμενον*	*hupokeimenon*
(the) whole	(*τὸ*) *ὅλον*	(*to*) *holon*
wind back	*ἀνελίττειν*	*anelittein*
wish, object of	*βουλητόν*	*boulēton*
without qualification	*ἁπλῶς*	*haplōs*
worst	*χείριστος*	*cheiristos*
the zodiac, the constellations of	*τὰ ζῴδια*	*ta zōidia*

GREEK–ENGLISH

ἀγαθός	*agathos*	good
ἀδιαίρετος	*adiairetos*	indivisible
ἀδύνατος	*adunatos*	impossible
τὸ ἀδύνατον	*to adunaton*	impossibility
ἀΐδιος	*aïdios*	eternal
αἱρετόν	*haireton*	object of choice
αἴσθησις	*aisthēsis*	perception
αἰσθητός	*aisthētos*	perceptible
αἴτιον	*aition*	cause
αἰών	*aiōn*	lifetime
ἀκίνητος	*akinētos*	unchanging; unmoved
ἀμερής	*amerēs*	partless
ἀναλογία	*analogia*	analogy
κατ᾽ ἀναλογίαν	*kat᾽ analogian*	analogically
τῷ ἀνάλογον	*tōi analogon*	by analogy
ἀνελίττειν	*anelittein*	wind back
ἄνθρωπος	*anthrōpos*	human being; human
ἀντικείμενα	*antikeimena*	set against each other (adj.)
ἀπαθής	*apathēs*	impassive
ἄπαυστος	*apaustos*	unceasing
ἄπειρος	*apeiros*	infinite
ἁπλοῦς	*haplous*	simple
ἁπλῶς	*haplōs*	without qualification
ἀριθμός	*arithmos*	number
ἀρχή	*archē*	principle; starting-point
ἄστρον	*astron*	star
τὰ ἀπλανῆ ἄστρα	*ta aplanē astra*	the unwandering stars
τὰ πλανώμενα ἄστρα	*ta planōmena astra*	the wandering stars
τὸ αὐτόματον	*to automaton*	chance
ἄφθαρτος	*aphthartos*	imperishable
βελτίων	*beltiōn*	better
βία	*bia*	force
βουλητόν	*boulēton*	object of wish
γένεσις	*genesis*	coming to be
γενητός	*genētos*	generable
γένος	*genos*	genus
γονή	*gonē*	semen
διαγωγή	*diagōgē*	way of life
διάνοεῖσθαι	*dianoeisthai*	reflect
διάνοια	*dianoia*	reflection; thought

δόξα	*doxa*	opinion
δύναμις	*dunamis*	potentiality
δυνάμει	*dunamei*	potentially
εἶδος	*eidos*	form
καθ' ἕκαστον	*kath' hekaston*	particular
ἐναντίον	*enantion*	opposite
ἐναντίωσις	*enantiōsis*	opposite condition
ἐνέργεια	*energeia*	activity; actuality
ἐνεργείᾳ	*energeiāi*	in actuality
ἐνεργεῖν	*energein*	(to be) active
ἐντελέχεια	*entelecheia*	actuality
ἐντελεχείᾳ	*entelecheiāi*	in actuality
ἕξις	*hexis*	state
ἐπιθυμητόν	*epithumēton*	object of appetite
ἐπιμήνια	*epimēnia*	menstrual fluids
ἐπίπονος	*epiponos*	burdensome
ἐπιστήμη	*epistēmē*	knowledge; science
ἔσχατος	*eschatos*	last
εὔλογον	*eulogon*	reasonable
τῷ ἐφεξῆς	*tōi ephexēs*	in succession
ζητεῖν	*zētein*	seek
τὰ ζῴδια	*ta zōidia*	the constellations of the zodiac
ζωή	*zōē*	life
ζῷον	*zōion*	animal; living being
θεῖος	*theios*	divine
θεοί	*theoi*	gods
ὁ θεός	*ho theos*	God
θέσις	*thesis*	setting
θεωρία	*theōria*	contemplation; investigation
αἱ ἰδέαι	*hai ideai*	the Ideas
καθ' αὑτό	*kath' hauto*	in itself
καθόλου	*katholou*	universal; universally
κακός	*kakos*	bad
κακῶς	*kakōs*	badly
κάλλιστος	*kallistos*	finest
καλός	*kalos*	fine; good
κινεῖν	*kinein*	change (verb); initiate change; move (tr.); cause motion
κινεῖσθαι	*kineisthai*	move (intr.); be moved
κίνησις	*kinēsis*	change (noun); motion; process
κινητικός	*kinētikos*	able to (can) cause change
κινούμενος	*kinoumenos*	(being) moved

κινοῦν	*kinoun*	mover
κράτιστος	*kratistos*	greatest
κρεῖττων	*kreittōn*	better
κύριον	*kurion*	what determines
κυριώτερος	*kuriōteros*	superior
λόγος	*logos*	account; argument; formula
λοξὸς κύκλος	*loxos kuklos*	oblique circle
μέγεθος	*megethos*	magnitude
μέρος	*meros*	part
μεταβάλλειν	*metaballein*	change (verb)
μεταβλητή	*metablētē*	subject to change
μεταβολή	*metabolē*	change (noun)
μόριον	*morion*	part
μῦθος	*muthos*	myth
μυθικῶς	*muthikōs*	mythically
νεῖκος	*neikos*	Strife
νοεῖν	*noein*	think
τὸ νοεῖν	*to noein*	thinking (noun)
νόησις	*noēsis*	grasping in thought (noun); thinking (noun)
νοητός	*noētos*	intelligible; object of thought
τὸ νοούμενον	*to nooumenon*	what is thought
νοῦς	*nous*	intellect
νύξ	*nux*	night
(τὸ) ὅλον	(*to*) *holon*	(the) whole
ὄντα	*onta*	beings
ὀρέγεσθαι	*oregesthai*	desire (verb)
ὀρεκτόν	*orekton*	desire, object of
ὄρεξις	*orexis*	desire (noun)
ὁρμή	*hormē*	impulse
οὐρανός	*ouranos*	(the) heaven; the heavens
οὐσία	*ousia*	substance
πάθος	*pathos*	attribute
τὸ πᾶν	*to pan*	the totality of things; the universe
παρά	*para*	over and above
πλάνητες	*planētes*	planets
ποιεῖν	*poiein*	act upon; act upon so as to produce; do; make
ποιητικός	*poiētikos*	able to (can) act upon; productive
πρᾶγμα	*pragma*	thing
πρός τι	*pros ti*	relative

πρότερος	*proteros*	prior
πρῶτος	*prōtos*	first; primary
σπέρμα	*sperma*	seed
στέρησις	*sterēsis*	privation
στοιχεῖον	*stoicheion*	element
στρογγύλος	*strongulos*	spherical
κατὰ συμβεβηκός	*kata sumbebēkos*	incidentally
συνεχής	*sunechēs*	continuous
συνεχῶς	*sunechōs*	continuously
σύνθετος	*sunthetos*	composite
συνωνύμον	*sunōnumon*	synonym
συστοιχία	*sustoichia*	column of opposites
σφαῖρα	*sphaira*	sphere
σχῆμα	*schēma*	form; shape
τάξις	*taxis*	arrangement
τέλειος	*teleios*	perfect
τέλος	*telos*	end
τέχνη	*technē*	art
τόδε τι	*tode ti*	this something
τόπος	*topos*	place
τὸ τί ἦν εἶναι	*to ti ēn einai*	essence
τύχη	*tuchē*	luck
ὕλη	*hulē*	matter; timber
ὑποκείμενον	*hupokeimenon*	what underlies
τὰ ὑποκείμενα	*ta hupokeimena*	the things which have been laid down
τὰ φαινόμενα	*ta phainomena*	the phenonema
τὰ φαινόμενα ἀποδιδόναι	*ta phainomena apodidonai*	give the phenonema
φθαρτός	*phthartos*	perishable
φθείρεσθαι	*phtheiresthai*	perish
φθορά	*phthora*	ceasing to be (noun)
φιλία	*philia*	Love (noun)
φορά	*phora*	locomotion; motion
φύσις	*phusis*	nature
φύσει	*phusei*	by nature; natural
φυσικός	*phusikos*	natural
τὰ φυσικά	*ta phusika*	natural things; the works on nature
φυσική	*phusikē*	natural science
οἱ φυσικοί	*hoi phusikoi*	natural scientists
φωνή	*phōnē*	voice
χάος	*chaos*	chaos

χείριστος	*cheiristos*	worst
χρῆμα	*chrēma*	thing
χρόνος	*chronos*	time
χρῶμα	*chrōma*	colour
χωριστός	*chōristos*	separate
ψυχή	*psuchē*	soul

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Note: Page references in bold are to the translation.