The Grounds of Unity:

substantial and sub-substantial being in Aristotle

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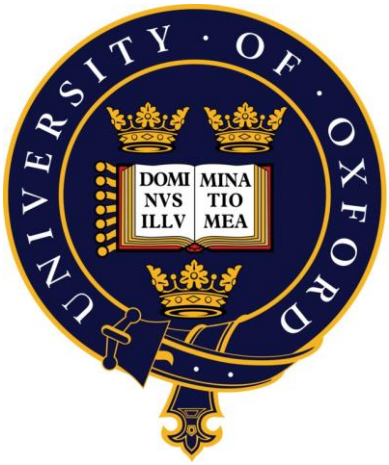

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Abstract

Strawson famously classified Aristotle as a descriptive metaphysician, alongside himself, and in contrast to more revisionary philosophers like Plato. The extent to which Aristotle was merely concerned to describe our conceptual scheme has, however, been over-estimated by some. Although common-sense beliefs are among the starting-points from which Aristotle pursues his metaphysical inquiries, the conclusions of those inquiries are in fact quite radical.

In chapter one, we identify three interpretative questions about Aristotle's notion of substance:

(1) does Aristotle change his mind about what things are the substances between writing the *Categories* and the *Metaphysics*?

(2) are matter, form and the compound of the two all substances, albeit to different extents, or are only forms substances?

(3) however we resolve these questions about hylomorphism, what range of forms count as substantial, and why?

In chapter two, we examine the criteria of being a substance. These provide evidence for Aristotle's changing his mind between the *Categories* and *Metaphysics*. An examination of the 'χωριστόν' criterion also supports the view that only forms are substances: Aristotle claims that compounds are separate *simpliciter*, since they can exist without items in other categories, and not vice versa, but this claim cannot be supported. Only forms are separate in definition, and so, on the assumption that being separate is necessary for being a substance, only forms are substances.

If we are to understand the claim that only forms are substances, we should acquire a better understanding of what is meant by 'form', and why Aristotle thinks there are such things. Chapters three to five undertake this task. Chapter three discusses Aristotle's introduction of matter and form in the *Physics* to account for substantial generation, and his argument in Z.17 that form is substance, since it is what makes some matter one thing. In chapter four, this unificatory role is distinguished from the role of a principle of individuation, and it is argued that only individual forms are suitable to play the latter role. In chapter five, we examine some recent attempts to blur the distinction between matter and form, by maintaining that form is essentially matter-involving. We argue that the view according to which form is defined independently of matter is preferable.

In chapters six and seven, we address the third interpretative question. Chapter six argues that artefacts are not substances (and not merely substances to a lesser degree than organisms) because they are not separate, since they depend on the intentional activity of their creators or users. Chapter seven considers Aristotle's views about mixtures. These are also compounds of matter and form, but fail to be substances because, like matter, they depend on a higher form to make them one thing.

To my parents

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Contents

Chapter One: Aristotle's metaphysics and the nature of substance

I. The origins of metaphysics

What is the relationship between metaphysics as Aristotle conceived of it, and as it is practised today by modern philosophers? In a way this question depends on a misapprehension: for, although the word 'metaphysics' derives from Aristotle's work of that name, it is unlikely that Aristotle himself was responsible for the title. Early citations do not refer to the work as 'metaphysics', and the title is first attested in the first century BC by Nicolaus of Damascus, in his compendium of Aristotle's philosophy. Ancient sources claim that this title was due to Andronicus of Rhodes, head of the Peripatetic school in Rome in the middle of the first century BC.[1] Andronicus was responsible for editing Aristotle's works, and the story goes that he chose to place Aristotle's treatise on first philosophy after (*meta*) his treatment on nature (*phusis*), and the puzzles associated with it, the *Physics, or Ta Phusika*. Hence *Ta Meta Ta Phusika* simply means the work that comes after the *Physics*. The veracity of this story has been doubted by some.[2] The *Metaphysics* does not come immediately after the *Physics* in the corpus. As well as referring to Aristotle's *Physics*, 'ta phusika' might mean 'the natural things'. There are other Aristotelian works broadly devoted to natural science, and the *Corpus Aristotelicum* as transmitted to us via the Medieval manuscripts places the *Metaphysics* after all of these. The Academics, and later the Stoics, divided philosophy into three branches: logic, physics, and ethics. Aristotle's *Metaphysics* is more closely related to physics, of which theology was sometimes considered a sub-division, than to the other two branches, so it must have made some

[1] Cf. Ammonius, *In de Int.* 5.24, Plutarch, *Sulla* c. 26; and, for more detail about how Aristotle's work acquired its title, cf. Owens (1978), 68-84, and Moraux (1951).
[2] Cf. Chroust (1961).

sense to position it where it is in the manuscripts. Of course, Andronicus, or whoever is responsible for the ordering, had to put it somewhere, but it is reasonable to ask if he had any more compelling reason for placing it where he did, and for giving it such a peculiar title.

To answer these questions we would do well to examine the work itself, and the way in which Aristotle characterises it. There are good reasons to believe that Books α and K are not by Aristotle, while Book Δ, though genuine, appears to be out of place. The extent to which the rest forms a coherent whole is a matter of debate, but it would surely be desirable to establish a single subject matter that will unify the apparently disparate topics covered.[3] Although Aristotle does not call what he is doing 'metaphysics' anywhere in the text, he does describe it as 'first philosophy' (1026a24), 'the science of being *qua* being' (1003a21ff.), and 'theology' (1026a19-23, 1064b1-6). He also refers to it as 'wisdom' (*sophia*; 982a16-19, 982b9, 996b9, 1059a18-34, 1060a10), although he sometimes applies this to the whole of theoretical philosophy, which also includes physics and mathematics (981a27, 1005b1, *EN* 1141b1). Elsewhere, he characterises first philosophy as the science of substance (*ousia*; 999b31, 1028b4-7, 1069a18); the science of primary substance (1005a35); the science of the causes of substances (1003b18, 1042a25, 1069a18); and the science of form (*Phys.* 192a34-6, 194b14-15). Aristotle does not seem to recognise any inconsistency in such multifarious ways of designating first philosophy.[4]

One way in which we might make sense of the claim that metaphysics belongs after natural science would be if metaphysics relied on results established in physics, so that to understand it properly one would have to understand physics first. However, if anything, Aristotle seems to think it is the other way around: metaphysics deals with *first* philosophy, while natural science is second philosophy; one should study substance in general before

[3] Ross (1924), vol. 1, Introduction §1, makes the helpful point that the *aporiai* of Book B get solved eventually.
[4] Cf. Owens (1978), 9.

moving on to examine a particular kind of substance (natural or changeable ones). Perhaps the most plausible further sense, then, in which the *Metaphysics* can be thought of as 'after physics' is if this can be taken to mean 'beyond physics' in that it has a more general, or more important, subject-matter that requires to be treated of first in the proper order of explanation. This suggestion is supported by various passages in which Aristotle claims that one should start with the things that are more intelligible to oneself and proceed to what is more intelligible by nature. He makes this claim at the end of Z.3 (1029a33-b12) to explain why it is appropriate to examine perceptible substances before imperceptible ones, and the principle clearly determines the position of Book Λ, where imperceptible substances are discussed, at the end of the *Metaphysics*.[5] The idea that it is right to treat 'first things' last would explain the description of the science as being both first philosophy and *meta ta phusika*: metaphysics deals with more difficult issues, of a higher order of generality than those discussed in physics, so it is suitable to be tackled later in a student's course of study; nevertheless those issues are also the most fundamental, so that one lacks a complete grasp of physics, and all the other sciences, until one has mastered the science of being *qua* being.

II. The content of metaphysics

Whatever the origins of the word 'metaphysics', there is a puzzle about what Aristotle thinks of himself as doing in this work. Traditionally, scholars have drawn a distinction between general metaphysics – a general study of what there is,[6] or of being in

[5] Cf. *APo*. 71b33–72a25, *Top*. 141b3–14, *Phys*. 184a16–23 for similar claims. For a good discussion of the possible doctrinal meaning of 'meta' in 'meta ta phusika', cf. Reiner (1969).

[6] I take it that there is an existential sense of the Greek verb 'εἶναι', and that this is at least the primary sense that Aristotle has in mind in his expression 'τὸ ὂν ᾗ ὂν'. It might seem anachronistic to attribute an existential sense of 'εἶναι' to the Greeks. The English verb 'to exist' is a relatively recent addition to our language: the OED's first attested usage is in Shakespeare. It derives from the Latin verb 'exsistere', which means 'to stand out or be perceptible' in Classical Latin. The charge of anachronism depends on the claim that the Greek verb

so far as it is being – and special metaphysics, which picks out a special category of beings to study. The problem is that Aristotle seems to regard himself as doing both of these things at once. At the beginning of Book Γ, we are told: 'There is a science which studies being in so far as it is being, and those things that belong to this in virtue of itself.' (1003a21-2)[7] This is contrasted with 'the special sciences...[which] cut off some part of [being] and study what is coincidental concerning this;[8] as for instance the mathematical sciences.' (22-6)[9] In Γ.3-8, Aristotle goes on to consider the logical principles of non-contradiction and excluded middle, and this investigation might reasonably be considered an exercise in general metaphysics, a discussion of principles that apply to everything that is.

There is an apparent conflict between the start of Book Γ and the start of Book E, where Aristotle identifies first philosophy with theology, the study of changeless or supra-

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'εἶναι' cannot mean the same as our verb 'to exist'. This is more plausible if, as some modern philosophers have maintained (cf. Parsons (1980)), there is a difference between 'to be' (in its complete sense) and 'to exist' in English. I agree with Van Inwagen (2001), 15-16, that this is false. Take the sentence 'There is a fat, jolly man called 'Father Christmas', who lives at the North Pole, and doesn't exist.' Such sentences might lead one to suppose that there are things which do not exist, and, of course, if being and existence have different extension, the concepts are not the same. The correct response to this apparent counter-example is to say that there is no such thing as Father Christmas; and in general for any purported non-existent being, one should always say either that there is no such thing, or that it does in fact exist. If one thinks that sentences like this one are true, one needs to find a way of stating their truth conditions that does not imply that the non-existent thing is.

[7] All translations from Aristotle are my own, made in consultation with Barnes (1984), and, where it exists, the Clarendon Aristotle Series. Unless otherwise stated, the Greek text used is that printed in the Oxford Classical Texts.

[8] It seems most natural to take the antecedent of 'τούτου' to be 'μέρος'. On this construal, the special sciences are said to study the accidents of a part of being. This might seem surprising: mathematics does not merely study the accidents of quantities; one would think that it studies their essences and necessary features as well. One might be tempted to take the 'τούτου' to refer to 'αὐτοῦ', so that the special sciences study the accidents of being (not just a part of being). However, there is no need to depart from the more natural reading: if 'cutting off a part of being' involves finding the essence of the part, we need not suppose that the special sciences are confined to the study of accidents. We can take Aristotle to be asserting that the special sciences involve a two stage process. First, one works out the essence of one's subject-matter by defining it (the physical metaphor of 'cutting off' is similar to Aristotle's use of 'ὅρος' (literally, 'a boundary'), 'διορισμὸς', etc. to refer to definitions). Then one studies the accidents. The fact that 'ἀποτεμόμεναι' is aorist would suggest that the first stage should be completed before the second is embarked upon, although Aristotle may not have been thinking about the temporal priority of the stages.

[9] Ἔστιν ἐπιστήμη τις ἣ θεωρεῖ τὸ ὂν ᾗ ὂν καὶ τὰ τούτῳ ὑπάρχοντα καθ' αὑτό. αὕτη δ' ἐστὶν οὐδεμιᾷ τῶν ἐν μέρει λεγομένων ἡ αὐτή· οὐδεμία γὰρ τῶν ἄλλων ἐπισκοπεῖ καθόλου περὶ τοῦ ὄντος ᾗ ὄν, ἀλλὰ μέρος αὐτοῦ τι ἀποτεμόμεναι περὶ τούτου θεωροῦσι τὸ συμβεβηκός, οἷον αἱ μαθηματικαὶ τῶν ἐπιστημῶν.

sensible substances. We are informed that there are 'three kinds of theoretical philosophy – mathematical, natural and theological' (1026a18-19), and that 'if there is no other substance apart from those constituted naturally, the science concerned with nature would be primary. But if there is some changeless substance, <the science which studies> this is prior and is primary philosophy, and universal in this way because primary' (27-31).[10] It looks as though Aristotle is doing precisely what he denied he was doing earlier: engaging in a special science which selects some part of what there is (namely, the divine or changeless part) as an object of study. However, although he acknowledges this worry, saying 'one might be perplexed as to whether first philosophy really is universal, or concerns a particular genus and one particular nature' (1026a23-5),[11] he apparently does not regard it as seriously problematic, since his only response to the worry here is the enigmatic claim that it is universal because it is primary. The final sentence of E.1 then assimilates theology to the science of being *qua* being introduced in Γ.1, as though their identification were perfectly straightforward.

This puzzle of how to reconcile Aristotle's general and special metaphysics is closely related to another difficulty: every science is concerned with a particular genus as object of study, e.g. botany is concerned with plants. However, Aristotle specifically says elsewhere that there is no genus of being (*APo.* 92b14, cf. *Top*. 121a16-19, b7-9). From these assumptions it follows that there is no science of being. Now, one might think that this is unproblematic: for Aristotle does not assert that there is a science of being, but of being *qua* being. So, as long as there is a genus of being *qua* being, there is no contradiction. If 'being *qua* being' is supposed to pick out a different subject-matter from 'being', '*qua* being' must

[10] ὥστε τρεῖς ἂν εἶεν φιλοσοφίαι θεωρητικαί, μαθηματική, φυσική, θεολογική... εἰ μὲν οὖν μὴ ἔστι τις ἑτέρα οὐσία παρὰ τὰς φύσει συνεστηκυίας, ἡ φυσικὴ ἂν εἴη πρώτη ἐπιστήμη· εἰ δ' ἔστι τις οὐσία ἀκίνητος, αὕτη προτέρα καὶ φιλοσοφία πρώτη, καὶ καθόλου οὕτως ὅτι πρώτη·

[11] ἀπορήσειε γὰρ ἄν τις πότερόν ποθ' ἡ πρώτη φιλοσοφία καθόλου ἐστὶν ἢ περί τι γένος καὶ φύσιν τινὰ μίαν.

not indicate the manner in which the subject-matter, being, is to be studied. Instead, and despite the contrast in Book Γ between the special sciences and the universal science, it should pick out some proper subset of being – being *qua* being – as the subject-matter of the science.[12]

Predicates like 'exists' (or 'is one') apply to everything, and plausibly do not add anything to a thing's description when they are predicated.[13] This would provide a reason for thinking that being is different from other properties, which divide what exists into two classes – those things to which the property belongs and those to which it does not. However, it is still unclear why Aristotle should think that this means that there is no genus of being; or why he cannot say that metaphysics is a special case of a science with no genus; or that, while it is not strictly-speaking a science, it is sufficiently science-like to count as a unified subject.[14] Aristotle may simply have changed his mind between writing the logical works and the *Metaphysics*, or he may have failed to notice the contradiction (although

[12] Grammatically, 'ᾗ ὄν' in the first sentence of Γ.1 could qualify 'τὸ ὄν' (it studies being-qua-being) or it could qualify 'θεωρεῖ' (it studies being in the qua being way). The second reading seems less likely given that later in the chapter (1003a31) we find the phrase 'τοῦ ὄντος ᾗ ὄν τὰς πρώτας αἰτίας', where there is no verb to take the 'qua being' with. We should take 'ᾗ ὄν' to qualify 'τὸ ὄν', but the phrase is still ambiguous, since it might refer to some proper subset of being, as defined by a property that only some of the beings have, or to all beings, but only in a certain respect or in so far as they have a certain property. If we study animal qua female, one might think that the domain of our study is female animals; or one might think that it is all animals, but that we are studying them in so far as they have a property, being female, which only some of them have. This second way of understanding the 'qua' locution seems preferable: if the purpose of the participle or adjective after the 'qua' were just to restrict the domain further, it would be more straightforward simply to write 'we study female animals' etc.; also, it is unclear how the restriction is supposed to take place when one has the same expression before and after the 'qua'. Even though this second way of understanding the phrase 'qua being' has it qualifying 'being', it is really equivalent to the reading on which it qualifies 'studies': 'x qua y' picks out an ordered pair, consisting of a domain (x) and a property belonging to members of that domain (y). Then one studies x by means of y; and it makes no difference whether one takes 'by means of y' with the verb or the domain. This reading does not help to reconcile the universal science of Γ.1 with the characterisation of first philosophy as theology in E.1, which is why some scholars have preferred the reading according to which the 'qua' restricts the domain of study.

[13] At least Kant thought so: 'By whatever and by however many predicates we may think a thing — even if we completely determine it — we do not make the least addition to the thing when we further declare that this thing is. … If we think in a thing every feature of reality except one, the missing reality is not added by my saying that this defective thing exists.' (*Critique of Pure Reason*, B628)

[14] These views might be supported by the fact that 'Ἔστιν ἐπιστήμη τις' at the beginning of Γ.1 could mean 'there is a sort of science'; for this apologetic use of 'τις', cf. Smyth (1920), §1268.

probably we should favour interpretations that do not require this.) While all of these solutions seem possible, a number of scholars[15] have attributed to Aristotle the view that there is a distinct genus of being *qua* being, in order to explain his practice of investigating not all of being, but one category of being – substance, and then concentrating on one sort of substance – insensible substance.

Scholars who take this approach have attempted to use the doctrine of the homonymy of being to support their case. In Γ.2, Aristotle tells us: 'Being is spoken of in many ways, but with reference to a single thing and one nature and not homonymously. Rather, just as every healthy thing stands to health, some by preserving it, and some by producing it, and others by being indicative of it, and others by being receptive of it, or as what is medical is related to medicine...so too being is said in many ways, but with reference to a single source. Some things are called beings (*onta*) because they are substances (*ousiai*), others because they are affections of substances, others because they are a path to substance, or are negations of some one of these or of substance itself (wherefore we even say that non-being *is* non-being).' (1003a33-b10)[16] Aristotle claims that being is not homonymous, by which he means (in this passage) that it is not like 'bank' which has two meanings that are entirely unconnected. On the other hand, it is 'said in many ways', in that, though each use of 'being' is related to a common source, just as each use of 'healthy' is related to the common source of health, the relation to that source is different in different cases. One cannot substitute the definitions of 'being' for one another and preserve

[15] E.g. Owen (1965), Patzig (1979), Frede (1987).

[16] Τὸ δὲ ὂν λέγεται μὲν πολλαχῶς, ἀλλὰ πρὸς ἓν καὶ μίαν τινὰ φύσιν καὶ οὐχ ὁμωνύμως ἀλλ' ὥσπερ καὶ τὸ ὑγιεινὸν ἅπαν πρὸς ὑγίειαν, τὸ μὲν τῷ φυλάττειν τὸ δὲ τῷ ποιεῖν τὸ δὲ τῷ σημεῖον εἶναι τῆς ὑγιείας τὸ δ' ὅτι δεκτικὸν αὐτῆς, καὶ τὸ ἰατρικὸν πρὸς ἰατρικήν (τὸ μὲν γὰρ τῷ ἔχειν ἰατρικὴν λέγεται ἰατρικὸν τὸ δὲ τῷ εὐφυὲς εἶναι πρὸς αὐτὴν τὸ δὲ τῷ ἔργον εἶναι τῆς ἰατρικῆς), ὁμοιοτρόπως δὲ καὶ ἄλλα ληψόμεθα λεγόμενα τούτοις, — οὕτω δὲ καὶ τὸ ὂν λέγεται πολλαχῶς μὲν ἀλλ' ἅπαν πρὸς μίαν ἀρχήν· τὰ μὲν γὰρ ὅτι οὐσίαι, ὄντα λέγεται, τὰ δ' ὅτι πάθη οὐσίας, τὰ δ' ὅτι ὁδὸς εἰς οὐσίαν ἢ φθοραὶ ἢ στερήσεις ἢ ποιότητες ἢ ποιητικὰ ἢ γεννητικὰ οὐσίας ἢ τῶν πρὸς τὴν οὐσίαν λεγομένων, ἢ τούτων τινὸς ἀποφάσεις ἢ οὐσίας· διὸ καὶ τὸ μὴ ὂν εἶναι μὴ ὄν φαμεν.

meaning, i.e. they are not synonymous.[17] If this is right, it would explain why there is no genus of being – just as there is no genus of healthy things. Everything that is called a being is not a being in the same sense, though they are all related by the common source. Nevertheless, there is a genus, and a science, of being *qua* being, since the subject-matter of this is what being applies to in the primary sense, the sense to which all the other senses of being make reference in their definitions.[18]

An obvious question at this juncture is: what is the common source which unites all beings? It seems clear what Aristotle's answer will be. According to the *Categories*, 'all the other things are either said of the primary substances as subjects or in them as subjects. So if the primary substances did not exist it would be impossible for any of the other things to exist.' (2b6-7)[19][20] All beings in the other categories depend on substance, so substance is the common source of being, which the science of being *qua* being studies. According to Aristotle, a quality (or member of any category other than substance) must be a quality *of* some substance. To say that paleness exists is just to say that some substance is pale; whereas, when we say that Socrates exists, we need not explicate this in terms of quality or any other category. Accounts of things in the other categories of being must make mention

[17] This point is complicated by the fact that we are told they are not homonymous. Shields (1999), §1.2, distinguishes two sorts of homonymy – discrete and comprehensive. The former applies to cases like 'bank' and 'bank', the definitions of which have nothing in common, while the latter applies to cases where the definitions partly overlap. Shields calls words such as 'healthy' and 'being' that (allegedly) involve different relations to a common source cases of 'core-dependent homonymy'. Owen (1960) refers to this phenomenon as 'focal meaning'; Irwin (1981) calls it 'focal connexion', to avoid the implication that it is primarily a thesis about the meanings of words. Aristotle never says that being is homonymous, but Shields (1999), §1.3, argues that the claim that it is said in many ways implies this.

[18] Alternatively, one might argue that the science of being *qua* being studies all beings, but only in so far as they relate to their common source. This makes better sense of the 'qua' locution (cf. fn. 12), but forces us to concede that Aristotle abandons the claim that a science requires a single genus. Perhaps Aristotle recognises different sorts of science – demonstrative ones, which require non-homonymy so that the syllogisms they make use of are valid; and others, which do not.

[19] ὥστε τὰ ἄλλα πάντα ἤτοι καθ' ὑποκειμένων τῶν πρώτων οὐσιῶν λέγεται ἢ ἐν ὑποκειμέναις αὐταῖς ἐστίν. μὴ οὐσῶν οὖν τῶν πρώτων οὐσιῶν ἀδύνατον τῶν ἄλλων τι εἶναι·

[20] For further discussion of this passage, cf. Chapter 2, §V.

of substance, but not *vice versa*.[21] In the sentences 'a horse exists', 'paleness exists', 'hatred exists', 'exists' means different things, since they can be paraphrased as 'a horse is a substance', 'paleness is a quality (of some substance)', 'hatred is a relation (between substances)'. This interpretation assumes that 'exists' is the way to understand 'is' in the claims about a science of being. Alternatively, one might take it to be a claim about the 'is' of predication. In that case, 'is' means different things in 'Socrates is a man', 'Socrates is pale' and 'Socrates is ten stone'. Probably Aristotle means to commit himself to both of these sorts of homonymy.

The homonymy of being makes it clearer how Aristotle could expect to identify general metaphysics – the study of being *qua* being – with the detailed account of substance which he pursues in large portions of the *Metaphysics*. Unfortunately the doctrine itself is highly problematic. To demonstrate a case of core-dependent homonymy, one must first show that the terms in question have different definitions, i.e. that they are not synonymous, and then that those definitions have a common source. In the 'healthy' case, both requirements are convincingly fulfilled. When it comes to 'being', we are merely told that it is like 'healthy'; we have not been given any reason for accepting this. We should note that Aristotle is not making the familiar point that 'is' has various different uses – existential, predicative, identity, constitution. That claim might be supported by our semantic intuitions, as well as syntactic differences. Nor is his point that 'is' is context sensitive, so that when I say 'there is no beer' the context determines whether I am quantifying over the whole universe, or just the contents of my fridge. Aristotle's position is

[21] The quote from the *Categories* makes it sounds as though the sort of dependence Aristotle has in mind is existential dependence – a quality cannot exist without being the quality of some substance. The problem with this is that it is difficult to see how a substance could exist without having some qualities. For the dependence to be asymmetric, it is preferable to understand it as definitional dependence. For more detail on the correct interpretation of this passage see Chapter Two, §V.

that the existential 'is', or the copular, has a different meaning for each of the categories,[22] but it is not clear how this view is to be motivated. In defence of Aristotle, Frede argues[23] that we should distinguish kinds of being from ways of being: camels and horses are different kinds of being, but they have the same way of being, a way not shared by colours or weights or places. However, we are offered no account of a way of being, nor does the idea appear to be particularly intuitive. Indeed we think it makes sense (and is an accurate description of Aristotle's theory) to assert 'Everything that exists is either a substance, or a quality, or a quantity, etc.', but what is the sense of 'exists' in this sentence? If there is a way of being that can range over items in different categories, then why do we need to postulate in addition a way of being for each individual category?

A modern defender of the view that bodies exist in a different sense from the sense in which minds exist is Gilbert Ryle.[24] Ryle points out that the statement 'there exist prime numbers and Wednesdays and public opinions and navies' sounds peculiar. This sort of peculiarity can be a sign of ambiguity in a language: compare 'I have two animals – a horse and a dog' with 'I have two bats – a cricket bat and a vampire bat'. However, the peculiarity of Ryle's sentence is plausibly attributed to other factors than the homonymy of 'exist': the fact that some of the conjuncts by themselves sound peculiar (e.g. 'there exist Wednesdays'), and that it is not the sort of sentence one would ever hear outside the philosophy classroom. Other tests for linguistic ambiguity, such as checking to see whether other languages use multiple different words for the putative ambiguous term, favour univocity.

[22] Indeed, given the primary role given to theology, he may require two different senses of being for the category of substance, one for sensible and another for insensible substances.
[23] Frede (1987), 87, expanding upon the approach of Patzig (1979).
[24] Ryle (1949), 23.

Van Inwagen (2001), 16-18, offers another argument for the univocity of being. Numbers are univocal: if I own five cats and you have written five poems, then the number of your poems *is* the number of my cats, never mind that cats and poems are very different sorts of thing. There is a close connection between numbers and being or existence. The proposition that there are no unicorns (or that unicorns do not exist) is logically equivalent to the proposition that the number of the unicorns is zero; there are horses if and only if the number of horses is one or more.[25] These claims of logical equivalence do not show that for something to be (or exist) just is for there to be one of it: the two expressions could be coextensive, but different in meaning. However, if we assume that numerical expressions are univocal, when we say that there is at least one A and that there is at least one B, it is tempting to think that we are making the same claim about the As and the Bs. Since each of these claims is equivalent to a purely existential claim about the As and the Bs, one might conclude that the existential predicates must be univocal too. If not, the different senses of exist would be logically equivalent, in which case everything that exists in one sense exists in every other sense, which defeats the purpose of having different senses of being for different categories.

A defender of the homonymy of being can respond to this argument by claiming that it begs the question. Numerical expressions may be univocal, but that does not mean that the sentences 'there is at least one donkey' and 'there is at least one colour' are making the same claim about donkeys and colours. The word 'one' may be univocal in these sentences, but the defender of homonymy will maintain that 'there is' means something different in

[25] Plausibly, sentences beginning 'the number of x is...' are only true if numbers exist. If so, the number sentences will only be equivalent to the existence sentences on the assumption that numbers exist necessarily, and the two sorts of sentence will never be synonymous. Those worried about the necessary existence of numbers might prefer to formulate the number sentences differently, e.g. 'there are zero unicorns' or 'the unicorns are zero in number'.

each case. While it would seem to be begging the question against the homonymy of being to outlaw this move, there are other equivalent numerical sentences that do not contain an existential use of 'is': one can say 'the number of the donkeys is greater than or equal to one' or (slightly awkwardly) 'the donkeys are one or more'. To get around these cases, the homonymy lover would have to embrace the homonymy of the 'is' of identity and of predication,[26] which might be more homonymy than he was bargaining for. Nevertheless, this possible response means that Van Inwagen's argument is not decisive.

Still, Aristotle's doctrine of the homonymy of being seems to lack sufficient support, and would be rejected by the majority of modern philosophers. If his approach to metaphysics depends upon this doctrine, then his whole metaphysical system appears to be under threat. Fortunately, Shields (2012) has argued that we need not jump to such a conclusion. Aristotle's practice of conducting general metaphysics by investigating the nature of substance can be defended independently of the homonymy of being. Shields points to Aristotle's general procedure in science: 'We think we understand each thing without qualification, and not in the sophistic, accidental way, whenever we think we know the cause in virtue of which it is' (*APo.* 71b9-16).[27] A science searches for the causes and first principles of its domain, and at the beginning of the *Metaphysics* Aristotle tells us that first philosophy is no different: 'It is clear that wisdom is a science of certain principles and causes (*archai* and *aitiai*). But since this is the science we are seeking, this is what we must consider: of what sorts of principles and causes is wisdom a science?' (*Met*. 982a1-6).[28]

[26] There are languages without a copular. To deal with these, one would have to say that it is the instantiation relation that the sentence expresses between subject and predicate which is homonymous, even though there is no word which represents that relation.

[27] Ἐπίστασθαι δὲ οἰόμεθ' ἕκαστον ἁπλῶς, ἀλλὰ μὴ τὸν σοφιστικὸν τρόπον τὸν κατὰ συμβεβηκός, ὅταν τήν τ' αἰτίαν οἰώμεθα γινώσκειν δι' ἣν τὸ πρᾶγμά ἐστιν

28 ὅτι μὲν οὖν ἡ σοφία περί τινας ἀρχὰς καὶ αἰτίας ἐστὶν ἐπιστήμη, δῆλον. Ἐπεὶ δὲ ταύτην τὴν ἐπιστήμην ζητοῦμεν, τοῦτ' ἂν εἴη σκεπτέον, ἡ περὶ ποίας αἰτίας καὶ περὶ ποίας ἀρχὰς ἐπιστήμη σοφία ἐστίν.

Shields refers to several Medieval commentators who appreciated this point, including Thomas Aquinas: 'Although this science studies the three things mentioned earlier [*scil*., first causes, maximally universal principles, and separate substances], it does not study any of them as its subject, but only being in general. For the subject of a science is the thing whose causes and attributes are studied; and it is not the very causes of the genus which are themselves under investigation. For cognition of the cause of some genus is the end which investigation in a science attains.'[29] If Aristotle can demonstrate that substance is in some sense the cause or principle of being in general (and insensible substance the cause of sensible substance), he can justify his approach to metaphysics. The homonymy of being was one way in which this goal might be achieved, but not the only way. Indeed Aristotle is committed to the view that there is a causal asymmetry between substance and the other categories of being. He may still subscribe to the position which earlier was used to justify homonymy – that accounts of things in the other categories of being must make mention of substance, and not *vice versa*. However, this does not require that there be different ways of being for each of the categories. It may be the account of the thing itself, not of its way of being, that makes reference to substance. Certainly Aristotle does appear to believe in the homonymy of being, but his approach would still be defensible without this doctrine.

III. Aristotle, the atomists, and the principles of unity

Aristotle's investigation of the causes of being may seem far removed from the disparate concerns of modern metaphysicians. The sorts of topics that feature in a typical introductory course in modern metaphysics include the problem of universals, the nature of time, persistence through time, causation, infinity, possible worlds, fictional objects and the

[29] Aquinas, *Comm. in Meta,* prol.; Shields (2012), 364.

relation of mind and body. Aristotle touches on some of these in his *Metaphysics*; others he deals with in his *Physics*, *De Anima*, and other works; and some he does not consider at all. One might think that this is a problem for the unity of modern metaphysics, not for Aristotle. Nevertheless, it will help us to understand Aristotle's position, and how it relates to part of what is nowadays called 'metaphysics', if we compare his views to those of some of his contemporaries, whose metaphysical outlook is similar to some well-known philosophers operating today.

The ancient atomists, Democritus and Leucippus, believed that there was nothing but atoms – imperceptibly small, indivisible particles – and the void. The atoms were infinite in number, and in variety of shape. Together with void, their various combinations and interactions were held to explain our experience of the physical world: what we think of as everyday objects, chairs, people, etc., are not really unified wholes at all, but groups of atoms. When we perceive an object as having a property, e.g. a table as being brown, it is not because there is some macroscopic object, the table, which stands in some instantiation relation to another object, the property of being brown. Admittedly, that is how it appears to us pre-theoretically, but, once we investigate the matter more carefully, we discover that this appearance is generated by a world of atoms that is not directly available to perception. We do not perceive things as they really are, but the best way to account for the deliverances of sense perception, and our common sense view of the world more generally, is by postulating atoms as the ultimate cause.

It is certainly easier to claim that objects at the micro level explain appearances at the macro level than it is to give an example of such an explanation. Still, even if we cannot point to any instances of, e.g., biologists explaining some instance of animal behaviour solely in terms of atoms, that such an explanation could in principle be given has seemed

plausible to many modern philosophers. Unlike Democritus, we now have empirical evidence for the view that there are atoms. Of course, what we now call atoms are not in fact indivisible (merely quite difficult to divide), and they do have (separable)[30] parts (although whether some of these parts have parts is an open question). However, all this shows is that what we previously thought were atoms were not atoms strictly speaking, and we need to go smaller to find the truly indivisible ultimate constituents of reality. The philosophical position known, since van Inwagen (1990), as mereological nihilism – the view that nothing is a part of anything – has much in common with ancient Atomism. If one believes that everything macroscopic can be explained by the microscopic, and not *vice versa*, one is not forced to give up one's belief in macroscopic things, but one no longer needs to mention them in giving a full account of what happens. Instead of talking about tables, we can talk about atoms arranged table-wise, and if doing so provides us with an ontologically simpler theory – a theory that makes use of fewer basic concepts – by disposing of the concept of parthood, philosophers such as Ted Sider (2011a) have argued that we are justified in denying that the things we ordinarily take as paradigm examples of real objects exist at all.[31]

The straightforward denial of the existence of complex things is probably the most natural way to interpret the fragments of Democritus that have come down to us (almost no fragments of Leucippus survive, and Epicurus even doubted his existence.)[32] Democritus says, in a famous fragment, 'by convention sweet, by convention bitter, by convention hot,

[30] Even Ancient Greek atoms have parts in a weak sense of the word 'part', since, being finitely large, one can distinguish their different geometrical regions (their surface, their central point, their upper half, etc.)
[31] Other contemporary defenders of nihilism include Dorr and Rosen (2002) and Cameron (2010).
[32] Cf. Diogenes Laertius, *Lives and Opinions of Eminent Philosophers*, X. 7.

by convention cold, by convention colour; but in reality atoms and void.'[33] Does this mean that only atoms and void really exist, while other things like colour are wrongly thought to exist? Or does it mean that colour (etc.) exists too, but in a different way, conventionally as opposed to really, where these are simply different ways of existing as opposed to a way of distinguishing the existing from the non-existing? The first interpretation is supported by Sextus Empiricus' gloss on the above quotation: 'which is to say that the sensible things are considered and believed to be, but these things are not in reality, but only atoms and void <are>.'[34] Although the focus seems to be on sensible qualities, not complex physical objects, if Sextus is right that Democritus believed only in atoms and void, he should deny the existence of tables and horses as well as colours, tastes and temperatures. Such a denial is compatible with claiming that talk about tables and horses is useful, despite being strictly-speaking false (this sort of view is sometimes referred to in contemporary philosophy as 'fictionalism').

Sometimes contemporary nihilists try to make their view more compatible with common sense, by claiming that it is true that (e.g.) tables exist, but they do not exist in the same sense as atoms, which are the only things that exist fundamentally or really. This is similar to the second interpretation of the Democritus passage, according to which colour (etc.) exists but only in the conventional manner. If this defence depends on a doctrine of the homonymy of existence, it is vulnerable to the objections raised above against that aspect of Aristotle's metaphysics; but such a view also seems to go against the spirit of nihilism, which is motivated by the idea that it is simpler to suppose that complex objects do not exist at all. It would hardly be simpler to say that they do exist, but in some different

33 'νόμωι' γάρ φησι 'γλυκύ, [καὶ] νόμωι πικρόν, νόμωι θερμόν, νόμωι ψυχρόν, νόμωι χροιή, ἐτεῆι δὲ ἄτομα καὶ κενόν' (DK 68B9). Cf. DK 68B117, 68B125 and 68A49.

34 (ὅπερ <ἔστι>· νομίζεται μὲν εἶναι καὶ δοξάζεται τὰ αἰσθητά, οὐκ ἔστι δὲ κατ' ἀλήθειαν ταῦτα, ἀλλὰ τὰ ἄτομα μόνον καὶ τὸ κενόν). (DK 68B9)

way from the way in which the atoms exist. If, on the other hand, saying that tables exist but not fundamentally means that they exist in the same manner as atoms, but are dependent on atoms in some asymmetric way, this sort of view has much more in common with Aristotle's own metaphysical approach than it does with genuine nihilism.

Sider appeals to the idea of meta-semantic tolerance to defend the claim that ordinary talk of complex objects may be compatible with nihilism.[35] Meta-semantic tolerance is the idea that a certain amount of error in our ordinary conceptions of terms is compatible with sentences containing those terms being true. After modern science discovered that atoms are almost entirely made up of empty space, one might have thought that our judgements about solidity, e.g. that this table is solid, had been shown to be false. However, another possibility is that our judgements were true all along, but we meant something different from what we thought we meant by our predicate 'is solid'. Sider thinks that the nihilist can analogously claim that 'there is a table' is true; but it does not mean what ordinary English speakers think it means. Instead it means that there are atoms arranged table-wise. The appeal to meta-semantic tolerance may preserve the truth of the common sense utterances, but it does not go very far towards dealing with the criticism that nihilism contradicts common sense. Unlike in the solidity case, ordinary language users will not readily admit that their talk of tables, if understood strictly as they intended, was false. Indeed they will insist that their original meaning of the word 'table' was the correct one. They could, if they wanted, stipulate new linguistic devices, 'is a table*' etc., that could not be interpreted in the nihilist way, but which would allow them to make new common sense utterances, 'there are tables*', which the nihilist would have to admit were false, according to his theory.

[35] Cf. Sider (2011a), §3.

Aristotle disagrees with both the ancient atomists and the modern mereological nihilists about the central metaphysical question – what exists. Not only does he deny the existence of atoms, but he asserts that the basic entities, or substances, in his terminology, are the everyday objects of common sense, this man and this horse. The disagreement is due to a different attitude about the appropriate methodology for metaphysics. Democritus and Sider think that it is incumbent upon them to be able to explain the fact that we have the perceptual experiences and the common sense beliefs that we do by talking solely about atoms (or whatever the fundamental simples are). To this extent, they accord more importance to common sense than the Eleatic philosophers who argued that, contrary to appearances, there was only one, unchanging thing, without apparently taking much trouble to explain how their theory could be consistent with the phenomena. Nevertheless, the atomists, and their modern counterparts, attribute little or no importance to the *content* of perception and common sense, as a guide to metaphysical truth. For them, the premise that I see a table, or that it is common sense that there are tables, cannot be used to argue for the metaphysical claim that there are tables. Instead, the data from which our metaphysical investigations should begin are provided by our most advanced physical theory.

Even putting aside scepticism about whether the atomist can really account for our experiences with atoms (and void) alone, there are reasons to question this sort of metaphysical approach. For a start, the pronouncements of actual physicists are not guaranteed, or even likely, to be true, as they will themselves admit. One can say that metaphysics should use as its premises the pronouncements of the ideal scientific description of reality, but this is not of much practical help, since there is no immediate prospect of our finding out what those are. It is also not clear that the sorts of things that

physicists say about the smallest known things provide us with enough data from which to generate much in the way of metaphysical theories. It seems quite possible, certainly if science limits itself to what is empirically verifiable, that even an ideal scientific description of reality would be consistent with many different metaphysical views.

The atomists' simplicity principle is also open to question: it is usually conceded that a theory which postulates a smaller number of entities while otherwise making the same predictions should not be considered better than its less parsimonious rival, on these grounds alone. Rather the better theory is the one that postulates the number of entities that there actually are; and, *pace* Parmenides, there is no reason to expect that number to be closer to one than uncountably many. The ancient atomists supposed that there were infinitely many atoms, and while modern physicists may deny this, they still believe there are a very large number. Despite this, it is still argued that a theory that avails itself of fewer basic notions, that postulates fewer types of thing, is to be preferred (assuming both theories otherwise make the same predictions). However, it is unclear why the same principle that held for sheer quantity of entities should not also apply to the number of basic notions: i.e. the better theory is the one that postulates only the types of thing that there actually are, but there is no reason to expect this to be the fewest possible. The atomist assumes it is in his theory's favour that it does not need to make use of a notion of parthood. Also, at least the ancient version only requires one sort of change: all the other sorts of change that Aristotle recognises – coming to be and passing away, alteration, growth and decay, and mixing – are to be understood in terms of the movement of atoms. The atoms themselves do not suffer any of these forms of intrinsic change.

Whether this sort of simplicity is welcome depends in part on one's attitude to common sense. Aristotle seems to have assumed that it is reasonable to use the dictates of

common sense, the views of predecessors, and perception, as sources from which to begin his metaphysical inquiry, and many philosophers have agreed with him on this. I do not intend to argue (any more) that the Aristotelian approach is superior; I merely mean to illuminate it by drawing a contrast with an alternative. Aristotle did not think that common sense was immune from criticism.[36] Our pre-theoretical assumptions may involve concealed contradictions, or they may be disproved by scientific investigation. So, although he takes as a starting point the view that the basic entities, the substances, are the objects of everyday experience, this view is open to revision. By considering what these apparent substances have in common, he is able to clarify the notion of substance – to answer the question what makes something a substance. And once the concept has been clarified, the initial list of substances can be amended as necessary.

One apparent advantage of the atomist position over the Aristotelian one emerges when we compare both with another ontological position popular among modern philosophers, the one associated with classical extensional mereology. According to its advocates, for every collection of objects, however unrelated, there is a further object which they compose.[37] Take two completely unconnected objects, for instance my nose and the Radcliffe Camera. If they exist, then so does a further thing that is the fusion of my nose and the Radcliffe Camera. Like atomism, this sort of view also departs from common sense, but in the opposite direction, by according equal status to the gerrymandered objects as to the everyday ones. It makes existence trivial, since anything one can think of, no matter how obviously absurd, exists just as much as the things we spend most of our time being interested in.

[36] Aristotle's attitude to common sense, or the *phainomena*, is the subject of heated scholarly debate, especially regarding the circumstances in which he thinks that it can be overturned: cf. Davidson (1991), McLeod (1995), Nieuwenburg (1999), Nussbaum (1982), Owen (1961), Pritzl (1994).
[37] For one recent defence of this view, cf. Van Cleeve (2008).

Both the atomist and the Aristotelian adopt restricted ontologies in that they only admit some of the objects which the classical extensional mereologist recognises. The atomist may seem to have the advantage because it is clear which things he thinks are the basic entities and why. He has a clear principle of restriction – of the things that the classical extensional mereologist admits, those without parts are the ones that really exist. There is also a fairly clear sense in which an individual atom counts as a unity: it is one atom.[38]

Aristotle also thinks that the basic entities, the substances in his terminology, must be unities, and that this is what is wrong with the unrestricted mereologist's account.[39] My nose and the Radcliffe Camera are two things, not one. However, it is less obvious than in the atomist's case why the things Aristotle (at least initially) regards as substances should qualify, since they manifestly have multiple parts. He owes us a principle of restriction, an account of what makes his substances the unities, as opposed to other possible candidates.

Aristotle's investigation of the causes or principles of being or unity in the *Metaphysics* is an attempt to answer this question. He claims that every sensible substance is a compound of matter and form, and, in Z.17, he argues that it is a thing's form which is responsible for making it a unity. Now there are three things – matter, form, and the

[38] That said, an Aristotelian will claim that the atomist does not have the metaphysical machinery necessary to explain what makes this one atom distinct from others of the same kind. For that he needs to invoke the form of the atom. The atomist may respond that this is not something that his theory needs to explain. For more on this debate, see Chapter Four on the role of form as principle of individuation. The atomist may also be at a disadvantage compared with both the Aristotelian and the classical extensional mereologist, because his theory relies on an assumption that there are things without parts, and so is incompatible with matter (and space-time) being 'gunky', or even with the possibility of gunk, if atomism is supposed (as most metaphysical theories are) to apply necessarily. Atomism also seems to be incompatible with our existence, assuming we have parts, and so must respond to Descartes' *cogito* argument. Also, its contention that the data for metaphysics are supplied by our best physical theory may cause problems, if that theory makes essential use of composites, such as regions and paths (composed of points). Cf. Sider (2011a), §7 and 9-11, for responses to these arguments.

[39] Of course, he does not put it in these terms, since no ancient philosopher explicitly embraced the completely unrestricted ontology of classical extensional mereology. Nevertheless, Aristotle does criticise sophistic thinkers whose views are continuous with this approach. These sophists also advocate enlarging our ontology in extreme and unintuitive ways. For example, they are willing to recognise the seated Socrates as an entity distinct from Socrates himself.

compound of the two – which might be substances; and during the course of *Metaphysics* Z it emerges that, despite the initial proposal, derived from common sense, and adopted in the *Categories*, that particular organisms are primary substances, it is in fact a thing's form that is the best candidate for being a substance.

IV. Three interpretative controversies about substance

At this point, there are three major controversies in the interpretation of Aristotle's notion of substance that need to be acknowledged. The first is about the relationship between the view of primary substance expressed in the *Categories* and that which we find in the *Metaphysics*. In the *Categories*, individual organisms like this horse or Socrates, some (but not all) of the common sense objects of experience, are identified as primary substances, and there is no mention of matter and form. In the *Metaphysics*, three candidates for being substance (among others) are discussed: matter, form and the compound of the two.[40] While all three are referred to as substances, only form is granted the title of primary substance. The traditional view is that the two texts are contradictory, and that this is to be explained by the hypothesis that the *Categories* is the earlier work, written before Aristotle had thought of his hylomorphic framework. Reflection on hylomorphism, the view that every object is a compound of matter and form, led to his changing his mind about what the primary substances are. The traditional view has been challenged recently by Wedin (2000), who argues that the two works are compatible, since

[40] It is natural to identify the compound of the *Metaphysics* with the primary substance of the *Categories*, although Aristotle does not tell us to do so, and some scholars deny this, on the grounds that form plus matter does not include a thing's accidents.

something different is meant in each by 'primary': the *Categories* is talking about ontological primacy, whereas the *Metaphysics* means that forms are explanatorily primary.[41]

This controversy about the relationship between the *Categories* and the *Metaphysics* is symptomatic of a more general methodological dispute in the history of philosophy: some interpreters, who go by the sobriquet of Unitarians, think it is crucial to attribute to the great thinkers of the past a consistent set of views.[42] Of course, past philosophers were just as capable of making inconsistent claims as present philosophers without realising it, perhaps even more so given that they were working in the relative infancy of philosophy, before the development of many of the formal tools that nowadays make it easier to identify contradictions. Nevertheless, Unitarians insist that we should operate with a principle of charity according to which we try to avoid attributing inconsistent views, or at any rate obviously inconsistent ones, to past geniuses wherever possible.

The opponents of the Unitarians are the Developmentalists. They point out that not every inconsistency is unintentional on the author's part: even the most obdurate thinkers inevitably change their minds over time. If an author asserts P in one work, and not P in another, the best explanation may not be that he failed to notice the contradiction, or that some ambiguity renders what he says consistent. It may be that he simply no longer thinks what he previously thought, and is expressing his new view of how things stand. The fact that the contradiction occurs across multiple works is crucial. If the author asserted P and not P in consecutive sentences, the hypothesis of a change of mind would be totally implausible. Changes of mind may be more or less instantaneous, but no philosopher would choose to record them in that way. It is still quite implausible for an author to change his

[41] Cf. Studtmann (2012), which argues that, far from being inconsistent with it, Aristotle's categories are actually derived from his hylomorphism.
[42] Cf. Wians (1996), for a good discussion of the Unitarian position with regard to Aristotle.

mind within a single unified work (although when these are written over quite lengthy periods of time, it is more likely). But in different works written over a long period of time, these sorts of inconsistencies are to be expected. It seems foolish to decide to be a Unitarian or Developmentalist on *a priori* grounds, for both sides have a point. The Unitarians are right that we should operate with a principle of charity that seeks to minimise obvious contradictions, and the Developmentalists are right that such contradictions are sometimes better attributed to a change of mind than explained away. One needs to look at the details of the particular case to determine which sort of explanation is more plausible. Of course, the task is made more difficult in the case of ancient philosophers, where we often have very little reliable information about their intellectual history and the dating of their works. If we knew, for instance, that Aristotle had taken pains to update his earlier works to make them consistent with his later views, this would make the Developmentalist hypothesis that a given contradiction should be explained by a change of mind less plausible.

There is a second controversy, connected to this first one about the relationship between the *Categories* and the *Metaphysics*, but which primarily concerns the interpretation of the *Metaphysics*. We said that, in Book Z, Aristotle considers matter, form, and the compound of the two as possible candidates for being substance, and arrives at the conclusion that only form is primary substance. If only forms are primary substances, what of matter and the compound? Are they substances too, but to a lesser degree, or do they not count as substances at all properly speaking? This controversy is related to the previous one, since, if the compound is a substance, albeit not a primary one, in the *Metaphysics*, and the compound of the *Metaphysics* is the primary substance of the *Categories*, there seems

to be less of a doctrinal shift between the two works than if compounds do not count as substances at all.

Most interpreters have been reluctant to attribute to Aristotle the more extreme view that only forms properly speaking count as substances. There is perhaps some concern about what categories matter and compounds would then belong to. More importantly there is a feeling that much of the appeal of Aristotle's distinctively common sense approach to metaphysics is lost, if it turns out that the fundamental things do not at least include (some of) the ordinary objects of experience. However, it is not obvious that Aristotle needs to abandon his common-sense-based methodology to reach the extreme conclusion. He could start his metaphysical investigations with some data about what people ordinarily regard as the fundamental things, or substances, by looking at what those things have in common get a clearer grasp of the concept of substance, and in doing so discover that none of the things that people (including himself) originally thought were substances really were.[43]

It may be doubted whether it is coherent for Aristotle to use this method to come to the conclusion, from his armchair, that the word 'substance' has an extension that is totally disjoint from that with which it is associated by everyone else in the linguistic community. If the extension of all words is determined by the beliefs of the majority of their users, this would not be possible.[44] There is nothing strange about words changing their extensions:

[43] Of course this is a gross oversimplification of Aristotle's reliance on common sense or the *endoxa*. In particular, it may give the misleading impression that his aim is to uncover the meaning of an ordinary Greek word. In fact, when choosing which beliefs to use as data for his metaphysical theorising, far from adopting a democratic attitude, Aristotle clearly prioritises the views of the wise over those of the many. That is because he is concerned to learn what makes something a being, being's real essence, as opposed to its nominal definition. Nevertheless, the point remains that, whatever their provenance, the initial data could be complelety wrong about the extension of the concept, but still constitute a fruitful starting point.

[44] Or rather it would not be possible if the extension is determined by their beliefs in a simple-minded way, for instance by taking an average of what they believe the extension to be. The extension might still be

'the French' refers to a set of people that is completely disjoint with the set that it referred to two hundred years ago; and that does not require there to have been a change in the meaning of the term. Our case is different because it requires that most of the language users be wrong about the correct extension of their term.

We might compare the case of whales and dolphins, which were wrongly included in the extension of the term 'fish', until science pointed out that they had more in common with mammals. Again, the change in linguistic usage was not accompanied by a change in the meaning of the word; rather, it turned out that that meaning did not apply to some of the things that it had been thought to apply to.[45] While it seems to be linguistically possible for whole communities to be wrong about some of the things that their terms apply to, it is not obvious that they could be wrong about all of them. Could all of the so-called 'fish' have been mammals, for example, and none of them really fish? One is inclined to think not. The things called fish were grouped together because they were perceived to have something in common. In the case of whales, the fishy property of living in the sea was overridden by more important properties shared with other things. We could decide that it was scientifically more beneficial to group the fish with the mammals, and invent a new term that applied to both. We could choose to change our language, so that the word 'fish' referred to mammals and the word 'mammals' to fish. We could change the extension over time, by killing all the fish, so that only whales and dolphins were left. But it seems as though our discoveries about fish are constrained by the original extension, in such a way

determined by their beliefs in a more complicated way that was compatible with them all believing it to be something quite different from what it in fact is.

[45] At any rate it could have happened this way. Alternatively, people could have already been aware of the properties of whales and dolphins, and their ceasing to be fish could have been due to a change in the meaning of the word 'fish' from something more naive to something more scientific. On this view, whales and dolphins used to be fish, but are no longer, not because they changed, but because the meaning of the word did; whereas in the other scenario they were never really fish, people just wrongly thought they were. It is enough for our purposes that the version whereby most people were mistaken about the extension of their word is linguistically possible.

that we could not discover that the word originally applied to none of them, but to some other things.

Does this mean that Aristotle could not discover that 'substance' refers to none of the ordinary objects of perception, but to forms, i.e. things of whose existence most of linguistic community is not even aware? Not necessarily. Other examples may make his case seem more favourable. For instance, consider the word 'witch'. Between the 15th and 18th Centuries, tens of thousands of women in Europe and North America were executed on the grounds that they were witches. We now think that none of these people were in fact witches. Most were merely sufferers from epilepsy or people against whom others had a grudge. Now we might discover that in fact there were some secret witches, people who did cast spells, worship the devil, etc., who were not referred to, either by themselves or by others at the time, as witches. We might well be inclined to describe such a case as one in which the extension of the word 'witch' was completely disjoint with that associated with it by the linguistic community.

Is the word 'substance' more like 'fish' or 'witch'? At this point one might be tempted to answer, "neither". 'Ousia' is Aristotle's own technical term, albeit one borrowed from ordinary Greek, under the influence of Plato. As such he may fix its reference however he likes, without being constrained by his linguistic community. It is true that Aristotle's philosophical use of the word 'substance' is more or less original. However, if he is going to maintain the position that his metaphysics is based on common sense or the views of predecessors, his talk of substances must be translatable into talk of what fundamentally is, the basic things, objects, entities, or whatever the ordinary Greek would be comfortable having opinions about.

To answer this question, we need to understand the difference between fish and witches. Plausibly the difference is due to the manner of their definition. The word 'fish' was coined by someone pointing to a fish and saying, "Anything sufficiently similar to this is called a 'fish'." Perhaps someone did something similar with the word 'witch', pointing to an epileptic woman, but, if they did, their coinage failed to catch on, since 'witch' does not mean epileptic woman. The meaning of 'witch' seems to have been determined differently: somehow a group of properties, such as casting spells and worshipping the devil, necessary and sufficient conditions for being a witch, got associated with it, without anyone actually having those properties.

Since we know little about the origins of our words it is not immediately obvious which category our 'thing' or Ancient Greek 'on' falls into, let alone Aristotle's 'ousia'. One reason to think that 'substance' may be more witchlike than fishy is the role that empirical science plays in determining the essence of 'fish'. Presumably it is no coincidence that the deictic method which ensures there are some referents was used to define 'fish' and our other natural kind terms. We start with some general observations about the things we call 'fish': they swim in the sea, breathe under water and lay eggs. When it turns out that whales do some of these things but not others, we have to decide whether or not they belong in the extension. The way we do this is by seeing which properties are more scientifically relevant to our explanations about other phenomena in the world. This is what determines which properties make something sufficiently similar to the original archetype. Sufficient similarity is not secured by sheer quantity of identical properties: a whale that was superficially very similar to a fish – had the same colour, shape and weight – still wouldn't count, as long as it lacked the important scientifically relevant features. 'Witch' on the other hand cannot be defined in this way, since it is a concept that plays no role in empirical

science. Now ‘thing’, unlike ‘witch’ is certainly a word that is regularly employed by empirical scientists, but it does not seem as though their use of it is likely to tell us much about which properties of things are the scientifically relevant ones. There simply is no question of which things are sufficiently similar to a hypothetical archetype thing to count as things, since everything counts as a thing automatically.

If ‘thing’ and ‘substance’ are more like ‘witch’ than ‘fish’ in this way, there is some hope for the view that Aristotle could coherently use common sense judgements about what exists as data, and come to the conclusion that all of those common sense judgements were mistaken. Of course, the fact that this sort of view is open to him does not show that he in fact thought that only forms are substances. To find out whether this was his view we must clarify what he means by ‘substance’, and also ‘matter’, ‘form’ and ‘primary’, for, as we have acknowledged, despite being grounded in common sense, these are technical terms of his own coinage.

These first two controversies about the interpretation of Aristotle’s notion of ‘substance’ arise out of Aristotle’s hylomorphism, and the technical distinctions that it introduces. How does hylomorphism fit with the views about substance expressed in the *Categories*? And are matter and the compound substances just to a lesser degree than forms, or are they not substances at all? There is another question about the extension of Aristotle’s notion of substance that is independent of these issues about the correct interpretation of hylomorphism. Even supposing that matter, form and the compound all count as substances in some sense, not everything that may properly be regarded as a compound of matter and form will necessarily count as a substance, composed of some matter and form that are also in some sense substantial. Artefacts decompose into matter and form; so do the material parts of organisms, whether they are homogenous like blood

and bone, or heterogeneous like hands. So called 'kooky' objects, like seated-Socrates, may be thought of as having a form of a sort, and hylomorphism could also be extended to natural phenomena like rivers, mountains and rocks. None of these compounds seem to be considered by Aristotle to be as good candidates for being substances as living organisms, like Socrates or this horse. There is an interpretative question about whether any of them counts as a substance, albeit to a lesser degree than living things. And there is also the important question of what it is about living things that makes Aristotle think they are the best candidates (or what it is about the others that makes them defective).

In this thesis I will attempt to make some progress towards addressing these three interpretative controversies about substance. We have said that 'substance' or 'ousia' is a technical term for Aristotle: he uses it differently from any of his predecessors, and very differently from the non-philosophical Greek. Nevertheless it is supposed to approximate to an ordinary, pre-philosophical concept, that of a being or thing. It is just that Aristotle refines the ordinary notion to make it more rigorous. By examining the initial candidates for being things, and seeing what they have in common, he gets a first attempt at an account of the meaning of substance. Aristotle introduces some criteria for being a substance, the properties that make something a substance, which he seems to regard as sufficient, or at least necessary for being a substance: a substance is a subject, a 'this', separate, prior in definition and in knowledge. The problem is that it is extremely unclear what the status of these criteria is, and what precisely they mean. To get a better understanding of the criteria, and so of the nature of substance, we can use our initial understanding of them to refine our knowledge of the extension of substance: we can rule out some of the things that common sense thought were substances, and introduce other things in their place. We can then use the new extension to get a better grasp on the criteria. This process of mutual

refinement of criteria and candidates reflects Aristotle's procedure in the central books of the *Metaphysics*, and explains how he can end up with a notion of substance that is completely disjoint from the ordinary language notion that he started with.

Our eventual conclusion will be that Aristotle's views about the extension of substance are quite restrictive: the only things in the sublunary world[46] that are substances are the forms of living things. The historical conclusion that this was Aristotle's view should be distinguished from the philosophical assessment that it is the best version of a view like his. That said, because the principle of charity is a major constraint on how we should interpret the writings of past geniuses, we will, as any historian of philosophy must, at least in part be governed by our philosophical assessment in arriving at our historical conclusion. Our discussion will sometimes make use of contemporary jargon and distinctions that would not have been obviously recognisable to Aristotle. Again, this is no less desirable than unavoidable: we have no option but to conduct our philosophical discussions in our own language and using our own conceptual tools, which inevitably will differ somewhat from those of an Ancient Greek. We will not be guilty of anachronism, as long as we avoid attributing these modern distinctions to Aristotle himself. The principle of charity does not mean that we must always refrain from criticising Aristotle, where there is strong evidence in favour of his holding a view which we regard as false: we have already seen an example of this in our discussion of the homonymy of being. We will begin with a discussion of the most direct evidence for Aristotle's views about the nature of substance – his criteria for being a substance. We will then need to consider Aristotle's hylomorphism: why does he think that every sensible thing is a compound of matter and form, and what does he mean by matter and form? Finally we will look at some of the things that, despite admitting of hylomorphic

[46] In the superlunary world there are also the heavenly bodies and God.

decomposition, Aristotle seems to deny are substances in the full sense, and consider, with reference to the criteria, why they are judged to fall short.

Chapter Two: What are the criteria for being an Aristotelian substance? What is the status of these criteria?

I. What are the criteria?

In the course of pursuing his science of being *qua* being, Aristotle begins *Metaphysics* Z by asking what substance is: 'And indeed the question what being is, which both long ago and now and always is being inquired into and puzzled about, is this: what is substance?' (1028b2-4).[47] In Z.2, he addresses this question by considering various possible candidates for being substances that have apparently been advocated by his predecessors: bodies, e.g. animals and plants and their parts; the elements and their parts and things composed of them; the heaven and its parts, stars and moon and sun; the limits of bodies, i.e. surfaces, lines, points, and units; Plato's Forms and mathematical objects; etc.[48] To decide which of these, if any, should be counted among the substances, there is an obvious need for an account of what Aristotle means by 'substance', or rather 'οὐσία', and much of books Z and H are devoted to supplying such an account.

'οὐσία' is a technical term of Aristotle's, and there is an onus on those who introduce technical terms to provide definitions of them using non-technical language that is generally understood. It is plausible to suggest that some important philosophical concepts, such as knowledge perhaps, cannot be defined, since some concepts must be taken as basic to avoid an infinite regress of definitions (or a circle of definitions). However,

[47] καὶ δὴ καὶ τὸ πάλαι τε καὶ νῦν καὶ ἀεὶ ζητούμενον καὶ ἀεὶ ἀπορούμενον, τί τὸ ὄν, τοῦτό ἐστι τίς ἡ οὐσία. Sometimes in the *Metaphysics* Aristotle speaks about the substance of a thing, rather than just substance. Although attempts have been made to argue that he has different objects in mind depending on whether the genitive is present or absent, for instance, that the substances *simpliciter* are compounds and their substances are forms, it is not possible to square this with Aristotle's usage: it seems as though he assumes that the substances will also be the substances *of* other things. If so, an answer to the question 'what is substance?' will also tell us what the substances of at least some things are.

[48] Cf. Δ.8 and H.1 for similar lists.

terms like '*a priori*' or 'substance', which have evidently been invented by philosophers, cannot plausibly be taken as basic, and, if their inventors fail to give clear definitions of these sorts of terms, there will be justifiable suspicion that the distinctions they are trying to draw are confused.

The word 'οὐσία' is a verbal noun derived from the feminine participle form of 'εἶναι', to be. In ordinary Greek it means a person's property, i.e. what they own (the English 'substance' can have a similar sense). Aristotle's choice of the term is undoubtedly influenced by Plato, who uses it, synonymously with 'φύσις', to refer to a thing's stable nature or reality, e.g. 'οὐσίαν δικαιοσύνης...φύσις δικαιοσύνης' (*Rep.* 359a-b), as opposed to its 'γένεσις'. From there, it comes to mean being in general, as opposed to non-being: e.g. 'οὐσίαν λέγεις καὶ τὸ μὴ εἶναι' (*Th*. 185c). Although the word is used philosophically by Plato, he does not make it the central notion in his metaphysical system, as Aristotle does.

One might suggest that by 'the substances' Aristotle simply means 'the fundamental things' or 'the basic constituents of reality', or something of this kind. Such an approach may appeal to modern metaphysicians, many of whom make use of a notion of fundamentality.[49] By itself, such a suggestion makes limited progress, since the meaning of 'fundamental' or 'basic' are equally in need of explanation. Does 'fundamental' mean more important or interesting as far as we are concerned (whoever 'we' are), or something more metaphysically loaded? If the latter, does it implicate Aristotle in the view that there are degrees of existence or reality; or is it that everything exists to the same extent, but some things are more basic, perhaps *causally* more basic, than others (in which case, how is this to be understood); or is there some other sort of asymmetry (priority in ontological dependence, for instance) among the things there are which could account for some of

[49] Cf. Sider (2011b) for an example of a view which makes fundamentality central, and Cameron (2008) for criticism of the intuition that some things must be fundamental.

them being 'fundamental'? In order to determine which, if any of these forms of priority Aristotle has in mind, one will need to attend to his various definitions of 'οὐσία'. As we shall come to see, Aristotle nowhere defines οὐσία' in terms of fundamentality, even if he does regard substances as prior to other categories of beings.

Indeed, Aristotle does not provide us with anything like a neat definition of 'οὐσία'[50] at all. Even so, he does, chiefly in the *Categories* and the *Metaphysics*, discuss various criteria for being a substance. The distinction between candidates and criteria for being a substance is not one that Aristotle himself draws, but many scholars are happy to understand him as implicitly having some such division in mind.[51] The question 'what is substance?' is ambiguous. It might mean: what things are substances? This is to inquire into the extension of the term 'substance', in effect to ask which of the possible candidates for being a substance in fact qualify as substances. Alternatively, it might mean: what does 'substance' mean? This is to inquire into the intension of the term, in part by asking what the criteria for being a substance are, or what it is that makes something a substance. Although Aristotle does not explicitly acknowledge this ambiguity, the way in which he goes about his metaphysical investigations in the central books suggests that he thinks that he needs to answer both questions. It seems likely that if we want to work out which things are the substances, we will need to know what 'substance' means; and knowledge of what the term means may come, at least in part, from initial information about its extension.

[50] The closest he comes is in *Metaphysics* Δ.8, 1017b23-6: 'It follows, then, that substance is spoken of in two ways, (a) the ultimate subject, which is no longer predicated of anything else, and (b) that which is a 'this' and separate – and of this sort is the shape or form of each thing.' This important passage is perhaps partly responsible for what Shields (1995), 163, refers to as 'a traditional interpretation of the *Metaphysics*', according to which Aristotle's three criteria of substantiality are being a ὑποκείμενον, being a τόδε τι, and being χωριστόν.

[51] The English word 'criterion' is, of course, borrowed from the Greek, and was often spelt with Greek letters in the 17th century. It occurs once in the *Metaphysics*, at 1063a3, where it is applied to a sense-organ, which is called a 'κριτήριον...χυμῶν', 'a means of judging flavours'. Aristotle does not seem to use the word in the technical sense adopted by his interpreters.

Characterising the search for the criteria for being a substance as a quest to discover the meaning or intension of the word 'substance' may be misleading, if it suggests that Aristotle is engaged in a project of mere linguistic analysis, of the sort carried out by lexicographers. This would be to take the claim that he is a common-sense philosopher too far. As we have already observed, although the deliverances of common sense are one source of data for his metaphysical theorising, in practice he is more interested in the views of distinguished predecessors, most importantly Plato. The criteria are probably better thought of as the properties that make something a substance. To invoke a Lockean distinction, Aristotle is looking for the real essence of substance, not the nominal definition, properties which may suffice to distinguish the category from other things, without revealing its nature. The question 'what is substance?' was ambiguous, since it could be a request for an extension or an intension; but the question 'what does ‘οὐσία’ mean?' is also ambigious. It could mean what does the ordinary Greek have in mind when he uses the term, but evidently that is not Aristotle's concern, since he is using it in a way that is foreign to ordinary Greek speakers. Rather, what he wants to know, when proposing criteria, is what substance, the metaphysical category, really is, nevermind whether anyone has ever used the word with that nature in mind.

Given that Aristotle does not explicitly draw the relevant distinctions, it is unsurprising that there are passages where it is unclear whether the things being discussed are candidates or criteria:

> Substance is spoken of, if not in more ways, still at any rate especially in four cases; for both the essence and the universal and the genus are thought to be the substance of each thing, and fourthly the subject. (Z.3, 1028b33-6)[52]

We will have to rely on our general understanding of Aristotle's position to work out whether claims such as 'substance is form' or 'substance is prior in definition' are statements about candidates or criteria.

It is also often unclear what Aristotle's interpreters have meant by a 'criterion': the English word, like the Greek, means a standard (or test or means) for judging. What is unclear is whether Aristotle's 'criteria' are supposed to be ways for us to judge whether a possible candidate is in fact a substance, or whether they should be regarded as more metaphysically loaded. In the latter case, they might, for instance, form part of what it is to be a substance (the essence of substance, supposing (controversially) that a category like substance could have an essence). Of course, we need not suppose that all the things that have been identified as criteria are to be understood in the same way.

Fine (2003) usefully distinguishes six different criteria for being a substance from the *Categories* and the *Metaphysics*:

(1) substances persist through change

(2) substances are (basic) subjects (ὑποκείμενα)

(3) substances are thises (τόδε τι)

(4) substances are separate (or separable?; χωρίς, χωριστόν)

[52] Λέγεται δ' ἡ οὐσία, εἰ μὴ πλεοναχῶς, ἀλλ' ἐν τέτταρσί γε μάλιστα· καὶ γὰρ τὸ τί ἦν εἶναι καὶ τὸ καθόλου καὶ τὸ γένος οὐσία δοκεῖ εἶναι ἑκάστου, καὶ τέταρτον τούτων τὸ ὑποκείμενον.
My translation is intended to preserve the Greek's ambiguity about whether the four cases are senses or candidates, though in fact I think they must be the latter: if Plato thought that universals were substances, surely he and Aristotle were not just using 'οὐσία' in different senses. Ross' rendition, 'if not in more senses, still at least to four main objects', makes it sound as though he takes the adverb, 'πλεοναχῶς', and the dative construction, 'ἐν τέτταρσί', to refer to different things, as though Aristotle were saying that even if 'substance' is not ambiguous, there are still four sorts of thing that are substances. Such a reading would be more plausible, if we had 'πολλαχῶς' instead of 'πλεοναχῶς'.

(5) substances are prior in definition

(6) substances are prior in knowledge

It is not clear whether these criteria are meant to be understood as necessary conditions for being a substance, or sufficient conditions, or both (or neither), and Fine in fact decides this question individually for each criterion, on the basis of what seems to her to cohere best with Aristotle's preferred candidates for substance. We would like to know, for instance, whether he thinks that something could fulfil some but not all of the criteria. Aristotle does not tell us where he gets his criteria from, just as he is silent on the origin of his system of categories. In both cases, his general approach would suggest that he is relying on the *endoxa*: common sense and the views of predecessors about what things there are, from which he could perhaps abstract what those things have in common.[53] Despite considerable uncertainty about the status and origin of Aristotle's criteria, it still seems that an examination of them is the most promising place to start, if we are to make progress towards answering the interpretative questions identified in Chapter One. It is reasonable to hope that some of these uncertainties may be resolved along the way.

II. Persistence through change

Criterion (1) is derived wholly from the *Categories*, and even there it is not especially prominent: 'It seems to be especially peculiar to substance that, beingnumerically one and the same, it is able to receive opposites. In no other case could one bring forward anything,

[53] Cf. especially *Topics* I.1, for Aristotle's use of the *endoxa*; even if he does not always call them '*endoxa*', his practice of starting an inquiry by examining the reputable opinions of predecessors is ubiquitous.

numerically one, which is able to receive opposites.' (4a10-13)[54] This criterion only applies to the primary substances of the *Categories*, this man as opposed to man the universal species, and it seems as though Aristotle regards it as both necessary and sufficient for being a primary substance.

It is worth considering why we do not find a similar criterion in the *Metaphysics*. One possible reason is that the criterion is not obviously sufficient for being a substance: a sustained trumpet note may be now loud, now soft, in which case it is capable of receiving opposites, but Aristotle would surely be reluctant to call it a substance. Another possible reason for rejecting this criterion is that it may not be necessary for being a substance. Perhaps Aristotle's preferred candidates for being (primary) substance in the *Metaphysics*, forms, can persist through change, if they are the subjects of accidental properties in the manner of the compound and the primary substances of the *Categories*.[55] However, if the unmoved mover has no accidental properties, it cannot change (intrinsically), so the criterion would not be a necessary condition for being a substance, and perhaps this is why it is omitted.[56]

[54] Μάλιστα δὲ ἴδιον τῆς οὐσίας δοκεῖ εἶναι τὸ ταὐτὸν καὶ ἓν ἀριθμῷ ὂν τῶν ἐναντίων εἶναι δεκτικόν· οἷον ἐπὶ μὲν τῶν ἄλλων οὐδενὸς ἂν ἔχοι τις προενεγκεῖν [ὅσα μή ἐστιν οὐσία], ὃ ἓν ἀριθμῷ ὂν τῶν ἐναντίων δεκτικόν ἐστιν·

[55] On the subjecthood of form, see below. Frede and Patzig (1988), ii. 38-9, claim that the compound of the *Metaphysics* (matter + form) is to be distinguished from the primary substance of the *Categories* or the object of experience (matter + form + accidents). However, it is not so clear that the accidents cannot be included either within the thing's form, or its matter; the matter that combines with the form to make up the compound is not prime matter, and so is not completely without properties. If forms change one may well wonder how that change is to be understood: since the *Physics* account makes change the acquisition of a form, to retain that account there would have to be meta-forms which forms lose or acquire when they change.

[56] The unmoved mover is not mentioned in the *Categories*.

III. Being a subject

The subject criterion (2) is much more prominent in Aristotle's account in both the *Categories* and the *Metaphysics*. In the *Categories*, we are told, 'a substance – that which is most strictly, primarily, and especially so called – is that which is neither said of a subject nor in a subject, e.g. the individual man or the individual horse.' (2a11-14)[57] Moreover, 'all the other things are either said of the primary things as subjects or in them as subjects' (2a34-5).[58] Although things other than the primary substances are subjects, primary substances are subjects *par excellence* (or 'basic' subjects, though Aristotle does not call them this here), because not only are they not predicated[59] of anything else, but everything else is predicated of them. Secondary substances (species) have a better claim to be substances than genera (2b15-22), and indeed everything else (2b36-3a6), because they are only predicated of primary substances, and everything else is predicated of them.

In the *Categories*, tremendous weight is placed on being a basic subject: not only is it necessary and sufficient for being a primary substance (being a subject is necessary but not sufficient), but, we are told, 'it is because they are subjects for everything else that primary substances are called substances most strictly.' (2b37-3a1)[60] The subject criterion returns to prominence in *Metaphysics* Z.3, 1028b36-7, where we are told, 'the subject is that of which other things are predicated, while it is itself not predicated of anything else'.[61] It appears as though what is under discussion is the same notion of basic subject which made primary substances the best candidates for substance in the *Categories*; and Aristotle immediately

[57] Οὐσία δέ ἐστιν ἡ κυριώτατά τε καὶ πρώτως καὶ μάλιστα λεγομένη, ἣ μήτε καθ' ὑποκειμένου τινὸς λέγεται μήτε ἐν ὑποκειμένῳ τινί ἐστιν, οἷον ὁ τὶς ἄνθρωπος ἢ ὁ τὶς ἵππος.
[58] τὰ δ' ἄλλα πάντα ἤτοι καθ' ὑποκειμένων λέγεται τῶν πρώτων οὐσιῶν ἢ ἐν ὑποκειμέναις αὐταῖς ἐστίν.
[59] On how best to understand the 'said of' and 'in' types of predication, v. Ackrill (1963), ad 1a20.
[60] ἔτι αἱ πρῶται οὐσίαι διὰ τὸ τοῖς ἄλλοις ἅπασιν ὑποκεῖσθαι κυριώτατα οὐσίαι λέγονται·
[61] τὸ δ' ὑποκείμενόν ἐστι καθ' οὗ τὰ ἄλλα λέγεται, ἐκεῖνο δὲ αὐτὸ μηκέτι κατ' ἄλλου·

continues, 'for that which is a primary subject is thought to be substance most of all' (1029a1-2),[62] and 'it has now been said in outline what substance is, that it is that which is not predicated of a subject, but of which other things are predicated.' (1029a7-8)[63] It seems that being a basic subject is being touted again as, not just a necessary and sufficient condition for being a substance, but the property that makes something a substance.

However, the situation in the *Metaphysics* is complicated by the presence of matter and form, which are not mentioned in the *Categories*. In Z.3, Aristotle goes on to object that '<on this view,> matter becomes substance…for the predicates other than substance are predicated of substance, while substance is predicated of matter…But this is impossible; for both separateness and 'thisness' are thought to belong most of all to substance.' (1029a10, 23-4, 27-8)[64] The problem is that Aristotle's favoured candidate for substance, form, seems to fail the subject criterion, since it is predicated of matter.[65] One interpretation of this passage is that here Aristotle is explaining why it is necessary to give up his subject criterion from the *Categories*, because it identifies the wrong thing as substance, and look for other criteria.[66]

The idea that the subject criterion is dropped completely in Z.3 is difficult to square with its reappearance at H.1, 1042a26ff. A preferable alternative suggestion is that, while it remains a criterion for substancehood, it is no longer the only one: although matter is more of a subject than form, form is a better candidate for substance, since it fulfils the separateness and 'thisness' criteria better than matter. One might even go further in

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[62] μάλιστα γὰρ δοκεῖ εἶναι οὐσία τὸ ὑποκείμενον πρῶτον.

[63] νῦν μὲν οὖν τύπῳ εἴρηται τί ποτ᾽ ἐστὶν ἡ οὐσία, ὅτι τὸ μὴ καθ᾽ ὑποκειμένου ἀλλὰ καθ᾽ οὗ τὰ ἄλλα·

[64] ἡ ὕλη οὐσία γίγνεται…τὰ μὲν γὰρ ἄλλα τῆς οὐσίας κατηγορεῖται, αὕτη δὲ τῆς ὕλης… ἀδύνατον δέ· καὶ γὰρ τὸ χωριστὸν καὶ τὸ τόδε τι ὑπάρχειν δοκεῖ μάλιστα τῇ οὐσίᾳ

[65] For the claim that form is (primary) substance, cf. 1032b1-2, 1033b17-8, 1035b14ff., 1037a22ff., 1041b7-9. For evidence that Aristotle thinks that form is predicated of matter, cf. also 1043a5-6, 1049a34-6.

[66] This is the sort of view advocated by Granger (1995a and b).

support of the subject criterion and maintain, pointing to Aristotle's use of 'τύπῳ' at 1028a7, that it is still the only, or at least the dominant, criterion present in the *Metaphysics*, as it was in the *Categories*. It is just that now Aristotle is acknowledging that it only applies 'in outline', and needs to be filled out with different ways of being a subject, which are distinguished in Z.13 (see below).

In support of this line of thought, one might point out that the secondary substance of the *Categories* seemingly qualified as a substance, despite not being a basic subject, because it was the next best thing, being predicated only of primary substance. Still, there are two passages in which Aristotle specifically claims that form is a subject: 'in one way matter is said to be <of the nature of subject>, in another, form, and in a third way, the compound of these' (Z.3, 1029a2-3);[67] 'the subject is substance, and this is in one way the matter (and by matter I mean that which, not being a 'this' actually, is potentially a 'this'), and in another way the definition or form (which being a 'this' is separate in definition), and thirdly the compound of these, which alone is generated and destroyed, and is separate *simpliciter*' (H.1, 1042a26-31).[68]

Ross' translation of these passages refers to three different 'senses' of 'ὑποκείμενον' (where we have used the less commital 'ways'), but it is not clear that Aristotle is claiming here that the word is homonymous, as opposed to there being three different sorts of objects which all count as subjects, perhaps in the same sense. In fact, two passages where 'ὑποκείμενον' is explicated do suggest that there may be two different senses: 'something is a subject in two ways, either being a 'this', just as an animal is a subject to its attributes,

[67] τοιοῦτον δὲ τρόπον μέν τινα ἡ ὕλη λέγεται, ἄλλον δὲ τρόπον ἡ μορφή, τρίτον δὲ τὸ ἐκ τούτων

[68] ἔστι δ' οὐσία τὸ ὑποκείμενον, ἄλλως μὲν ἡ ὕλη (ὕλην δὲ λέγω ἣ μὴ τόδε τι οὖσα ἐνεργείᾳ δυνάμει ἐστὶ τόδε τι), ἄλλως δ' ὁ λόγος καὶ ἡ μορφή, ὃ τόδε τι ὂν τῷ λόγῳ χωριστόν ἐστιν· τρίτον δὲ τὸ ἐκ τούτων, οὗ γένεσις μόνου καὶ φθορά ἐστι, καὶ χωριστὸν ἁπλῶς·

or as the matter is a subject to the actuality' (Z.13, 1038b5-6);[69] 'for that of which or the subject differ by being or not being a 'this': for example, the subject of accidents is a man, i.e. body and soul, while the accident is musical or white…Whenever this is so, the ultimate subject is a substance; but when this is not so but the predicate is a form or a 'this', the ultimate subject is matter and material substance.' (Θ.7, 1049a27-36)[70] Shields (1988b and 1995) and Frede and Patzig (1988) argue, against Granger, that it is in the first of these two senses, as a 'this' that underlies attributes, that form is a subject. There is nothing that is subject to it in this sense, since matter is subject to it in a different sense. Brunschwig (1979) tackles the problem in a similar way, by arguing that 'κατηγορεῖσθαι' is ambiguous, and Aristotle uses it in a special sense when he claims that form is predicated of matter. Indeed, if 'ὑποκεῖσθαι' and 'κατηγορεῖσθαι' are correlative terms, such that x is a subject of y iff y is predicated of x, one would expect both words to be homonymous if either is.

We can rule out the interpretation of Z.3 that has it rejecting the subject criterion altogether, on the grounds that it reappears later on. However, it is much harder to determine whether or not Aristotle is embracing different senses of 'subject', or just different sorts of things that are all subjects in the same sense. The fact that we have 'διχῶς' as opposed to 'διχῶς λέγεται' at 1038b5 might seem to favour the latter interpretation, but this is certainly not decisive, since claims of homonymy are not primarily linguistic theses for Aristotle, even if he often expresses them in this way. We can say, with Shields, Frede and Patzig, that there are two senses of 'subject', and form counts as a basic subject in the sense in which 'thises' can be subjects. In that case, it is at least possible that the subject criterion

[69] ὅτι διχῶς ὑπόκειται, ἢ τόδε τι ὄν, ὥσπερ τὸ ζῷον τοῖς πάθεσιν, ἢ ὡς ἡ ὕλη τῇ ἐντελεχείᾳ

[70] τούτῳ γὰρ διαφέρει τὸ καθ' οὗ καὶ τὸ ὑποκείμενον, τῷ εἶναι τόδε τι ἢ μὴ εἶναι· οἷον τοῖς πάθεσι τὸ ὑποκείμενον ἄνθρωπος καὶ σῶμα καὶ ψυχή, πάθος δὲ τὸ μουσικὸν καὶ λευκόν (λέγεται δὲ τῆς μουσικῆς ἐγγενομένης ἐκεῖνο οὐ μουσικὴ ἀλλὰ μουσικόν, καὶ οὐ λευκότης ὁ ἄνθρωπος ἀλλὰ λευκόν, οὐδὲ βάδισις ἢ κίνησις ἀλλὰ βαδίζον ἢ κινούμενον)· —ὅσα μὲν οὖν οὕτω, τὸ ἔσχατον οὐσία· ὅσα δὲ μὴ οὕτως ἀλλ' εἶδός τι καὶ τόδε τι τὸ κατηγορούμενον, τὸ ἔσχατον ὕλη καὶ οὐσία ὑλική.

remains the dominant criterion for determing substance, and form as opposed to matter is primary substance because the sense in which it is a subject is a more substantial one. Alternatively we may interpret the talk of two 'senses', as we understood the three 'senses' in Z.3 and H.1, as referring not to different meanings of 'subject' but to different sorts of object that stand in the same relation. If we do the latter, we will have to allow that form is a subject to a lesser degree than matter, but insist that it is enough of a subject to count as a substance, and its primacy is due to the fact that it fulfils the other criteria and matter does not. Fortunately, it willnot make much difference to our line of argument which of these lines we choose to take, but it is, in either case, worth reflecting on why Aristotle thinks that being a subject makes something a substance.

In the *Categories*, being a basic subject is connected with ontological priority: 'all the other things are either said of the primary substances as subjects or in them as subjects. So if the primary substances did not exist it would be impossible for any of the other things to exist.' (2b6-7)[71] That items that are 'in' a subject depend on the subject for their existence is a consequence of Aristotle's explication of the concept: 'by 'in a subject' I mean what is in something, not as a part, and cannot exist separately from what it is in.' (1a22-3)[72] Though he does not say as much, presumably he holds a similar view about the 'said of' relation: the species man may not depend for its existence on any individual man, but it depends on there being individual men. If Aristotle thinks that being a basic subject entails independent existence, this would explain why he puts so much emphasis on this criterion. However, in §V-VI, when we discuss these passages in more detail, it will emerge that there are strong

[71] Πάντα γὰρ τὰ ἄλλα ἤτοι καθ' ὑποκειμένων τούτων λέγεται ἢ ἐν ὑποκειμέναις αὐταῖς ἐστίν· ὥστε μὴ οὐσῶν τῶν πρώτων οὐσιῶν ἀδύνατον τῶν ἄλλων τι εἶναι

[72] ἐν ὑποκειμένῳ δὲ λέγω ὃ ἔν τινι μὴ ὡς μέρος ὑπάρχον ἀδύνατον χωρὶς εἶναι τοῦ ἐν ᾧ ἐστίν

reasons to doubt whether the primary substances of the *Categories* in fact possess the sort of independent existence that Aristotle seems to attribute to them here.

IV. Thisness

In the *Categories*, something's being a 'this' (criterion (3)) is connected[73] with its being a particular: 'in the case of the primary substances, it is indisputably true that each of them signifies a 'this'; for the thing revealed is individual and numerically one.' (3b11-12)[74] Secondary substances are not 'thises', but it seems that individuals in other categories must be. So being a 'this' is necessary but not sufficient for being a primary substance, and neither necessary nor sufficient for being a substance. In the *Metaphysics*, Aristotle seems to employ a slightly different notion of 'τόδε τι', one which is both necessary and sufficient for being a substance: 'both separateness and 'thisness' are thought to belong most of all to substance' (1029a28-9);[75] 'when one thing is said of another, that is not what a 'this' is, e.g. white man is not what a 'this' is, since being a 'this' belongs only to substances.' (1030a3-6)[76] Since he still recognises particulars in categories other than substance, 'thisness' can no longer mean particularity, but there is not much positive explication of what it does mean. The second passage, from Z.4, may be thought to imply that a 'this' is not said of something,[77] and, since universals are by their nature predicated of things (1038b15-16, *De*

[73] It seems that here 'τόδε τι' may just mean a particular; at any rate being a particular is necessary and sufficient for being a τόδε τι.

[74] ἐπὶ μὲν οὖν τῶν πρώτων οὐσιῶν ἀναμφισβήτητον καὶ ἀληθές ἐστιν ὅτι τόδε τι σημαίνει· ἄτομον γὰρ καὶ ἓν ἀριθμῷ τὸ δηλούμενόν ἐστιν.

[75] καὶ γὰρ τὸ χωριστὸν καὶ τὸ τόδε τι ὑπάρχειν δοκεῖ μάλιστα τῇ οὐσίᾳ

[76] ὅταν δ' ἄλλο κατ' ἄλλου λέγηται, οὐκ ἔστιν ὅπερ τόδε τι, οἷον ὁ λευκὸς ἄνθρωπος οὐκ ἔστιν ὅπερ τόδε τι, εἴπερ τὸ τόδε ταῖς οὐσίαις ὑπάρχει μόνον·

[77] Whether it in fact implies this depends on whether 'that' in 'that is not what a 'this' is' refers to the thing that is predicated or the complex whole. The example of the white man suggests it is the latter, in which case this passage would not show that a 'this' cannot be a universal.

Int. 17a38ff.), no universal is a 'this' (1038b34-1039a2).[78] In that case, 'thises' are all particulars of some kind, but what kind? To say that they are the substantial kind of particulars would not be helpful, if the 'thisness' criterion is supposed to contribute to our understanding of what a substance is.[79]

We also know, from the Z.4 passage, that a white man is not a 'this', and Fine (2003), 403, claims that it emerges in Z.11 that 'a man considered as a compound is not a this, since his form is essentially said of his matter.'[80] If this is right, it is noticeable that both these examples of particulars that are not 'thises' are complex entities, so that perhaps being simple is contained in the notion of 'thisness'. Even if so, simplicity would not seem to rule out a particular whiteness, for example, from being a 'this', nor would it obviously rule out matter; so, maybe being a unity would be a better attempt at a characterisation, since that notion is notable for its absence among the official criteria of substance. Fine says the term 'seems to convey the idea of determinateness, perhaps of countability, and of being a stable object of reference',[81] but there is a feeling that we are being forced to speculate from insufficient evidence.

[78] Also, since substance is a 'this', it follows that no universal is a substance, which is, at least on the most straightforward reading, the conclusion for which Aristotle seems to argue in Z.13. This is a strong reason for thinking that the forms that are substances in the *Metaphysics* must be particulars.
[79] Or at least it would contribute no more than telling us that substances are, amongst other things, particulars.
[80] It is not clear to me where in Z.11 this emerges, and, if the compound is not a 'this', it is difficult to understand Θ.7, 1049a27-36.
[81] For discussion of the idea that it means 'determinate', see Bostock (1994), 83.

V. Separation *simpliciter* and priority in being

The next criterion on Fine's list is separation (criterion (4)). In H.1, two sorts of separation are distinguished, separation in definition, and separation *simpliciter*. Although we are not told this explicitly, separation in definition seems to be equivalent to criteria (5) and (6), priority in definition and in knowledge. Separation *simpliciter*, on the other hand, is most naturally understood in terms of priority in being, as defined in *Metaphysics* Δ.11, and the sort of priority apparently enjoyed by primary substances in the *Categories*.

In the *Categories*, we have seen that Aristotle connects his notion of being neither said of nor in, i.e. being a basic subject, the defining feature of primary substances, with a modal asymmetry, characterised by a counterfactual conditional:[82]

> 'all the other things are either said of [the primary substances] as subjects or in them as subjects. So if the primary substances were not it would be impossible for any of the other things to be.' (2b6-7)
>
> Πάντα γὰρ τὰ ἄλλα ἤτοι καθ' ὑποκειμένων τούτων λέγεται ἢ ἐν ὑποκειμέναις αὐταῖς ἐστίν· ὥστε μὴ οὐσῶν τῶν πρώτων οὐσιῶν ἀδύνατον τῶν ἄλλων τι εἶναι

It is natural to take the complete uses of the verb 'to be' in the second sentence of this passage to mean existence, and that is how it has been traditionally construed. Even on that assumption, however, the sentence is ambiguous, since it might mean

(1) For all x, where x is a primary substance, if x did not exist, then, for all y, where y is not a primary substance, y would not exist.[83]

[82] I have followed other translators in rendering the conditional in this passage as a counterfactual, despite the fact that normally in Greek 'ἄν' is found in the *apodosis* of this sort of construction. One could render the sentence as an indicative conditional instead: 'if the primary substances are not, it is impossible for any of the others to be'. The reason for preferring the counterfactual translation is that we know that Aristotle does in fact deny the truth of the *protasis*, and the counterfactual translation makes this clearer. One might compare a theist, who says 'if there were no God, there would be no right and wrong'. He could have made the same point by saying 'if there is no God, there is no right and wrong', but, being a theist, the first formulation is much more natural.

or

(2) If it were the case that, for all x, where x is a primary substance, x did not exist, then, for all y, where y is not a primary substance, y would not exist.[84]

According to (1), if any primary substance, say Socrates for example, failed to exist, then everything that is not a primary substance would fail to exist too. (2), on the other hand, says that, if all the primary substances, Socrates, Callias, etc., failed to exist, there wouldn't be anything else.

Although he does not say as much here, it is also natural to assume that Aristotle would hardly think this relationship between primary substances and other things worth asserting, unless he thinks that the converse relationship does not hold between items in other categories[85] and primary substances, i.e. unless he believes either

(3) For all y, where y is not a primary substance, if y did not exist, then, for all x, where x is a primary substance, x would still exist.

or

(4) If it were the case that, for all y, where y is not a primary substance, y did not exist, then, for all x, where x is a primary substance, x would still exist.[86]

---

[83] The 'ἀδύνατον' in this sentence leads to another scope ambiguity. Technically it could qualify just the consequent of the counterfactual, in which case the point would be that, if the primary substances did not exist, it would be *impossible* for anything else to exist. However, it seems more likely that it qualifies the whole sentence, so that the point is just that whichever of (1) and (2) Aristotle is asserting is supposed to hold necessarily.

[84] Translated into the language of predicate logic, where 'P' means '...is a primary substance', 'E' means '...exists', and '□->' represents the counterfactual conditional, the ambiguity can be displayed more clearly: (1) ∀x(Px ->(¬Ex □-> ∀y(¬Py -> ¬Ey))); (2) (∀x(Px -> ¬Ex) □-> ∀y(¬Py -> ¬Ey)).

[85] I take it that the 'other things' mentioned are things in other categories, and not the other categories themselves, since the plural claim 'if primary substances were not...' indicates that it is not the category, primary substance, but things that belong to it which are under discussion. Even if the other things include other categories, it would make no difference to the argument, provided that a category exists only if its members exist, which seems like something that Aristotle would accept.

[86] More formally: (3) ∀y(¬Py -> (¬Ey □-> ∀x(Px -> Ex))); (4) (∀y(¬Py -> ¬Ey) □-> ∀x(Px -> Ex)).

(1) entails but is not entailed by (2); and (4) entails but is not entailed by (3). (3) is obtained from (1) by swapping the expressions 'is a primary substance' and 'is not a primary substance', and negating the consequent, since we are assuming that Aristotle believes that the relationship that holds between primary substances and items in other categories is asymmetric.[87] (4) is obtained from (2) in the same way. It seems as though Aristotle must believe either (1) and (3), or (2) and (4), depending on whether he understands the claim that, if the primary substances were not, the other things would not be along the lines of (1) or (2). The problem is that neither of these positions seems to be true.[88]

It is worth pausing over our assumption that Aristotle thinks primary substances are existentially independent of other things (in the manner of either (3) or (4)), since he does not explicitly say as much here, and we are going to argue that he is wrong to think so. Would it not be better to avoid burdening him with this false view, and instead to attribute some other doctrine to him? The problem is that, if Aristotle does not think that primary substances can exist without other things, there does not seem to be any good reason for him to mention the fact that other things cannot exist without them: if no category is existentially independent of any other, singling out primary substances, and saying that other things are not independent of them just seems to be highly misleading. This two-way

[87] A relation, R, is asymmetric iff ∀x∀y(Rxy -> ¬Ryx). In this case, the relation in question is 'if...were not,...would not be'.

[88] Scholars have long been aware of this difficulty. E.g. Ackrill (1964), 6, comments on our passage: 'Aristotle's conclusion is evidently intended to mark out primary substances as somehow basic (*contra* Plato). But the point is not very well expressed. For it may well be doubted whether (Aristotle thinks that) primary substances could exist if secondary substances and items in other categories did not do so. But if the implication of existence holds both ways, from the rest to primary substances and from primary substances to the rest, the statement in the last sentence of his paragraph fails to give a special status to primary substances.'

reading also makes the *Categories* cohere better with the definition of priority of being in *Metaphysics* Δ.11, discussed below.[89]

As we saw, an advocate of (1) must hold that if any primary substance, for example Socrates, failed to exist, everything that is not a primary substance would fail to exist, but while it might be plausible that, without Socrates, particular attributes of Socrates, such as Socrates' paleness, would not exist, there seems to be no reason to think that the same is true of particular attributes of other primary substances, e.g. Callias' paleness, or universal attributes of Socrates himself, e.g. being rational. The weaker claim, (2), certainly seems much more plausible: if there were no primary substances at all, there would be no items in other categories.

Presumably Aristotle thinks that the antecedent of this counterfactual is impossible, but this does not mean that he would regard it as vacuously true (as it would be according to a Lewisian semantics for counterfactuals). Indeed, it seems likely that Plato would have denied (2): Platonic Forms are universals which can exist uninstantiated; so, if there were no (Aristotelian) primary substances, this would not mean that the Form of a human being did not exist. Perhaps Plato would not have regarded the antecedent of the counterfactual as impossible. However, in *Physics* IV.14, Aristotle employs counterfactuals with antecedents he clearly does think are impossible, when he considers the question of 'whether if the soul were not time would be or not' (223a21-2).[90] That all counterfactuals with impossible antecedents turn out vacuously true is a problem for Lewisian semantics, not for Aristotle.

Aristotle very probably does believe (2), but unfortunately (2) alone will not provide the desired asymmetry between primary substances and items in other categories. For that

[89] Admittedly we are not told explicity in Δ.11 that the things that are prior in being are compound substances. However, it makes sense to equate priority in being with separation *simpliciter*, which is attributed to the compound.

[90] πότερον δὲ μὴ οὔσης ψυχῆς εἴη ἂν ὁ χρόνος ἢ οὔ

we need the converse claim, (4): if there were no items in categories other than primary substance, there would still be all the primary substances. This is equivalent to the claim that all the primary substances could exist without there being any items in other categories at all. Certainly there are *some* items in other categories which primary substances could exist without: Socrates could exist without his paleness, Callias' paleness, and the universal paleness. However, it seems that Aristotle would deny that he could exist without his essential properties, such as his rationality, and his necessary but non-essential ones, such as his sense of humour. The weaker claim, (3), that all the primary substances would still exist without any of the items in other categories taken individually, though not necessarily without all of them at the same time, is refuted by the same examples: Socrates cannot exist without his rationality. And in any case the converse of (3) is not (2) but (1), which we have already shown to be false.

One might think that Aristotle does not need to show that primary substances and the other categories are asymmetric in terms of their ability to exist without each other. All that he needs to do is to demonstrate that they are not symmetric.[91] If so, (3) and (4) are stronger than required, and all that is in fact needed is either

(5) For all y, where y is not a primary substance, if y did not exist, then, for at least one x, where x is a primary substance, x would still exist.

or

(6) If it were the case that, for all y, where y is not a primary substance, y did not exist, then, for at least one x, where x is a primary substance, x would still exist.[92]

[91] A relation, R, is not symmetric iff ¬∀x∀y(Rxy -> Ryx).
[92] Formally: (5) ∀y(¬Py -> (¬Ey □-> ∃x(Px & Ex))); (6) (∀y(¬Py -> ¬Ey) □-> ∃x(Px & Ex)).

(5) and (6) are just (3) and (4) with existentially, as opposed to universally, quantified consequents, and are what you get if you swap the expressions 'is a primary substance' and 'is not a primary substance' in (1) and (2) and negate the whole sentences, as opposed to just the consequents. Hence, (1) and (5) or (2) and (6) would establish the relevant non-symmetry, despite falling short of asymmetry. (6) does not seem significantly more plausible than (4): given that all primary substances have some essential and necessary properties, it is not possible to point to even a single one that could exist without all items in other categories. The weaker (5) may seem to be true: for any item that is not a primary substance, we can always point to some primary substance that could exist without it. However, we have already shown that (1), with which (5) would have to be combined, is false.

It does not seem to be possible to find a good thing for Aristotle to mean by 'if the primary substances were not it would be impossible for any of the other things to be [and not *vice versa*]', at least if we understand 'be' to mean exist, and if we want to avoid special pleading or limitations on the scope of the claim that are not mentioned in the text.[93] One might hope that this sentence was an aberration, to which Aristotle was not seriously committed. However, several passages in the *Metaphysics* indicate that Aristotle is still wedded to the idea, even though he puts it in slightly different terms. The claim in the *Categories* that we have been discussing is represented as following from the fact that all other things are either said of or in primary substances as subjects. That items that are 'in' a

[93] Irwin (1988), ch. 4 and 10, defends such a restrictive view. It is plausible that Aristotle thinks, if Socrates were the only man, he would exist though the universal man would not, on the grounds that there must be at least two men for there to be the universal that they have in common. It would still need to be explained how he would be separate from particular properties and matter, but perhaps these are somehow 'contained in' him, so that he can exist without anything which is not one of his parts.

subject cannot exist without that subject is a consequence of Aristotle's explication of the concept of inherence:

> 'by 'in a subject' I mean what is in something, not as a part, and cannot be separately from what it is in.' (1a24-5)
>
> ἐν ὑποκειμένῳ δὲ λέγω ὃ ἔν τινι μὴ ὡς μέρος ὑπάρχον ἀδύνατον χωρὶς εἶναι τοῦ ἐν ᾧ ἐστίν

Though he does not say as much, presumably he holds a similar view about the 'said of' relation: the species man may well be able to exist without any particular man, but plausibly Aristotle thinks that it would not exist if there were no particular men whatsoever. If whatever is said of or in a subject depends on that subject for its existence, and everything else is (ultimately) said of or in primary substances, then everything else would not exist if there were no primary substances (N.B. this does not secure the result that, if there were nothing else, there would still be primary substances, i.e. the asymmetry which we found difficult to justify above).

'χωρίς', and its cognates, only occurs once in the *Categories*, in the explication of being 'in' a subject. However, it figures frequently in the *Metaphysics* as a criterion of substance. At Z.1, 1028a33-4, Aristotle tells us that substance is primary,

> 'for of the other predicates[94] none is separate,[95] but only [substance]'
>
> τῶν μὲν γὰρ ἄλλων κατηγορημάτων οὐθὲν χωριστόν, αὕτη δὲ μόνη·

[94] Ross renders 'κατηγορημάτων' as 'categories', which makes sense in the context, but we would expect 'κατηγορίων'.

[95] Verbal adjectives in '-tos' may have a passive meaning (separated), or they may express possibility (separable); cf. Smyth (1920), §472. Fine (2003), 403, fn.13, claims that 'χωρίς' and 'χωριστόν' should both be taken to denote actual separation, where this is understood to mean having the capacity for independent existence. One reason for resisting the translation 'separable', understood in the same way, is that we can then reserve this for potentially having the capacity for independent existence, although admittedly one could use 'potentially separable' with the same meaning. Another reason to prefer the translation 'separate' is that 'χωρίς' is not syntactically a modal word in Greek. In any case, I have followed Fine's suggestion. Whether we use 'separate' or 'separable', it should be clear that Aristotle's concept is an inherently modal one.

In the *Metaphysics*, separation is often mentioned in the same breath as 'thisness', e.g. 1017b25, 1029a28, and it too seems to be both necessary and sufficient for being a substance: so, at 1086b3-5, Aristotle denies that universals are separate. At H.1, 1042a28-31, he seems to distinguish two different sorts of separation, separation in definition which applies to the form, and separation *simpliciter* which applies to the compound:

> 'the definition or form (which being a 'this' is separate in definition), and thirdly the compound of [matter and form], which alone is generated and destroyed, and is separate without qualification'
>
> ὁ λόγος καὶ ἡ μορφή, ὃ τόδε τι ὂν τῷ λόγῳ χωριστόν ἐστιν· τρίτον δὲ τὸ ἐκ τούτων, οὗ γένεσις μόνου καὶ φθορά ἐστι, καὶ χωριστὸν ἁπλῶς·

The claim that forms are separate in definition looks as though it might be another way of saying that they are prior in definition (i.e. criterion (5), on which see below). The claim that compounds are separate without qualification seems highly reminiscent of our *Categories* passage, since it is natural to equate matter-form compounds in the *Metaphysics* with primary substances in the *Categories*. This suspicion is confirmed by a passage earlier in the *Metaphysics*, where Aristotle defines his notion of priority in being:

> 'Some things are said [to be] prior and posterior in this way, others [to be prior] in nature and substance, as many as can be without the others, but those [others] cannot be without them.'
>
> τὰ μὲν δὴ οὕτω λέγεται πρότερα καὶ ὕστερα, τὰ δὲ κατὰ φύσιν καὶ οὐσίαν, ὅσα ἐνδέχεται εἶναι ἄνευ ἄλλων, ἐκεῖνα δὲ ἄνευ ἐκείνων μή· (Δ.11 1019a1-4)

Although the *Categories* passage did not put things in terms of priority of being, and expressed the asymmetry between primary substances and other things with a counterfactual conditional, it seems likely that 'if x were not, y would not be' is supposed to

be equivalent to ‘y cannot be without x’. Ambiguities analogous to those noted above will recur again in these formulations: so instead of (1)-(6), we will have

(7) For all y, where y is a non-substance, for all x, where x is a substance, it is not the case that y can exist without x.

or

(8) For all y, where y is a non-substance, it is not the case that for all x, where x is a substance, y can exist without x.

(7) claims that the non-substances cannot exist without any of the substances, and, like (1), seems to be falsified by the fact that, e.g., Callias’ paleness can exist without Socrates. (8), on the other hand, is much more plausible, since it only requires that non-substances be unable to exist without any substances at all. Unlike in the *Categories* passage, here Aristotle does explicitly commit himself to the converse principle: either

(9) For all x, where x is a substance, for all y, where y is a non-substance, x can exist without y.

or

(10) For all y, where y is a non-substance, for all x, where x is a substance, x can exist without y.

(10) says that the substances can exist without any non-substances at all, and is surely false, since, e.g., Socrates cannot exist without his sense of humour. Again, (9), which claims that the substances can exist without any non-substance you care to choose, though not necessarily without all of them at once, is refuted by the same example, and in any case is the converse of (7) which we have already rejected.

We have seen, then, that Aristotle's claim that if the primary substances were not nothing else would be either cannot be dismissed as a problem that is confined to the *Categories*. Aristotle remains committed to the same claim in the *Metaphysics*, although now he expresses it in terms of substances being prior in being to, and separate *simpliciter* from, non-substances, and with the relation 'x can be without y' instead of a counterfactual conditional.

VI. Separation and priority in definition, and priority in knowledge

Considering the problems for Aristotle's view on the above interpretation, it is unsurprising that scholars have looked for alternative possible readings of the relevant passages. One suggestion is that our existential interpretation of the verb 'to be' in *Categories* 2b6-7 and *Metaphysics* Δ.11 1019a1-4 was incorrect. When Aristotle says that if the primary substances were not the other things would not be, or that things that are prior in nature and substance can be without other things, though the latter cannot be without them, he does not mean that substances can *exist* without other things, but not *vice versa*. What else might he mean? Michail Peramatzis has offered the following non-existential account of Aristotelian ontological priority (i.e. priority in being):

'*A* is ontologically prior to *B* if and only if *A* can be what it is independently of *B* being what it is, while the converse is not the case.'[96]

Peramatzis is no doubt influenced by the important work of the prominent neo-Aristotelian, Kit Fine, who defends a similar account of ontological priority.[97] Fine points out that what he

[96] Cf. Peramatzis (2011), 204. Peramatzis' view is not simply that εἶναι is being used in its incomplete, predicative sense, according to which it stands for 'is F', for some unspecified predicate, F. As he points out, saying that x can be F without y being F, e.g. Socrates can be white without Plato being white, is in most cases philosophically uninteresting. He needs the unspecified predicate to be the quite specific 'is what it (essentially) is'.

calls the 'modal/existential account' of ontological priority or dependence is too blunt an instrument to capture our intuitive judgements about what depends on what, for reasons similar to those we have already discussed: necessarily, if Socrates exists, so does the singleton set {Socrates}, but we do not want to say that Socrates depends on a set; similarly, Socrates will depend on any necessary existent, e.g. the number 2; and metaphysical views according to which substances exist necessarily, or are world-bound, run in to the difficulty that the substances, assuming there are more than one, will depend on each other, which is incompatible with their independent status. Even if such views turn out to be false, they should not be ruled out by one's account of dependence.

Fine suggests that, instead of thinking of x's being as its existence, we take it to be x's essence, nature or identity: either the collection of x's essential properties or (equivalently) the propositions that are true in virtue of what x is. If we assume that these properties or propositions have constituents (just as linguistic, or nominal, definitions are collections of sentences, or predicates, composed of words), we can offer an alternative account of ontological dependence: x depends on y if y is a constituent of an essential property of x; or, alternatively, x depends on y if y is a constituent of a proposition that is true in virtue of what x is.

Some evidence that this use of the verb 'to be' was not foreign to Greek philosophy is provided by a famously mysterious passage in Plato's *Republic*. Responding to a request to define the Form of the good, Socrates explains its superiority to the other Forms, using the analogy of the Sun: 'Therefore we should say that not only do the things that are known owe their being known to the good, but that they also have both their being and substance by means of it, though the good is not substance, but greatly surpasses substance in

[97] Cf. Fine (1995).

seniority and power.' (509b5-10)[98] Since it is generally supposed that all Platonic Forms exist necessarily, it is hard to see why other Forms should owe their *existence* to the good. It cannot be because it can exist without them, but not *vice versa*: there is no possible world in which the good exists and the other Forms do not, since there is no possible world in which the other Forms do not exist. The existential dependence of the other Forms might be captured by a counter-possible conditional: if, *per impossibile*, the Form of the good did not exist, the other Forms would not exist (and not *vice versa*). But why should anyone accept that? The passage makes more sense if we suppose that the being of the Forms refers not to their existence but to their essence or nature: the other Forms owe their essences or natures to the good, because the good is a constituent of their essences. This would also provide a good reason for thinking that knowledge of the other Forms requires knowledge of the good, on the assumption that one cannot know a Form unless one knows its definition.

The claim that the good features in the definitions of all the other Forms is certainly a bold one. It is fairly plausible that moral Forms, like justice, will make essential reference to the good, and, if organisms and artefacts are essentially teleological – are defined by reference to what they are for, or good for – one can see why Plato might think that, e.g., the Form of a man or of a bed is defined in terms of the good. How far this claim can be extended is not our concern. The point is that we obtain a more likely reading of this difficult passage, if we suppose that the being of x means x's essence, not its existence.

Returning to Aristotle, there is little doubt that he did hold some such view about the priority of definitions to the things that they define, and that such a criterion is at the very

98 Καὶ τοῖς γιγνωσκομένοις τοίνυν μὴ μόνον τὸ γιγνώσκεσθαι φάναι ὑπὸ τοῦ ἀγαθοῦ παρεῖναι, ἀλλὰ καὶ τὸ εἶναί τε καὶ τὴν οὐσίαν ὑπ' ἐκείνου αὐτοῖς προσεῖναι, οὐκ οὐσίας ὄντος τοῦ ἀγαθοῦ, ἀλλ' ἔτι ἐπέκεινα τῆς οὐσίας πρεσβείᾳ καὶ δυνάμει ὑπερέχοντος.

heart of his account of substance, explaining why a thing's form, which he identifies with its essence, is (its) primary substance. However, it is less clear that this is what he means by priority in nature and substance in *Metaphysics* Δ.11, or by the claim that if the primary substances were not the other things would not be in the *Categories*.

For one thing, it does not seem that understanding 'x can be without y' as short for 'x can be what it is independently of y being what it is', as Peramatzis suggests we should understand it, will dissolve the problems that we have outlined above for the existential interpretation. If necessarily something is what it is if and only if it exists, the very same cases we considered earlier will refute the claim, and it seems likely that Aristotle would accept such a principle. None of the arguments we considered before relied on hyper-intensional expressions, so the fact that the predicates 'exists' and 'is what it is' are necessarily coextensive is enough to generate all the same difficulties. The universal having a sense of humour can exist, and so be what it is, independently of any primary substance existing and being what it is. Perhaps it could not be what it is if there were no primary substances at all, but then neither can the primary substances be what they are without there being some items from other categories, which are what they are. If the less obvious, non-existential construal of 'being' in these passages still results in a false view, there seems to be little reason to favour that reading.

The other main objection to Peramatzis' reading is that it conflates two different notions of priority that Aristotle takes pains to distinguish. In *Metaphysics* H.1, a passage we have already quoted in our discussion of the subject criterion, Aristotle asserts that compounds are separate *simpliciter*, while forms are separate in definition: 'in another way <substance> is the definition and the form, which, being a this, is separate in definition; and in a third way it is what comes from these <sc. matter and form>, which alone can come to

be and pass away, and is separate *simpliciter*. For, of those things that are substances according to definition, some are separate *simpliciter* and some are not.' (1042a28-31)[99] Peramatzis responds to this problem by arguing that separation or priority in definition is a generic notion which embraces two distinct species: there is priority in nominal and in real definition, and only the latter implies ontological priority.[100] Even if we concede this, it still seems as though ontological priority is uncomfortably similar to priority in *real* definition. Peramatzis admits that the two are (perhaps even necessarily) coextensive, but denies that they are identical, since he holds that ontological priority grounds priority in real definition.[101] It is difficult to see why Peramatzis believes that this grounding relation obtains. He says that ontological priority 'is effectively a notion of formal causation', and seems to think that this is enough to establish it as more fundamental than real definitional priority. However, it is unclear why the latter cannot also be equated with formal causation.

A slight alternative to Peramatzis' position would be to distance ontological priority from formal causation. On this view, there would be three sorts of priority: existential priority, priority in essence or definition (which is more or less the same as formal causation), and ontological priority. Ontological priority might be explicated thus: x is ontologically prior to y iff x is not made to be by y but y is made to be by x. In this formulation the 'to be' could be understood existentially or as short for 'to be what it is'. Substantial compounds would count as ontologically primary because they would not be made to be by anything other than or external to them: the only thing ontologically prior to them would be their own form. It might seem that this is the sort of notion that Aristotle has in mind when he gives his 'healthy' example in Γ.2: health itself is ontologically prior to

[99] ἄλλως δ' ὁ λόγος καὶ ἡ μορφή, ὃ τόδε τι ὂν τῷ λόγῳ χωριστόν ἐστιν· τρίτον δὲ τὸ ἐκ τούτων, οὗ γένεσις μόνου καὶ φθορά ἐστι, καὶ χωριστὸν ἁπλῶς· τῶν γὰρ κατὰ τὸν λόγον οὐσιῶν αἱ μὲν αἱ δ' οὔ.
[100] Peramatzis (2011), 255.
[101] Ibid., §12.4.

healthy things like diets or scalpels, because the latter are made to be by the former, and not *vice versa*. The problem with this solution is that it is unclear how we should understand the being made to be relation, if not in terms of essential priority or formal causation. This is after all what the healthy example is often thought to illustrate. One might think that the modern metaphysical notion of grounding could be invoked to underpin ontological priority as something different from essential priority, but in fact most modern metaphysicians are either sceptical about whether grounding is a useful concept, or attempt to define it in terms of essences. While one might attempt to take the being made to be or grounding relation as a primitive, such an approach seems unsatisfactorily *ad hoc*. Therefore this attempt to make use of a third sort of priority does not seem very promising.[102] In the end, whether Peramatzis' attempt to save Aristotle's notion of ontological priority succeeds or not, the implications for the question of what things count as substances for Aristotle will be the same. For, since he concedes that ontological priority is equivalent to priority in real definition, and equates it with formal causation, it is clear that the things that are ontologically prior on his view are the things that are prior in definition and in knowledge: substantial forms. Compounds of matter and form may be ontologically prior to items in other categories, if the latter include them in their definitions, but they are still ontologically posterior to their forms. On the more traditional view that we have defended, Aristotle regards compounds as prior in being and separate *simpliciter*, where this means that they are capable of existing without other things and not *vice versa*. He holds that forms are separate and prior in definition, and prior in knowledge, since they are the essences of other

[102] In his more recent work, Fine (2010) argues for a double primitivism, with grounds and essences both being counted as basic, and irreducible to one another: 'it seems to me that [it is an error to attempt] to assimilate or unify the concepts of essence and ground. The two concepts work together in holding up the edifice of metaphysics; and it is only by keeping them separate that we can properly appreciate what they are and what they are capable of doing together.' However, such an approach is only justifiable if it can be convincingly demonstrated that both sorts of primitive are really needed.

things, and not *vice versa*. However, we have seen that Aristotle's claim that compounds are existentially prior to other things is false: Socrates could not exist without all things in other categories, e.g. he could not exist without his property of being extended; and, although he could exist without some things in other categories, this is not sufficient to make him existentially prior, since some things in other categories could exist without him. Therefore, whichever interpretation of ontological priority we adopt, the criteria of separation and the various sorts of priority all point to forms being the substances.

VII. Conclusion

What can we conclude from our examination of Aristotle's criteria for being a substance? There seems to be significant evidence of a change in position between the *Categories* and the *Metaphysics*. In the former, the main criterion for being a substance is being neither said of nor in, i.e. being a basic subject, and this is held, in the absence of matter and form, to favour particular things, like Socrates or this horse. In *Metaphysics* Z.3, by contrast, Aristotle seems to distance himself from the subject criterion, either rejecting it altogether, or, more probably, qualifying it so that it is no longer the only criterion: matter is a basic subject, but it is either not a substance, or at any rate a substance to a lesser degree than form and the compound because it is neither a 'this' nor separate. There is also a change in the meaning of 'τόδε τι' between the *Categories* and the *Metaphysics*. In the *Categories*, it seems to just mean a particular; whereas in the *Metaphysics* it has a more specialised sense, since it is necessary and sufficient for being a substance. However, since it remains quite unclear what it signifies, other than perhaps the substantial kind of particularity, it is not much use for achieving a better grasp of the nature of substance. The

most useful criterion in this regard is separation, which comes in two varieties: separation *simpliciter* and separation in definition. The former is equivalent to priority in being, while the latter is equivalent to priority in definition and (its epistemic equivalent) priority in knowledge. Aristotle believes that separation *simpliciter* applies to compounds, while forms are separate in definition. However, the claim that compounds are separate, understood as meaning that they can exist without other things and not *vice versa*, is simply false. Therefore the criterion of separateness suggests that forms alone ought to be regarded as substances, even if that is not in fact Aristotle's view.

Chapter Three: Two arguments for the existence of form

I. The invention of matter

In the last chapter, we considered the criteria for being an Aristotelian substance, showing how they can help us to discover what the substances are. In particular, we saw some reasons for thinking that forms have a better claim to be counted as substances than matter or the compound of matter and form, on the grounds that they fulfil the criteria of being separate and prior in definition. We have yet to say very much, however, about what Aristotle means by 'matter', 'form' and the 'compound' of the two. Until we have a better grasp of his hylomorphic system, we will not be able even to understand the claim that form is (primary) substance fully, let alone to appreciate why Aristotle believes it. This we must do, however, if we are to assess whether or not he is right.

To a modern reader, the term 'matter' will seem more familiar and straightforwardly comprehensible than the somewhat mysterious 'form'. Few will doubt the existence of the former, whereas whether or not there are forms is admittedly steeped in controversy. In fact, for a contemporary of Aristotle the reverse would have been true. Aristotle's most common word for form, 'εἶδος', is borrowed from Plato, who also made forms the fundamental entities in his metaphysics, though what the two mean by 'form' is importantly different. The introduction of matter as a major metaphysical category was more original. Aristotle was not the first philosopher to be interested in what things are made from, but he was the first to coin a word to stand for the concept. I take it he chose 'ὕλη' for no more complicated reason than that lots of things, prior to the invention of plastic, were made of wood.

II. Matter and form in the *Physics*

Aristotle introduces us to matter and form in the first book of the *Physics*: he begins with the assertion that the study of nature involves a search for 'principles' (as well as causes and elements; 'ἀρχαί', 'αἴτια', and 'στοιχεῖα'). Principles seem to be equated with 'things which are by nature clearer and more knowable', as opposed to 'things which are less clear by nature, but clearer to us' (184a16-21).[103] By the latter he presumably means ordinary physical objects, which are said to be 'compounded' (22).[104] After rejecting the views of various predecessors about the principles,[105] Aristotle determines that they must be either two or three in number, and goes on to give a general account of 'coming to be', in chapter 7, that explains how this is so.[106]

Aristotle agrees with those of his predecessors who hold that there is no generation *ex nihilo* (nor destruction *in nihilum*).[107] This being so, for every change there is something that exists before the change, and from which it proceeds (the *terminus a quo*, which Aristotle designates as 'τὸ γιγνόμενον'), and something that exists after the change is complete, and is its end-point (the *terminus ad quem*, which he calls 'ὃ γίγνεται'; unfortunately he is not quite consistent with this terminology). Moreover, there is always something which remains through the change, as well as something which does not:

[103] πέφυκε δὲ ἐκ τῶν γνωριμωτέρων ἡμῖν ἡ ὁδὸς καὶ σαφεστέρων ἐπὶ τὰ σαφέστερα τῇ φύσει καὶ γνωριμώτερα· οὐ γὰρ ταὐτὰ ἡμῖν τε γνώριμα καὶ ἁπλῶς. Διόπερ ἀνάγκη τὸν τρόπον τοῦτον προάγειν ἐκ τῶν ἀσαφεστέρων μὲν τῇ φύσει ἡμῖν δὲ σαφεστέρων ἐπὶ τὰ σαφέστερα τῇ φύσει καὶ γνωριμώτερα.

[104] It is also possible that he means the contrast to be between common-sense propositions and ones that are less obvious but more philosophically important. The two possibilities are not mutually exclusive, but it seems easier to interpret him in this context as talking about things, not propositions. Cf. Charlton (1970), note *ad loc*.

[105] He discusses the Eleatics, Parmenides and Melissus, in I.2-3, and Empedocles and Anaxagoras in I.4-6, with passing references to Plato, Anaximander and Democritus.

[106] An account of coming to be, or change in general (the account in I.7 deals with both substantial generation and accidental change), is the first task to be undertaken by the natural scientist, because 'nature is a principle of change and alteration' (200b12).

[107] Loux (2012), §2, points out that Aristotle's theory of change can be understood as a response to an argument of Parmenides' for the conclusion that change is impossible: what comes to be must come to be from what is or from what is not; but it cannot come to be from what is, since that already is; and it cannot come to be from what is not, since generation *ex nihilo* is impossible; so nothing can come to be (cf. *Physics* 191a27-30). Aristotle's response is essentially to say that the argument equivocates on the meaning of 'is'.

according to Aristotle's example, in the change whereby a man comes to know music, the man remains while the not-knowing-music does not (190a9-21).[108] In general, according to Aristotle, there are therefore always two (simple) γιγνόμενα, two *termini a quibus*: the thing that remains the same (the man) is said to be what 'underlies' or 'is subject to' ('ὑποκεῖσθαι') the change, and, though it is one in number, it is not one in form or account ('εἴδει' and 'λόγῳ', which he says here are to be taken as synonymous) (15-17); the thing that does not remain (the not-knowing music) is always one of a pair of opposites.[109]

Only substances are spoken of as coming to be unqualifiedly – as opposed to coming to be something: we say that Socrates came to be, but not that Socrates' pallor came to be; instead we would say that Socrates came to be pale. This is a linguistic datum which Aristotle thinks is explicable only if we accept his theory of categories. He claims that for the other categories of being it is obvious that there is a subject that remains the same when they come to be: quantities, qualities, relations, times, and places come to be *of* some subject, since they are all 'said of' substances, and substances alone are not said of anything else (190a31-b1). Whatever the precise meaning of the 'said of' relation here,[110] the point seems to be that things not in the category of substance, if they are to exist, must be had by a particular substance (or perhaps by more than one substance in the case of universals), so that when they come to be there will always be a substance that has them to underlie the change.[111]

[108] In addition, the complex, not-knowing-music man, does not remain.
[109] In Chapter Five, we were told 'that opposites are principles is universally agreed' (188a19).
[110] It does not seem to be the same as the technical meaning in the *Categories*, where x is said of y iff x is a genus or species of y. Cf. Ackrill (1963), note *ad* 1a20.
[111] This seems to ignore the case when the substance comes to be at the same time as the qualities etc. that it possesses, but since Aristotle intends to show that substantial generation also involves a subject, there will be one available for the substance's initial qualities etc., although it will not be a substance.

Although it is less obvious that there is a subject in cases of substantial generation, nevertheless Aristotle maintains that there always is one. For animals and plants, the subject out of which they come to be is said to be their seed (3-5). We are then given a list (presumably meant to be exhaustive) of the ways in which things that come to be *simpliciter* (i.e. substances) do so, together with examples: 'The things which come to be *simpliciter* do so some of them by change of shape, like a statue, some by addition, like things which grow, some by subtraction, as a Hermes comes to be out of the stone, some by composition, like a house, some by alteration, like things which change in respect of their matter. All things which come to be like this plainly come to be out of subjects.' (5-10)[112]

The catalogue of different types of coming to be *simpliciter*, together with their concomitant examples, helps us to understand how the terminology of 'subject' and 'opposites' applies to these as well as to other sorts of change. We can see how Aristotle's account makes the principles of change two or three in number: for every change, there is (i) the thing that underlies/is subject to the change, (ii) the opposite from which the change proceeds, and (iii) the other opposite in which the change culminates. (ii) is also called the privation ('στέρησις', 27), while (iii) is called the form ('εἶδος', 28).

III. The opposites

The distinction between form and privation is reminiscent of one found in the *Categories* between possession and privation: 'Privation and possession are spoken of in connection with the same thing, for example sight and blindness in connection with the

[112] γίγνεται δὲ τὰ γιγνόμενα ἁπλῶς τὰ μὲν μετασχηματίσει, οἷον ἀνδριάς, τὰ δὲ προσθέσει, οἷον τὰ αὐξανόμενα, τὰ δ' ἀφαιρέσει, οἷον ἐκ τοῦ λίθου ὁ Ἑρμῆς, τὰ δὲ συνθέσει, οἷον οἰκία, τὰ δ' ἀλλοιώσει, οἷον τὰ τρεπόμενα κατὰ τὴν ὕλην. πάντα δὲ τὰ οὕτω γιγνόμενα φανερὸν ὅτι ἐξ ὑποκειμένων γίγνεται.

eye.' (12a26-7)[113] The distinctions are apparently not the same, however, since 'with privation and possession…it is impossible for change into one another to occur. For change occurs from possession to privation, but from privation to possession is impossible.' (13a31-4)[114] Moreover, in the *Categories'* discussion, possession and privation are contrasted with contraries such as hot and cold (12b33-5), whereas in the *Physics* hot and cold are examples of the sorts of opposites meant (190b31-2).

Leaving aside the *Categories*' distinction, we should notice that in the *Physics* Aristotle surprisingly counts both hot/cold and musical/unmusical as examples of the sorts of opposites between which changes take place. Hot and cold, or black and white, are extreme ends of a scale; they are not such that one or other of them must be had by everything, nor even by everything that is capable of having them, since things can be at intermediate points on the scale – grey or warm. On the other hand, musical and unmusical seem to be straightforward contradictories, such that everything is either one or the other.[115] They are the sorts of opposite properties that logicians might represent schematically as *F* and not-*F*. While there may be nothing wrong with regarding changes as taking place between opposites like hot and cold, for the generality of the account it seems preferable to insist that the opposites are a positive property together with its negation: particularly in changes that involve the coming to be of a substance, there simply is no positive opposite as in the case of hot/cold or black/white, a fact that Aristotle himself

[113] Στέρησις δὲ καὶ ἕξις λέγεται μὲν περὶ ταὐτόν τι, οἷον ἡ ὄψις καὶ ἡ τυφλότης περὶ ὀφθαλμόν·

[114] ἐπὶ δέ γε τῆς στερήσεως καὶ τῆς ἕξεως ἀδύνατον εἰς ἄλληλα μεταβολὴν γενέσθαι· ἀπὸ μὲν γὰρ τῆς ἕξεως ἐπὶ τὴν στέρησιν γίγνεται μεταβολή, ἀπὸ δὲ τῆς στερήσεως ἐπὶ τὴν ἕξιν ἀδύνατον·

[115] Or at least everything capable of being one or the other: it is not clear whether Aristotle would describe a stone, for instance, as 'ἄμουσον'.

recognises (*Categories*, 3b24-7).[116] This also fits better with Aristotle's comment: 'It is clear that…the opposites must be two in number. But in another way that is not necessary. For one of the opposites, by its absence and presence, is sufficient to effect the change.' (191a4-7)[117] The absence of black does not suffice for something to become white. We are supposed to be able to understand how the principles can be regarded as two, as well as three, in number. If the opposites are contradictories we can easily understand them as the absence and presence of one thing. Aristotle goes on to say very little about privation in comparison with the other principles, which suggests that it is somewhat tangential to his account. Form, on the other hand, is explicated as 'that of which we give the account' (13). It is probably best to conclude that he should not have included hot and cold as examples of the sorts of opposites he had in mind.

IV. The subject

Aristotle explains the nature of the underlying thing or subject as follows: 'As for the underlying nature, it must be grasped by analogy. As bronze stands to a statue, or wood to a bed, or the matter and the formless before it acquires a form to anything else which has a definite form, so this stands to a substance, to a this, to what is.' (7-12)[118] It seems that if we are properly to understand the nature of the subject we must look to the relationships between things and what they are made of, and abstract it from these. That Aristotle regards a substance's matter as the thing that underlies the change by which it comes to be

[116] This seems no less true for many items in the other categories, nor does it seem that we merely lack a word for the relevant positive opposite: what could the opposites of being pregnant or being in London be, except not being pregnant or being not in London?

[117] καὶ δῆλόν ἐστιν ὅτι δεῖ ὑποκεῖσθαί τι τοῖς ἐναντίοις καὶ τἀναντία δύο εἶναι. τρόπον δέ τινα ἄλλον οὐκ ἀναγκαῖον· ἱκανὸν γὰρ ἔσται τὸ ἕτερον τῶν ἐναντίων ποιεῖν τῇ ἀπουσίᾳ καὶ παρουσίᾳ τὴν μεταβολήν.

[118] ἡ δὲ ὑποκειμένη φύσις ἐπιστητὴ κατ᾽ ἀναλογίαν. ὡς γὰρ πρὸς ἀνδριάντα χαλκὸς ἢ πρὸς κλίνην ξύλον ἢ πρὸς τῶν ἄλλων τι τῶν ἐχόντων μορφὴν [ἡ ὕλη καὶ] τὸ ἄμορφον ἔχει πρὶν λαβεῖν τὴν μορφήν, οὕτως αὕτη πρὸς οὐσίαν ἔχει καὶ τὸ τόδε τι καὶ τὸ ὄν.

is fairly clear. The question is how this is to be reconciled with the view that the man underlies the change whereby he comes to know music. If the subject in the case of substantial generation is some matter, but in the case of accidental changes it is a substance, this would seems to threaten the generality of our conception of a subject. We might argue that a two-fold account is precisely what Aristotle is offering us: substantial generations are to be analysed into (i) the subject (matter), e.g. some bronze, (ii) the privation, e.g. not being a statue, (iii) the substantial form, e.g. being a statue; accidental changes or 'alterations' are analysable into (i) the subject (a substance), e.g. a man, (ii) the privation, e.g. not knowing music, (iii) the non-substantial form,[119] e.g. knowing music.

Obviously both types of change have a good deal in common, even if they have different sorts of subjects. If the subject is conceived of simply as what remains the same through a change, then the difference seems unproblematic. All the same, it is possible to understand Aristotle as thinking that matter is properly-speaking the subject in accidental changes as well. It is clear from the account of substantial generation that every (natural) substance is a compound of some matter and a substantial form.[120] Both matter and form exist when the substance comes to be, since the matter is what underlies and persists through substantial generation, and the form is what is added. Although the theory of substantial generation does not require the matter to continue to exist, after the substance has come to be, neither is there any reason to suppose that Aristotle thinks that particular substances can exist without matter. Rather, the natural thing to suppose is that they

[119] Strictly speaking, it will be an accidental form, which is a species of non-substantial form.
[120] This is probably what Aristotle meant in *Physics* I.1, when he said 'The things that are in the first instance clear and plain to us are rather those which are compounded.' (184a21-2)

continue as matter-form compounds, until they perish, at which point their matter loses the relevant substantial form and acquires the corresponding privation.[121]

While a particular natural substance is always a matter-form compound, it is less clear whether its matter and form exhaust what it is. One would have thought that they would have to, since, at least initially, its matter is what persisted through its coming to be, and its form is what was added, so, on the assumption that at the first moment of its existence every part of it either existed before it did or was added, it does not seem that there is room for anything else. Once again, there is no reason to suppose that, if a substance is exhausted by its matter and form initially, it should be any different later on.

Accidental properties pose a problem for the view that a thing's matter and form exhaust its nature. If a substantial form is what members of a given species have in common, it is not clear how it could account for these properties, which differ from one member of the species to another. One way to escape this problem would be to allow that substances must have another component, an accidental form, to account for their accidental properties. In that case, one would have to say that, while a substantial form is added when a substance comes to be, it is not all that is added, since the accidental form is added too. This seems to depart from Aristotle's explicit account of substantial change in a regrettable fashion. A different approach would be to invoke particular forms: every substance may have a particular substantial form that accounts for its accidental properties, while the universal substantial form that these particulars instantiate is only specific about what essential properties the particulars must have, while perhaps merely providing a range of possible values for the accidental properties – skin must be some colour, but never mind

[121] The fact that Aristotle repeatedly refers to the particular substance as a 'compound' (*sunolon*, *suneilemena*, *suntheta*, *sunkeimena*) makes it clear that both matter and form are necessary. He makes this explicit at *De Generatione et Corruptione* I.2, 317a23-6, where he distinguishes between substantial and accidental change by saying that the former involves the acquisition or loss of either the form *or the matter*.

which. It may be thought that a particular form should still only include essential properties, in which case a third option would be to say that the accidental properties are part of the matter.

Whichever of these interpretations we adopt, and there may be other viable alternatives, the important point is that every natural substance has a material component, which is available to be the subject in any changes it undergoes. We might wonder how matter could be the subject when something changes in respect of its matter. That Aristotle thinks this is possible is clear from the final item in his list of ways of coming to be *simpliciter* at 190b5-10. We might seek to avoid this difficulty by distinguishing between matter types and tokens: if I change the blade in my razor, in one sense its matter has changed – the blade is no longer constituted by the same piece of metal; in another sense, though, it is still made of the same stuff (or the same sort of stuff) even if different atoms are involved.[122] We, and Aristotle, might wish to extend our notion of the same type of matter to encompass not just structurally identical constituents but also constituents that though structurally distinct are suited to perform the function required by the form: so if a steel blade is replaced by a titanium one that still does the job effectively, we might say that while the matter token has changed the matter type is the same.

Certainly we can distinguish between particular, generic (or universal) and functional matters in this way. However, the question then arises as to which of these different sorts of matter is the subject in substantial generation. The traditional view is that it is particular matter – this piece of wood, not wood in general, or whatever stuff is suitable for a given functional role. The other sorts of matter may perhaps be regarded as underlying accidental changes, including the change that a substance undergoes when it changes its particular

[122] Aristotle uses the example of a saw (200b5f.), presumably because razor blades had not yet been invented by his pupil, Alexander the Great.

matter (although it is not clear what it means to say that a universal underlies a change). That is because they are designed to persist for (at least) as long as the particular substance does.[123] However, if the traditional view is right, it is not generic or functional matter that underlies the change through which a substance comes to be. A substance is a compound of particular matter and form, and there is no single sort of matter that is available to underlie both substantial and accidental changes.[124]

V. Gill on matter

A non-traditional interpretation of Aristotle's hylomorphism has been proposed by Mary Louise Gill.[125] Gill draws a distinction between two sorts of matter. A particular organism, e.g. Socrates, is a compound of his form or essence and his organic body, which, according to Gill, is his proximate, functional or 'good' matter. His form is predicated of this functional matter essentially: if the body were not alive, it would only be a 'body' homonymously, just as the dead fingers mentioned in Z.10 (1035b23ff.) are not really fingers at all. By contrast, artefacts, such as houses, are predicated of their proximate matter, the bricks, accidentally.[126] Gill believes that Socrates' form must be essentially predicated of his matter in order for him to count as a proper unity, unlike 'cloak' in Z.4 (1029b26ff.), which, although superficially simple, stands for something, pale man,

[123] In fact it is not necessary to make matter universal in order to have something which persists for as long as the substance does. One might distinguish between vertical and horizontal matter: vertical matter is the particular stuff that constitutes a substance at a time. A substance can certainly have different vertical matter at different times. Horizontal matter is whatever plays the matter role for a substance throughout its existence. One might think of it as a four-dimensional space-time worm, composed of different vertical matter slices. Things do not change their horizontal matter over time. Whether such a distinction could credibly be attributed to Aristotle is unclear. In any case, the horizontal matter is defined in such a way that it too cannot be the matter which predates the substance, from which it comes to be.

[124] If a substance is a compound of particular matter and form, and it is legitimate to talk of it having both generic and functional matter, one might wonder whether these should be thought of as part of its particular matter or of its form (or neither). We will return to this question in chapter 5.

[125] Cf. Gill (1989).

[126] For a discussion of the question of whether or not artefacts are substances, cf. Chapter 6.

inherently complex. If Socrates' form were predicated accidentally, his account (form + matter) would have two existentially independent components; so he would be an accidental unity, like pale man.[127]

On Gill's view, Socrates also has some more remote matter, which she refers to as 'generic' and 'bad' matter. This is the matter from which he came to be, the elements, or, more proximately, the *katamenia*;[128] and there is also the homonymous flesh and bones into which he perishes. It is here that Gill's view becomes really heterodox: for this pre-existing matter does not persist in the ordinary sense, by remaining the same through time. That is because it is generic, or universal, and not particular, as the traditional interpretation would have it. According to Gill, Socrates' particular pre-existing matter persists only in the sense that (some of?) its essential properties survive as necessary but non-essential properties of Socrates. E.g. having the tendency to move downwards may be an essential property of his pre-existing matter, due to its containing a preponderance of heavy elements; and this same property belongs to Socrates himself necessarily but non-essentially. Gill is not very explicit about which other properties constitute Socrates' generic matter. She could say that it is all those necessary non-essential properties of Socrates which are had by his pre-existing matter either essentially or necessarily (or maybe just essentially). A more complicated account would be needed, if one wanted, e.g., having stiff bones to count as a necessary feature of Socrates that is part of his generic matter, since such a property would not be had either essentially or necessarily by the pre-existing matter, but would have to be somehow derived from its essential or necessary properties.

[127] Also, the compound would be definitionally posterior to both form and matter. Gill wants to argue (against orthodoxy, which makes form definitionally prior) that Aristotle's final view (expressed in H.6-Θ, though not in Z-H.5) is that the compound is definitionally prior to both form and matter.

[128] Aristotle believes, somewhat ludicrously, that the female animal's menstrual blood – the *katamenia* – provides the matter for the new organism in reproduction, while the male sperm supplies the form.

Gill should resist saying that Socrates is a compound of his form and his generic matter, at least in the same sense of 'compound' as that in which he is a compound of his form and his functional matter, since that would make his generic and functional matters the same. Rather, his generic matter is a complex universal which is predicated of Socrates (and not of his form); whereas his form is predicated of his functional matter (which is also universal, since it is common to all human beings).

A major objection to Gill's account is that her way of understanding the persistence of the pre-existing matter in substantial change is not real persistence. After Socrates has come to be, this matter exists merely potentially, which according to Gill means that the particular matter has ceased to be and only some of its properties remain. One might wonder how this is to be squared with the requirement from the *Physics* that every change involves a subject. The only things that exist both before and after the change, and so are available to 'underlie' it, are the properties. However, if these are the only things that persist in substantial generation, substantial generation cannot be distinguished from an objectionable case of generation *ex nihilo*. Suppose, *per impossibile*,[129] a cat could turn into a dog. Intuitively, there are two distinct metaphysical (im)possibilities: the same thing is first a cat, and then later a dog; or a cat vanishes and is simultaneously replaced by a different thing, a dog. Only the first case is an example of one substance changing into another, but both cases are qualitatively identical. If our intuition that these cases are distinct is sound, we should also be able to distinguish between cases where the pre-existing matter persists and ones in which it is merely replaced by something qualitatively the same, but Gill's account of the matter's persistence conflates these two distinct alternatives. The traditional interpretation according to which the pre-existing matter is some particular stuff which

[129] Aristotle holds that no organism can become a different species of organism, but he does think that the elements can change into one another.

survives and acquires a substantial form in substantial generation is able to distinguish such cases from the metaphysically impossible, but conceivable, cases of mere replacement which require generation *ex nihilo*. On these grounds, the traditional interpretation is preferable.[130]

VI. A reconstruction of the argument of *Metaphysics* Z.17

Matter and form are theoretical entities, postulated because of the explanatory work that they do. Like all such abductively justified entities, what they are is determined by this explanatory work, by what they are for. We have seen that, in the *Physics*, Aristotle argues for matter and form, and thereby delimits their nature, on the basis that they are needed to account for substantial generation. If we are to avoid the conclusion that such changes are instances of generation *ex nihilo*, there must be something that underlies and persists through them, and this is the matter. If they are changes at all, there must be something different, that was not there before, and this is the form. These theoretical roles help to define matter and form, but they need not exhaust their nature. In *Metaphysics* Z.17, Aristotle provides us with another argument for the existence of form, and also for thinking that it is a substance, based on an explanatory role that, though clearly related to the role it plays in the *Physics*, is nevertheless distinct: form is what unifies some matter to make it one thing. This role is different from the role form played in the *Physics*, since it makes no reference to substantial generation. Even if substances all existed eternally, the distinction between matter and form would still be necessary. The rest of this chapter will be devoted to reconstructing the argument of this important and controversial text.

[130] Cf. Chapter 7, §III, for a similar objection to Gill's version of Aristotle's account of mixture.

VII. Z.17, 1041a6-b9: a new argument for the conclusion that form is substance

Z.17 can be divided into two parts. In the first part, 1041a6-b9, we receive a new argument, apparently not based on the criteria for being a substance discussed in the previous chapter, for thinking that substance is form. This argument is supported, in 1041b9-31, by a subsidiary argument for the existence of form, understood as that which unifies some matter and makes it one thing. We will discuss this argument in the next section.

(1) Substance is a sort of cause. (1041a9-10)

Aristotle begins his new approach to the question 'What is substance?' in this chapter with the claim that 'ἡ οὐσία ἀρχὴ καὶ αἰτία τις ἐστίν'. Sometimes his notions of 'principle' and 'cause' are equated (cf. Γ.2, 1003b22-4; Δ.1. 1013a17), but more often a principle seems to be an especially important sort of cause. If, as is often said, it is reasonable to think of Aristotle's notion of cause as being more similar to our notion of explanation, or as the answer to a 'why?' question, we should consider what sort of why-questions substances provide the answers to (assuming that 'αἰτία τις' indicates that it is not all such questions).

(2) All why-questions say why one thing belongs to another. (10-11)

Aristotle justifies this claim by considering a possible counter-example – the question 'why is a musical man a musical man?' He points out that this may be taken in two ways: it may mean the same as 'why does musical belong to a man?', in which case it is not a counter-example at all; or it may mean 'why is a musical man the same as himself?'.

Aristotle claims that this second sort of question is pointless ('τὸ μὲν οὖν διὰ τί αὐτό ἐστιν αὐτό, οὐδέν ἐστι ζητεῖν'), because, when we ask why something is the case, the fact that it is the case must already be clear. It is not altogether obvious how this explains the pointlessness of these sorts of questions. Bostock conjectures that the thought is something like the following: before we can ask 'why is x x?' we must know that x exists; but 'x exists' implies that 'x = x'; so 'x is x' is not extra information, and hence does not require further explanation.[131]

Aristotle gives another reason for thinking that this sort of why-question is pointless, which is somewhat easier to understand: the explanation of why x is x – because it is itself (αὐτὸ δὲ ὅτι αὐτό) – will be the same, whatever x is. Therefore it will not really be an explanation of why *a man*, as opposed to anything else, is the same as himself; the answer is too general and too brief to count as an explanation (ἀλλὰ τοῦτο κοινόν γε κατὰ πάντων καὶ σύντομον). There is a question about the status of Aristotle's exception (πλὴν εἴ τις λέγοι ὅτι ἀδιαίρετον πρὸς αὐτὸ ἕκαστον, τοῦτο δ' ἦν τὸ ἑνὶ εἶναι). Is Aristotle claiming that 'because a thing cannot be divided from itself, and this is what it is to be one thing' would count as a legitimate answer to, e.g., 'why is a man a man?' If we take the second 'τοῦτο' in line 20 to refer to 'αὐτὸ δὲ ὅτι αὐτό', and 'πλὴν ... εἶναι' to be parenthetical, we might suppose that he regards this less brief account as more promising, though it is equally general, and so it would not be true after all that there is no explanation of why a man is the same as himself.

What about sentences that are not of subject-predicate form, such as 'it thunders'? Aristotle claims that to ask why it thunders is to ask why noise is produced in the clouds, so presumably he thinks that all such why-questions which do not appear to ask why one thing belongs to another can be rearranged in a form which does. One might doubt whether

[131] Cf. Bostock (1994), 236-9.

these are really the same question, and also whether the same trick can be performed for all such examples.

Aristotle seems to imply that the ambiguity which he points to in 'why is a musical man a musical man?' is only present when the question uses a complex term, so that 'why is a man a man?' or 'why is a musical thing musical?' (17-18) have to be understood as asking why something is the same as itself. However, these questions can also be given a *de re* reading: we can ask why one thing (the property of being a man) belongs to another (this particular man); and this seems to be different from asking why it is the case that this man is this man. Either Aristotle has not seen that these simple-term why-questions are also ambiguous, or he thinks that the *de re* reading is really asking why something is the same as itself.

(3) The answer to a why-question (what one seeks) is the cause. (27-8)

(4) And this cause is the essence (what it was to be). (28)

Here whether or not we include (4) in the argument will be influenced by whether we follow Alexander (and Jaeger) in deleting 'τοῦτο δ' ἐστὶ τὸ τί ἦν εἶναι, ὡς εἰπεῖν λογικῶς', or retain the manuscript reading with Ross and Frede & Patzig. The reason for doubting that the words are genuine is that they appear to claim that *every* cause is an essence, and this apparently contradicts Aristotle's regular four-causal approach, as described in *Physics* 2.3 and *Metaphysics* Δ.2. If we retain them, Aristotle immediately goes on to say that in some cases the essence is a final cause (in the case of a house or a couch) and in some cases it is an efficient cause, and one might think that this provides us with a way out of the difficulty. It is Aristotle's view that the same thing can play different explanatory roles: shelter may be both what a house is for (its final cause) and what it is (its formal cause). We are not given

an example of an efficient cause here, but, if we consider the example just given of thunder, we are told in *Posterior Analytics* B (93b8, 94a5) that its efficient cause – fire being quenched in the clouds – ought to be incorporated into a proper definition of thunder. We may also compare *Physics* 2.7, 198a25-5: 'what a thing is and what it is for are one and the same, and that from which the change originates is the same in form as these.' And cf. Z.7, 1032a24-5.

Even if formal, final and efficient causes can always be identified, there is still a question about the material cause. One might just claim that Aristotle is ignoring matter here, perhaps because it is not so clear what sort of why-questions it is meant to answer (but e.g. 'why does the tree trunk float?' seems like a plausible candidate). A more ambitious response might point to passages such as Z.11, 1036a25-32 and 1036b5-8, where Aristotle apparently talks of some forms (those of composite substances) as being enmattered. One can understand the claim that form is (essentially) enmattered broadly-speaking in two ways:[132] (1) on the model of snubness as being concavity *in a nose*, because the type of concavity is specifically of the nasal kind (*Physics* 2.2, 193b31-194a15; 194b9-13; *Sophistici Elenchi* 31, 181b35-182a6), the form must include a specification of the matter; (2) the form can be defined in a matter-free way, but it requires the presence of the matter if it is to exist. If retaining the manuscript reading means that we must accept (1), there are difficulties to be faced: Bostock (241) comments 'one would not know what to make of the contrast between matter and form if matter is itself to be counted as a *part* of form.' We may add: how can form nevertheless count as prior in definition to matter? And how can form be distinguished from the universal compound?

[132] In fact there are many more possible positions on the question of whether the form includes a specification of the thing's matter (depending on what sort of matter is meant, and what range of forms). We will discuss this question in more detail in Chapter Five, and argue for the conclusion that natural forms are not matter-involving.

Another objection to the manuscript text is that, even if final, material and efficient causes may coincide with the essence or formal cause, it seems doubtful that this is always the case. For instance, in *Physics* 2.7, we are told that the efficient cause of 'why did they go to war?' is 'because they were raided' and the final cause 'in order to conquer'. It would make no sense to identify these, or to make them part of the definition of war. Similarly, we may well think that the matter/form distinction is not supposed to apply to things like thunder, and Aristotle says this explicitly about the eclipse at H.4, 1044b9-15. Moreover, we would expect Aristotle to be talking only about a certain range of causes, given the claim at the beginning of the chapter that substance is 'αἰτία τις'. Perhaps we can accept the manuscript reading, but nevertheless insist that Aristotle is not making the claim that all causes are essences: 'τοῦτο δ' ἐστὶ τὸ τί ἦν εἶναι' may just refer to the examples he has just been discussing (thunder and the house); or it may be implicit that he is limiting himself to why-questions where the answer is an essence. If we make this concession, we will have to understand the argument of the chapter as not involving the premise that all causes are essences (i.e. (4) will not figure in the argument).

(5) The question 'what is a man?' is equivalent to (and better expressed as) 'why is this (matter) a man?' (a32-b7)

Aristotle has spent some time arguing that all why-questions ask why A is B. He now finds fault with the question 'ἄνθρωπος τί ἐστι;', apparently because it is not of this form. This can only be regarded as a problem if he assumes that it is a why-question, and he goes on to reformulate it as one. But why should he think that it is a why-question?

Aristotle makes this claim, that what-questions are why-questions in *Posterior Analytics* B 2: 'It is clear that what it is and why it is are the same. What is eclipse? Loss of

light from the moon due to the screening of the earth. Why is there an eclipse, or why is the moon eclipsed? Because the light leaves it when the earth screens it.' (90a14-18) So, in the eclipse case, the answer to the two questions is the same, and Aristotle seems to think the same will be true if we ask about man. In *Posterior Analytics* B 1, four kinds of question were discerned: (1) if x is F; (2) why x is F; (3) if x is; (4) what x is. Questions (1) and (3) reduce to whether or not there is an explanatory middle term, while questions (2) and (4) reduce to what that middle term is. So the question 'what is an eclipse?' is the same as 'why is there an eclipse?' because both become the question 'why is *the moon* eclipsed? Aristotle does not say how he envisages this working in the man case, but we can speculate: 'what is a man?' and 'why is there a man?' become 'why is *this* a man?' Although on the face of it 'what is a man?' is a general question and 'why is this a man?' is about an individual, the answers to both will be the same, because in both cases the answer will be what it is to be a man, i.e. the essence of a man. That is what something in general, and this in particular, must possess in order to count as a man.

It is not easy to understand the point in the *Posterior Analytics*. Although Aristotle may very well have had in mind his (presumably) earlier work, we can understand how he might have come to the same conclusion – that what-questions are why-questions – in a different way. We have seen at the beginning of the chapter that he affirms that substance is a sort of cause, that is an answer to a why-question. It is also standard Aristotelian doctrine that substance answers the question 'what is it?' (e.g. at *Topics* 103b21 he uses 'what is it?' as an alternative to 'οὐσία', to designate the category; cf. *Categories* 2b31). So it seems that the same thing – substance – answers both what- and why-questions; and this might be thought to be sufficient to show that the questions are the same. Of course different questions may have the same answer, so it does not really show this.

What is the why-question which is equivalent to 'what is a man?'? Aristotle's first thought would seem to be that it is 'why is a man a man?'. However, this appears to be the sort of question which he earlier ruled out as pointless, on the grounds that it asks why something is the same as itself. Now we said earlier that there is also a *de re* reading of this question, which asks of some thing (which happens to be a man) why it is a man. This question, far from being pointless, is a perfectly reasonable way to translate the 'what is a man?' question into a why-question. It is not clear whether Aristotle is fully aware of the *de re* reading. At any rate, he decides that in order to avoid being understood as asking why something is the same as itself, it is better that the 'it' in 'why is it a man?' should not be 'a man'. If it needs to be something other than 'a man' about which we ask why it is a man (because why-questions always ask why one thing belongs to another), the only other suitable candidate would seem to be the man's matter.

One might think that there is another option which Aristotle overlooks here: if we ask why the universal man belongs to this particular man, we are asking why one thing belongs to another. So one does not even need the *de re*/*de dicto* distinction to see that asking why a man is a man can be understood as asking why one thing belongs to another. It seems most unlikely that Aristotle would fail to notice this. One possible explanation of why he does not make this the question is if he thinks that when we are talking about a particular man, the answer to the question why is he a man must be a particular form, while if we are talking about why is the universal man a man, the answer will be the universal.

(6) The answer to the question 'why is this matter an F' is 'because what it is to be F belongs to it'. (b5-6)

Once Aristotle has established that the 'what is a man?' question is equivalent to (or requires the same answer as) the 'why is this matter a man?' question, his desired conclusion results relatively easily. The answer to the question 'why is this matter a man?' is 'because the essence (or form) of a man belongs to it': 'οἷον οἰκία ταδὶ διὰ τί; ὅτι ὑπάρχει ὃ ἦν οἰκίᾳ εἶναι.' Since the answer to the 'what is a man?' question is substance, and the two questions have the same answer, substance must be essence or form. So the argument as a whole seems to be this:

(1) A thing's substance is a sort of cause.

(2) A cause is the answer to a why-question.

(3) So a thing's substance is the answer to a why-question. (2, 3)

(4) All why-questions ask why one thing belongs to another.

(5) A thing's substance is the answer to a 'what is an F?' question.

(6) The question 'what is an F?' has the same answer as some why-question.

(7) This why-question is either 'why is an F an F?' or 'why is this matter an F?'

(8) But it is not 'why is an F an F?' (4)

(9) So 'what is an F?' has the same answer as 'why is this matter an F?' (6, 7, 8)

(10) The essence or form of an F is the answer to 'why is this matter an F?'

(11) So the essence or form of an F is the answer to 'what is an F?' (9, 10)

So a thing's substance is essence or form. (5, 11)

Alternatively, if we agree with Ross that Aristotle is here committing himself to the claim that every cause is an essence, we can get to the same conclusion by means of a rather simpler argument:

(1) A thing's substance is a sort of cause.

(2) Every cause is an essence.

So a thing's substance is essence (or form).

For all its simplicity, this argument is problematic: exegetically because it fails to show how much of the content of the chapter is relevant, and philosophically because premise (2) appears to be false. I will therefore assume that the first reconstruction is closer to the mark.

Most of the rest of the chapter (b12-28) is devoted to an argument for why we must allow that substances are not merely their matter, but are a compound of matter and form, where the form is not to be counted as just another element, but is the cause of the thing's unity, and hence is its substance. I take it that, while this conclusion supports the preceding argument (in particular premise (10)), this is a new argument, and the main purpose of the chapter is to show that essence or form is the substance of a thing, in the manner that I have suggested.

VIII. Z.17, 1041b9-31: a supplementary argument for the existence of form

After he has offered his new argument for the conclusion that substance is form, Aristotle observes that inquiry into simple things is impossible, or at any rate requires a different method (9-11). Presumably the idea is that, since why-questions always ask why one thing belongs to another, it is possible to ask such questions of compounds (of matter and form), but not of simple things (such as forms). Aristotle may also have in mind the point that explanation must stop somewhere: a chain of explanation must end in something which does not require (or admit of) explanation, otherwise it would be of no use to finite

beings such as ourselves.[133] At Θ.10, 1051b17-52a4, he offers an account of how we can come to know such simples through a process that is analogous to touching.

After this brief comment on simple things, Aristotle proceeds to dedicate the rest of the chapter to 'things that are compounded in such a way that the whole is a unity, not like a heap but like a syllable' (11-12). A syllable, we are told, is not (identical with) its elements (presumably, unlike a heap), because the syllable 'ba' is not the same as the letters 'b' and 'a' (12-13).[134] Similarly flesh is not identical with *its* elements, fire and earth (13-14). Aristotle justifies these claims by pointing out that, when the syllable (or the flesh) is dissolved, it no longer exists, but its elements do (14-16). It is easier to understand what he means in the case of some flesh, since we can see how this could be destroyed in a way which did not destroy the fire and earth which composed it. The flesh and its elements have different persistence conditions; the former has the modal property of being destructible by burning (say), which the latter lack, and therefore they cannot be identical. The syllable example is a little less clear, because one is unsure whether Aristotle means a particular token of a syllable or the universal (he also might be talking about the universal flesh, but this makes it harder to make sense of 'διαλυθέντων'). If we think of a particular syllable 'ba', written on a piece of paper, we can see how it might be destroyed, by being ripped up in such a way as to preserve the individual letters 'b' and 'a'. It is less clear how to understand the destroying, if the syllable were a spoken instance, and even more obscure if it were the universal type. Aristotle could avail himself of the following argument, which would also work for universal syllables, since it does not rely on a difference in temporal or modal properties:

[133] Compare the regress that results if forms are understood to be essentially matter-involving, outlined in Chapter Five, §III.
[134] Plato makes a similar point about syllables at *Theaetetus*, 203e.

1. The syllables ‘ba’ and ‘ab’ have the same letters.
2. If syllables are identical with their letters, ‘ba’ = ‘ab’. (1 and the transitivity of identity)
3. ‘ba’ ≠ ‘ab’.

   So, syllables are not identical with their letters. (2 and 3)[135]

That said, the demonstratives in ‘αἴτιόν γε τοῦ εἶναι τοδὶ μὲν σάρκα τοδὶ δὲ συλλαβήν’ (26-7) suggest that he is thinking of particulars.

Whatever the justification that Aristotle has in mind, it seems true to say that neither a syllable nor some flesh is identical with its elements. It is noticeable that both examples are of things that Aristotle does not regard as substances, so that he seems to want to argue that all (non-heap-like) compounds are not identical with their elements, where something’s ‘elements’ is understood to mean whatever are its material parts (i.e. not merely earth, air, fire and water).[136] The argument continues with the claim that if a syllable is not identical with its elements, it must be something else besides them (16-17). Aristotle then proceeds to argue that this other thing cannot be one of its elements,[137] nor can it be composed of elements (19-20). If it were another of its elements, he says that the same argument will apply, resulting in an infinite regress (20-22). The idea is that if, as well as the elements a and b, we need a further element, c, to account for the non-identity of

[135] While this appears to be a good argument for distinguishing syllables (whether universal or particular) from their letters, it does not require that syllables be destructible. One might point out that, since Aristotle thinks of universals as dependent for their existence on their instances, he can make sense of the idea that they have different persistence conditions: there could be instances of ‘b’ and of ‘a’, but no instances of ‘ba’, in which case Aristotle would seem to be committed to the existence of the letters but not the syllable; so they cannot be identical. A similar argument would distinguish the universal flesh from the universals fire and earth.

[136] Cf. also the example of the house at b6, which we are told is not a substance at b28ff; it was implied that flesh is not a substance at Z.16, 1040b5ff.

[137] Literally the Greek argues that the further thing cannot be ‘an element’ (στοιχεῖον), not ‘one of its elements’, but we are taking ‘element’ to mean something’s material part – a relative notion – and this is what the argument requires. Does Aristotle mean to argue that the further thing is not a material part of the thing, or, as Irwin (1988), §155, suggests, not even an immaterial part? Although Aristotle’s examples suggest that he is thinking of elements as material parts, the claim that the further thing unifies the elements might be thought to imply that it cannot be a part of any sort, if it cannot be one of the things unified.

the thing with its elements, we will then just have another set of elements, a, b and c, which cannot be identical with the thing, and so will have to posit another element, d, etc.[138] If nothing is identical with its elements, however many elements you add, you will still need a further thing.

Next Aristotle argues that the further thing cannot be made of elements. He claims that, if it were, it would have to be made of more than one element, otherwise it would be that element (22-3). It is not clear why one should accept the general point that anything made of just one element is that element: one might think that, e.g., a statue could be made of a single lump of bronze without being identical with it.[139] However, this point does not seem to be crucial to Aristotle's argument for the conclusion that the further thing cannot be made of elements (or element). He says that, if it were, once again we would get the same argument as with the syllable and the flesh (24-5): if the further thing were composed of a and b, we would need to posit another further thing to explain why it was not identical with a and b, and so we would get a regress. One might well wonder why we would have to posit *another* further thing – why could it not be the same thing that was composed of a and b, and explained why it was not identical with a and b? Aristotle does not address this question, and we may suspect that he is not entitled to this conclusion, but neither does it seem crucial to his argument that the form not be composed of the matter, provided that the two are not identical.

So far the structure of the argument is fairly clear:

[138] 'The same argument' cannot refer to the argument that the thing must be distinguished from its elements because it can be destroyed though they survive: if the further thing were an element, it would be one that was destroyed whenever the thing was destroyed, so this would not give us a reason to distinguish the new set of elements from the thing. In fact b31-3 suggests that a thing's elements are the things into which it can be divided, from which it would follow that the further thing cannot be an element, without the need for the regress argument.

[139] Indeed it might seem that Aristotle does allow this at H.3, 1043b8-10.

1. A syllable is not identical with its elements. (b12-13)
2. If (1), in addition to its elements, there is some further thing which contributes to the syllable's identity. (16-17)
3. So there is some further thing which contributes to the syllable's identity. (1 and 2)
4. The further thing is not an element. (20-22)
5. The further thing is not made of elements. (22-25)

Aristotle has provided us with some reasons to accept that compounds are not exhausted by their material components. There is something else, which, although not a material component, is a part of the thing in some broader sense.[140] The further thing has been characterised in a negative way, as neither an element nor made of elements. Aristotle now tells us something positive about it: it is the cause of this thing being flesh and of that thing being a syllable (26-27). Not only that, but a few lines later we are told that it is the *primary* cause of the thing's being, and hence is its substance (27-8).

We can make sense of the idea that the further thing is *a* cause of the syllable's being (sc. what it is), in that, were it not for the further thing, there would be no syllable, merely a plurality of letters with no ordering to them.[141] One might think that the same could be said of the letters – without them there could be no syllable – in which case, why should they not count as the primary cause of the syllable's being, and its substance? It is true that the universal syllable could not be made of any other (universal) letters, but there is a sense in which particular instances of a syllable could have been made of different particular letter-instances (though the letter-instances would have to be of the same type).

[140] If 'elements' just means parts, then Aristotle is apparently in danger of saying that the further thing both is and is not a part. He could avoid this by distinguishing different sorts of parthood relation, and the most obvious way to do this is to have what something is made of (material parts) as the more specific notion, and what contributes to a thing's nature (both form and matter) as the more general one.

[141] This is to say that the form is existentially prior to the compound, in the sense that we denied that the compound was prior to things in other categories in Chapter Two, §V.

The same could clearly be said of the fire and earth which constitute some piece of flesh. A thing can change its particular matter, but not its form.

There are complications about this way of understanding why form and not matter is the primary cause of a thing's being. First, while Aristotle does allow (e.g. at *De Gen. et Corr.* i.5, 321b24-8) that living things change their matter, it is not clear that they all change their *proximate* matter: one might think that I have the same body throughout my life, even though it changes its matter (or perhaps one has to go down further still to find something that changes its proximate matter). Even if in the early stages of an organism's existence, it does not have the same proximate matter as it later acquires, one might point out that it also does not have the same shape, or organisation of parts. Now Aristotle may think that this does not matter, since for organisms the form is not an organisation or a shape, but a soul, and at the end of the chapter he says that only natural things are (and have) substances (28-30). He thinks that a thing's soul is not subject to this (or any) sort of change.

A different (and more promising?) way to understand the claim that the further thing is the primary cause of the syllable's being is in terms of its unificatory role: Aristotle thinks that there must be something which makes this plurality of letters one syllable, and, in general, something which makes anything's parts into a single whole. Reasonably, he thinks whatever plays this role cannot be any of the parts, and so, he argues, it must be some further thing. The first half of Z.17 argued for the conclusion that form is substance from the premise that form is the answer to the question 'why is this matter an F?', e.g 'why are these bricks a house?' (b5-6). The syllable example explains why it makes sense to think of form as playing this unificatory role. We can then understand Aristotle to be offering something like the following argument:

1. Whatever unifies a thing's matter makes it what it is.

2. Whatever makes a thing what it is is the primary cause of its being.[142]

3. The primary cause of a thing's being is its substance.

4. A thing's form unifies its matter.

So a thing's form is its substance.

We should notice that here, at the end of Z, we are told that the further thing is the substance *of* each thing (b27), whereas the chapter started with the claim that substance is a principle and a cause (a9-10), concluded that form was substance (b8-9), and that nature was substance (b30). It is difficult to tell whether, when Aristotle leaves out the genitive, it is meant to be understood. Since cause is a relational notion, it makes a certain amount of sense to understand the claim that substance is a cause as meaning that a thing's substance is the (primary) cause of its being, and to suppose that Aristotle is throughout the chapter only concerned with what is the substance *of* a thing. However, earlier in Z (e.g. 1028b8-16) he seemed to be interested in the question of what the substances are, where it does not look as though he means the dependent notion. One view is that he thinks that the only things that are substances *simpliciter* are compounds of matter and form, while the substances *of* these are forms. However, if he thinks that forms are substances *simpliciter*, and wants to use the argument of Z.17 to show this, he would need a reason to think that the fact that something is the substance *of* something makes it a substance *simpliciter*.

IX. Conclusion

There is little doubting the importance of this chapter for the success of Aristotle's metaphysical system: for in Z.4-11 it was assumed that substance, form and essence were to be equated, but the only real argument for this conclusion was based on the claim that

[142] Or perhaps, instead of 1 and 2, one could have 'whatever unifies a thing's matter is the primary cause of its being'. Since the argument is left implicit, it is impossible to be very precise.

being prior in definition was a criterion of substance. It may be somewhat of an exaggeration to say that this criterion was seemingly plucked from thin air, but at any rate it was not very clear where it came from. Here we get an argument to back up the criterion, but how convincing is the main argument of Z.17 as I have understood it? The first premise, that substance is a kind of cause, is a point that has not been much emphasised previously. Burnyeat et al. (1979) suggest that Aristotle may be equivocating on the meaning of 'ἀρχή': substance counts as a 'starting point' because it is the first category, but it is not obvious that this entitles one to conclude that it is any sort of cause. That said, the fact that no argument is provided for this premise suggests that Aristotle regards it as almost beyond dispute, and it seems reasonable to suppose that he considers it part of the meaning of the term 'substance', or at any rate as self-evident.

The most difficult part of the argument in the first half of the chapter involves the progression from the question 'what is a man?' to 'why is there a man?' to 'why is a man a man?' to the approved form of question – 'why are these flesh and bones a man?' While the argument does not require the stronger claim that a what-question and its correlative why-question are the same question, it does require that they have the same answer. The dismissal of the question 'why is a man a man?' seems problematic, both because it apparently ignores the possibility of a *de re* reading on which the question is not asking about a tautology, and also because, even without the *de re*/*de dicto* distinction, why should we not understand the question as 'why does the form of a man belong to this particular man?'? Perhaps Aristotle is influenced by his view that form is predicated of matter (and not of the compound?) In any case, it does not seem that this problem with the argument is fatal: whatever the correct why-question which corresponds to 'what is a man?', as long as the answer is essence/form, the argument can be saved.

While the idea that the answer to both what- and why-questions is essence or form makes a certain amount of sense from Aristotle's point of view, in the first part of the chapter he has not done much to convince an opponent that it must be so. What is the opponent's alternative position? It might be that matter is a thing's substance, or a less cooperative opponent might question the distinction between matter and form altogether. It is these sorts of opponents whom Aristotle addresses in the final section of the chapter, where he argues that a thing is not identical with its matter. There must be a further thing, form, which unifies the matter. This unifier is the primary cause of the thing's being, and so is its substance. If we add the principle that the substance of a thing is a substance *simpliciter*, we arrive at the desired conclusion that form is substance.

Chapter Four: The Principle of Individuation

In the last chapter, we established certain facts about the nature of form, by examining its role as what is added in substantial generation, and as what unifies some matter, making it one thing. In this chapter, we will examine a puzzle about hylomorphism raised by Kit Fine. We will see that this puzzle introduces another possible role for form to play, a role that it can only play if it is of a certain sort. Fine's puzzle will lead naturally into a discussion of the role of principle of individuation, which has been assigned by various scholars to both matter and form. The question of what is meant by a 'principle of individuation', and whether it differs from the unificatory role already assigned to forms, is in need of some clarification, which we will supply.

I. Kit Fine's 'A Puzzle Concerning Matter and Form'

Kit Fine identifies an apparent difficulty for Aristotle's theory of matter and form. The difficulty is as follows: it seems that two substances, e.g. Socrates and Callias, may have numerically the same matter at different times. That is it is possible (though unlikely) for all and only the particular elements that now compose Socrates to end up composing Callias at some later date. In such a case, Socrates and Callias would have the same matter, albeit at different times. Moreover, both being human beings, they would have the same form. But they themselves are compounds of matter and form, so if their matter and form are numerically the same, they must themselves be numerically the same.[143] Of course they are not numerically the same. So either this argument is invalid or one of its premises is false,

[143] Note that one cannot just say that to be identical they must have the same matter and form at the same time: they are supposed to be compounds of matter and form, not matter, form and a time. Forms are supposed to be the unifiers of matter, not form, time pairs. Cf. §V for further discussion of this point.

and Fine goes on to discuss the various options that are available to Aristotle, or someone (like himself) who is a believer in hylomorphism.

II. Equivocation

The first possibility which Fine considers is that the argument might turn on an equivocation in the meaning of 'matter'. For Aristotle, matter comes in different levels. In the situation envisaged Socrates and Callias would have the same remote or low-level matter (the same elements) but they would have different proximate matter, since the proximate matter of a human being is his body. Since a substance is a compound of a substantial form and some *proximate* matter, we are not entitled to conclude that Socrates and Callias are the same.

Fine comments that one need not accept that a substance is a compound of *only* the proximate matter and a substantial form. The proximate matter is also a compound of some lower matter and a form: so if Socrates is the compound Fm, where m is his proximate matter and F his substantial form, we can say that m is itself a compound Gn, where n is the proximate matter of m, and G its form. Then it is not obvious why we should not say that Socrates, as well as being Fm, is also a compound Hn, where H is some combination of the forms F and G. However, even if we grant this, it will not help dissolve the challenge of equivocation: for Socrates and Callias may now have the same matter, but we will have lost our reason for thinking that they have the same form. The compositional form, H, is more fine-grained than the substantial form, and the fact that Socrates and Callias are both human beings will no longer suffice to show that they have the same compositional form. So we will have eliminated an ambiguity in 'matter' only for a similar ambiguity to arise in 'form'.

There is, however, a more successful way of tackling the objection that the argument equivocates on 'matter'. We can redescribe the situation so that not only are Socrates' and Callias' forms the same, but the forms of their bodies are also the same, and the forms of the matter of their bodies, and so on all the way down. Although it is unclear what in general is required for the matter of two things of the same form to have the same form, e.g. for Socrates' and Callias' bodies to have the same form, it seems reasonable to suppose that it is sufficient for two things to have the same form that they be qualitatively the same. So we can ensure that Socrates' and Callias' matters have the same form, if we suppose that they are qualitatively the same. One might insist that no two things are qualitatively the same, but Aristotle is not Leibniz. What is more, although strict qualitative identity, i.e. having all the same non-relational and relational properties, may require demanding metaphysical assumptions such as an eternally cyclic universe, probably all that is required is that there be no *relevant* qualitative difference between Socrates and Callias, where 'relevant' means such as to result in them or their matter having different forms. While one might insist that two things must be qualitatively the same to have the same form, this also does not seem to be Aristotle's view. So if we tailor our example to this requirement, we can thwart the charge of equivocation. The argument then is valid, so we must choose one of its premises to reject.

III. Common Form

The first premise which Fine considers rejecting is the idea that co-specific or relevantly similar things, such as Socrates and Callias, necessarily have a common form. This one might reject if one were a believer in individual forms. Fine comments that it is easier to attribute the belief in individual forms to Aristotle than to believe it oneself, because

Aristotle had a reason for that belief – 'that forms are real and active principles in the world, which is denied to any right-minded modern.' (19) It is not absolutely clear to me what he means by this, but, if it is the point that Aristotelian forms are efficient causes, we need to consider first why this is not something that a right-minded modern can accept, and secondly, if we have granted that he cannot, whether this is an indispensible element of Aristotle's theory.

On the exegetical question of whether Aristotle himself accepted individual forms, Fine points out that the question is not so much whether he accepted them as what role he gave them: if he believed in universal forms, he could construct individual forms out of some kind of indexed version of the universal (e.g. an ordered pair of the universal form and the thing which had it); similarly, if he believed in individual forms, he could construct the universal as some sort of abstraction from the individuals (e.g. an equivalence class of individual forms). So the real question is whether it is an individual form which combines with matter to make up a compound. Fine assumes that this could only be the case if it is an individual, as opposed to a universal form, which is a thing's essence. He then distinguishes full advocates of individual forms, who believe that everything which has a form has an individual form, from partial advocates, who think that only certain things, perhaps living things or things which need not be the matter of anything, have them. The partial advocate will lack a complete solution to the puzzle, if it can be restated (a) for artefacts and (b) for the proximate matter of substances. In the end, I do not find what Fine has to say against individual forms convincing, and the Common Form premise will emerge as the most promising candidate for rejection.

IV. Migration

The next response that Fine considers is that one might reject Material Migration, i.e. the possibility that two co-specific things exchange matter. He again claims that this is not open to a neo-Aristotelian, since we know that there is nothing to prevent the molecules which compose me from later composing you, but Aristotle did not know about molecules, so perhaps he could have rejected Material Migration. Fine defines the negation of Material Migration, which he calls Entrapment, as the view that necessarily things with the same matter and form are the same. He distinguishes this from two other theses: Strong Entrapment says that things with the same matter are the same; whereas (Material) Individuation says that things with the same form are the same *in virtue of* their matter being the same, i.e. it adds to Entrapment that the identity of the matter should explain the identity of the things. Textual evidence for Aristotle holding some form of Entrapment is found at ?.6, 1016b31-3, Z.8, 1034a5-8, and I.3, 1054b16-17: the first apparently supports Strong Entrapment, the second Individuation, and the third Entrapment. Fine also believes that the comments about the unificatory role of form in Z.17 and H.6 provide indirect support for Entrapment. However, he does not think that this solution is open to Aristotle because it seems that he only subscribes to Entrapment for the proximate matter of sensible things: the solution of the puzzle requires either that the proximate matter of anything enmattered is entrapped, or that the proximate and non-proximate matter of any sensible thing is entrapped; but Aristotle in fact seems to restrict Entrapment to the high-level matter of sensible things.

We can judge Aristotle's attitude to Material Migration, if we consider what he would say about various proposed examples of it. An opponent of Material Migration must either say that the alleged things in the case are the same, or that their matter is different;

while a proponent will say that they are distinct, though their matters are the same. The first cases that Fine considers are ones involving fission (which Aristotle accepts for plants and earthworms)[144] and fusion. Suppose an amoeba, xy, splits into two amoebae, x and y, and then fuses back to form an amoeba, xy. Are xy and xy distinct? The opponent of Material Migration can (and must)[145] say 'no'. However, we can make the case more difficult if we imagine a very big amoeba which is capable of surviving its fusion with (or fission into) a small one. The opponent of Material Migration must deny that this sort of survival is possible, since, if it were possible, repeated fusions and fissions could result in all the matter of the original amoeba ending up in a different one (contra Entrapment). Not only must the opponent insist that all three parties to fission or fusion are distinct; he must also maintain that anything which is destroyed in such a process be capable of being restored (if all its matter ends up acquiring the same form again), and hence is not completely destroyed.

Fine discusses similar cases that arise for artefacts, e.g. if a statue is melted down and then recast in the same form. One might think that such cases are unproblematic for Aristotle, if we take his denial that artefacts are substances seriously:[146] if artefacts are not things in their own right (but are only treated as such for the purpose of analogy), perhaps strictly speaking the statue is the same as the bronze. But then there is no distinction between the thing and its matter which is needed to construct the puzzle cases. Fine doubts that this is a correct interpretation of Aristotle on artefacts. Instead he suggests that Aristotle's view may be that bronze and statue are distinct, but they only have the relation

[144] Cf. *De Anima*, 411b24-6. If it is right that fission is possible only if fusion is, Aristotle would need to respond to this sort of case, if he were minded to reject Material Migration.
[145] That is, unless he is willing to assert that the matter does not persist in the transition from there being one amoeba to there being two. While this might seem plausible for more proximate matter, it seems difficult to maintain if we are talking about, e.g., elements.
[146] For an explanation of why Aristotle does not regard artefacts as substances, cf. Chapter Six.

of matter to compound by way of analogy;[147] or alternatively that the statue literally has the bronze as its matter (and its shape as its form), but the form and the statue are not literally substances, but only substances by way of analogy.[148] On either of these views, disintegration/reintegration cases can be constructed using the analogues instead of the real notions, and so, were Aristotle minded to reject Material Migration, he would have either to deny that matter persists through disintegration/reintegration, or to accept that, when the matter is reintegrated, the artefact is reinstated. It seems clear that he would not be willing to deny that matter can persist through such processes: e.g. *Metaphysics* .4 1014b30-1, 'for when a product is made out of these materials, the first matter is preserved throughout.' Therefore he is left with the same sort of response as was found unpalatable in the fission/fusion cases for organisms.

Fine now moves on to the most plausible instances of Material Migration: ones that involve the transfer of matter between organisms through ordinary chemical and biological processes. He supposes that Socrates and Callias are trees, to avoid complications that are peculiar to personal identity.[149] If we 'track' the elemental matter of Socrates at one time, it may turn out that it coincides with Callias' elemental matter at a later time. If such migration is possible, the matter must 'get out' of the first tree and 'get in' to the second. It must also 'get across' from the one tree to the other, but it is reasonable to assume that, if getting out and in is possible, so is getting across, since the same sorts of processes will be required.

[147] The statue might be an accidental unity of the bronze and its accidental shape, like musical Coriscus, cf. *Metaphysics* 1015b16-19.
[148] Fine suggests that this interpretation is preferable if Aristotle thinks that substance admits of degrees, since it is easier to see why different forms might count as more or less substantial than it is to see why the same might be true of different *relations* between matter and form.
[149] If having the same memories and personality is sufficient for having the same form of a person, we might not be so confident that the two putative persons are really distinct.

The matter may get out either all at once, when the tree ceases to exist, or else gradually; and similarly it may get in either all at once, when the tree comes to be, or else a bit at a time. Therefore we need to consider Aristotle's views about the transfer of matter in substantial change and in growth and diminution. Fine quotes *De Generatione et Corruptione* 1.5, 321b25-8: 'This is how the matter of flesh grows: an addition is not made to each and every part, but some flows away and some comes in new.'[150] The natural way of understanding this is that some matter which is not part of the matter of the flesh at one time is a part of the matter of the flesh at a later time. And if this is the correct way of understanding the passage, migration would be possible by way of growth and diminution. However, one might avoid this conclusion in a couple of ways. One could understand the passage to mean that some matter, m, that is not part of the matter of the flesh, becomes some matter, n (n ≠ m), that is. In that case, the original matter, m, would not become a part of the matter of the flesh. Alternatively, one might concede that the original matter becomes part of the matter of the flesh, but only in a time-relative sense. Then the fact that the matter of the flesh of one individual had all the same parts at one time as the matter of the flesh of another individual at another time might not suffice for the two matters being the same. So what Aristotle says here about growth does not prove beyond all doubt that he accepted the possibility of elemental migration, although the most natural reading of the passage would suggest that he does.

Next Fine discusses Aristotle's views about substantial change. According to the traditional interpretation of Aristotle, prime matter persists through all changes, and

[150] Οὕτω δ' αὐξάνεται ἡ ὕλη τῆς σαρκός, καὶ οὐχ ὁτῳοῦν παντὶ προσγίνεται, ἀλλὰ τὸ μὲν ὑπεκρεῖ τὸ δὲ προσέρχεται, τοῦ δὲ σχήματος καὶ τοῦ εἴδους ὁτῳοῦν μορίῳ.

elemental matter through all non-elemental changes,[151] so that migration would be possible. However, this interpretation has been challenged recently. If we consider the first tree at the moment when it dies, before this moment we have a living tree and thereafter a dead tree, and both of these contain some elemental matter. The opponent of Migration must maintain that the elemental matter of the living tree is not numerically the same as the elemental matter of the dead tree; otherwise, if it can persist through this change, it can surely persist through all the other changes which result in its constituting the other tree. If the earths, say, of the living and dead trees are not the same, it must be because their forms are not the same: for if the one matter continues as the other, and their forms are the same, it is hard to see why they should not themselves count as the same.[152] The difference in form cannot consist in, e.g., a difference in the ratios of contraries that make up the earth, for there is no reason to suppose that this must have changed. The only way we can account for the difference is if we suppose that Aristotle distinguishes between actual and potential earth. Now it is true that Aristotle does think that, e.g., a dead hand is not the same, or of the same form, as a living hand, but is merely homonymously a hand. He is prepared to extend this view down to flesh and bone, i.e. the matter of the bodily parts, and perhaps further.[153] However there is no real evidence that he was willing to extend it all the way down to the level of the elements.

Even if we allow that the elemental matter of the living tree and the dead tree are not the same, there is still a problem for the opponent of Migration. Although the matter of the living tree no longer actually exists once it dies, it may still potentially exist. If it

[151] Cf. *Metaphysics* H.5, 1045a3-6: 'If from a corpse is produced an animal, the corpse first goes back to its matter, and only then becomes an animal.'
[152] Even if the elements have no underlying matter, because there is no prime matter, they can still be said to have a form in the looser sense of species or kind, although they have no form in the sense of that which combines with matter to make up a unified whole.
[153] Cf. *De Generatione et Corruptione*, 2.1, 734b24-735a26.

potentially exists, presumably this means that it is capable of being reinstated, of actually existing again. But what more could be required for reinstatement to occur than for the matter to take on the form of the second tree? Migration will have occurred, even though the matter only gets out in the sense that it has its potential existence preserved. To avoid this result, the opponent of Migration must insist that a thing's matter is destroyed on its death, so that it no longer exists either actually or potentially. This may be right for more proximate matter, such as hands, but it is hard to accept for the elements.

Given that there seem to be good reasons, in the phenomena of fission and fusion, growth and diminution, and substantial change, for Aristotle to accept Migration for living things, Fine suggests that he could adopt a differential solution: he could reject Common Form for animate things, and say that these are individuated by their individual forms or souls; and he could reject Migration for inanimate things, and individuate them by way of their matter which is necessarily peculiar to them. One difficulty with this sort of differential approach concerns how one explains why only living things have individual forms. There would have to be something in non-living things sufficiently unlike a soul to be specific (non-individual), but sufficiently like it to be a form.

V. Composition

The final solution which Fine contemplates is rejecting Simple Composition: the idea that anything enmattered is a compound of its matter and form at a given time. The standard interpretation of Aristotle has him committed to both Common Form and Material Migration, and Fine first contends that this is the position Aristotle in fact held, and then also reports that it is the position he, as a neo-Aristotelian, is inclined to adopt. If this is

right, the only way to solve the puzzle will be to reject Simple Composition. But is this a credible interpretation of Aristotle? And is it a defensible view in its own right?

Fine admits that there is no disputing that Aristotle was committed to what he calls Composition – that anything enmattered is a compound of matter and form. However there are a number of ways in which this might be filled out. Simple Composition is the most natural way of doing so: the compound is compounded of the thing's matter and form at a particular time, and the relation between the compound and the thing is identity. However, there are two points which tell against this interpretation. First, in Simple Composition the material component is the thing's matter *at a particular time*; but assuming that things can change their matter, we might well wonder (a) how just one of the matters, which it has at a particular time, can yield the whole thing, and (b) how different matters at different times can yield the same thing. Simple Composition, Fine says, 'makes the operation of compounding unduly selective or unduly conflationary.' (31)

The other problem for Simple Composition is that, if one accepts the traditional interpretation of Aristotle, i.e. that he was committed to both Common Form and Material Migration, then he cannot consistently accept Simple Composition. Now this will not be clear-cut proof that Aristotle *did* not accept Simple Composition, for quite apart from questions about whether the traditional interpretation is correct, he might not have noticed the puzzle which Fine has been discussing. This is all the more plausible seeing as many of his interpreters have apparently not noticed it either. Fine suggests that they, and perhaps Aristotle too, missed the point that if the non-proximate matter of a substance can migrate so too can the proximate matter of a non-substance. Also, there are no clear examples in Aristotle's metaphysical system of things whose proximate matter can migrate: certainly it is not possible for living things, or the higher forms of matter; it may be only possible at the

level below the lowest at which hylomorphism holds, but Aristotle does not make it explicit what sort of matter lies at this level, and so was never confronted with a specific example. Of course, even if Aristotle was inconsistent, one may still consider what he should have said, or what someone who wanted to expound their own hylomorphic theory could say, and in this spirit Fine goes on to discuss alternatives to Simple Composition.

One possibility involves relativizing the concept of identity to a time: an enmattered object is then *identical at a particular time* to the compound of its matter and form at that time. One could then solve the puzzle if the object is not absolutely identical to (or numerically the same as) the compound that it is identical to at a particular time. Enmattered things and compounds would be distinct things, despite the fact that they were always *identical at any particular time*.[154] One difficulty with this suggestion is that there is no evidence that Aristotle wanted to distinguish compounds from sensible things: for instance, when he is considering whether matter, form or the compound is substance, there does not seem to be a fourth alternative, and he seems to be assuming that the compound is the sensible thing.

Another alternative, which Fine calls Plural Composition, stipulates that a thing is the compound of its form and all the various matters that it has at different times: X = F(m1, m2,...mk), where m1...mk are X's proximate matters in order of temporal occurrence. This proposal might help to counter the objection that Simple Composition is unduly selective or conflationary, but it fails to save Aristotle from contradiction, since we can easily alter the case to one in which Socrates and Callias have the same matter throughout their existence.

[154] Perhaps it is easier to speak of enmattered things and compounds coinciding at a particular time. Then wherever there is an object of the one sort there will be an object of the other sort, but a compound will 'jump' from coinciding with one thing (Socrates) to nothing to another thing (Callias).

Finally, one could relativize the concept of a compound to a time (Relative Composition): enmattered objects are absolutely identical to compounds, but a compound is not absolutely a compound of matter and form, but only relative to a particular time. X = Ft(m), where m is the proximate matter of X at t; or, combining Relative and Plural Composition, X = Ft(m1...mk), where t is the period of time for which X exists, and m1...mk are its matters in order of occurrence. Relative Composition does deal with the problem directly, since Socrates and Callias can have the same form and matter, and yet be different compounds because the times are different.[155] It does not commit Aristotle to a more complicated ontology, like the first solution, and, in the Plural version, it also deals with the complaints about undue selectivity and conflation.

There is an exegetical problem with ascribing this final, preferred version of Composition to Aristotle, and that is that it apparently conflicts with his view that form is what unifies a compound.[156] The problem is how to understand the role of the time in the unification of the compound by the form: it cannot be just another element to be unified, for the time at which the matter exists does not figure as a part of the resulting unity; the unification cannot be relativized to a time, for how could the time be relevant to the form's making the matter into one thing (rather than another)? Fine suggests that the only way in which we can understand the role of the time is if we suppose that unification is not many-one but many-many: the form does not make any given matter into a single thing; it makes it into many, and the time serves as an index by which one of these can be picked out. The problem with this is that it is difficult to see why we should call such a process unification, when the result is not numerically one. On the additional assumption that unification must

[155] There may also be a modal version of the puzzle: Socrates is such that his matter and form could be identical with those of Callias at a certain time. This puzzle might be solved by also relativizing compounds to worlds.
[156] Cf. H.6, 1045a7-10; 1041a26.

be many-one, Aristotle is still inconsistent if he accepts either version of Relative Composition. Indeed, under this assumption we can formulate the puzzle without mentioning composition at all: if a common form must unify common matter into one and the same thing, and Socrates and Callias have the same form and the same matter, they are one and the same. Since Aristotle (and many neo-Aristotelians) would surely be unwilling to give up the unifying role of form, Fine concludes that there is no alternative to Simple Composition which deals with the puzzle adequately; and since he has already committed himself to Common Form and Material Migration, he finds the puzzle insoluble.

VI. The mereological puzzle

In case the lack of success at finding an alternative to Simple Composition led one to wonder whether Fine's acceptance of Common Form or Material Migration might have been too hasty, in the final section he produces another puzzle which seems to require us to reject Simple Composition. Socrates' elemental matter could be different at different times. Suppose, at one time, he is Fm and at another Gn, where m and n are his elemental matters at those times and F and G their complementary forms. n is part of Gn, and so part of Fm (since Fm = Gn). But n is not part of F (since they have no parts in common), so it must be part of m. Conversely, by a similar process of reasoning, m is part of n. So m = n (since they are parts of one another). But this contradicts the assumption that Socrates' elemental matter could differ.

This puzzle is different from that with which the rest of the article has been occupied: it depends not on the possibility of migration – of the same matter being in different things – but of variation – of the same thing having different matters. Both puzzles rely on Simple Composition, the numerical identity of an enmattered object with a

compound of its matter and form at a time. However, while the first argument used the fact that for any matter and form there is at most one compound, this one relies on the fact that matter and form exhaust the mereological content of a compound. Fine suggests that there are two conditions of unification, corresponding to the two puzzles: 1) form must make the parts into a definite thing (i.e. one thing not two); 2) form must make the parts into the requisite whole (something with the correct parts). Then each puzzle can be thought of as an attempt to show that one of these conditions cannot be satisfied.

How might the new puzzle be solved? One option, which is compatible with all suggested solutions to the first puzzle, is to deny that matter and form exhaust the mereological content of the compound. We can distinguish two assumptions on which the puzzle relies: that matter and form are parts of the compound; and that any material part of Fm must either have a part in common with F or be a part of m. Hylomorphism does not require that one conceive of matter and form as parts, but Fine argues that this is how Aristotle thinks of them, and that he thinks they are the only parts. There are plenty of examples of Aristotle calling the matter a part of the compound, and some passages that seem to show him thinking of the form in this way (e.g. 1023b18-22), although he is eager to stress that they are not parts in the same way (e.g. H.3, 1043b5). Fine says that a version of the argument could still be given even if form were not a part of the compound. As for the second assumption, it does not seem that there is anything other than matter and form which could be a part of the compound. As Fine points out, a heap that is constituted by a and b + c will also have b, c, a + b, and a + c as parts, but this just emphasises that anything which is a part of the compound must stand in some mereological relationship to its constitutive parts.

Another possible solution involves denying that anything can change its matter. Fine calls this proposal Rigidity. Rigidity is the converse of Entrapment: the latter said that, when the matter is the same, the thing is the same (if m = n, x = y); while Rigidity is the claim that, when the thing is the same, the matter is the same (if x = y, m = n). Plausibly Rigidity implies Entrapment (i.e. if migration is possible so is variation): if my matter can migrate, it can be the matter of someone else at a later time; but there is no apparent reason why I should not continue to exist at that later time, in which case I would have to have different matter. However the reverse implication, from Entrapment to Rigidity, can be resisted: if my matter is different at different times, this does not show that matter must have 'got in' or out of me, since what one takes to be its entry or exit might in fact involve a change in its identity. The neo-Aristotelian is committed to Variation (the negation of Rigidity), and there is some evidence that Aristotle is too (cf. *De Generatione et Corruptione* 321b25; and the evidence for his being committed to Migration).

Finally, once again, one might reject Simple Composition. If our concern were merely to solve this problem, we could do so by replacing it with Plural Composition, since then the different material parts would both be incorporated into the compound. However, we have seen that Plural Composition will not help with the original problem. If one adopted a non-standard interpretation of Aristotle, and solved the original puzzle either by accepting Individual Form or Entrapment, adopting Plural Composition here would mean that one had a solution to both problems. Fine cautions that this approach will not remove all difficulties for our understanding of unification: if we accept Individual Form, every compound has a form which is unique to it; and if we accept Entrapment, every compound has some similarly unique material components. In either case, the thing that is supposed to account

for the unity of the compound, the form or the material components, is itself understood in terms of unity.

It is not clear to me that this is really an insuperable difficulty: any attempt to explain a thing's unity by postulating entities that account for it must, to avoid a regress, either hold that the explanatory entities do not need their own unity explaining, or that they explain their own unity (or each other's). In any case, if, as Fine appears to have shown, such a position is, despite its difficulties, the only way to avoid contradiction, then it looks as though both Aristotle and his supporters ought to accept Plural Composition together with either Individual Form or Entrapment.

It is evidently important for anyone who wants to defend hylomorphism to have a response to Fine's puzzles, but the suggestion that individual forms may provide a solution is also significant for our investigation of the nature of form. Fine rejects this option on the grounds that individual forms are unacceptable to modern sensibilities, but in fact not all modern philosophers have felt that way, and Fine himself seems to allow that there is more evidence for individual forms in Aristotle than there is for his accepting Entrapment. The idea that individual forms are what distinguish qualitatively identical but distinct individuals is sometimes summarised by saying that forms are principles of individuation. Unfortunately, insufficient care has been taken to distinguish this role of form from its unificatory function.

VII. Aristotle's principle of individuation

In recent years there has been some controversy over what plays the role in Aristotle's metaphysics of a principle of individuation: while the predominant view has been that this role is reserved for matter, some scholars have maintained either that Aristotle

means it to be form, or that he does not see the need for a principle of individuation at all. Some of this controversy seems to have resulted from a failure to be clear about what a principle of individuation is, or what problem it is supposed to solve. For instance, in Anscombe et al. (1953), Popper points out that the apparent disagreement between Lukasiewicz and Anscombe is due to the fact that they are answering different questions: Lukasiewicz insists that form should be counted as the 'source of individuality' because it explains how a thing with many parts is a single individual and not a plurality, it accounts for the unity of individuals. He has in mind questions like 'How do all these bricks constitute a single house?' or 'What makes this collection of flesh and bones Socrates?', and here Aristotle does indeed appear to make use of form. On the other hand, Anscombe says that it is matter which makes an individual the individual it is, numerically distinct from other individuals of the same (and other) species. This is a problem about numerical distinctness rather than unity. It is perfectly consistent to say that Socrates is one man because of his form which unifies his matter into a single whole, and he is a numerically distinct individual from Callias because his matter is numerically distinct from Callias'.[157] It has become conventional to call an answer to Lukasiewicz's problem a principle of unity, and an answer to Anscombe's problem a principle of individuality, and I will adopt this terminology.

Even once it has been distinguished from a principle of unity, there is still much that remains unclear about the claim that matter is the principle of individuation.[158] The

[157] Anscombe's question may not be wholly separable from Lukasiewicz's, if detemining that two objects are two requires one to answer the question, 'Two whats?', and if an answer to this latter question can only be provided by answering Lukasiewicz's. It is often maintained that questions of identity are sortal relative: it does not make sense to ask whether x and y are the same, unless we supplement our question with a sortal - the same F. If so, it is natural, though not perhaps obligatory, to make questions of distinctness, or non-identity, sortal relative as well.

[158] After one has separated out issues about unity, there are still many different questions that could be addressed by a principle of individuation. There are epistemological questions: (1) how can we tell that there are several individuals of the same kind?; (2) how can we tell one individual from another of the same kind? There are metaphysical questions: (3) what makes an individual different from another of the same kind?; (4)

traditional interpretation is that this is a metaphysical thesis: matter is what makes one individual different from another (of the same kind). However, Charlton (1972) has argued that Aristotle at no point addresses this issue, but is instead concerned with the epistemological question of how we tell one individual from another. We will look at the textual evidence for this view presently, but first it is worth considering why one might think that the metaphysical issue is not worth pursuing. The obvious reason is if one thought that there was no answer to the question 'what makes this individual numerically distinct from that one?' – that nothing *makes* them distinct, they just are. An advocate of this view might point out that even if we accept that matter is what makes this individual distinct from that one, we still have no answer to the question 'what makes this portion of matter numerically distinct from that one?'. There will always be certain of these numerical distinctness facts that remain unexplained on any theory. But if explanation has to stop somewhere, why not stop at the beginning? Why not just say that it is a bare fact that Socrates is numerically distinct from Callias, and leave matter out of it?

One might think that one could respond to this argument by insisting that there is an answer to the question what makes Socrates' matter numerically distinct from Callias': it is the matter itself. If matter can explain the distinctness of individual substances, why should it not also explain its own distinctness from other matter? Whether or not this move is legitimate will depend on which facts are not in need of explanation, but may correctly be assumed to be primitive. The problem is that 'this matter is distinct from that matter

what makes an individual identical to itself? All of these can be asked either about a single time (the synchronic question) or different times (the diachronic question); and where we are asking about multiple individuals we could leave out 'of the same kind'. Then there are questions about counting: (5) 'How is it that two or more individuals (even if qualitatively indistinguishable) can be counted – each counting as exactly one – and therefore be distinguished?' (Popper, in Anscombe et al. (1953), 93); (6) what makes two co-existing individuals of the same kind, e.g. two pennies, 'to be two'? (Geach, in Anscombe and Geach (1961), 73). It is not absolutely clear whether these counting questions can be assimilated to one or other of the epistemological or metaphysical questions, and in general much confusion has been caused by people not making clear which question they take themselves (or Aristotle) to be answering.

because it is this matter' seems to be a very similar sort of explanation to 'Socrates is distinct from Callias because he is Socrates' – both are cases of x explaining its own distinctness from y. Either both should count as adequate explanations or neither should. But the advocate of matter as principle of individuation adopted this view precisely because she found this sort of explanation unsatisfactory, or not an explanation at all. Therefore this response does not seem to be open to her.

It seems that those who are committed to there being something which accounts for the numerical distinctness of individuals must say that there is nothing that accounts for the numerical distinctness of the distinctness-makers.[159] Both sides agree that explanation must stop somewhere, but they differ over where it is appropriate to stop: is it a basic, inexplicable fact that Socrates is numerically distinct from Callias, or that their matter is distinct?[160] The debate is reminiscent of that between realists about universals who make use of the one-over-many argument and the sort of nominalist who does not seek to explain the resemblance of particulars, but accepts as a 'bare' fact that this is red and that is red, and there is no more explaining to be done. The latter are accused of burying their heads in the sand, ostrich-style, when there is a real question crying out for their attention; while the former are criticised for wantonly helping themselves to unnecessary metaphysical baggage. It is hard to know how to adjudicate such disputes. The disagreement is about what the *explananda* are, and short of appealing to intuitions, which seem of dubious value in this sort of theoretical terrain, it is unclear how we should determine this. It is fair to say that, if something is inexplicable, it should not be counted as an *explanandum*; conversely, perhaps the best way to demonstrate that something does require explanation is to provide a

[159] Unless they introduce some *further* thing to account for *their* distinctness, but this results in an infinite regress, which, as well as being ontologically bloated, appears to be vicious, since we can never grasp the full account of what makes Socrates and Callias distinct.

[160] For a contemporary discussion of this question, cf. Markosian (2008), §8.

credible explanation of it. Of course, not everyone will agree on what counts as a credible explanation. Nominalists will maintain that universals are not credible candidates to explain anything, and no doubt some people will say the same about matter. Certainly there is a question about whether Aristotle can use *his* concept of matter, which was introduced in the *Physics* to play the role of being what persists through substantial generation and decay, and which, together with form, makes up an individual, for this apparently different function of explaining individuality.[161] At any rate, even if it is difficult to prove that there is an important metaphysical question here, the traditional interpretation of Aristotle is that he thinks there is. But to establish this we need to look at the relevant texts.

VIII. The traditional interpretation: matter as principle of individuation

There are two main texts which have been thought to show Aristotle advancing the view that matter is the principle of individuation: *Metaphysics* □.6, 1016b31-2, and Z.8, 1034a5-8. In the first of these, we are told:

> Moreover, some things are one in number, some in species, some in genus, some by analogy; in number those whose matter is one...[162]

[161] Indeed it is not clear if one can reconcile the pre-existent and concurrent matter of the *Physics*, and similar objections can be raised about the many uses to which Aristotle puts his concept of form. Bostock (2006) concludes that Aristotle's hylomorphism is ultimately indefensible, because he employs form for too many different explanatory purposes. Of course there is no problem with ordinary things having multiple functions, but when we are talking about things which are functionally introduced, whose natures are apparently purely functional, it is difficult to know how we should determine whether there is one thing with multiple functions, or two different things (although it is quite common for mathematicians to attribute multiple functions to sets in this way). The situation is clear when the two functions are incompatible, and perhaps this will turn out to be the case for some of Aristotle's uses of form, such as its role in his theory of perception or inheritance. If so, these extended uses of form could be harmlessly jettisoned. In the cases that are of primary concern to us, there does not seem to be any reason to think that the roles of unifier and individuator are incompatible, and in fact it would seem preferable on simplicity grounds to have the same thing do both.

[162] ἔτι δὲ τὰ μὲν κατ' ἀριθμόν ἐστιν ἕν, τὰ δὲ κατ' εἶδος, τὰ δὲ κατὰ γένος, τὰ δὲ κατ' ἀναλογίαν, ἀριθμῷ μὲν ὧν ἡ ὕλη μία.

According to the traditional interpretation, here we have the claim that x and y are numerically identical (or 'one in number') if, and only if, they have the same matter (or the matter of x is 'one' with the matter of y). One should note that this is different from the claim that matter explains what makes one individual *distinct* from another, but perhaps it is reasonable to suppose that whatever accounts for numerical sameness will also explain numerical distinctness.[163] The traditional interpretation is certainly a defensible reading of the Greek, but Charlton argues that we should understand it differently. He points out that the context of the □.6 passage is one in which Aristotle has been investigating the grounds for things being called 'one': whether 'by virtue of concurrence', e.g. the just and the musical, if Coriscus happens to be just and musical; or 'of themselves', if they are continuous, e.g. a line or an arm, if they are one in species, e.g. quantities of water or wine, or if they are one in genus, e.g. a horse and a man. Why, then, should we take our passage to be about individuation rather than unity? Kirwan suggests[164] that the paragraph is intrusive, but Charlton is surely right to criticise such readiness to doubt the received text when it is not to our liking. He points out that the most extended discussion of numerical oneness in Aristotle, Topics I, 103a8-31, does not seem to be about individuation.[165] If Aristotle is talking about unity in 1016b31-2, what point is he making? Charlton interprets him as making a point about continuity: 'a single thigh is one because the bone in it, its matter, is continuous.'[166]

[163] Charlton (1972), 242, quotes *Met.* Z.17, 1041a18-19, where Aristotle seems to doubt whether the question what makes something identical with itself is a genuine one, 'unless one were to say that each thing is inseparable from itself; and its being one just meant this.' (πλὴν εἴ τις λέγοι ὅτι ἀδιαίρετον πρὸς αὑτὸ ἕκαστον, τοῦτο δ' ἦν τὸ ἑνὶ εἶναι·)
[164] Kirwan (2003), note ad loc.
[165] Here Aristotle seems to be making a Fregean point, that x and y are one in number if they mean the same.
[166] Charlton (1972), 243.

S. Marc Cohen (1984) responds to Charlton's article in defence of the traditional interpretation. He admits that the rest of the chapter is about unity, but points out some difficulties for Charlton's own interpretation. Charlton does not make it clear whether he takes Aristotle to be talking about the one-place predicate 'x is one in number' or the two-place predicate 'x is one with y in number'. If he were talking about the former, the passage would have to be about unity and not individuation, since 'x is one in number if...' cannot be used to characterise a two-place relation like identity or numerical sameness. However, while this might seem possible, if we only consider oneness in number, all sides agree that Aristotle is here contrasting this sort of oneness with oneness in other respects. He is interested either in the general schema 'x is one in respect of □' or 'x is one with y in respect of □'. But talk of oneness in form, genus and analogy only make sense when taken the second way: e.g. horse and man are one in genus *with each other*; the claim is not that horse is one in genus, which, if it means anything, is a trivial claim, either true of all species or none.

Cohen also objects that Charlton's interpretation does not fit with the surrounding context as well as he would like. Earlier in the chapter, at 1016b11-13, we are told,

> Although in a way we assert that anything whatever is one which is a quantity and continuous, in a way we do not if it is not some kind of whole, that is, if it does not possess one form.[167]

His example is of a shoe, which, if its parts were jumbled together, might count as one in the first sense, but not in the second. Aristotle seems to believe that the unity which comes from material continuity does not entail the unity which comes from form. However,

[167] ἔτι δ' ἔστι μὲν ὡς ὁτιοῦν ἕν φαμεν εἶναι ἂν ᾖ ποσὸν καὶ συνεχές, ἔστι δ' ὡς οὔ, ἂν μή τι ὅλον ᾖ, τοῦτο δὲ ἂν μὴ τὸ εἶδος ἔχῃ ἕν·

immediately after the crucial passage, at 1016b35-37, he claims that oneness in number does imply oneness in form:

> In every case the later follow from the earlier, as for example what is one in number is also one in form but what is one in form is not all <one> in number...[168]

So, on Charlton's interpretation, Aristotle contradicts himself within twenty lines. The traditional interpretation escapes this consequence, by making the first passage about unity and the second about individuation.

The second important passage for detecting Aristotle's views about individuation comes at Z.8, 1034a5-8:

> And when we have the whole, a form of such a kind in this flesh and in these bones, this is Callias or Socrates; and they are different in virtue of their matter (for that is different), but the same in form, for their form is indivisible.[169]

According to the traditional interpretation, these lines are saying that Socrates and Callias are numerically distinct because of their matter, not their form, and on the face of it this is the clearest example of Aristotle affirming that matter is the principle of individuation. However, Charlton points out that 'different' could mean qualitatively different, and that the passage could be making an epistemological claim about how we discern Socrates and Callias. Cohen replies that there is nothing in Z.8 to suggest it is about anything other than metaphysics: it is about the generation of substantial individuals, natural and artificial, and the relationship between matter, form and compound. However, the idea that it is talking about qualitative difference cannot be dismissed so easily. Charlton compares I.9, 1058b1-11, where Aristotle makes the point that qualities like colours do not make things different

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[168] ἀεὶ δὲ τὰ ὕστερα τοῖς ἔμπροσθεν ἀκολουθεῖ, οἷον ὅσα ἀριθμῷ καὶ εἴδει ἕν, ὅσα δ' εἴδει οὐ πάντα ἀριθμῷ·

[169] τὸ δ' ἅπαν ἤδη, τὸ τοιόνδε εἶδος ἐν ταῖσδε ταῖς σαρξὶ καὶ ὀστοῖς, Καλλίας καὶ Σωκράτης· καὶ ἕτερον μὲν διὰ τὴν ὕλην (ἑτέρα γάρ), ταὐτὸ δὲ τῷ εἴδει (ἄτομον γὰρ τὸ εἶδος).

in form, since they primarily qualify matter. Here 'different matter' must mean qualitatively different, and some of the language and examples in that passage mirror the Z.8 one, which, Charlton suggests, is indicative of the fact that Aristotle has the same point in mind: suppose Callias is pale and Socrates dark; they are different, but not different in form; they differ because of their matter, since pallor and darkness primarily qualify their skin, i.e. part of their body.

Cohen points out that there are two ways to take Charlton's reading: 1) Aristotle is addressing the metaphysical problem of individuation, but offering as a criterion qualitative sameness or difference. Not only would this commit Aristotle to the Identity of Indiscernibles, which there is little reason to suppose he accepted, but it would require 'ἕτερον' to mean first 'numerically different' and then 'qualitatively different' five words later. 2) Or, more plausibly, if we take 'ἕτερον' to mean 'qualitatively different' throughout, the point would be that having qualitatively different matter is what makes two individuals qualitatively different. Against this second reading, Cohen points out that earlier in the chapter, at 1033b29-32, Aristotle is talking about numerical identity:

> In some cases it is even apparent that the begetter is of the same kind as the thing it begets (not, however, the same nor one in number, but in form), for example in natural cases (for man begets man)...[170]

[170] ἐπὶ μὲν δή τινων καὶ φανερὸν ὅτι τὸ γεννῶν τοιοῦτον μὲν οἷον τὸ γεννώμενον, οὐ μέντοι τὸ αὐτό γε, οὐδὲ ἓν τῷ ἀριθμῷ ἀλλὰ τῷ εἴδει, οἷον ἐν τοῖς φυσικοῖς—ἄνθρωπος γὰρ ἄνθρωπον γεννᾷ

IX. A new role for (individual) forms

Although Cohen makes a good case against Charlton's reading of the texts, it is not totally decisive. If, as Charlton does, one believes that Aristotle recognised individual forms,[171] it is reasonable to think that they could play the role of accounting for numerical distinctness just as well as matter, since they too are peculiar to their individuals. Moreover, there is a further reason to doubt whether matter is fit for the role, if we draw another distinction about the sort of question the principle of individuation is supposed to answer. So far we have been considering what it is that makes an individual numerically distinct from (or identical to) another at a time – the synchronic question. However, we can also ask a diachronic version of this: what makes an individual at t1 distinct from/identical to another at t2? This is really just Fine's puzzle of matter and form. As we have seen, the problem is that organisms change their matter over time: if the matter of x is m1 at t1 and m2 at t2, then, if m1 and m2 have nothing in common, it is hard to see how either one could explain x's numerical sameness between t1 and t2. One might attempt to deal with this problem by pointing out that, although x's token matter has changed, its type matter remains the same. However, type matter will not allow us to distinguish between Socrates and Callias at different times. The other option would be to deny that things can change their matter, i.e. to accept Fine's Entrapment. This might be plausible for proximate matter, but it is totally implausible for more remote sorts of matter, such as the elements. It is pretty clear that Aristotle does not accept Entrapment: indeed he cannot accept it, if matter is to be the subject in substantial generation. If matter is only fit to answer the synchronic individuation question, there remains a question as to what is the principle of diachronic

[171] Charlton (1972), 244, fn. 12.

individuation. Of the items in Aristotle's metaphysical tool-shed, it would seem that the only one capable of fulfilling this purpose is individual form.

Why must the forms be individual? We need to distinguish between two different questions, one about unification, the other about individuation: (i) what makes this goat (or this goat matter) one and the same goat (over time)? (ii) what makes this goat distinct from that one? The first question seems to be the one which Aristotle addresses in Z.17, and does not obviously require an answer that is unique to the goat in question. Goatiness in general may well suffice. The answer to the second question, however, cannot be the universal species, since it is common to both goats, nor can it be their matter, since they could (albeit improbably) be composed of the numerically same stuff at different times. It is not so obvious that Aristotle sees the need to address the second question, but, if his forms are particular, not universal, he is in a good position to do so.

Chapter Five: Matter-involving Forms in Aristotle

There has been a good deal of discussion in recent years among interpreters of Aristotle's hylomorphism, concerning whether or not a thing's form includes a specification of its matter. The question is sometimes presented, somewhat vaguely, as being about whether or not form is essentially matter-involving. The controversy derives from a debate between Myles Burnyeat and Richard Sorabji, who offered alternative ways of understanding Aristotle's claim in his philosophy of perception that the sense organ assumes the form of the object of perception. It has since taken on a wider significance, with some scholars claiming that hylomorphism offers a superior alternative to both materialism and Cartesian dualism in the philosophy of mind. Different opinions about whether or not forms have essences, together with different ways of understanding the sort of matter that may or may not be involved in form, and the manner of its involvement, lead to numerous different positions which have been ascribed to Aristotle. After clarifying these positions, I consider some philosophical arguments for and against them, in order to determine what reasons we can find in Aristotle's works for supposing that he held any of them. I conclude that the textual evidence is ambiguous, but that there is no compelling philosophical reason to think that Aristotle is committed to forms being matter-involving in any strong sense, and that in fact he ought to resist such a position.

I. Introduction

Aristotle introduces matter and form in the *Physics* as contrasting notions. In substantial generation, some pre-existing matter acquires a form to become a substance that is a compound of the two.[172] Matter and form are also identified as distinct causes or explanatory factors, each of which must be grasped if one is to learn all there is to know about a thing.[173] It may come as a surprise then to find him making comments which suggest that matter and form are more intimately intertwined than is obviously required by the manner of their introduction. To begin, he regularly distances himself from Plato's theory of Forms, which exist quite apart from the material world, insisting that his own forms are somehow enmeshed in matter.[174] More strikingly, he maintains that all natural forms are like the snub, where, evidently, something is snub only if it is concavity-realised-in-a-nose.[175]

The close relation between matter and form is still more in evidence in Aristotle's philosophy of perception, a circumstance which has led Myles Burnyeat to argue for a thoroughly materialistic notion of form. According to Burnyeat, Aristotle's views about perception committed him to a conception of matter as being essentially enformed. This result in turn led Burnyeat to conclude that Aristotle's conception of form is so thoroughly materialistic as to be incompatible with modern materialist ways of thinking. He argued ultimately that, once we realised this, the only appropriate response was to junk hylomorphism altogether.[176] Other eminent Aristotelians found Burnyeat's general

[172] Cf. *Physics*, I.7, discussed in Chapter Three, §II-IV.
[173] Cf. *Physics*, II.3, and *Metaphysics* Δ.2.
[174] Cf. *Metaphysics*, E.1, Z.11, and *De Anima*, 1.1.
[175] Cf. *Physics*, 2.2, and *De Sophisticis Elenchis* 13 and 31.
[176] Cf. Burnyeat (1992). Burnyeat's article was a response to Sorabji (1974), which claimed that, when Aristotle says that the sense organ takes on the form of the object of perception without its matter (*De Anima*, 2.12, 424a17), this involves the sense organ literally becoming like the external object, e.g. the eye jelly literally

approach congenial but his ultimate conclusion unwarranted. According to these interpreters, everything is a compound of matter and form (including, in a sense, matter and form themselves), a result which is indeed incompatible with the modern way of conceiving of matter. So much the worse, then, they conclude, for those of us unable to transcend the prejudices of our times. In particular, it is noteworthy that the signal problem of Cartesian Dualism, of explaining how two very different types of thing can causally interact, simply does not arise for Aristotle (and this is why he never discusses it). Far from providing any grounds for junking Aristotle's philosophy of perception, these commentators find something positively liberating about it.

In this connection, there has been a lot of talk recently of Aristotelian forms as being matter-involving. The problem with the '-involving' locution is that it is regrettably vague. On the one hand, almost nobody thinks that matter and form are identical. On the other, everyone agrees that Aristotelian natural forms are realised in matter. Between these two truisms lie a bewildering variety of positions that have been championed by different interpreters. Friends of Aristotle would like to find him advocating a view of form as involving matter in a way which does not impair their role as metaphysical principles that are in some sense naturally opposite.

II. Seven positions

The question at the heart of the controversy that I mean to discuss is whether or not a thing's form includes a specification of its matter. In fact, this question is sometimes

going red. Burnyeat, on the other hand, denied that, according to Aristotle, the eye jelly literally changes colour in perception, but he went further. The eye's taking on a colour is to be identified with the subject's awareness of that colour, so that, on Aristotle's view, there need be no physiological process at all which underlies a case of perception. For a further response to Burnyeat, cf. Cohen (1992). This debate, although it is narrower than the question of whether form in general is matter-involving, contains the seeds of the one which I go on to discuss.

presented differently, as being about whether or not form is essentially matter-involving. In this formulation the sense in which matter is involved is in need of clarification, and it also is unclear whether it is supposed to be a thing's form, which is also its essence,[177] which is matter-involving, or the essence of the form (or both). Different opinions about whether or not forms have essences, together with different ways of understanding the sort of matter that may or may not be involved in forms, lead to numerous different positions which one might ascribe to Aristotle. Below are some possible interpretations, with increasing degrees of matter-involvement:

1. Spiritualism/Hyper-formalism: natural compounds (and their forms) have forms or essences that are independent of matter.

2a. Functionalism: compounds have forms or essences that involve matter, but only functional matter, i.e. not only are they compounds of matter and form, but functional matter is part of their essence or form; the form that is part of the compound's form however has a form or essence that is not matter-involving.

2b. As in (2a), compounds are essentially matter-involving in the merely functional sense; forms have no essences or forms.

2c. As in (2a) and (2b), compounds are essentially functional-matter-involving; and so are forms, i.e. not only are the forms or essences of compounds themselves in some sense compounds of matter and form, as in (2a) and (2b), but they themselves have essences (or forms) that are (essentially) matter-involving.

[177] Aristotle identifies a thing's form with its essence at Z.7, 1032b1-2: 'by form I mean the essence of each thing and <its> primary substance' (εἶδος δὲ λέγω τὸ τί ἦν εἶναι ἑκάστου καὶ τὴν πρώτην οὐσίαν). He makes the same identity claim at Z.10, 1035b32. Cf. also H.4, 1044a36. Throughout this chapter I will be assuming that Aristotle means to refer to the same thing when he speaks of a thing's form (εἶδος), its essence (τὸ τί ἦν εἶναι), and (at least sometimes, in a narrow sense that does not include its other causes) its definition (λόγος , ὅρος).

3a. Robust matter-involvement: compounds have matter-involving forms or essences in a more robust sense, i.e. not mere functional matter but a more robust sort of matter is part of their essence; the forms that are parts of the compounds' forms however have forms or essences that are not matter-involving.

3b. As in (3a), compounds are essentially matter-involving in the robust sense; forms have no essences.

3c. As in (3a) and (3b), compounds are essentially robust-matter-involving; and so are forms, i.e. not only are the forms or essences of compounds themselves in some sense compounds of matter and form, as in (3a) and (3b), but they themselves have essences (or forms) that are (essentially) matter-involving.[178]

No doubt there are other possible combinations of views,[179] but these will be enough for our purposes.

In order to make these formulations more precise, it will help to clarify the distinction between merely functional and more 'robust' matter. I take it that a form contains functional matter if it includes the specification that it must be instantiated in whatever matter suffices for it (or rather the compound of the matter and it) to perform its functional role. It might turn out, contingently or as a matter of hypothetical necessity, that only one sort of stuff will suffice, and this would not prevent the form from containing only functional matter, provided that this specific stuff is not mentioned in the form itself. If, on

[178] Most of these positions have been ascribed to Aristotle by different scholars, although sometimes it is difficult to tell precisely which view they think Aristotle holds, as they do not always draw the relevant distinctions as I have done. Frede (1990) expresses his support for (1); some form of Functionalism is defended by Gill (1989), Irwin (1988) and Whiting (1992); Balme (1984) favours some form of robust-matter-involvement, (3a-c); Charles (2008) defends either (3b) or (3c) against Caston (2008), who seems to prefer (3a); Peramatzis (2011) appears to favour (3c).

[179] In particular, one might wonder whether position (1), Spiritualism/Hyper-formalism, could be further divided into three different versions, as both Functionalism and the robust-matter-involving position have been, depending on whether forms (a) have essences with which they are identical (self-predication), (b) have no essences, or (c) have essences with which they are not identical. (1c) would then be vulnerable to a regress similar to the one targeted at positions (2c) and (3c) in the next section.

the other hand, some specific matter is mentioned in the specification of the form, whether homoiomerous, e.g. bronze, flesh and bone, etc., or heterogenous, e.g. hands, or an organic body, the form contains robust matter. Importantly, while the matter that it contains must be of a specific sort to count as robust, it does not have to be particular matter: it may be the kinds bronze or hands in general that are mentioned, not this quantity of bronze or this hand.

This way of drawing the distinction between functional and robust matter may seem peculiar, since Aristotle regards many of these specific types of matter as essentially functional: a hand that is not capable of performing the functions of a hand, because it is disconnected from the body or made of stone, is only a 'hand' homonymously, and Aristotle makes similar comments about flesh. It is unclear how much of the hierarchy of matter he thinks is essentially functional. It is hard to see how the elements could be so regarded, since they constitute so many different sorts of thing.[180] In any case, although many of these specific types of matter may be essentially functional, they do not seem to be purely functional. Their nature does not seem to be exhausted by their function, and so it is still appropriate to regard them as more robust sorts of matter. One might dispute whether this is true of the organic body, and, if this is purely functional, then its inclusion in a form would not make that form robust-matter-involving.

The sense in which matter is or is not involved in, contained in or part of an essence or form is also in need of some clarification. I am thinking of essences or forms as not themselves linguistic but as things with a structure that corresponds to that of a complex

[180] However, in the final chapter of *Meteorlogica* Aristotle suggests otherwise: 'The same, then, is true of flesh, except that its function is less clear than that of the tongue. So, too, with fire; but its function is perhaps even harder to specify by physical inquiry than that of flesh.' (IV.12, 390a14-16)

linguistic expression, like a predicate.[181] A form that contains more than merely functional matter is one which has a component which corresponds to a specific material term such as 'bronze' or 'hand', while one containing purely functional matter will have a part corresponding to the generic term 'matter'. We will attempt to remain neutral on the question of whether these components of the form are the universal matter types or their particular instantiations themselves, or intensions or concepts that represent them.[182] If it is the matter itself, either universal or particular, which is part of the form, one might be tempted to make the further claim that it constitutes the form. In *Metaphysics* Z.17, Aristotle provides an argument for denying that a thing's form (and the thing itself) is identical with its matter, on the grounds that it is possible for the matter to exist when the form does not. This argument may only show that a thing's form is not identical with the matter which predates it (its non-proximate matter). If a substance's proximate matter exists when and only when its form does (necessarily), one would need a different argument to show that the two are not identical. Even supposing that matter and form are not identical, it is a further question whether Aristotle believes that a form is constituted by its matter. Z.17 seems to deny this, since it claims not only that a form is not identical with one of the elements that it unifies (1041b20-22), but also that it is not composed of those elements (22-5). It is not altogether clear whether Aristotle is entitled to this conclusion,

[181] All that will be required for my argument is that a form may be regarded as having parts in some very weak sense of the word 'part', which does not require that the parts be capable of independent existence or definition, merely that they be distinct. Although there are syntactically simple (i.e. one word) predicates, it seems plausible that all the forms that Aristotle is interested in (the substantial ones) will be more complicated, and therefore will require many words to specify their nature (if it can be specified linguistically at all). Also, many (perhaps all) one word predicates are only superficially simple, since they are equivalent to multi-word predicates, and could not be understood unless explicated in terms of these.

[182] The idea that it is particular matter that is part of a thing's form might be thought to conflict with the claim that an Aristotelian form is wholly present in each of its instantiations, since each of those instantiations has different particular matter, and no particular can be in two places at once. It is unclear how committed Aristotle is to the idea that universals have locations. Even if they do, if Aristotelian forms are particular, this objection would not work.

however, and the issue is complicated by the fact that there is significant disagreement about the nature of the constitution relation.[183] In any case the question of whether a thing's matter constitutes its form, as presumably it constitutes the thing itself, can only arise if the matter is part of the form in the weaker sense of featuring in its specification, which does not require constitution.[184]

III. Textual matters

Various textual arguments may be given for regarding forms as matter-involving. In particular, advocates of the seven positions will offer different interpretations of (a) the mistake Aristotle attributes to Socrates the Younger in *Metaphysics* Z.11, (b) passages in which Aristotle distinguishes mathematical and natural forms (E.1, *Physics* 2.2, and *De Anima* 1.1), and (c) his use of the snub analogy.

The passage in the *Metaphysics* where Aristotle most obviously addresses this question is Z.11. He begins the chapter by asking 'what sorts of thing are parts of the form, and which are not, but are parts of the compound' (ποῖα τοῦ εἴδους μέρη καὶ ποῖα οὔ, ἀλλὰ τοῦ συνειλημμένου, 1036a26-7). He first discusses the case of things which are realised in multiple different sorts of matter: a circle may be realised in bronze or stone; so it is clear that its matter, bronze or stone, is not part of the substance (i.e. form) of the circle, since it is separate (or separable) from them (ταῦτα μὲν δῆλα εἶναι δοκεῖ ὅτι οὐδὲν τῆς τοῦ κύκλου οὐσίας ὁ χαλκὸς οὐδ' ὁ λίθος διὰ τὸ χωρίζεσθαι αὐτῶν·, 1036a33-4). We are then told that,

[183] For more detailed discussion of this passage, cf. Chapter Three, §VIII. Shields (1988a), §IV, 113, following Wiggins (1980), 197, n. 1.19, defines constitution as follows: x constitutes y iff x has all and only the non-historical and non-modal properties that y has. This has the consequence of making constitution a symmetric relation, and identity a species of constitution. For an alternative view of constitution, cf. Shoemaker (1970).
[184] Shields (1988a), §IV, offers four arguments for the view that Aristotle regards forms as immaterial in the sense that it is not constituted by matter. It is worth considering whether these arguments have any bearing on the question of whether forms are matter-involving in the weaker sense that does not require constitution.

in the case of things which are not seen to be separate/separable, nothing prevents the same considerations from applying to them, 'even if all the circles that had been seen were bronze' (ὥσπερ κἂν εἰ οἱ κύκλοι πάντες ἑωρῶντο χαλκοῖ·, 1036b1). Aristotle considers a case where all circles are *seen* to be made of bronze, because the point he is making is in part an epistemic one: in such a case, it would be difficult to separate the bronze from the form in thought; but it would be correct to do so, since the bronze would still be no part of the form (1036b2-3). Presumably he means the same thing to hold in a case where all circles, whether seen or unseen, are bronze. Everything of a given kind being made of a specific sort of stuff is not sufficient for that stuff to feature in the specification of its form. We are not told what would happen if all circles were necessarily made of bronze, perhaps because bronze was the only material (in the actual world and any accessible worlds) that could be bent in the requisite way, but it seems likely that even in that (outlandish) scenario Aristotle would deny that the bronze was part of the circle's form.[185]

Having considered the case of circles, Aristotle moves on to consider the form of a man, and to ask of flesh and bones, 'Are these too parts of the form and definition?' (ἆρ' οὖν καὶ ἐστὶ ταῦτα μέρη τοῦ εἴδους καὶ τοῦ λόγου; 1036b5) Some interpreters[186] understand the next sentence to contain Aristotle's answer: 'In truth no, they are the matter; but, because <the form> is not also in other <sorts of matter>, we are unable to separate them' (ἢ οὔ, ἀλλ' ὕλη, ἀλλὰ διὰ τὸ μὴ καὶ ἐπ' ἄλλων ἐπιγίγνεσθαι ἀδυνατοῦμεν χωρίσαι, 1036b5-7). Rendered thus, the text suggests that, as in the circle case, flesh and bones are not part of the form of man. However, other editors,[187] especially those friendly to matter-involving forms, print this sentence as a question, rendering the 'ἢ' as the

[185] This would be an instance of hypothetical necessity, on which cf. §VI.
[186] E.g. Balme (1980), 294; Lear (1989), 283; Gill (1989), 132; Frede & Patzig (1988), ad loc.; Apostle (1966), ad loc.
[187] E.g. Ross (1924), Burnyeat et al. (1979), Bostock (1994), ad loc; cf. Cohen (1992), 72.

interrogative ‘or can it be that...?’ instead of the emphatic ‘in truth’. This second way of understanding the sentence, as a question, though it does not require it, leaves open the possibility that Aristotle’s answer will be that, unlike in the circle case, flesh and bones are indeed part of the form of a man. Since punctuation marks are a later invention, it is impossible to be certain which reading Aristotle intended, and all we can conclude from this sentence is that it is inconclusive.

We might hope that Aristotle’s view about whether flesh and bones are part of the form of man will become clearer later in the chapter. Unfortunately, as is often the case with Aristotle, the relevant passage is also open to multiple interpretations. The chapter goes on to describe how ‘some people are in doubt even in the case of the circle and the triangle, on the grounds that it is not right to define them in terms of lines and continuity, but that these too should all be spoken of in the same way as flesh and bones of man and bronze and stone of statue.’ (ἀποροῦσί τινες ἤδη καὶ ἐπὶ τοῦ κύκλου καὶ τοῦ τριγώνου ὡς οὐ προσῆκον γραμμαῖς ὁρίζεσθαι καὶ τῷ συνεχεῖ, ἀλλὰ πάντα καὶ ταῦτα ὁμοίως λέγεσθαι ὡσανεὶ σάρκες καὶ ὀστᾶ τοῦ ἀνθρώπου καὶ χαλκὸς καὶ λίθος τοῦ ἀνδριάντος·, 1036b8-12) Presumably these thinkers object to lines and continuity being parts of the definitions of circle and triangle on the grounds that they are matter, comparing them to other sorts of matter that are obviously inadmissible in definitions. Aristotle criticises this line of thought, which suggests that he does think that certain sorts of matter are admissible in definitions. However, the fact that he groups flesh and bones with bronze and stone as the sort of matter that is obviously inadmissible suggests that he does not think that they are parts of the form of man. Although it could conceivably be the thinkers, not Aristotle himself, who

invoked the flesh and bones example, it would seem to serve their purposes better to rely simply on the clearer case of bronze not being part of the form of statue.[188]

The impression so far is seemingly contradicted by 1036b22ff., where we are told 'And therefore to reduce everything in this way and to take away the matter is futile: for surely some things are this <form> in this <matter> or these things is this state; and the comparison in the case of animal, which Socrates the Younger used to make, is not a good one; for it leads away from the truth, and makes one think that it is possible for man to exist without his parts, as the circle can without bronze.' (διὸ καὶ τὸ πάντα ἀνάγειν οὕτω καὶ ἀφαιρεῖν τὴν ὕλην περίεργον· ἔνια γὰρ ἴσως τόδ' ἐν τῷδ' ἐστὶν ἢ ὠδὶ ταδὶ ἔχοντα. καὶ ἡ παραβολὴ ἡ ἐπὶ τοῦ ζῴου, ἣν εἰώθει λέγειν Σωκράτης ὁ νεώτερος, οὐ καλῶς ἔχει· ἀπάγει γὰρ ἀπὸ τοῦ ἀληθοῦς, καὶ ποιεῖ ὑπολαμβάνειν ὡς ἐνδεχόμενον εἶναι τὸν ἄνθρωπον ἄνευ τῶν μερῶν, ὥσπερ ἄνευ τοῦ χαλκοῦ τὸν κύκλον, 1036b22-8) Here Aristotle would seem to be referring back to the earlier comparison between the flesh and bones of a man and the bronze or stone of a statue at 1036b11, and claiming that the comparison misleadingly suggests that flesh and bones are not part of the form of a man, when in fact they are.

That anyway is how those in favour of robust-matter-involvement take this passage, but there is another possible reading. Instead of failing to realise that human beings, unlike circles, are essentially realised in flesh and bones, and as such these must be included in their form, Socrates the Younger's mistake might have been not paying attention to the fact that circles, being mathematical objects, need not be instantiated in matter at all, whereas human beings always are. If this is the mistake that Aristotle is identifying, this passage would not support robust-matter-involvement, or indeed any other sort of matter-involving forms, but only the view that natural forms, like the form of a man, are always instantiated

[188] Cohen (1992), 72, makes this point.

in matter of certain sorts. Even if the forms were necessarily so instantiated, this would not require that the matter be included in the specification of the thing's form.[189] Is there any way to adjudicate between these two interpretations? Aristotle goes on to provide a further reason for the comparison being objectionable: 'for animal is something sensible[190] and cannot be defined without change; and so not without its parts being in a certain way. For it is not in any way that the hand is part of man, but when it is capable of fulfilling its function, so that it is alive; if it is not alive, it is not a part.' (αἰσθητὸν γάρ τι τὸ ζῷον, καὶ ἄνευ κινήσεως οὐκ ἔστιν ὁρίσασθαι, διὸ οὐδ' ἄνευ τῶν μερῶν ἐχόντων πώς. οὐ γὰρ πάντως τοῦ ἀνθρώπου μέρος ἡ χείρ, ἀλλ' ἡ δυναμένη τὸ ἔργον ἀποτελεῖν, ὥστε ἔμψυχος οὖσα· μὴ ἔμψυχος δὲ οὐ μέρος, 1036b28-32) This does seem to imply that animal cannot be defined without mentioning its parts, but the Hyper-formalist can maintain that the sort of definition that Aristotle has in mind is not the thing's essence or form, but a looser sort that includes all of its causes, including the material one. Since this reading is available, Z.11 cannot provide conclusive evidence for Aristotle believing in matter-involving forms.

Other passages cited in favour of robust-matter-involvement, where Aristotle distinguishes between mathematical and natural forms, are also open to these two interpretations. In Metaphysics E.1, Aristotle contrasts physical and mathematical objects, saying of the former 'for the definition of none of these is without change, but it always contains matter' (οὐθενὸς γὰρ ἄνευ κινήσεως ὁ λόγος αὐτῶν, ἀλλ' ἀεὶ ἔχει ὕλην, 1026a2-3). Even more explicitly than Z.11, this passage might seem to rule out Hyper-formalism or Spiritualism, position (1), the view that natural forms make no reference to matter.

[189] Cf. §VI for a defence of the claim that things may be necessarily realised in a certain sort of matter, without a specification of that matter featuring in their essences.

[190] Or 'capable of perception', if we prefer the reading 'αἰσθητικόν'. In that case, Aristotle would not be appealing to the principle that anything sensible is subject to change, but only making the more modest claim that things that are capable of perception change, since perception is a kind of change in the perceiver.

However, again the Hyper-Formalist can claim that the 'definition' that contains matter is not the form or essence, but a looser sort of account that includes all four causes (or as many as the thing in question has). Similar remarks apply to *De Anima* 1.1 and *Physics* 2.2, where we again find a distinction between the methodology of the natural scientist, who must pay attention to matter, and that of the mathematician, who must not. It may well be that Aristotle, unlike Plato, did not think that mathematical objects were existentially independent of matter, such that they would exist even if not instantiated. If so, he could still distinguish mathematical forms from natural ones by the fact that, though both are existentially dependent on matter, only natural forms are definitionally dependent on it. This would require that some kind of matter be mentioned in the form of a man, but it would not require the robust sort. However, none of these passages clearly requires any sort of matter-involving forms. An alternative way of differentiating mathematical and natural forms would be by reference to the sorts of things that have them. It could be that all that is meant is that natural things have a material cause, which mathematical ones lack.

Finally, a number of these passages contrast the snub with the concave, and recommend that the natural scientist proceed as though he were investigating the former. If the snub (*to simon*) refers to a concave nose, it could be that Aristotle's point is again simply that the objects of natural science are compounds of matter and form. However, occasionally (e.g. *Physics* 2.2, 194a13) he says that one should proceed 'as if we were investigating snubness' (περὶ σιμότητος). Whereas '*to simon*' could refer to the compound or the form, it is natural to think that the abstract noun must refer to the form. Since Aristotle says that snubness, the form, is concavity (which in this context means snubness) in a nose, and, in *De Sophisticis Elenchis* 13 and 31, considers a regress similar to the one

which threatens advocates of robust-matter-involvement, the snub analogy seems to provide support for the view that substantial forms are indeed robust-matter-involving (since noses are a specific sort of matter).

While this does seem to be the strongest evidence for thinking that Aristotle believed more than merely functional matter to be contained in the form, the Hyper-formalist still has a way to resist: he can claim that snubness and concavity are the same in essence. The 'in a nose' clause that is mentioned when defining 'snubness' is not part of its essence. It merely restricts the application of the word to a certain subset of the concave things. This response from the Hyper-Formalist is similar to the earlier examples where he appealed to a looser notion of definition that went beyond a thing's essence, as a way of avoiding committing Aristotle to the view that the matter was part of the essence. The difference here is that the thing in question, snubness, is a form, and as such, if our reading of Z.6 is correct, is supposed to be identical with its essence. If both snubness and concavity are identical with their essences, and their essences are the same, then they are also the same (by the transitivity of identity). The Hyper-formalist would be committing Aristotle to the view that the same thing may have different definitions. Indeed, worse than that, the same concept appears to have different extensions, depending on whether it is being considered as snubness or as concavity. The way to resolve this is to distinguish between the words 'snubness' and 'concavity', and the single property that each refers to. The modes of presentation of this single property are different: 'snubness' contains an implicit restriction to noses, but this is not part of the essence which it refers to. At least, that is what the defender of non-matter-involving forms must say.[191]

[191] For a detailed discussion of Aristotle's use of the snub analogy, cf. Lewis (2005).

IV. The Regress

The textual evidence surveyed in the previous section seemed to end in a stalemate: although, at first glance, various passages seemed to commit Aristotle to some degree of matter-involving forms, it emerged that these passages could also be read in ways which avoided this conclusion. In addition to purely textual arguments, however, more philosophical considerations may be brought to bear in order to adjudicate between the seven positions outlined above. A serious objection to both (2c) and (3c) is that they apparently lead to a vicious infinite regress: if a compound's essence or form is itself a compound of matter and form, and this second form has an essence or form which is also a hylomorphic compound, etc., every compound will have an infinite series of essences or forms associated with it, whether the matter we have in mind is merely functional, or more robust. Socrates is (essentially) a compound of matter and form, so is his form, so is its form, etc.[192] The regress is not merely unattractively bloated and otiose. If a full explanation of what something is requires one to list an infinite series of forms, such explanations will not be viable for finite beings like us.[193] Aristotle notices an analogous regress in his discussion of the snub in *Sophistici Elenchi* 13 and 31: snubness =(def) concavity in a nose; but in this context 'concavity' just means 'snubness'; so (replacing 'concavity' with its definition) it is also the case that snubness =(def) concavity in a nose in a nose, etc. One might argue that

[192] Note that this regress only applies if all forms are held to be matter-involving. It does not afflict the more moderate matter-involving positions, (2a) and (3a), since they can hold that the form of the compound is matter-involving, and hence has both material and formal parts, but that this second form, the form of the form, is pure, and has itself as a form, e.g., the form of a computer may be computing functions in certain suitable matter, but the formal part of that form (computing functions) would be pure. For my argument against the more moderate matter-involving positions, cf. §VIII.

[193] There may be some doubt as to whether the regress is really vicious: perhaps my house is made of bricks, the bricks of clay, clay of mud, etc. If this series were to go on forever, one could still know a good deal about what constitutes my house, even though one could not know everything. Nevertheless, in this example most scholars will concede that Aristotle thinks the series must end either with the elements or prime matter, i.e. pure matter with no formal component whatsoever. Similarly it seems that Aristotle would deny that there could be an infinite series of matter-involving forms associated with every substance, and so it is enough for our purposes that he, as well as all those scholars who ascribe some variety of matter-involving form doctrine to him, regards the regress as vicious.

so-called 'response-dependent' concepts which refer to themselves in their definitions are in general unobjectionable.[194] Perhaps to be cool is (among other things) to be thought to be cool, or a necessary condition of being homosexual is self-identifying as homosexual. However, it seems that Aristotle does regard the snub case as problematic, since he describes it as being reduced to babbling, and is concerned to find a solution according to which the regress does not arise.

David Charles seeks to avoid the regress which plagues (2c) and (3c) by denying the assumption that anything that is matter-involving must be a compound of matter and form. Form is matter-involving, but that is not to say that it has its own form or essence and its own matter. Form and matter are introduced to explain certain facts about ordinary objects of perception, such as this man or this horse. Once those facts have been accounted for, there is no need to look for the same explanations of the theoretical entities which have been introduced to provide the original explanation. One might worry that, if a compound is defined in terms of things which have no definition (matter and form), it is hard to see how its definition can be informative. However, this does not seem to be a knock-down objection, since form and matter could be grasped without definition by induction or analogy, as Aristotle says we grasp his notion of *dunamis* in □.6. Or they could be primitives, grasped by intuition or *nous*.

Charles' way out of the regress is to deny that forms have essences, i.e. to fall back to (2b) or, in his case, (3b). This position faces a number of textual obstacles. For instance, at the beginning of De Anima 1.1 Aristotle announces that 'our aim is to grasp and understand [the soul's] nature and essence [τήν τε φύσιν αὐτῆς καὶ τὴν οὐσίαν], and secondly its properties' (402a7-8). In Z.11, he refers to the account of the essence (ὁ λόγος ὁ τοῦ τί ἦν

[194] Cf. Wedgewood (1997).

εἶναι; 1037a22-3), and claims that 'the account of the soul is [the account] of the man' (1037a28-9). In *Physics* 2.2, 194a13, the natural scientist is urged to investigate 'as if we were considering about snubness what it is [περὶ σιμότητος...τί ἐστιν]'. Here 'snubness' seems to refer to the form as opposed to the compound, where *to simon* is ambiguous between the two. For these textual reasons it would be preferable for a proponent of (2b) or (3b) to be able to say that forms do have essences or definitions in a sense, but they are identical with these[195] (as snubness = concavity in a nose), and they do not have explanatory accounts, or essences properly speaking.

The difficulty with this is that it is not clear that the defender of (2b) or (3b) can claim that forms have definitions of any sort and still maintain a doctrine that is distinct from both (2a) or (3a), on the one hand, and (2c) or (3c) on the other. Presumably, like forms themselves, their definitions must have a structure that approximates to that of a linguistic entity. Whatever else one says about these definitions then, it seems clear that they must be divisible into component parts, as complex predicates are divisible into words. We may ask of these component parts whether or not they are robust-matter-involving, i.e. the question which the proponent of (2b) or (3b) answers in the affirmative with respect to the form or essence of the compound – does it have parts which correspond to material terms like 'flesh' or 'hand' or 'matter'? If some parts of the form's definition are matter-involving, and others are not (presuming at least some are not), this seems to make the definition in some sense a compound of material and formal parts. We can then identify the formal parts, and ask if there is a definition of them, and, if the answer is 'yes, a matter-involving one', we are stuck once again with the regress which afflicted (2c) and (3c).

[195] It is often thought that Aristotle identifies forms and their essences in Z.6. Charles (2011) argues for an alternative view. Cf. §VIII.

On the other hand, if no part of the form's definition is matter-involving, the proponent of (2b) or (3b) must hold that, while compounds have essences which are matter-involving, these essences have definitions which are not, and this seems to make his view intolerably similar to (2a) or (3a). This latter view is outright inconsistent with forms being identical with their definitions or essences, as apparently argued for in Z.6, since the former have a property – being matter-involving – which the latter lack. In order to carve out a distinct view, the advocate of (2b) or (3b) is faced with an unpalatable choice: he must either deny that forms have definitions at all, and face the textual worries mentioned above; or he must insist that these definitions do not have parts, or at any rate not parts of which it makes sense to ask whether or not they are matter-involving. Until he can supply an account of definition which makes this plausible, his position will remain unstable.[196]

V. Definitions and their parts

The advocates of the interpretations which we have been arguing against, (2b), (2c), (3b) and (3c), may complain that we have attributed to Aristotle an overly simplistic view about the structure of forms, in particular about their parts: we have blithely been supposing that a form is structured in a manner analogous to a linguistic entity, and as such is divisible into word-like components, which can then be assessed to determine whether or not they 'involve' matter of various sorts. However, this picture may be misleading in so far as it implies that the 'parts' of the form are independent objects which may themselves

[196] One might think that one can avoid having a multi-part definition, if, instead of defining snubness as concavity in a nose, one defines it as nasal-concavity. However, the hyphen really just obscures the fact that this is a combination of two distinct ideas, one material, the other formal. If one expresses the definition as being a nose and being concave, there is no need for one item in the definition to be predicated of the other. That forms have parts in this sense does not prevent them from being unities: matter/form compounds, like Socrates, are one despite having multiple parts, because their form unifies these parts into a whole; but if forms do not have multiple parts in the same sense – i.e. physical parts that constitute them – it is not clear that they require a further entity to account for the unity of their parts.

have a hylomorphic structure. Michael Peramatzis puts the point in his book by distinguishing between objective or strong parts and aspectual or weak ones.[197] While it may seem easy enough for us to divide the form into formal and material components, Peramatzis claims that this is no more than a verbal separation or an abstraction in thought. We are not picking out distinct or mutually independent objects. That is because the parts of the form are inextricable or mutually interdependent: the formal part cannot be specified without making reference to the material one, and *vice versa*; nor can either be what it is without the other.

Assuming that Peramatzis is correct about the structure of forms, it is important to note that, if it is to provide a way to escape the regress, it is not compatible with our previous way of understanding forms as decomposable into word analogues or concepts. It seems then that the real structure of forms cannot be properly captured in language, or perhaps even in thought. There may not be anything metaphysically impossible about forms being ineffable in this way, but perhaps it might be considered a disadvantage.

A more serious problem is that it is not clear that thinking of the 'parts' of forms as inextricable will really avoid the regress. Peramatzis explicates inextricability by saying that the formal parts of the form are essentially and definitionally dependent on the material parts, and *vice versa*. Essential or definitional dependence is usually defined in terms of the definition of one thing featuring in the definition of the other. However, it is crucial to stopping the regress that these formal and material parts, like forms themselves, do not have definitions properly speaking: only compounds do. One is allowed to speak of forms as having definitions loosely speaking, provided that this is understood to mean that they are (identical with) definitions. If we allow this way of speaking for the 'parts' of forms too, we

[197] Peramatzis (2011), §14.2, 305-8.

can make sense of their mutual definitional interdependence: as Peramatzis puts it, the form of the compound, $F_c =_{def} F_1, F_2,..., F_m$ enmattered in $M_1, M_2,..., M_n$.[198] Similarly, one might expect the form part, $F_1 =_{def} F^*_1, F^*_2,..., F^*_m$ enmattered in $M^*_1, M^*_2,..., M^*_n$. If the definition of M_1, etc., is given in a similar way, we have explained the definitional interdependence of the form's parts, but only at the cost of generating an infinite regress of 'definitions', which seems no more palatable if we write '=' to connect *definiens* and *definiendum* instead of '$=_{def}$'. If, on the other hand, we ban talk of definitions of forms and their parts altogether, it seems that we need to offer a different account of inextricability.

David Charles suggests (in correspondence) that the inextricability, or incompleteness, of the 'parts' of the form might be captured in a different way, using the machinery of determinables, determinants and determinates.[199] An example of a definition expressed in this form would be: being spherical =def being a solid with all points equidistant from the centre. In this example, the *definiens* can be divided into two parts: being a solid is the determinable, and having all points equidistant from the centre is the determinant. Having all points equidistant from the centre can be understood (with suitable emendation to rule out the non-3-dimensional cases) as a specific way of being a solid, and as such one might claim that it is dependent on the determinable in the requisite way. It is more difficult to make a case for the determinable, being a solid, being somehow dependent on the determinant, having all points equidistant from the centre. It certainly does not seem obvious, for instance, that in order to grasp the concept of a solid one must understand centres, points and equidistance. Even if being a solid was dependent on having all points equidistant from the centre in this way, the example brings out another objection to this approach: it does not seem that invoking determinables etc. will suffice to give an

[198] This is Schema [D] in Peramatzis (2011), first introduced in §5.1, 96.
[199] Prior (1949) contains a useful synopsis of the history of this distinction.

account of the inextricability of matter and form that does not implicitly rely on mutual definitional interdependence. The reason why determinants might be thought to depend on their determinables is that an account of the former must refer to the latter. But if determinable-determinant inextricability still relies on definitional interdependence, then it is not really an alternative account of inextricability, and so is vulnerable to the same regress objection outlined in the previous paragraph.

The determinable/determinant/determinate distinction is also invoked by both Charles and Peramatzis for another purpose: to respond to the different objection that, if form is (essentially) matter-involving, it is no longer clear why it should be called 'form', or how it is to be distinguished from the compound. The two could be distinguished if the matter involved were purely functional – so, for instance, rationality in whatever material is suitable for fulfilling this function – but not if it were more 'robust' – rationality in flesh and bones (or even an organic body). One might try to distinguish form and compound by saying that the matter involved in the former is generic – flesh and bones in general, not these particular flesh and bones. This would suffice to distinguish the form from the particular compound, but Aristotle also suggests (e.g. Z.11, 1037a6ff.) that there is a universal compound – man, as opposed to this man. Therefore, both Charles and Peramatzis distinguish between objects, whether particular or universal, and ways of being. Forms are ways of being, and what is meant by calling them such is that they are the determinants, which act on the determinable matter to produce the determinate compound.

It is not hard to see why some such move is required by advocates of robust matter-involvement (positions 3a-c), in order to explain the difference between the universal compound and the form. However, the proposal to invoke the modern

determinable/determinate distinction will no doubt strike some as anachronistic.[200] It is not even clear that the modern distinction is appropriate to capture Aristotle's genus/species/differentia relation, since in paradigm cases of determinables there are no determinants which make the determinates which fall under them what they are: e.g. this determinate shade of red is not normally thought to be made the shade that it is by any property that it has and others lack.[201] Still, one might concede that Aristotle might have been getting at something relevantly similar to the modern distinction, with his talk of objects and ways of being. A more significant problem is that Aristotle does not obviously even recognise a distinction between objects and ways of being. For him, the important metaphysical divisions are between universal and particular, and substance and accident, but neither of these will help us distinguish the compound from a robust-matter-involving form. The invocation of determinables etc. is not only anachronistic; Aristotle does not seem to see the need for a fundamentally different category of being for forms to belong to, and this must count as some evidence against the view that he accepted robust-matter-involvement.[202]

VI. Two arguments for robust-matter-involvement

In addition to the interpretative considerations, discussed in §III, David Charles offers two more philosophical arguments for regarding forms as robust-matter-involving, which he

[200] No doubt Aristotle was aware that there is a difference between, e.g., particular shades of colour and colour terms which embrace a range of such shades, but, since he did not have any technical terminology to describe the difference, it is doubtful whether he would have used the distinction to explain the difference between universal compounds and forms.

[201] In his entry, 'determinables and determinates', in Edwards (1967), John Searle claims that the distinction was introduced precisely as an alternative to the genus/species/differentia taxonomy.

[202] This is so, even if, in the final assessment, forms are the only things which Aristotle counts as substances, properly speaking; for compounds are still regarded as good candidates for substancehood, and do not obviously belong to some different category.

calls the argument from definition, and the argument from explanation of change. In this section we will examine Charles' arguments.[203]

The argument from definition starts from the premise that, in order to account for the unity of the compound and to explain why it is what it is, the form must refer to a feature which is predicated of the matter not as one thing said of another (as white is predicated of man), but as a *per se* feature (as snub is a *per se* type 2 predicate of nose, since noses are mentioned in the account of the snub).[204] Then the claim is that form cannot be predicated of (this specific sort of) matter in the required way if it is independent of matter in the way suggested by (1) and (2a-c), Hyper-formalism and Functionalism. So far the argument only seems to motivate regarding the form or essence of the compound as robust-matter-involving, which is compatible with (3a), i.e. with the form itself having an essence that is devoid of matter. However, Charles believes that the argument also tells in favour of the more thoroughly matter-involving positions (3b) and (3c): just as the unity of the compound demands that its form be predicated of its matter *per se*, so the unity of the form will not allow it to have formal and material parts that are independent of one another. But if the form's formal parts are also matter-involving, that rules out (3a), and (3b) and (3c) are the only options remaining.

The argument from explanation of change relies on the fact that natural things, unlike mathematical ones, are subject to change. Only things with matter (and not matter of

[203] Since these arguments do not yet appear in Charles' published works, it is quite possible they are not his final thoughts on the matter. Nevertheless, whatever their pedigree, they are arguments that deserve a hearing.

[204] In *Posterior Analytics* I.4, 73a34-b5, Aristotle distinguishes between two ways in which something may be predicated of a subject *kath' hauto* (often translated by the Latin phrase 'per se', or 'in itself'): (i) x is F kath' hauto iff x is F and F features in the definition of x; (ii) x if F kath' hauto iff x is F and x features in the definition of F. An example of a *per se* type 1 predication is 'Callias is a man', since man features in Callias' definition; an example of a *per se* type 2 predication is 'this number is odd', since number features in the definition of odd.

the 'intelligible' kind had by mathematical objects)[205] are capable of change, and, if natural forms are to account for the characteristic changes undergone by natural compounds, the claim is that they must themselves be robust-matter-involving. For example, the property of falling downwards when unsupported is one had by all human beings, which Aristotle would explain as being due to their being made of a preponderance of the heavier elements, earth and water. If the form of a human being is to account for this fact, plausibly it will have to make mention of the material constitution of human beings that results in this sort of characteristic behaviour.

It is important to note that Aristotle denies that natural forms themselves are subject to change *kath' hauto*, in *De Anima* 1.3.[206] Since only compounds of form and matter are subject to change, this argument can at best lend support to the weaker sort of robust-matter-involvement, embraced by all of (3a)-(3c): in order to account for the sorts of change characteristic of natural compounds, their forms must make reference to the specific sorts of matter that they have.

In assessing these two arguments, a lot seems to depend on how extensive an explanatory role can be assigned to hypothetical necessity. All human beings have a tendency to fall, necessarily, at least in a world with laws of physics like ours. However, it is not so clear whether this characteristic sort of change is one which must be explained by the form or essence of a human being, as opposed to his matter. Even on the assumption that the explanation must in some sense make reference to the thing's form, it is not clear that it must be given solely in terms of the form, which would seem to be required if this argument

[205] The phrase 'intelligible matter' (ὕλη νοητή) only occurs three times in the Aristotelian corpus, all of them in the *Metaphysics*: Z.10, 1036a10ff., Z.11, 1037a5f., H.6, 1045a34ff. For a good discussion of these passages, cf. Helmig (2007).

[206] Indeed Shields' first argument for the conclusion that forms are not material, in the sense of not being constituted by matter, relies on this fact. Cf. Shields (1988a), §IV, 114-118.

is to motivate the strong form of matter-involvement required by Charles. After all, there are lots of other sorts of thing, both living and inanimate, which share this particular characteristic. Supposing there was a characteristic sort of change peculiar to all and only human beings, even then it is not obvious (a) that this fact has to be explained by the essence of a human being, and (b) that its explanation will require the essence to be robust-matter-involving. To be sure, we would like some explanation of why this sort of change is peculiar to this sort of creature, but it might simply be a fact about the world that anything with an essence of this sort has to change in this sort of way, without that change being something that is specified within the essence itself. In this connection it is important to notice that Aristotle recognises the existence of *idia*, that is of properties that apply to all and only instances of a given species, which an instance of that species has necessarily, but which are not part of its essence: e.g. all and only human beings are capable of laughter.[207] The essence of a human being is rationality, and the fact that we all (apparently) have a sense of humour follows from the essence together with how the world is. Many characteristic changes of organisms may be best explained in a similar way: all ducks waddle, but waddling is not part of their function. Rather anything that fulfils the functional requirements of a duck must (in a world like ours) walk inelegantly.

An analogous response to the argument from definition suggests itself. The unity of the compound does not require that form be predicated of matter in the *per se* (type 2) sense, which would require that the matter (or its definition) be mentioned in the specification of the form. Rather, the requisite unity will be secured if the form is such that, given the way the world is, it necessarily (but not essentially) is instantiated in this sort of matter. This, then, seems to be a kind of hypothetical necessity. If one looks for an

[207] Cf. *Categories* 3a21, 4a10; *Topics* 102a18-30, 134a5-135b6.

explanation of why human souls are reliably, and necessarily, found in human bodies, it seems reasonable to expect that explanation to make reference to the formal and material nature of human beings and also to the nature of the world, e.g. what sorts of material are available. However, it is not clear that this sort of explanation requires the specification of the human soul to mention hands, feet, etc.

VII. A Cartesian motivation

Another possible motivation for robust-matter-involving forms is the idea, mentioned in §I, that they offer a way out of problems that are supposed to afflict Cartesian dualism. Briefly, if mind and body are two very different sorts of thing, it is often thought that there is a problem about how such different things could causally interact. It is a common sense assumption that the mind can interact with the body, as it does when I make a conscious decision to go for a walk, etc. Conversely, the body seems to affect the mind, when I stub my toe on the door frame and suffer the resultant pain. Aristotle believes that the form of a human being is its 'ψυχή', a word which is often translated 'soul', but which can, perhaps less misleadingly, at least in the human case, be rendered 'mind'.[208] The proximate matter of a human being is the organic body. If the form that is the human soul (the form of the compound) is not matter-involving, whereas the body is, Aristotle might seem to be committed to a version of dualism. On the other hand, if both soul and body are in some sense compounds of matter and form, they are not different in kind, and there is no puzzle about how they can interact.

[208] In the Christian tradition, it is usually assumed that the soul survives the death of the body, and that an individual is properly identified with his soul, but it seems unlikely that Aristotle would have accepted either of these assumptions. In *De Anima*, he does make it clear that one of the capacities of the human soul, which distinguishes it from the souls of plants and animals, is that it is that with which we think. To that extent, at least, it seems to play the same role as our concept of mind.

It is a little unclear which of our seven positions succeeds in escaping the mind/body problem by making mind and body the same kind of thing. Clearly position (1) does not. All of the other positions claim that the form or soul of a human being (the form of the compound) involves matter, whether of merely functional or more robust sorts. One might think that functional matter views (2a-c) would not suffice to avoid the problem, if functional matter is a fundamentally different sort of matter from the matter of the compound. Even if the matter of the compound were purely functional, as long as there was some, perhaps more remote, matter of the non-purely-functional sort, that was involved in apparent interactions with the mind, such as when I stubbed my toe, the problem would remain. Since the problem was described as a worry about the possibility of interaction between the form and matter of the compound, and all of positions (3a-c) take the same view on both of these, differing only in their attitudes towards the form or essence of the form, it may seem that they are all equally supported by this argument. Opponents of (3a) might point out that its adherents are committed to the existence of immaterial forms, but since these are not so obviously required to causally interact with material things, they seem to be irrelevant: the argument is not that there cannot be two fundamentally different sorts of thing, and adherents of (3b-c) may well accept that there are non-natural kinds of form (most obviously) mathematical ones, which are immaterial.

The argument for robust-matter-involving forms as a solution to the mind/body problem is only persuasive if we are convinced that there is no alternative solution, but of course that is far from obvious. Indeed not everyone is even convinced that there is really a problem at all: we said that the problem was about how two very different sorts of thing can causally interact, but one might well wonder why this is supposed to be problematic.

Explanations usually advert to some principle of the causal closure of the material world, but again such a principle seems to need the support of further arguments.

The defender of matter-involving forms may not be able to claim that it is an advantage of his view that it avoids the mind/body problem, at least without a lot more work. He might restrict himself to a more modest claim: that his view is more plausibly attributed to Aristotle, since Aristotle doesn't discuss the mind/body problem, and he has an explanation for that which others lack, whether or not the mind/body problem is a serious problem. Although this sounds less committal, it still relies on an assumption that the problem is a real one: otherwise there is another, better, reason for Aristotle not to mention it - he (rightly) wasn't worried about the question of how pure forms and matter could interact.

VIII. Which position is best?

So far we have seen, in §III, that both positions (2c) and (3c) are vulnerable to a problematic regress: if every form is itself a compound of matter and form, then every form will have an infinite series of higher forms associated with it. One way to escape the regress would be to deny that forms themselves have essences or definitions or forms, i.e. to revert to (2b) or (3b). We saw that this position seemed to conflict with a number of passages where Aristotle evidently implies that forms do have definitions or essences, namely *De Anima* I.1, *Metaphysics* Z.11, and *Physics* 2.2. In §V-VI, we considered some arguments for the view that forms are matter-involving. We found that the arguments from definition and explanation of change could be countered by invoking the notion of hypothetical necessity: human beings necessarily have these specific sorts of body parts and are involved in these specific, matter-requiring sorts of changes, but this need not mean that the matter must be

mentioned in a specification of their essences. The argument based on offering a response to the mind/body problem was only convincing if one thought that (a) it was a real problem and (b) no other solution was available.

This leaves us with positions (1), (2a) and (3a). It is more difficult to decide which of these possible interpretations of Aristotle's hylomorphism we should prefer. So far we have not found any convincing philosophical reasons for thinking that matter-involving forms are necessary;we considered some textual reasons for thinking that Aristotle believes in them in §III, which we found to be inconclusive. A textual reason for preferring (1) to both (2a) and (3a) can be found in Z.6, where Aristotle claims that 'from these arguments it is clear that each thing and its essence are one and the same but not by accident'[209] (1031b20). The most natural, and the traditional way to understand this passage is that it is asserting that things and their essences are numerically identical. Charles (2011) points out a problem with the traditional reading: a thing's essence is supposed to be what makes the thing what it is. It is prior to the thing in definition, and the thing's formal cause. All of these relations (making something what it is, being prior to something, causing something) seem to be asymmetric ones, but nothing can stand in an asymmetric relation to itself. Charles' solution is to argue that 'is one and the same as' does not express numerical identity here, but rather the asymmetric relation 'is defined in terms of'.

The challenge for Charles' reading is to show that (a) 'is one and the same as' in Aristotle can mean 'is defined in terms of',[210] and (b) that the resulting claim, that x is the essence of y only if y is defined in terms of x, is not just trivially true. Another way to escape Charles' problem is to retain the traditional construal of 'is one and the same as' here as

[209] ἔκ τε δὴ τούτων τῶν λόγων ἓν καὶ ταὐτὸ οὐ κατὰ συμβεβηκὸς αὐτὸ ἕκαστον καὶ τὸ τί ἦν εἶναι.
[210] Elsewhere in the chapter, e.g. 1031b31, quoted in the next paragraph, Aristotle simply asserts that some things are their essences. On Charles' view this 'εἶναι' must also not be construed as the 'is' of identity.

numerical identity, but to restrict the scope of 'each thing', so that Aristotle is not asserting that compounds like Socrates are identical with their essences, but only that forms are. Such a restriction is plausible, since in Z.4-11 Aristotle is considering the hypothesis that substance is essence, which he identifies with form (cf. fn 178). All of the examples considered in the main body of Z.6 are of universals – white man, man, white, musical, good, animal, being, unity, beauty – and although some of these could be universal compounds as opposed to forms, most of them must be forms. At 1031b11-14, we are told, 'Therefore it is necessary that the good and the essence of good are one, and the beautiful and the essence of beauty, and whatever is not said of something, but which is said of itself and is primary.'[211] As we know, on Aristotle's view, the primary substances are forms. The idea that forms have themselves as forms or essences may sound worryingly like the view that they are predicated of themselves, which, together with some other assumptions, leads to the Third Man Argument which causes problems for Plato's theory of Forms.[212]

However, this only follows, if we accept that the relation between a thing and its form is always predication. Although there is evidence that Aristotle believes that forms are predicated of matter, at least in one sense of 'κατηγορεῖσθαι',[213] it does not seem as though he is committed to the position that they are predicated of the compound; and even if they were, he could still deny that the relation between a form and itself is predication. Indeed, one might well wonder what the problematic Aristotelian sentences, analogous to Plato's 'the Form of the large is large', are.

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211 ἀνάγκη ἄρα ἓν εἶναι τὸ ἀγαθὸν καὶ ἀγαθῷ εἶναι καὶ καλὸν καὶ καλῷ εἶναι, <καὶ> ὅσα μὴ κατ' ἄλλο λέγεται, ἀλλὰ καθ' αὑτὰ καὶ πρῶτα·

[212] Cf. the much-debated passage, *Parmenides* 132a-b. In fact the label 'Third Man Argument' is not used by Plato, but derives from Aristotle's discussion of the argument: cf. *Metaphysics* 990b17 = 1079a13, 1039a2; *De Sophisticis Elenchis* 178b36 ff.

[213] Cf. Chapter 2, §III, for a discussion of the subjecthood of form.

Anyone who accepts, as we have argued that Aristotle does, that every form has a form or essence must either embrace an infinite regress of forms, or say that some forms are identical with their forms or essences.[214] Aristotle makes his rejection of the infinite regress explicit in Z.6: 'The absurdity would be apparent also if one were to posit a name for each essence; for there will be another <essence> also beyond that one, for example, there will be an essence also of the essence of a horse. Yet, why should not some things be their essences from the start, if indeed an essence is a substance?...Moreover, if unity and the essence of unity are distinct, the process will go on to infinity; for there will be the essence of unity and also unity, so that also in their case the same argument will apply.'[215] (1031b28-1032a4)

Aristotle is committed to forms having themselves as forms, whether or not forms are matter-involving; so, if this is considered problematic, it is a problem on any view. However, the advocates of matter-involving forms have another problem: matter-involving forms cannot be identical with their forms. If their forms are not matter-involving, they cannot be identical with them, since they are matter-involving and their forms are not. If their forms are matter-involving, they also cannot be identical with them: since they are matter-involving, their form does not exhaust what they are (Fc = F + m), but nothing is identical with a proper part of itself. The defenders of the more moderate matter-involving form positions (2a) and (3a) may seem to be in a better position: since they hold that the form of the form is not matter-involving, they can halt the regress by claiming that this form has itself as essence or form. Although such a move is philosophically sound, it does no

[214] A third option would be to accept a finite circle of forms, so that, e.g. Fc (the form of the compound) has F as its form, and F has Fc as its form, but there is no reason to suppose that Aristotle held any such view.

215 ἄτοπον δ' ἂν φανείη κἂν εἴ τις ἑκάστῳ ὄνομα θεῖτο τῶν τί ἦν εἶναι· ἔσται γὰρ καὶ παρ' ἐκεῖνο ἄλλο, οἷον τῷ τί ἦν εἶναι ἵππῳ τί ἦν εἶναι [ἵππῳ] ἕτερον. καίτοι τί κωλύει καὶ νῦν εἶναι ἔνια εὐθὺς τί ἦν εἶναι, εἴπερ οὐσία τὸ τί ἦν εἶναι;... ἔτι εἰ ἄλλο ἔσται, εἰς ἄπειρον εἶσιν· τὸ μὲν γὰρ ἔσται τί ἦν εἶναι τοῦ ἑνὸς τὸ δὲ τὸ ἕν, ὥστε καὶ ἐπ' ἐκείνων ὁ αὐτὸς ἔσται λόγος.

cohere very well with Z.6: for there is no reason to suppose that the things that Aristotle is here claiming are identical with their essences are the forms of forms, as opposed to the forms of compounds.

Z.6 gives us a textual argument for preferring position (1), Hyper-formalism, to positions (2a) and (3a), the compromise positions that claim that the form of the compound is matter-involving, but its form, i.e. the form of the form of the compound, is pure. There is also a more philosophical argument to be made, based on simplicity or Ockham's Razor. Our main reason for rejecting positions (2c) and (3c) is that they lead to a regress which seems ontologically bloated and unnecessary: for every sensible thing, there is an infinite series of forms. The more moderate positions (2a) and (3a) can escape this regress by identifying the form of the form with its essence, but they still require that there be two forms for every sensible thing: the form of the compound, which is matter-involving, and the form of the form which is not.

In chapter 1, we objected to the modern atomists' appeal to ontological simplicity, when arguing that their theory was to be preferred because it does away with the notion of parthood. That was because their theory, though in some sense simpler, was in conflict with common sense. One needs to be careful, when wielding Ockham's Razor, that the entities one is doing away with are not ones that we have good reason to suppose do in fact exist. This is not to say that simplicity is not an important theoretical consideration. In choosing between Hyper-formalism and weak matter-involvement, we have a choice between a theory that posits one form for every sensible object (on the assumption that forms are particulars) and a theory that requires two. Since we have not found any of the philosophical reasons for matter-involving forms compelling, we should prefer the simpler

theory, which in this case appears to be position (1): Aristotelian forms are not matter-involving.

It may seem that position (1), Hyperformalism, is committed to just as much metaphysical baggage as the moderate positions (2a) and (3a): for in responding to the textual arguments of §III, we were forced to distinguish between a thing's broad definition (λόγος or ὅρος), which embraces all four of its causes, including matter, and its narrow definition or form/essence (εἶδος or τὸ τί ἦν εἶναι), which is in no sense matter-involving. On the other hand, positions (2a) and (3a) must either admit that things have two forms, or distinguish between a thing's essence, which is matter-involving, and its form which is pure. Put this way, positions (1) and (2a)/(3a) begin to look like notational variants of one another: their disagreement merely comes down to whether or not they are willing to call this broad, matter-involving definition an essence or form. Hyper-formalism is still preferable, since it fits better with Aristotle's identification of a thing's form and its essence (cf. fn. 178, and the preceding discussion of Z.6), but it might have been better if Aristotle had not said the things that commit him to the existence of broader, matter-involving definitions, since we have found little philosophical need for any such entities.

IX. Conclusion

It now remains to sum up our findings about which of the seven possible positions on the extent to which a thing's matter is included in its form is most defensible, and which is best supported by the texts. The more thoroughly matter-involving interpretations (2c) and (3c) are vulnerable to a problematic regress. The regress could be avoided by denying that forms have definitions, as advocated by (2b) and (3b), but this seems to contradict the texts. If it is allowed that they have definitions in a weak sense, by being identical with the

definitions that they are, the regress can be generated again by examining their parts, and asking whether or not these are matter-involving. If it is denied that the parts are independent of one another, for this claim to be intelligible they must have distinct definitions, which again produces the regress. Attempting to explicate the inextricability of the form's parts with the determinable/determinant distinction is unhelpful. All three robust-matter-involving positions (3a-c) also struggle to distinguish the form from the universal compound. On the other hand, the philosophical arguments offered in favour of robust-matter-involvement – that it is needed to preserve the unity of the form, and to account for change – do not seem very persuasive, if some things are allowed to be explained not by a thing's essence but by hypothetical necessity. The argument that matter-involving forms are required to address the Cartesian problem of the interaction of mind and body, or, more modestly, that they are required to explain why Aristotle does not consider the problem, is only convincing if we believe that there is a real problem.

Choosing between positions (1), (2a) and (3a) proved more challenging, but we found both (2a) and (3a) to be incompatible with our interpretation of Z.6, according to which forms (including the forms of compounds) are identical with their essences. We also thought that (1) was to be preferred on grounds of simplicity, since it only requires one form per compound. Finally, we looked at the passages which have been cited in support of the view that Aristotle regards forms as matter-involving. We found that all of these passages could be handled by the Hyper-formalist, if he was allowed to distinguish between a thing's essence, and a looser sort of definition that does bring in its matter (along with other causes). We should conclude that the most attractive position for Aristotle to hold is Hyper-formalism: Aristotelian forms are 'pure'; they do not contain a specification of the thing's matter. This conclusion is of course important for a proper understanding of hylomorphism

in general, but it is also particularly significant for our investigation into the nature of substance. If forms are the only things that are substances properly-speaking, the idea that they, like compounds, are matter-involving suggests a view that is less of a departure from common sense. If forms are pure, then Aristotle's metaphysical conclusions are more surprising and counter-intuitive than that.

Chapter Six: Aristotle on the Substantial Status of Artefacts

In the last four chapters, we have considered how Aristotle's views about the extension of substance are affected by his distinction between matter and form. Forms are the best candidates for being substances, because they are the only things that are separate and prior in definition. The fact that they make particular things one is also said to qualify them for substancehood. We now turn to the third interpretative question identified in Chapter One, §IV: however one resolves the issues about hylomorphism, not everything that is a compound of matter and form counts as a substance for Aristotle. To attain a proper understanding of his notion of substance it is not enough to achieve a mastery of the matter/form distinction. We must also understand why not all forms are substantial. In this chapter, we will consider the controversial case of artefacts.

Everyone agrees that Aristotle regards organisms as better examples of sensible substances than artefacts, for he says as much. However it is less clear whether he thinks that artefacts are substances to a lesser degree, or not substances at all, and scholars who have considered this question have come to different conclusions. We will consider arguments for both positions, with a view to reaching a resolution. In *Physics* 2.1, Aristotle distinguishes things that are due to nature from things that are not, on the grounds that the former have an internal source of change. I claim that artefacts lack an internal source of change because they are intention-dependent entities. They therefore fail to fulfil the 'χωριστόν' criterion for being substances. I then suggest that the Ship of Theseus puzzle may provide a further explanation of why intention-dependence might make one want to deny that artefacts are substances to any degree.

I. Two ways of understanding Aristotle's attitude towards the substantial status of artefacts

At the end of Z.17, Aristotle says, 'since not all objects are substances, but only those that are formed naturally and in accordance with their nature, it would appear that this nature is their substance.' (1041b28-30)[216] Commenting on this passage, Aquinas observes that 'some things are not substances, as is especially clear of artificial things' (Commentaria in Libros Metaphysicorum, 1680). Although Aristotle does not mention artefacts here, the claim that only natural things are substances clearly suggests that Aquinas' interpretation is correct. Now of course a scholar of Aquinas' magnitude is worth listening to, even when his interpretation is idiosyncratic, but in fact he is not the only writer who has understood Aristotle to be committed to the view that no artefact is a substance. So, Sir David Ross (1924, vol. 2, 229) speaks of the exclusion of *artefacta* from the 'dignity of substance'; David Wiggins (2001, 100, fn 25) says that 'Aristotle maintained that natural things are the real beings par excellence to which everything else is secondary'; and Christopher Shields (2008) has recently defended the view that only living things are substances.[217]

On the face of it, it seems difficult to take this passage in any other way. However, other scholars have suggested a different reading of this and other similar passages: namely, that, instead of not being substances at all, artefacts are merely substances to a lesser degree than organisms. For instance, Terence Irwin (1988, 571, fn 8) says 'These points suggest that organisms are better wholes, and hence are basic subjects to a fuller extent, than artefacts are; it does not follow that there is no important difference between artefacts and mere heaps or that artefacts are not substances to a high degree.' Frede and

[216] ἐπεὶ δ᾽ ἔνια οὐκ οὐσίαι τῶν πραγμάτων, ἀλλ᾽ ὅσαι οὐσίαι, κατὰ φύσιν καὶ φύσει συνεστήκασι, φανείη ἂν [καὶ] αὕτη ἡ φύσις οὐσία

[217] If this interpretation is correct, having a nature, or an internal principle of change, is necessary and sufficient for being a compound substance; that does not make it a criterion of substance, in the stronger sense of being part of what it is to be a substance. Also, we have argued previously that, properly speaking, only forms count as substances.

Patzig (1988, vol. 2, 377) observe that in Z.17 Aristotle, in contrast to earlier in the book, no longer regards artefacts as substances in the 'full sense'. This interpretation, unlike Aquinas', commits Aristotle to the view that substances come in degrees, that substance is a scalar or normative concept. Advocates of the view will argue that Aristotle plausibly thinks something similar about matter, since he seems to allow that matter is a substance, e.g. at H.1, 1042a26-8, but to claim that form and the compound are substances more than matter at Z.3, 1029a29-30. Of course, this is not the only way to understand these passages: in particular, 'μᾶλλον τῆς ὕλης' in Z.3 is ambiguous between 'more than matter' and 'rather than matter'.[218]

What does it mean to say that something is a substance to a lesser degree? One thing to notice is that it is not inconsistent with there being some minimum conditions that anything which qualified as any degree of substance would have to fulfil. Then some things might fulfil these conditions more emphatically than others. In theory, there might also be other ways of distinguishing between degrees of substance, independently of the minimum conditions, but a more plausible account of Aristotle is that it is his criteria of substantiality, such as being a ὑποκείμενον, being τόδε τι, and being χωριστόν, which apply to different extents in different cases. Shields (2008, fn 8) usefully compares the situation of two students who have achieved averages of 71 and 79 in their Finals papers: on one view, each is equally a first-class student, since they both scored more than 70; alternatively, one might claim that one was more of a first-class student than the other, since, though they both satisfied the minimum conditions, one did so by a greater margin.

[218] The reading 'more than matter' might seem preferable, on the grounds that almost immediately after this passage Aristotle refers to form using the expression 'τῆς τρίτης' (1029a32). The fact that the adjective is feminine means that we have to understand an implicit 'οὐσίας', which implies that both the compound and matter are still being thought of as substances of a sort. This point is not decisive, however, since 'the third substance' might be short for 'the third of the candidates for being substance which we have been considering'.

II. Why does this debate matter?

There are two main reasons for one to care about this debate: first, it has interesting consequences for our understanding of Aristotle's concept of substance in general. The view that artefacts are lesser substances obviously commits him to substances coming in degrees; the view that they are not substances is consistent with this, but removes some of the motivation for it. One might think that as long as Aristotle uses his technical terminology consistently, he is free to choose what the extensions of those terms should include. Questions about whether something is a bad piece of art, or not art at all, a bad philosopher or a non-philosopher, might call for an arbitrary choice; at any rate, not very much appears to be at stake. As we have seen, it does not seem that the same applies in the case of 'substance': for Aristotle's term is not intended to pick out a set of objects that he has, perhaps artificially, grouped together; rather it is meant to pick out a fundamental metaphysical category of entities that objectively have something important in common. A full explication of what it is that they have in common would presumably provide an answer to our question. A second reason for caring about the debate is that it should throw some light on the nature of artefacts, which is of independent interest. One reason why this question may have commanded relatively little attention is that it is possible to avoid taking a side by calling artefacts 'less substantial', which does not rule out their not being substantial at all, or referring to them as 'pseudo-substances'; the fact that these convenient verbal ambiguities are available (the latter is of course foreign to Aristotle) does not mean that the issue can reasonably be avoided.

III. Why artefacts might be thought to be substances

One can understand why some scholars have been keen to maintain that artefacts are substances, albeit to a lesser degree than organisms. Aristotle often uses them as examples of substances without any qualification, houses and statues being particularly common, and this practice would otherwise appear unnecessarily misleading. That said, they are not included in his lists of things thought to be substances in Z.2, H.1 and *De Caelo* 3.1. The criterion for being a primary substance in the *Categories* (2a11), of being neither said of nor in a subject (i.e. being an ultimate subject of predication) is naturally understood as applying to artefacts just as much as to this horse or Socrates. Similarly, the claim that 'it is distinctive of substance that what is numerically one and the same is able to receive contraries' (4b18) could be applied to both equally. Now it is often supposed that Aristotle changed his mind about the nature of substance between writing the *Categories* and the *Metaphysics*, but even if we accept this (which I do), the hylomorphic theory of substance found in *Metaphysics* Z and H seems no more appropriate to organisms than it does to artefacts, for which an analysis into material and formal components is just as plausible. Finally, if Aristotle's categories are meant to be a mutually exclusive and jointly exhaustive way of dividing up reality – a complete list of highest kinds – if artefacts do not belong in the category of substance, where do they belong? They certainly do not seem to fit easily into any of the other nine.

IV. Aristotle's distinction between things that are due to nature and things that are not

Whichever interpretation is correct, Aristotle clearly needs some reason for thinking that artefacts have less of a claim to substancehood than their organic rivals; and the nature of his argument for this should help us to determine which interpretation is preferable. A

good place to begin our search for such an argument is the passage at the beginning of *Physics* 2.1 where he draws a distinction between things that are due to nature and things that are not: 'Some things are due to nature; for others there are other causes. Of the former sort are animals and their parts, plants, and simple bodies like earth, fire, air, and water – for we say that these and things like them are due to nature. All these things plainly differ from things which are not constituted naturally: each has in itself a source of change and staying unchanged, whether in respect of place, or growth and decay, or alteration. A bed, on the other hand, or a coat, or anything else of that sort, considered as satisfying such a description, and in so far as it is the outcome of art, has no innate tendency to change, though considered as concurrently made of stone or earth or a mixture of the two, and in so far as it is such, it has.' (192b9-20)[219] Organisms (and their parts and the elements here) have an internal source of change and rest, and this is what distinguishes them from artefacts.[220]

Frank Lewis (1994), 268, suggests that there is a second difference: 'In the case of artefacts, it can seem plausible that their constitutive form – that is, the form that supervenes on the proximate matter – is nothing more than their shape or mode of spatial determination: the familiar examples of the bronze sphere or statue come to mind here.' While a 'thinner' notion of form may seem appropriate for *some* artefacts, it is not clear why this should be so for ones, like computers, with complex internal structures, and

[219] Τῶν ὄντων τὰ μέν ἐστι φύσει, τὰ δὲ δι' ἄλλας αἰτίας, φύσει μὲν τά τε ζῷα καὶ τὰ μέρη αὐτῶν καὶ τὰ φυτὰ καὶ τὰ ἁπλᾶ τῶν σωμάτων, οἷον γῆ καὶ πῦρ καὶ ἀὴρ καὶ ὕδωρ (ταῦτα γὰρ εἶναι καὶ τὰ τοιαῦτα φύσει φαμέν), πάντα δὲ ταῦτα φαίνεται διαφέροντα πρὸς τὰ μὴ φύσει συνεστῶτα. τούτων μὲν γὰρ ἕκαστον ἐν ἑαυτῷ ἀρχὴν ἔχει κινήσεως καὶ στάσεως, τὰ μὲν κατὰ τόπον,τὰ δὲ κατ' αὔξησιν καὶ φθίσιν, τὰ δὲ κατ' ἀλλοίωσιν· κλίνη δὲ καὶ ἱμάτιον, καὶ εἴ τι τοιοῦτον ἄλλο γένος ἐστίν, ᾗ μὲν τετύχηκε τῆς κατηγορίας ἑκάστης καὶ καθ' ὅσον ἐστὶν ἀπὸ τέχνης, οὐδεμίαν ὁρμὴν ἔχει μεταβολῆς ἔμφυτον, ᾗ δὲ συμβέβηκεν αὐτοῖς εἶναι λιθίνοις ἢ γηΐνοις ἢ μικτοῖς ἐκ τούτων, ἔχει

[220] Not all of the things mentioned here as being due to nature are substances: the organisms are, but their parts are not, as we will see in Chapter Seven. Being due to nature seems to be necessary for being a substance but not sufficient.

functions. While Aristotle admittedly had no computers, he was familiar with artefacts, like houses, with an internal structure.[221] Moreover, it is doubtful whether any artefact will have a form that merely specifies a shape without reference to a function, so I do not think this can be an important difference.

For the *Physics* 2.1 passage to be of any use, we need to understand what it means to have an internal source of change, and why lacking one might make something less of a substance. Aristotle goes on in this chapter to identify a nature with an internal source of change (192b21), and a thing's nature with its form (193b7-8) or its substance (*Metaphysics* Δ.4, 1014b35-15a11). Of artefacts, on the other hand, he says, 'They none of them have in themselves the source of their making,[222] but, in some cases, such as that of a house or anything else made by human hands, the source is in something else and external' (192b28-31). A house comes to be, and to acquire its form, at the hands of a builder, who shapes some matter in accordance with the form of a house present in his mind; in contrast, when a child grows into her adult form, the changes that take place are not effected by anything external, but by the immature organism moving towards her adult form.

In *Physics* 2.1 the parts of animals and the elements are said to be among the things that have an internal source of change and rest, and in Z.2 (1028b9-13), unlike artefacts, they are included among the various candidates for being substances, according to the *endoxa*. However, in Z.16 Aristotle explicitly denies that they are substances: 'Evidently even of the things that are thought to be substances, most are only potentialities, - e.g. the parts of animals (for none of them exists separately, and when they *are* separated, then they too

[221] He also knows of relatively complicated machines, as well as sophisticated puppets: cf. *De Motu Animalium*, ch. vii.

[222] That artefacts lack an internal source of their making or coming to be might not be enough to show that they lack an internal source of change, once they have come to be. However, as we will see in §VII, even after they have come to be, they are not independent of the intentional activity of their creators or users.

exist, all of them, merely as matter) and earth and fire and air; for none of them is one, but they are like a heap before it is fused by heat and some one thing is made out of the bits.' (Z.16, 1040b5-10)[223] One might conclude from this that having an internal source of change is not sufficient for being a substance, though it may still be a necessary condition which artefacts fail. Matter and artefacts would then fall short in comparison with organisms for different reasons. However, in *Physics* 8.4, there may be a hint that Aristotle thinks only organisms have an internal principle of change *and rest*. Here he says that only animate things can be moved by themselves: 'and in that case they would be able to stop the motion themselves – I mean, for example, if a thing causes its own walking, it also causes its own non-walking – so that if it were in the power of fire itself to travel upward, it would clearly also be in its power to travel downward as well.' (255a7-10)[224] The elements may have internal principles of change in that their motion is explicable by reference to their nature. However to be capable of initiating motion one must also be able to bring it to a halt – one needs an internal principle of rest as well. Only organisms control the direction of their motion in accordance with their own good.[225] The behaviour of the elements is not directed with reference to their own good. To this extent, their failure to count as substances is not dissimilar to the case of artefacts: both elements and artefacts lack this more robust sort of internal principle of change and rest which is required to be a self-mover; while both are teleological in a sense, neither aims at its own good.

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[223] Φανερὸν δὲ ὅτι καὶ τῶν δοκουσῶν εἶναι οὐσιῶν αἱ πλεῖσται δυνάμεις εἰσί, τά τε μόρια τῶν ζῴων (οὐθὲν γὰρ κεχωρισμένον αὐτῶν ἐστίν· ὅταν δὲ χωρισθῇ, καὶ τότε ὄντα ὡς ὕλη πάντα) καὶ γῆ καὶ πῦρ καὶ ἀήρ· οὐδὲν γὰρ αὐτῶν ἕν ἐστιν, ἀλλ' οἷον σωρός, πρὶν ἢ πεφθῇ καὶ γένηταί τι ἐξ αὐτῶν ἕν.

[224] καὶ ἱστάναι ἂν ἐδύνατο αὐτὰ αὑτά (λέγω δ' οἷον, εἰ τοῦ βαδίζειν αἴτιον αὑτῷ, καὶ τοῦ μὴ βαδίζειν), ὥστ' εἰ ἐπ' αὐτῷ τὸ ἄνω φέρεσθαι τῷ πυρί, δῆλον ὅτι ἐπ' αὐτῷ καὶ τὸ κάτω.

[225] Although his use of the walking example suggests that Aristotle is primarily thinking of animals in this passage, plants also move themselves in accordance with their own good, when they grow and, e.g., when they move towards the light (phototropism). In *Physics* 8.7, 261a23-5, we are told that the self-motion of organisms is only in respect of place, and this is contrasted with growth. However, phototrophic motion would still count as movement from place to place.

V. The ‘χωριστόν’ criterion

Aristotle claims that the difference between living things and artefacts is that, while living things have internal sources of change, artefacts do not. This seems to be because of the way in which they derive their nature from the person who makes them. We now need to consider how this fact about the way in which they come to be might explain their not being substances. At this point, it makes sense to bring in the criteria for being a substance which Aristotle puts forward both in the *Categories* and the *Metaphysics*. While, as we have seen, we are not offered anything like a neat definition of ‘οὐσία’, Aristotle does discuss various characteristics, which belong only or especially to substances. These include being a subject, being a ‘this’, being prior in definition and in knowledge, and being separate.

Aristotle may not tell us much about the nature of the criteria, or where he derives them from, but his account of substance is given in terms of them, and so it is here that we must look for an explanation of why lacking an internal source of change should disqualify artefacts. The criterion that artefacts most obviously fall foul of is being separate. In Z.1, 1028a33-4, we are told that substance is primary, ‘for of the other predicates none is separate, but only substance.’[226] The word which we have rendered as 'separate', ‘χωριστόν’, is translated by Ross as ‘can exist independently’; and this is how we understood separation *simpliciter* earlier: as having the capacity for independent existence.[227] In the *Metaphysics*, being χωριστόν is often mentioned in the same breath as being τόδε τι (e.g. Δ.8, 1017b25, Z.3, 1029a28), and there is a strong case for thinking that Aristotle regards both as being necessary for being a substance: in Z.3, 1029a27-8, we are told that ‘both separateness and ‘thisness’ are thought to belong most of all to substance’;[228] in M.9,

[226] τῶν μὲν γὰρ ἄλλων κατηγορημάτων οὐθὲν χωριστόν, αὕτη δὲ μόνη·

[227] For a more detailed account of Aristotle’s notions of separation, cf. Chapter Two, §V and VI.

[228] καὶ γὰρ τὸ χωριστὸν καὶ τὸ τόδε τι ὑπάρχειν δοκεῖ μάλιστα τῇ οὐσίᾳ

1086b3-5, Socrates is commended for not regarding universals as separate from particulars, unlike his successors who did make this mistake.

In H.1, 1042a28-31, two different sorts of separation are distinguished – τῷ λόγῳ χωριστόν, separation in account, which applies to the form, and χωριστόν ἁπλῶς, separation *simpliciter*, which applies to the compound. The claim that forms are separate in account looks as though it might be another way of saying that they are prior in definition. If artefactual forms are to be substances, they must be separate in account; and, if an artefact's definition refers to the people who made it, it would seem to fail this test. However, it is the second sort of separateness, separation *simpliciter*, that is immediately relevant, since this is the sort that is supposed to apply to substantial compounds. We argued in Chapter Two, §V, that Aristotle should not think that a compound substance like Socrates is capable of existing without there being anything else at all, and this was a major reason to prefer the view that only forms are substances. However, compound substances, like Socrates, may still enjoy a more limited ontological independence of things that are external to them. Plausibly Aristotle thinks that, if Socrates were the only man, he would exist though the universal man would not, on the grounds that there must be at least two men for there to be the universal that they have in common.[229] Then the only things other than Socrates required for his existence would be his particular properties and matter, and if these are regarded as 'contained in', or 'internal to' him in some appropriate way, we have a way of understanding the claim that he is χωριστὸν ἁπλῶς.

[229] If universals are introduced to explain how multiple things can be F, for some predicate 'F', such an explanation is not required if there is only one F thing or fewer (unless we also need them to account for the *possibility* of multiple Fs). There may be other good arguments for the existence of universals, but the one-over-many argument, as the name suggests, requires that there be many instances of the relevant characteristic.

Substances that are compounds of matter and form are χωριστὸν ἁπλῶς, where this means that they are capable of existing independently of anything external to them. If this is right, we can attribute the following line of thought to Aristotle: artefacts do not have an internal source of change, because they depend for their existence on the intentional activity of a creator who is external to them; if they are substances of any sort, they are compounds of matter and form; the χωριστὸν ἁπλῶς criterion, which is a necessary condition for being a compound substance, does not apply to them; therefore they are not substances. This argument seems to offer us a reasonable explanation of Aristotle's attitude towards artefacts. As I have explained the χωριστὸν ἁπλῶς condition, it does not readily admit of degrees – either something has the capacity for independent existence or it does not – and so, if it is true that this is a necessary condition for being a compound substance, the argument seems to support the view that artefacts are not substances at all.

VI. Intention-dependence and an argument for degrees of substantiality

There is a worry about the argument against artefactual substances, as I have presented it: I have claimed that artefacts are not substances because they depend for their existence on the intentional activity of the person who makes them. But a very natural objection to this is that, while that person is necessary to bring the artefact into existence, once it has been created, it no longer depends on its creator. Organisms also necessarily depend for their coming to be on things that are external to them – their parents; and, while not all pregnancies are intentional, at least some of them are. Just like an organism, an artefact can perfectly well continue to exist without its creator, and perhaps without any intentional beings whatsoever. The second point is perhaps more controversial. It is true that artefacts have some sort of independence of their creators (and users): after I have

made the table, I cannot cause it to stop existing by the power of my intentions alone, without some corresponding action, such as chopping it up into pieces. In this respect, artefacts are unlike more purely intentional objects like clubs (of the Bullingdon variety) or works of art (such as Duchamp's *Fountain*), which people do seem to be able to create and destroy by acts of will. The sort of distinction I have in mind is that which certain religious people draw when they say that God not only created the universe, but also sustains it, so that everything depends on Him for its continued existence. It is not clear why we should think that intentional beings are necessary to sustain artefacts after they have come to be.

In fact there is a reason to think that the dependence of artefacts on intentional beings does not end after they have come to be. It is too much of a simplification to say that the function of an artefact is determined wholly by what the person who makes it has in mind. The intentions of the people who use it seem to be relevant as well: if I start to use my computer as a doorstop, it ceases to be merely a computer, and becomes a computer-cum-doorstop. Perhaps this does not demonstrate that the artefact is not separate *simpliciter*, if it still exists, but, since what its function, its essence, or what it is, has apparently changed, something that is not possible for organisms, it (or its form) is not separate in account. The problem with this argument is that it relies on a certain diagnosis of the situation that is non-trivial. It may seem obvious that in the given example my computer changes its function. However, another possibility is that I simply create a new artefact, a doorstop, which occupies the same space as my computer. If my act of creation also destroys the original artefact, this would make the artefact like a club or a work of art, something which can be destroyed without being physically dismantled. If, on the other hand, the original artefact continues to exist in the same place as the newly created doorstop, we will have failed to show that it depends in any way on the intentional activities

of its users. The idea that there can be multiple artefacts in the same place at the same time seems metaphysically ugly, but that alone does not seem sufficient to rule it out.[230]

If artefacts depend on something external for their coming to be, but not for their continued existence, it is not clear that they are so different from organisms after all. Even putting aside God, everything which has not existed forever must be caused to exist by some prior thing: for an artefact that is its creator, for an organism its parents. Now it is true that in the organism case the parents are directly responsible for the creation of the seed (zygote), which then grows into its adult form, in accordance with its own intrinsic *telos*; an artefact, on the other hand, is not capable of this sort of intrinsic development, and its creator is wholly responsible for supplying it with its form and function. However, this might plausibly be seen as a difference of degree: organisms are more independent of their parents than artefacts are of their creators. Relatedly, someone who thought that artefacts were lesser substances might point out that organisms are unified in the face of more radical changes of shape and size, such as Socrates undergoes from the time when he is a baby to his adulthood; a statue of Socrates would not persist through these sorts of changes, though it might retain its unity against changes in colour or survive the replacement of its parts.

VII. Functional indeterminacy and the Ship of Theseus

According to the view just outlined, whereby artefacts depend on their creator for their coming to be, but not for their continued existence, the creator endows his product with a function, which thereafter determines its persistence conditions – what count as its

[230] In §VIII, we suggest that in certain cases an organism and an artefact may be collocated. Aristotle accepts that a thing's matter and its form are collocated, as well as the various ingredients in a mixture (cf. Chapter Seven), but plausibly would deny that multiple actual things can be in the same place at the same time.

parts at different times, and what sorts of changes it can survive. There are a number of potential problems for this picture. The idea that future users make some contribution to determining artefact functions is one. We saw that to avoid allowing that artefacts can change their functions, one was forced into the uncomfortable position of claiming that artefacts may be collocated. Cases where an artefact has more than one function, or has multiple creators with different intentions, may present further obstacles. However, I now want to focus on a different difficulty posed by the famous Ship of Theseus puzzle.

Briefly, at time t1 there is a ship belonging to Theseus. Call it the original ship. Its planks are gradually replaced by new planks, and the old planks are placed in a shed. At t2 all of the old planks have been replaced with new ones. Now the old planks are reconstructed into the form of a ship. We now have two qualitatively identical ships – the one in the shed and the one out at sea. The one in the shed – call it the historical ship – is made of numerically the same planks as the original. The one out at sea – call it the working ship – has a continuous history of existing in the form of a ship, and performing the functions traditionally associated with ships, and it is spatio-temporally continuous with the original.

The two ships cannot both be identical with the original, for then, by the transitivity of identity, they would be identical with each other.[231] The problem is that both ships seem to have good claims to being identical with the original. The historical ship is not just the same as the original in terms of macroscopic properties. It is composed of the very same planks – the same atoms in the same configuration. If we think that a watch can persist

[231] Also, the original cannot be identical with the pair, historical ship + working ship, connected to the original ship by a continuous, though divided, space-time path. No single ship is identical with a pair of ships. This brings out the point that identity is sortal relative: we can ask whether x and y are the same ship or the same pair of ships, but it only makes sense to ask whether they are the same if there is some implicitly understood sortal that allows us to evaluate the claim.

through being taken apart and put back together again, then it seems that having continuously existed in the relevant form is not necessary for diachronic identity; being made of the same parts seems to be sufficient. On the other hand, the working ship appears to have as good a claim as any of us has to being the same person we were ten years ago, for in that period all of our atoms may have changed. Having a continuous history of existing with the same form and function seems to be sufficient for diachronic identity; being made of numerically the same matter does not seem necessary. Before the historical ship was reassembled, we were in little doubt that the working ship was identical with the original. We do not normally think that questions of the identity of x and y should be determined by the presence or absence of some further thing.[232]

Some Aristotelians have felt confident that continuity of form or function is either necessary for diachronic identity, or at least trumps sameness of matter as a sufficient condition for identity, and therefore that the working ship, not the historical one, is identical with the original: e.g. Michael Frede (1987), 66, writes, 'It seems obvious to me that this ship, even though it is constructed from all the old planks and according to the original plan, is not the old ship, *Theoris*, but a new ship; the ship constructed from the new planks is, in fact, the old ship. No insurance company, presented with a policy written for *Theoris*, would pay for damages suffered if the ship constructed from the old planks had been shipwrecked. Moreover, this would be so even if the planks have been changed all at once, not over many years; it would be so even if the ship constructed from the new planks were constructed according to a modified plan so that, perhaps, only the ship constructed from the old planks was constructed according to the original plan.'

[232] Cf. fn 234 for further discussion of this principle.

It may seem that this is an appropriate Aristotelian response to the puzzle, given that Aristotle identifies the substance of a thing with its form, not its matter. However, I think that a different moral should be drawn from this sort of case: if an archaeologist or someone intending to honour Theseus were looking for his ship, they might well prefer the historical ship. Francis Dauer (1972) considers a similar case involving the Parthenon. If some modern-day Lord Elgin were to take the Parthenon apart slab by slab, replacing the slabs as he went, and transport the originals to the British Museum, one doubts that the claim that he had taken the original slabs but not the temple would satisfy the Greeks. Certain artefacts are essentially associated with their matter, at least for certain users at certain times. The creator's intentions are not specific enough to determine which ship is identical with the original; after all, most ship-builders will never have considered the puzzle, and many probably take a liberal attitude to what their products are for. 'Ship', and other artefact terms, are determinables or genus words, under which more determinate artefact species such as 'historical ship' and 'working ship' fall. There is no fact of the matter as to which ship is identical with the original. We might even say that the word 'ship' is vague, and sentences involving it, such as 'the original ship is the same as the functional ship' should be regarded as neither true nor false, or true on some precisifications, false on others, or whatever your preferred theory of vagueness stipulates.

If this is right, and the case can be generalised to all artefacts, we have a reason for thinking that extrinsically specified functions do not provide clear identity conditions, and artefacts are not determinate entities. If being determinate is necessary for being a substance (and this is how some have understood the 'thisness' criterion), we seem to have a reason for denying that artefacts are substances to any degree. 'But wait!' some of you may be thinking, 'Isn't the Theseus' Ship puzzle first alluded to in Plutarch's *Life of Theseus*?

What has any of this to do with Aristotle?' Of course, this is a fair complaint. Although it is to some extent inevitable that we interpret ancient thinkers in the light of our own philosophical concepts and in our own language, we should try to avoid the sort of anachronism that attributes to them views that they could not possibly have held. Arguably the Ship of Theseus puzzle as we know it is first formulated by Hobbes, and the concept of identity on which it relies was a Seventeenth-Century invention. It is quite possible that Aristotle had never thought of this sort of puzzle case. That would not mean that he would find the solution that I have offered unwelcome, nor is it impossible that he could have come to the same conclusion, that artefacts are not determinate entities, via a different route, such as some of the other problems mentioned earlier. For instance the fact that a sword starts off being for killing people and ends up being used for ornamental purposes might give rise to similar thoughts. However, if we had to accept that this is what Aristotle should think about artefacts, not what he actually thought, I would be happy enough with that.

One of the reasons I listed earlier for thinking that artefacts should count as substances was that it was not obvious which other category they belonged in. One response which this solution to the Ship of Theseus puzzle makes available is to say that only determinate entities are suitable for categorial membership. Alternatively, one might deny that the categories are exhaustive of the things there are: they exhaust the *simple* things, but it certainly is not clear that items such as parties, nations (or in an Ancient Greek context, *poleis*), or wars belong in one particular category. Plausibly these are complex entities made up of things from various categories. In a similar vein, one might think of an artefact as a complex of a quantity of matter and the substance (or substances) whose intentions determine its (less than completely determinate) function.

VIII. Some objections

I want to discuss a few objections to the view of artefacts I have just outlined. First, even if we grant that, in the normal case, an artefact's creator does not have a specific enough function in mind to determine which of various future candidates is identical with the fruit of his labour, it is not obvious that this must be so. Think of the creator's functional specification as a sentence that describes what the object is for. My argument might seem to suggest that if this functional specification is detailed enough there will be no obstacle to his creating a substance. Suppose, for instance, that I set out to create a working ship, why should *this* ship not count as a determinate entity with clear persistence conditions? One thing to say is that, although such a ship will not be vulnerable to the Ship of Theseus problem, as long as there are different ways of fulfilling its functional specification, one will be able to construct an analogous problem according to which there are two candidates each of which has a good case for being identical with the original. Plausibly as long as the creator's specification is purely functional, this will always be true, for there will always be more determinate ways of fulfilling any such specification. (I take it that the same concept can be determinable and determinate relative to different concepts.)

There is a special case, though, when someone intends to create an object which retains numerically the same matter, for then there will only ever be a maximum of one thing that fulfils that part of the functional specification. To call this sort of condition functional seems a bit of a distortion, although, as we have seen, there are purposes for which fulfilling such a condition is necessary. Since there is no ambiguity about this object's persistence conditions, there seems to be no reason for saying that it is indeterminate. If Aristotle would want to deny that it was a substance, which I presume he would, he would have to fall back on its being intention-dependent, but to the extent that the indeterminacy

revealed by the Ship of Theseus was supposed to show what was wrong with being intention-dependent, this looks like a bad result. One might question whether it is in fact possible to create objects with these sorts of persistence conditions. Or if one can create them, perhaps they are like clubs and can be willed out of existence, in which case they would be intention-dependent in the stronger sense that is more obviously incompatible with being χωριστὸν ἁπλῶς.

Someone might grant everything we have said about the Ship of Theseus case, and still wonder whether it provides a reason to think that artefacts that do not actually fall under such cases (though they could) are not substances. We argued that the *choriston* criterion is a necessary condition for being a substance which all artefacts fail to meet, because they all depend on the intentional activity of external creators or users. This does not just mean that they are created by intentional beings, who endow them with some identity conditions, which they then have independently, because the Theseus' Ship case shows that in fact they do not have determinate identity conditions. Someone might concede that artefacts depend on external creators for their coming to be, and that these creators inevitably endow them with identity conditions which are indeterminate in unusual counterfactual cases, but deny that this shows that the artefacts actually fail the *choriston* condition, and so fail to be substances. I suppose this would involve saying that most artefacts, though actually substances, might not have been substances, had they suffered a Theseus' Ship type process. One might respond to this by simply claiming that what category an item belongs to is essential to it, so nothing is a substance that might not have been one. I take it that this is probably Aristotle's view, although I am unsure what textual evidence might be marshalled in favour of it, and without further support it might seem regrettably doctrinaire. A better way to argue for the same conclusion might rely on the necessity of

identity statements. Of course most things do not have all the same properties in all possible worlds, but, if Kripke (1971) is right that what things something is identical to is the same across worlds, then presumably the same is true for what things something is not identical to. Then, if x is indeterminately identical to y if and only if it is not the case that x=y and it is not the case that ¬x=y, what things something is indeterminately identical to will also be the same across worlds. Then if being indeterminately identical to something is sufficient for not being *choriston*, we have the desired result.

A further problem is raised by cases that are apparently similar to the Ship of Theseus, but involve organisms. It has been claimed that artefacts lack determinate identity conditions because they are intention-dependent, but, if the same were true of some organisms too, it would be disastrous for my argument. And this is exactly what some philosophers have claimed is shown by certain fission cases (both real and imagined). I have two responses to this objection: the more modest one is to point out that it is possible to describe these cases in a way that does not require indeterminacy. The same could be said of the Ship of Theseus cases (as Frede does), but there we have an explanation of the indeterminacy in the form of the creator's functional specification.

Consider, for instance, an amoeba that splits into two exactly similar halves. The biologists will tell us that this is an example of asexual reproduction, of a parent amoeba producing two offspring and expiring in the process. However, suppose that, soon after splitting, one of the halves had died, while the other survived. In such a case, we (and the biologists?) might well have been more inclined to describe what occurred as the parent shedding half of its matter but persisting. Now in the asexual reproduction case, we cannot regard both halves as identical with the parent, for reasons rehearsed above. It would be arbitrary to regard just one of them as identical to the parent, since *ex hypothesi* each has

an equally good case. Therefore the only option is to side with the biologists in saying that neither is identical with the original.

If one half dies soon after the split, there is a time when both halves are alive, and so the same argument would apply, and we would be forced to admit that our intuition that the surviving half is the parent is a mistake. However, there is a similar case in which one half of the original amoeba dies immediately as the splitting takes place, not just soon after. In this immediate-dying case one might insist that the parent does survive. There would be a reason to deny this: in the asexual reproduction case, each surviving half was a different amoeba from the original; but, in the immediate-dying case, the surviving amoeba has exactly the same history as one of the surviving halves in the asexual reproduction case. The only difference is in what has happened to the other half, which has not survived. From the surviving amoeba's point of view, as it were, the only difference is in what has happened to something that is unquestionably different from it, but why should this make any difference to the question of whether or not it is identical with the original amoeba? But if it makes no difference, how can we say something different from what we said in the asexual reproduction case – that the surviving half is the original?

This argument rests on an assumption about amoeba-identity: that the properties of some different amoeba, C, are irrelevant to whether or not amoebae A and B are identical. Presumably this assumption derives what plausibility it has from a more general principle about identity: e.g. that the properties of c, where c ≠ a or b, are irrelevant to whether or not a = b.[233] If we accept the principle, we are obliged to conclude that even in the

[233] This principle is denied by Nozick (1981), in his closest continuer theory of personal identity: in cases where two individuals are equally close continuers of an earlier person, neither is identical with the original, since there is no closest continuer. The principle seems to follow from the fact that, whenever the identity relation holds between a and b, it holds necessarily. For the classic argument against contingent identity, cf. Kripke

immediate-dying case the surviving amoeba is not the same as the original. Alternatively we might reject the principle and preserve our intuitions (although it is doubtful that they are worth very much in these sorts of cases). Neither of these reactions seems to require the response that there is no fact of the matter about amoeba-identity, and this is the point of our digression into amoebae. Uncertainty about the case may be traced to uncertainty about the status of the principle. There may be similar uncertainty about whether someone is alive in certain medical cases, or whether a plant divided above the ground is still one plant or two plants growing from the same roots, or what to say about the sorts of science-fiction cases involving the (alleged) splitting of persons, which have been much discussed by Derek Parfit and others. One response to these sorts of uncertainty is the claim that there is no fact of the matter, but one might just as easily conclude that facts about the intrinsic functions of the amoebae, plants or persons, which are not immediately evident to the observer, decide the issue.

That is my more modest response to cases of organism fission, but there is a more ambitious reply which argues that it is not possible for an organism to split into two. Matter can be divided in the requisite way, but an organism is a compound of matter and form, and forms are abstract objects, which are essentially indivisible. Of course, the number ten is divisible in a mathematical sense, but it is a category mistake to think that it or anything essentially immaterial could be divided in the relevant sense. That is not to say that copying a person's memories and character-traits to another body (or many others) is impossible, but these are mental copies, not candidates for being identical with the original person.

A final point of interest, I am not sure it counts as an objection, is the relatively recent phenomenon of designer organisms, bacteria, for instance, created in the lab for a

(1971). If the principle is false, it seems that whether or not a = b depends on the contingent matter of whether or not some further thing, c, exists.

purpose. One might think that the arrival of these on the metaphysical scene blurs the distinction between organisms and artefacts, but a different attitude is suggested by my claim that artefacts are complexes of a quantity of matter and a creator (or his intentions). In these cases, instead of a quantity of matter, part of the complex is a substance with persistence conditions and an internal principle of change in its own right. The organism is collocated with (the non-intentional part of) the artefact. One would have created something with an internal principle of change, and so a substance, but also something else, an artefact, whose persistence conditions are indeterminate, since they are dependent on the indeterminate intentions of a creator. One might compare someone standing on the Fourth Plinth of Trafalgar Square, who is simultaneously a person and a work of art.

Chapter Seven: Aristotle on Mixture: on Behalf of Ascent

We have now developed an account of Aristotle's theory of substance according to which he advocates — reasonably and defensibly — an approach which privileges form as substance, including especially the forms of living beings. We have also seen how this approach handles puzzles cases, and so have shown, at least in broad outline, how Aristotle's account of substance remains viable. It is equally instructive to approach his theory of form as substance from another angle, from the bottom up, so to speak, by considering his views on mixture. For though his views on mixture are in some ways logically distinct from his theory of substance, they do show how he regards the role of form in the constitution of complex stuffs, and so shed light on the indispensability of form in determining identity conditions. A mixture is a compound of matter and form, but it is also the matter of a higher entity, whether another mixture, a heterogeneous part, like a hand, or a whole organism. As such it fails to be a substance for the same reason as matter: it fails the τόδε τι and χωριστόν criteria.

In the ensuing chapter I will examine three influential interpretations of Aristotle's views on mixture, owing to Richard Sharvy, James Bogen, and Mary Louise Gill, which, I argue, fail to fulfil one or other of the adequacy constraints on any theory of mixture that arise from Aristotle's discussion in *De Generatione et Corruptione*, I.10. I then consider two different versions of an Aristotelian theory of mixture distinguished by Kit Fine, which he labels 'Ascent' and 'Levelling'. As against Fine, I offer a defence of Ascent. Ascent faces several problems, the most significant of which is that it requires that mixtures containing the same elemental ingredients can be qualitatively distinct, but this, in the end, need not be regarded as problematic. On the contrary, this commitment helps illuminate the

importance of form in the provision of identity conditions for complex bodies. Moreover, in order to maintain that the ingredients are present in the mixture, Levelling commits Aristotle to the view that the primary relata of the mixing relation are forms, not compounds, and it is unlikely that he would have found this consequence acceptable.

I. The Problem

Mixtures play a crucial role in Aristotle's metaphysics: all heterogeneous substances are composed of them, and the elements, if they compose anything, compose them, so that they occupy a mid-point between these two extremes of Aristotle's ontology. At the start of *De Generatione et Corruptione*, I.10, Aristotle distinguishes five questions which his account of mixture must answer: 'We have to consider what mixture is, what that which is mixed is, to which of the things that are it belongs, and how; and moreover whether there is such a thing as mixture or whether this is false.' (327a32-4)[234] On the face of it he then goes on to answer the last question first, by discussing two puzzles about mixture, designed to show that it is impossible. As he proceeds, it emerges that the other questions about the nature of mixture will be answered in the course of his responding to these sceptical puzzles about its very existence.

In Sections II and III, I lay out the puzzles and detail some constraints on any adequate Aristotelian theory of mixture which they entail. In Section IV, I examine three influential interpretations of Aristotle's views, owing to Richard Sharvy, James Bogen, and Mary Louise Gill, which, I argue, fail to fulfil one or other of these adequacy constraints. In

[234] Williams (1982) renders the first two questions 'what mixing is, what a mixture is'. Although 'τὸ μικτὸν' can mean that which has been mixed, and hence a mixture (cf. 327b8 for this meaning), I agree with Joachim (1926)'s rendering of it here as that which is (to be) mixed, or in his commentary 'the combinable', i.e. the ingredient not the product. Joachim translates 'μίξις' as 'combination', but I have followed Williams and most other English scholars in rendering it 'mixing' or 'mixture'.

Section V, I turn to two different versions of an Aristotelian theory of mixture distinguished by Kit Fine, which he labels 'Ascent' and 'Leveling'. Both Ascent and Leveling hold that mixtures are compounds of matter and form, but according to Ascent the ingredients are the matter of the mixture, whereas according to Leveling the ingredients and the mixture have the same matter. Fine argues that Ascent suffers from insurmountable difficulties, and that Leveling can satisfy all of the adequacy constraints. In Section VI, I offer a defence of Ascent against some of the problems which Fine raises. In Sections VII and VIII, I examine Fine's defence of Leveling, and argue that it commits Aristotle to an unsatisfactory view about the primary relata of the mixing relation.

II. Aristotle's puzzles introduced

Aristotle's first puzzle is introduced at 327a34-327b10:

ἀδύνατον γάρ ἐστι μιχθῆναί τι ἕτερον ἑτέρῳ, καθάπερ λέγουσί τινες· ὄντων μὲν γὰρ ἔτι τῶν μιχθέντων καὶ μὴ ἠλλοιωμένων οὐδὲν μᾶλλον νῦν μεμίχθαι φασὶν ἢ πρότερον, ἀλλ' ὁμοίως ἔχειν, θατέρου δὲ φθαρέντος οὐ μεμίχθαι, ἀλλὰ τὸ μὲν εἶναι τὸ δ' οὐκ εἶναι, τὴν δὲ μίξιν ὁμοίως ἐχόντων εἶναι τὸν αὐτὸν δὲ τρόπον κἂν εἰ ἀμφοτέρων συνελθόντων ἔφθαρται τῶν μιγνυμένων ἑκάτερον· οὐ γὰρ εἶναι μεμιγμένα τά γε ὅλως οὐκ ὄντα. Οὗτος μὲν οὖν ὁ λόγος ἔοικε ζητεῖν διορίσαι τί διαφέρει μίξις γενέσεως καὶ φθορᾶς, καὶ τί τὸ μικτὸν τοῦ γεννητοῦ καὶ φθαρτοῦ· δῆλον γὰρ ὡς δεῖ διαφέρειν, εἴπερ ἔστιν. Ὥστε τούτων ὄντων φανερῶν τὰ διαπορηθέντα λύοιντ' ἄν.

'For it is impossible for one thing to be mixed with another, just as some say. For, if the things that have been mixed still exist and have not been altered, they say that they are no more mixed now than they were before, but that they are the same; and, if one of the two has been destroyed, [they say] that they have not been mixed, but that one of them exists

and the other does not, but that mixing is of things that are in the same condition; and in the same way, if when both of them have come together each of the things being mixed is destroyed, [they say] that things that are not at all are not mixed. This argument seems to seek to distinguish in what respect mixing differs from coming to be and passing away, and in what respect a mixture differs from that which has come to be or passed away. For it is clear that they must differ, if there is such a thing. Therefore if these things were clear, the difficulties would be resolved.'

The first puzzle can be summarized as follows: take any ingredient; either it continues to exist after mixing, or it does not; if it does, it is unaltered by mixing, and so has not been mixed; if it does not, it is destroyed, so again we cannot say that it has been mixed.

The second puzzle, 327b31-328a16, is not about the existence of the ingredients, but their division in the process of mixing:

τὸ δὲ συνεχὲς τούτοις ἀπόρημα διαιρετέον, πότερον ἡ μίξις πρὸς τὴν αἴσθησιν τί ἐστιν. Ὅταν γὰρ οὕτως εἰς μικρὰ διαιρεθῇ τὰ μιγνύμενα, καὶ τεθῇ παρ' ἄλληλα τοῦτον τὸν τρόπον ὥστε μὴ δῆλον ἕκαστον εἶναι τῇ αἰσθήσει, τότε μέμικται ἢ οὔ, ἀλλ' ἔστιν ὥστε ὁτιοῦν εἶναι μόριον τῶν μιχθέντων; λέγεται μὲν οὖν ἐκείνως, οἷον κριθὰς μεμίχθαι πυροῖς, ὅταν ἠτισοῦν παρ' ὁντινοῦν τεθῇ. Εἰ δ' ἐστὶ πᾶν σῶμα διαιρετόν, εἴπερ ἐστὶ σῶμα σώματι μικτὸν ὁμοιομερές, ὁτιοῦν ἂν δέοι μέρος γίνεσθαι παρ' ὁτιοῦν. Ἐπεὶ δ' οὐκ ἔστιν εἰς τἀλάχιστα διαιρεθῆναι, <οὐδὲ> σύνθεσις ταὐτὸ καὶ μίξις ἀλλ' ἕτερον, δῆλον ὡς οὔτε κατὰ μικρὰ σωζόμενα δεῖ τὰ μιγνύμενα φάναι μεμίχθαι. Σύνθεσις γὰρ ἔσται καὶ οὐ κρᾶσις οὐδὲ μίξις, οὐδ' ἕξει τὸν αὐτὸν λόγον τῷ ὅλῳ τὸ μόριον. Φαμὲν δ', εἴπερ δεῖ μεμίχθαι τι, τὸ μιχθὲν ὁμοιομερὲς εἶναι, καὶ ὥσπερ τοῦ ὕδατος τὸ μέρος ὕδωρ, οὕτω καὶ τοῦ κραθέντος. Ἂν δ' ᾖ κατὰ μικρὰ σύνθεσις ἡ μίξις, οὐθὲν συμβήσεται τούτων, ἀλλὰ μόνον μεμιγμένα πρὸς τὴν αἴσθησιν (καὶ τὸ αὐτὸ τῷ μὲν μεμιγμένον, ἐὰν μὴ βλέπῃ ὀξύ, τῷ Λυγκεῖ δ' οὐθὲν

μεμιγμένον), <οὐδὲ> τῇ διαιρέσει, ὥστε ὁτιοῦν παρ' ὁτιοῦν μέρος, ἀδύνατον γὰρ οὕτω διαιρεθῆναι.

'The puzzle continuous with these matters must be determined: whether mixture is something relative to perception. For when the things being mixed have been divided into such small pieces and placed next to each other in such a way that each is not clear to perception, then have they been mixed? Or not, but when each part of the things mixed is next to each other part? It is said in that way, for example, that grains of barley are mixed with grains of wheat, when each of the former is next to each of the latter. But if every body is divisible, since a body that has been mixed with a body is homoiomerous, each part would have to come to be next to each.[235] But since it is not possible for something to be divided into the smallest parts, and aggregation and mixture are not the same but different, it is clear that one should not say that the things mixed have been mixed by being preserved in the small parts (for this will be aggregation and not combination or mixture, nor will the part have the same ratio[236] as the whole; but we say, if it has been mixed, that the thing mixed must be homoiomerous, and just as any part of water is water, so also [any part] of what has been combined [is what has been combined]. But if mixture is aggregation of small parts, none of these things will follow, but things will be mixed only relative to perception, and the same thing will be mixed for one person, if he does not see sharply, but for Lynceus nothing will be mixed.) Nor [should one say that the things mixed have been mixed] by division so that each part is next to each, for it is impossible for anything to be so divided.'

[235] These three sentences are poorly expressed, since it seems that Aristotle means 'when each portion of ingredient A is next to at least one portion of ingredient B'.
[236] Frede (2004), fn. 12, prefers to translate 'logon' as 'definition' rather than 'ratio', but the definition or essence of a mixture is a ratio of elements (and of an element a ratio of contrarieties), so in this context the narrower meaning is preferable.

According to this second puzzle, there are two possible models of how the ingredients are divided in mixing – either they are divided into pieces that are further divisible, or into indivisible particles;[237] the first model is rejected, because a mixture is uniform, but the pieces will not have the same proportion as the whole; the second model is said to be impossible.

Aristotle advances the first puzzle as a demand for us to distinguish mixing (*mixis*) from coming to be and passing away (*genesis* and *phthora*) (327b7-8), whereas the second requires that we distinguish it from mere aggregation (*synthesis*) (328a8). It is clear at the end of the chapter that Aristotle takes himself to have provided us with solutions to both of these puzzles (328b14-16). His solution to the first puzzle involves saying that each ingredient still is, but only potentially (327b22-26). In response to the second, he says 'each [ingredient] changes from its own nature in the direction of the dominating one, though it does not become the other but something in between, and common to both.' (328a28-31) The puzzles can be understood as trying to show that various requirements on mixture (perhaps constitutive of the concept; but at any rate evident) cannot all be met. Aristotle's task, then, is to show that the requirements can be met, and the sceptical doubts about the possibility of mixture dissolved. In doing so, he must answer the dynamic question – what is

[237] The divisible pieces must be finite in size, but Aristotle does not say whether the indivisible particles are finitely large or infinitesimal and point-sized. Many commentators have supposed that he has the atomists in mind here. Cooper (2004), 317-19, adopts a different view of the two models, according to which the first requires that each piece be next to another of a different sort only as far as the eye can see, while the second requires each particle to be genuinely next to one of a different sort. The second model would then be said to be impossible because each particle would be further divisible, and so would include parts which were not next to particles of a different sort. So, on Cooper's view, the impossibility of the second model relies on the fact that matter is always further divisible, whereas on the more standard interpretation that I have adopted the claim that some matter could be completely divided just is what is impossible. The impossibility of indivisible particles was established earlier, at *G &C* I.2, 316a14-17a12. Cooper's interpretation requires him to take 'hekaston' at 327b to mean 'each of the things mixed' rather than 'each of the pieces' as Williams and Joachim understand it.

the process of mixing? – and the static question – what is a mixture (the result of the process)?[238]

III. Aristotle's puzzles explicated: constraints on an adequate resolution

The first puzzle involves four assumptions[239] about what happens to an ingredient in mixing which together entail a contradiction:

1) The ingredient is altered
2) The ingredient is not destroyed
3) If the ingredient exists after mixing, it is unaltered
4) If the ingredient does not exist after mixing, it is destroyed

Aristotle accepts the first two assumptions, and wants to show that the last two do not hold for an unequivocal meaning of 'exists': if it means exists actually, (4) is false; if it means exists potentially, (3) is false. Presumably the sceptic will still need some convincing that the mutual accommodation involved in mixing results in the ingredients existing potentially, as opposed to being destroyed. We can distinguish between the concurrent ingredients – those *of* which the mixture *is now* made – and the antecedent ingredients – those *from* which it *was* made. Then the static version of the puzzle amounts to asking how the

[238] Aristotle shows himself to be aware of the distinction in 327b6-9. However he does not always take pains to keep the two questions separate. Like Aristotle, we will mainly be concerned with the static question. For an interesting discussion of the dynamic possibilities, cf. Fine (1996), §VI.

[239] In identifying the various assumptions I have followed Fine (1996), whose views I go on to criticise in the second half of the paper. In general, I agree with his interpretation of the puzzles, and also for the most part with his criticism of other interpretations. His general point that earlier interpretations fail to take Aristotle's hylomorphism seriously is apt, though, as I argue, our doing so in fact leads us to conclusions other than those Fine himself adopts.

concurrent ingredients can *be* altered but not destroyed; while the dynamic version asks how the antecedent ingredients *become* altered but not destroyed.

The second puzzle introduces different assumptions about what is required of mixtures: they must be uniform; and the ingredients must be contained in the mixture. A mixture is uniform (*homoiomeres)* just in case each of its parts is like the whole (and every other part), 'just as any part of water is water' (328a8-12, cf. I.1, 314a20). This means that every part must contain the same ratio of ingredients as every other part (and the whole), but also every part must be a mixture of the antecedent ingredients. This second point is why Aristotle must reject the model of mixing where pieces of the ingredients are placed side by side, but change in the direction of each other: the result would be an aggregate which was uniform in kind, but not a mixture, since a sufficiently small part would contain only one ingredient, albeit in a modified form.[240]

The second assumption, that the mixture must contain the ingredients can be taken in two ways – mereologically or topologically: to say that an ingredient is 'in' the mixture may mean that it is a part of the mixture, or that its location is within the location of the mixture. However it is hard to see how an ingredient could be in the mixture in one sense and not the other: for, if it is a part of the mixture, presumably it has some location, and where else would that location be other than somewhere within the mixture's location; and, if the ingredient is located within the mixture, how could that be unless it was a part? The talk of dividing the ingredients into particles or pieces that lie side by side in the second puzzle suggests that Aristotle is committed at least to topological containment, and this is also implied by the first puzzle's commitment to the non-destruction of the ingredients.

[240] Cooper (2004) actually ascribes the uniform aggregate view of mixture to Aristotle, against orthodoxy. He claims that we should not be impressed by the claim at II.8, 334b31-2, that 'all the mixed bodies are put together from all the simple ones.' In my view he does not provide sufficient reason for abandoning the more usual understanding of the nature of a homoiomer.

Moreover, if he is to persuade the sceptic that mixture is possible, it is plausible to suppose that he must accept that the ingredients are part of the mixture: the sceptic will agree that two things can become some intermediate thing (this being a matter of common observation), but, if the ingredients are not parts of the mixture, why suppose it is a mixture, and not something else altogether? At *G. A.* I.1, 715a9-11, Aristotle appears to state explicitly that the elements are concurrent parts of homoiomerous mixtures (cf. *G & C* II.8, 334b31, *P. A.* II.1, 646a12-24).

In sum, Aristotle takes the first puzzle to show that any adequate theory of mixture must accept (1) Alteration, and (2) Non-destruction: the ingredients must be appropriately altered, and not destroyed. The second puzzle adds (3) Uniformity and (4) Containment, as requirements: the mixture must be uniform, and must contain its ingredients. From (3) and (4), another adequacy constraint follows – (5) Compresence: the ingredients of a mixture must be compresent. Suppose, for reductio, there are two concurrent ingredients with different locations. Part of the location of one is disjoint from the location of the other. Therefore the part of the mixture at that sub-location only contains one of the ingredients. So the mixture is not uniform.[241] Since the location of the mixture is the combined locations of its ingredients, the mixture's location will be the same as that of its ingredients, so that any mixture will involve (at least) three distinct things – one mixture and two ingredients – in the same place. Of these five requirements, the modern, atomistic conception of a chemical compound would seem to satisfy (1), (2) and (4): the atoms that enter into a compound are contained in it, in both mereological and topological senses; they are not

[241] This would be true even if the ingredients were arranged so that, say, one was located at rational, the other at irrational coordinates. In that case there would be no *extended* sub-location that did not contain both ingredients; however, point-sized sub-locations would contain just one or the other. In any case, Aristotle's antipathy towards actual infinities, as well as his anti-atomism, means that he would not accept such a picture. We might add that it is difficult to understand how a point-sized sub-location could contain an ingredient except derivatively, by falling within an extended region that contains that ingredient.

destroyed, although they are altered, since they undergo chemical bonding. Of course, a chemical compound is not uniform, nor are its atoms compresent.

These five requirements must be met by any satisfactory solution to the problem of mixture as contained in the two puzzles which Aristotle describes. Fine also identifies some further requirements, which, though they are perhaps not required of any solution, are required of a satisfactory account of Aristotle's proposed solution. In considering the first puzzle, Aristotle interprets alteration as a form of non-existence, and non-destruction as a form of existence. In order to avoid contradiction, non-existence in the former sense must be compatible with existence in the latter. Aristotle aligns these two senses of existence with his distinction between actuality and potentiality. Therefore the first extra requirements of Aristotle's solution involve reinterpreting requirements (1) and (2) thus: (1') Non-actual existence – the ingredients of a mixture do not *actually* exist; (2') Potential existence – the ingredients exist *potentially*.

Aristotle himself mentions a further requirement: ingredients, he says, must be such that they 'can again be separated out from the mixture' (327b27-9). His claim here is ambiguous between a generic and a singular reading: must it be possible to recover the same *kinds* of stuff as the antecedent ingredients (e.g. water and earth), or the same particular ingredients (particular water and particular earth)? It is likely that Aristotle means to endorse the singular reading. For one thing, he makes this point in order to demonstrate that the potentialities of the antecedent ingredients are preserved. But if it was not the same particular earth, say, that comes in and goes out, the most that separation could show would be that the potentiality of the outgoing earth (or perhaps of earth in general) was present in the mixture, but not of the incoming earth. Also, this assumption may be a requirement of any solution that will satisfy the sceptic: if the antecedent and succeedent

ingredients are numerically distinct, why should we say that it is a mixture of the antecedent ingredients, and not the succeedent ones? One might adopt a view according to which a mixture was of no particular, but merely generic ingredients, or on which it had its own particular ingredients, distinct from both antecedent and succeedent ones. However, it seems that the only views that will satisfy both the sceptic and Aristotle are ones on which antecedent, concurrent, and succeedent ingredients are all identical. Finally, accepting that the antecedent ingredients are the succeedent ones makes the requirement that they be 'in' the mixture, i.e. that they be its concurrent ingredients, more plausible. Otherwise there would have to be a time when they did not exist, or at least had no location; and, if that were so, on what basis would we be entitled to identify the antecedent and succeedent ingredients? Indeed in the apparently similar case of elemental change, where some water becomes air and then the air becomes water again, Aristotle sides with the sceptic in saying that the antecedent and succeedent waters are not the same (*G & C*, II.11, 338b15-18).

Still other requirements derive not from Aristotle's views about mixtures, but from his general metaphysical picture. Aristotle holds that every sensible thing is a compound of matter and form, and the form of a non-elemental homoiomer is ratio of elements.[242] This latter doctrine might be thought to conflict with the view which he sometimes asserts that homoiomerous parts like flesh are homonymous,[243] since presumably dead flesh could exhibit the same ratio of elements as the living tissue. Indeed the only way to save Aristotle from this inconsistency is to attribute to him the view that there are two different kinds of flesh, one essentially animate, the other essentially inanimate. The latter has as its form a ratio of elements, and is the matter of the former, which has a functional form. Presumably

[242] Cf. *Metaphysics* B.10, 993a16-20.
[243] E.g. *G.A.* II.1, 743b24-745a26.

animate flesh could not come to be through mixing, so not every non-elemental homoiomer would be a mixture.

A final requirement, also derived from elsewhere in Aristotle's metaphysics, is the view that potential, as well as actual, existents may have potentialities to affect and be affected. At *Metaphysics* H.5, 1044b29-1045a6, in discussing the case of wine turning into vinegar, Aristotle asks whether it is the wine or the water in the wine which is potentially vinegar. His answer is that it is the water which is potentially vinegar (and also the matter of the vinegar). The wine is only potentially vinegar derivatively, due to the potentiality of one of its ingredients. Since wine is a typical mixture, presumably it is generally the case that concurrent ingredients which only exist potentially can have potentialities. It is natural to suppose that among the ingredients' various potentialities is a potential to be actual or separated out from the mixture in which it currently resides. This is in fact how Aristotle expresses himself at 327b27-8 – 'the things that are mixed are capable of being separated' (cf. *Met.* Θ.8, 1050a15-17). If this is right, such a potentiality would provide a basis for the ingredients' potential existence and their recoverability. Since it is a potential to *be* not to *become* actual, the actualised thing would have to be identical with the thing with the potential; so this doctrine would also require the identity of the concurrent and succedent ingredients.

Fine designates these broader requirements on an account of Aristotle's solution as follows: (6)(a) Recoverability – the ingredients of a mixture are recoverable (b) Derivability – a mixture can be derived from its ingredients; (7) Proportionality – the form of a mixture is a ratio of elements; (8) Latent potentiality – ingredients may have potentialities which do not derive from the mixture of which they are part. Derivability is listed alongside

Recoverability, since, although Aristotle does not mention it, his commitment to Recoverability suggests that he would accept it.

IV. Three approaches – Sharvy, Bogen and Gill

Given these adequacy constraints, we can simultaneously begin to characterize Aristotle's solution to his two puzzles and assess the approaches advanced by earlier scholars. We may begin, as does Fine, with three prominent interpretations owing to Sharvy, Bogen, and Gill. We will find, in each case, that the interpretation advanced runs afoul of one or more of the adequacy constraints established. Many of the criticisms in fact derive from Fine, but it bears setting them out alongside some additional concerns raised here, because they help set the stage for a final appraisal of his own alternative proposal.

To begin, Sharvy (1983) sets out a theory of mixture that is Aristotelian in spirit, but couched in the language of contemporary mereology. He proposes that a mixture be understood as a mereological sum of collocated ingredients. His theory does not claim that the ingredients in a mixture exist potentially, but not actually, which doctrine he considers 'very mysterious and in conflict with Aristotle's general views on matter and potentiality'[244]. From the outset, then, he does not attempt to fulfil requirements (1') and (2'). The ingredients exist actually in the same spatio-temporal region by occupying different regions of a fifth dimension (not that he ascribes this part of the view to Aristotle). Sharvy's theory implies a metaphysical picture according to which quantities can move through each other without any intrinsic change, but Fine seems right to question whether Aristotle would have regarded such compresence as possible. At *Physics* IV.1, 209a6, he tells us that place cannot be a body 'for if it were there would be two bodies in the same place'; at 6. 213b18-20, that

[244] Sharvy (1983), 441.

'it is impossible for two bodies to be together'; and at *G & C* I.5, 321a8-10, 'If, on the other hand, it grows by the accession of a body, there will be two bodies – that which grows and that which increases it – in the same place; and this too is impossible.'[245]

Sharvy is right that such evidence is not decisive against his proposal, since Aristotle does allow a thing and its matter (e.g. a man and his body) to be distinct yet compresent, and also seems to be committed to the compresence of a mixture and its ingredients. One might attempt to resolve the conflict between these cases and the cited passages by suggesting that Aristotle thinks that it is not possible for two things that *actually* exist to be compresent, but of course this would not help Sharvy, since on his view the ingredients do actually exist. Therefore he suggests, an alternative explanation, according to which the ban on compresence applies to bodies, but not quantities of matter. Fine points out[246] that this would appear to license quantities of place, which one might think inconsistent with the *Physics* IV.1 passage; also *G & C*, I.5, 321b15-16, suggests that no two objects with size may occupy the same place, where this is supposed to rule out growth by the compresence of the thing that grows (e.g. some water) with that by which it grows (e.g. a small quantity of wine).

Another objection to the compresence of actually existing ingredients is that it requires two distinct contraries to be compresent, e.g. hot and cold, when the mixture contains two elements with these features. If, as Fine argues, the prime matter of the elements in the mixture has to be taken to be the same, we would have a case of opposites attaching directly to the same subject, which Aristotle claims to be impossible at *Metaphysics* Δ.6, 1011b17; but, even if we allow that they have different subjects, it is still

[245] Cf. *Physics* IV.7, 124b7, 8. 215a28-b23; *De Caelo* III.6, 305a19-20; and *De Anima* I.4, 409b3, II.3, 418b13-18.
[246] Fine (1996), 97.

just as difficult to understand how these opposites could both be actually instantiated throughout the same place.

Sharvy's view does not only run into difficulties over the possibility of compresence: even if we allow that the ingredients can be compresent, and call the process which brings this about 'merging', merging will not be a case of mixing, because the ingredients do not reciprocally affect one another or move towards each other.[247] In other words, Sharvy's theory does not satisfy requirement (1) – Alteration. Aristotle claims that things of the same nature cannot mix, because they cannot affect one another (*G & C* I.7, 323b30-324a7): when we 'mix' water with water, we can only obtain either an aggregate of the two waters, or some new water. It is difficult for Sharvy to explain why this should be. He suggests that it is because the two waters cannot be separated out, but then one would expect Aristotle to say just that, rather than that they cannot be mixed.

A final problem for Sharvy is a consequence of his taking a mixture to be a mereological sum of its ingredients. This is problematic because the sum exists before and after the mixture does. To say that a mixture is formed when its ingredients become compresent is to describe the process of mixing, but we still need to know what the mixture is. One might try to say that the mixture is a temporal segment of the sum – restricted to the period during which the ingredients are compresent. However, Fine claims that this fails, because the ingredients will then not be parts of the mixture. He attributes the failure to the fact that Sharvy's theory does not satisfy (7) – Proportionality; that the form of the mixture be a ratio of elements. The form provides an explanation of why the mixture comes to be and ceases to be, but Sharvy deliberately does not avail himself of this, instead denying that mixtures are true homoiomers. The neglect of form also explains the fact that the theory

[247] Cf. *G & C* I.10, 328a19-21ff.

does not account for Alteration, since this is to be understood in terms of the accommodation of the ingredients' forms to one another. Therefore, Fine concludes that Sharvy's account cannot be an adequate reconstruction of Aristotle's view: it is a modern conception of mixture that takes on the doctrine that it should be through and through the same; a mereological conception as opposed to a hylomorphic one.

We may follow Fine in treating Bogen's and Gill's accounts of mixture together, since they are open to the same basic objection. Bogen's view is motivated by the fact that he believes that a thing's proximate matter is identical with that thing, e.g. I am identical with my body.[248] Supposing a homoiomer to be a mixture of some elements, Bogen has a choice of either identifying these elements with the homoiomer, or insisting that they are its antecedent, but not its concurrent, matter. In order to avoid the result that I am identical with my elements, which he regards as absurd, he adopts the second approach, from which it follows that no mixture contains elements as parts of its concurrent matter. This position makes solving the second puzzle difficult, since that required that the elements be in the mixture, but it is not clear how this can be the case if they no longer exist, or at any rate are not parts of it. (It is also difficult to see how the elements can be individual bearers of potentiality on this view.) Bogen accounts for the presence of the elements in the mixture as follows: he thinks of the primary contraries as abilities; the elements possess these abilities maximally, mixtures possess them intermediately; the potential presence of the elements then simply amounts to the continued presence of their abilities, albeit to a modified degree. The main problem with this account is that 'presence by ability' is not really presence at all: Fine compares the case of a son who may acquire his father's abilities; we do not want to say (except metaphorically) that the father is in the son. Bogen's account

[248] Cf. Bogen (1996), §VIII.

does not solve the sceptical puzzle of how ingredients can be modified in the requisite manner and yet continue to exist in a mixture. Ability acquisition, even if you call it 'potential existence', is no better than complete destruction.

Gill's account is different in detail, but vulnerable to a similar criticism. She takes a thing's matter to be a property or universal. When we say that something has the property of being earthen, this is not to be construed as meaning that it contains some particular earth. This view allows her to go some way towards solving the second puzzle: there is a sense in which earth (as opposed to some particular earth) is in the mixture. Admittedly this is not what is ordinarily meant by 'containment', but perhaps it would be begging the question against Gill's theory to reject it on these grounds alone. Gill can also account to some extent for the ingredients having potentialities by saying that the universals are the bearers of these (though there are difficulties with this too). The first puzzle proves to be the more troublesome. Gill maintains that the pre-existing matter survives in a product potentially in the sense that its essential properties survive, i.e. the essential properties of the pre-existing materials become accidental properties of the product. However this is not in general true: e.g. fire is maximally hot, whereas the product of the mixing of fire and water is only hot to a limited extent. In such a case, the essential properties of the ingredients are transferred only in an attenuated sense: the property of being hot to some extent is a property that fire has as a consequence of an essential property, and this property is transferred to the mixture. However, this sort of property is not had by the mixture accidentally, but essentially. The reason for this oversight is that Gill is thinking primarily of anhomoiomerous substances: e.g. earth has a tendency to fall essentially, whereas a man has such a tendency merely accidentally. If she wants her account to apply to homoiomerous mixtures as well, she would do better, as Fine suggests, to say that it is

the properties themselves which are modified, as opposed to the manner of their possession. This would, however, have the consequence of moving her view that much closer to Bogen's.

Both Gill and Bogen assume that it is enough for their theories to explain the phenomenal fact of the resemblance of ingredients and mixture**.** This is, however, not sufficient to satisfy the sceptic, who can agree with them about the phenomenal facts, and still deny that a case of mixture underlies them. These interpretations of Aristotle are an improvement on Sharvy's, in that they make room in their accounts for form and potentiality. What is more, they have the advantage that they offer a positive account of potential existence, as the survival of certain properties.[249] However, whether one defines potential existence as the downgrading of abilities or the downgrading of essential properties, one is really just changing the meanings of words to make it look as though one has solved the problem. Such views conflate two distinct metaphysical possibilities – cases of genuine survival or persistence, and cases of mere replacement or resemblance. As a result they do not give the sceptic any reason to renounce his suspicion that in the cases pointed to the ingredients are destroyed and replaced by something new but similar.

V. Two hylomorphic approaches

According to Fine, the three approaches so far considered all suffer from a common defect: they fail to take seriously enough Aristotle's view that mixtures, like all sensible things, are compounds of matter and form. Saying what a mixture is will then involve saying how its

[249] In fact it seems as though Aristotle would not regard this as an advantage, since in *Met.* Θ.6, 1048a35-7, he insists that we should not look for a definition of his actuality/potentiality distinction, but should seek to understand it by induction and analogy, i.e. from examples.

matter and form relate to the matter and form of the ingredients. Fine considers two alternative ways in which this might work, which he calls 'Ascent' and 'Leveling'.

Aristotle's conception of matter and form is hierarchical: the matter of a compound may itself be a compound, e.g. a house is a compound of some bricks and a form (that involves being a shelter of a certain sort), but the bricks are also compounds of some matter (clay) and a form (what it is to be a brick);[250] and, at the other end of the scale, if Aristotle believes in prime matter, the elements would be compounds of some prime matter with a form that specifies the ratio of contraries which defines that element. We may thus distinguish a thing's proximate matter, the matter which combines with its form to constitute the hylomorphic compound that it is, and its non-proximate matters. These non-proximate matters continue at ever lower levels, until such time as one reaches an ultimate matter, whatever is at the bottom of the hierarchy, either prime matter or, if there is no prime matter, the elements (assuming the hierarchy cannot go on to infinity).[251]

The difference between Ascent and Leveling emerges when we consider the proximate matter of mixtures. Given the hierarchical nature of hylomorphism, we can assign different levels to hylomorphic compounds: an object without matter is level 0, one with proximate matter of level 0 is level 1, etc.[252] For primalists (those who believe in prime matter), the elements are level 1; for elementalists (those who don't), they are level 0. According to Leveling, mixtures are at the same level as the elements; according to Ascent,

[250] The same is true of organisms: e.g. a man is a compound of soul and body, his body is a compound of a bodily form and some bodily parts. However these examples are more controversial, since Aristotle thinks that a dead body is only homonymously called a 'body'. This might lead us to distinguish two bodies, one essentially ensouled, the other not, in the same place at the same time. This issue does not affect Aristotle's views on mixtures, since their matter is clearly not 'functional' in this way.

[251] This hierarchical picture does not commit Aristotle to the view that a thing may have multiple hylomorphic analyses, i.e. that it may equally be regarded as a compound of its form and its proximate matter, or as a compound of some more remote matter and a 'compound' form (its form + the form of its proximate matter...) Fine ascribes this position to Aristotle, without, it seems to me, much textual support.

[252] An object might have proximate matter with parts at two or more different levels; so, more strictly, an object's level is one more than the highest level of its material constituents.

they are at a higher level. This is because Ascent takes the elements to be the matter of mixtures,[253] whereas Leveling holds that either both elements and mixtures are alike in lacking a decomposition into matter and form, or both have prime matter as their proximate matter.

Fine thinks that the question of the relationship between the ultimate matter of the mixture and that of the ingredients can be resolved relatively easily, and will be the same whether we accept Leveling or Ascent.

Assuming there is prime matter,[254] he identifies three possibilities:

- Convergence – the prime matter, m, of the mixture, is the sum of the prime matters, m1 and m2, of the ingredients;
- Emergence – m is distinct (and disjoint) from m1 and m2;
- Anti-Haecceitism – questions of identity over time do not arise for parcels of prime matter, since they are not proper objects.

Fine argues that Convergence is implausible: suppose that a pint of wine, with prime matter m1, mixes with a gallon of water, with prime matter m2; the resulting mixture, according to Convergence, has as its prime matter the sum of the two compresent prime matters, m1 + m2; then, if we mix in another pint of wine, with prime matter m3, we get a mixture whose prime matter is a sum of three compresent prime matters, m1 + m2 + m3. However, we could have mixed two pints of wine with a gallon of water. Such a mixture

[253] In fact, the elements are only the *proximate* matter of mixtures, according to Ascent, in the simplest case where they are the ingredients. When a mixture is the result of mixing antecedent mixtures, those mixtures are its proximate matter.

[254] Fine attempts to remain neutral on the question of whether or not there is prime matter, but Code (1996), §III, argues that Leveling commits Aristotle to prime matter, since it requires the elements in a mixture to have the same matter as each other. If they and the mixture lacked matter altogether, Fine would not be able to invoke the doctrine of derived part (see §VI below) to account for the potential presence of the elements, as opposed to their forms, in the mixture. Ascent does not require prime matter, but it is consistent with it, and, if there is prime matter, the same considerations outlined in this paragraph will rule out multiple parcels of it being compresent.

would have as its prime matter the sum of only two compresent prime matters, despite the fact that the mixture is presumably qualitatively identical[255] with the previous one with the sum of three compresent prime matters as its prime matter. Such a position is inconsistent with what appears to be a very reasonable principle – that a thing's material constitution should depend solely on how the thing is at that time. Therefore, he concludes, despite the fact that prime matter only exists potentially, Aristotle should not allow that two parcels of prime matter can be compresent.

Fine does not attempt to adjudicate between the other two positions, since it is enough for his purposes that, on both Ascent and Leveling, the prime matter of the mixture cannot be a compresent sum. From this it follows that the ingredients that are present in the mixture cannot have their original prime matter; and the only apparent alternative, given their collocation, is that their prime matter, and that of the mixture, is the same.[256]

VI. Problems for Ascent

Given his ultimate aim of offering a detailed defence of Leveling, Fine begins by setting out some problems for Ascent. The good news for Ascent is that it can meet requirements (1) to (6), though there are difficulties about how it meets some of these, and about whether it can satisfy the other requirements, Proportionality and Latent Potentiality.[257] The most serious problem for Ascent involves a case similar to the one used

[255] This is a presumption which I will question presently. The view that there are multiple collocated prime matters, though not totally indefensible, is still I think implausible, since there would be no way to distinguish them. Not only does Convergence require the falsity of a weak version of the Identity of Indiscernibles, that includes relational properties; it also insists that we can count such indiscernible objects.

[256] This result is important for a full account of the nature of mixture on either view; but it is especially crucial for Fine's defence of Leveling, given the way in which he argues that the elements are present in the mixture (see below).

[257] On Ascent, the form of a level 2 mixture is a ratio of elements, but the form of a level 3 mixture is a ratio of ratios of elements, etc. Therefore the proponent of Ascent must maintain that, when Aristotle says that the form of a mixture is a ratio of *elements*, he is thinking only of the simplest case. It is not clear to me why Fine

to argue that distinct prime matters cannot be compresent. Suppose we have two mixtures: m1 is a mixture of earth and water in the proportion 1:1, and m2 is also a mixture of earth and water, but with the ratio 1:2. These mixtures are both level 2, according to Ascent, and, if we mix them together in a proportion 1:1, the result is a third mixture, m, which is level 3. The problem is that if we mix earth and water in proportion 2:3 directly, we can apparently get something, n, which is qualitatively identical to m, but level 2. The only difference between m and n is that m was formed by adding earth in two stages, while n's formation involved just one such addition. But differences in how things were formed are not differences in how they are now, or at any rate not differences which we think could possibly affect a thing's current physical character. If the principle invoked in the discussion of prime matter was right, then such differences cannot affect a thing's hylomorphic analysis either. As Fine observes, Ascent does not merely require that m and n have different matters and different levels – they must also have different forms: the form of n is a ratio of elements, but the form of m is a ratio of ratios.

Due to the inherent implausibility of the claim that qualitatively identical things should have different hylomorphic analyses, it seems that the advocate of Ascent must deny that m and n can be qualitatively identical, but is this a defensible position? Fine points out that the distinction between functional and non-functional homoiomers will not help, since most, if not all, non-functional homoiomers can be obtained by mixing mixtures as well as elements. The idea that m and n must be qualitatively identical is rendered more plausible by a background assumption that how a mixture is now, the qualities it has, depends on the lowest level matter that is 'in' it. After all, it is not true that everything 'in' m and n is the

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thinks that Ascent has a problem with Latent Potentiality, since on this view the elements are unproblematically present in the mixture, as its matter, and so can have potentialities which the mixture itself lacks.

same, since m1 and m2 are in the former but not the latter; but m and n do contain the same amounts of earth and water. Ascent is committed to denying that the same elemental proportions must result in a mixture with all the same properties, but we must remember that, unlike on Sharvy's view, the elements do not actually exist in the mixture. Indeed, according to Ascent, the manner in which the elements are present in the two mixtures differs, for in the first they exist potentially potentially, while in the second they exist potentially.

It is worth noting that this sort of view is not completely alien to all modern ways of thinking. We might compare Paul Humphreys' account of emergence, according to which basal property instances are exhaustively eliminated in the production of emergent ones (thus allowing future downward causation between emergent and basal property instances without the threat of over-determination).[258] Such a view denies mereological supervenience – the claim that the properties of wholes supervene on the properties of the parts of the wholes – since the properties of the parts are exhausted, and so no longer exist. Humphreys has in mind, among other things, cases of chemical bonding: suppose one starts off with some sodium and some chlorine and uses these ingredients to make some sodium chloride, or common table salt.[259] There is some sense in which the chlorine is present in the resultant ionic lattice, but the properties of the elemental chlorine, e.g. being poisonous, are not necessarily preserved, and new properties, e.g. being a tasty condiment, have emerged, which belong to neither one of the ingredients. On this view, the properties of the *concurrent* lower-order entities may still determine the properties of the higher-order ones,

[258] Cf. Humphreys (1997). The view requires that it be *instances* of properties, not properties themselves, that are eliminated in the process of emergence, since the properties are multiply realisable universals.
[259] Of course, one may need other chemicals to enable this process, and both sodium and chlorine atoms are bonded (metallically and covalently) even in their elemental forms, but I take it that these details do not invalidate Humphreys' account.

but the properties of the *original* lower-order entities cannot do so, since these no longer exist when the emergent ones do.

Now naturally there are differences between Humphreys' account and Aristotle's, but if the former is defensible, it suggests that Aristotle too could have adopted a view according to which two mixtures might contain the same elemental ingredients, and yet not be qualitatively identical, provided that the order in which the elements entered the mixture was not the same. This defence of Ascent has a perhaps surprising consequence, in that it makes the choice between Ascent or Leveling an empirical matter: if it turned out that m and n had different properties, Ascent would be vindicated, and Leveling proved wrong; whereas if they were qualitatively identical, Ascent would be falsified, and Leveling would be the only remaining hylomorphic account of mixture available. Although it is unusual that our metaphysical theories should be empirically testable, I do not see why this is objectionable.[260]

One might go further than this, and argue that there are actual cases, which Aristotle would regard as examples of two homoiomers containing the same elements in the same proportions, but being qualitatively different. In fact it is difficult to produce an example that is uncontroversial. We might think that when one heats clay to make a brick one is not adding or removing any elements, but plausibly Aristotle would say, e.g., that one is adding fire and removing air or water. Indeed it is possible that he thinks that any change to which we subject a homoiomer must involve adding or removing elements. This would not mean that no examples of the requisite type were available, since one might arrive via two different processes at qualitatively distinct stuffs composed of the same elements. Aristotle does not tell us enough about the elemental constituents of things to decide whether or not

[260] The theory is not *actually* empirically verifiable, since in our world matter is atomistic, but in a non-atomistic world it would be verifiable.

this is allowed, but nothing he says rules out the possibility that, e.g., bronze and brass (or, less radically, hot and cold blood) might contain the same proportion of elements.[261] The proponent of Leveling might argue that in such a case the two mixtures would not only be made of the same lowest level things, but also would have the same internal structure, since the elements must be homogeneously present throughout. However, according to Ascent, not only are the elements present with different modalities (in one case potentially, in the other potentially potentially), but there are also other things (namely, lower order mixtures) present in the one but not the other. To assume otherwise is to assume the truth of Leveling, and therefore to beg the question.[262]

Fine discusses several other problems for Ascent. The form of a mixture is supposed to be intermediate between those of its ingredients (*G & C* I.10, 328a27-30), but how can a form of a level 2 mixture be intermediate between those of two level 1 elements, when it applies to elements and they to prime matter? It is true that Leveling can offer a simpler account of the intermediacy of the mixture's form, as the mean of the powers specified in the elements' forms, but it is not clear that a similar, albeit more complex, account could not be constructed for Ascent. Another problem concerns the analogy of mixture with

[261] The closest Aristotle seems to come to ruling out the possibility of qualitatively distinct things with the same elemental ratios is in de Partibus Animalium II.1, 646a16-20: 'Ὑγρὸν γὰρ καὶ ξηρὸν καὶ θερμὸν καὶ ψυχρὸν ὕλη τῶν συνθέτων σωμάτων ἐστίν· αἱ δ' ἄλλαι διαφοραὶ ταύταις ἀκολουθοῦσιν, οἷον βάρος καὶ κουφότης καὶ πυκνότης καὶ μανότης καὶ τραχύτης καὶ λειότης καὶ τἆλλα τὰ τοιαῦτα πάθη τῶν σωμάτων.' Saying that other properties 'follow from' the four primary contraries need not be interpreted to mean they are wholly determined by the ratios of those contraries. Even if it did, it is quite possible that Aristotle is simplifying, given the biological context, or that he has not yet realised the implications of his views about mixture.

[262] As well as asking whether there are any actual cases which Aristotle would regard as confirming Ascent, we should consider whether there are any cases which he would regard as actual counterexamples to it. One might think that dividing a mixture in two and then mixing the parts together would yield such a case, on the grounds that repeatedly doing so would result in limitless ascent in hylomorphic level, with no corresponding qualitative change. However, Aristotle can resist such cases, since he denies that things of the same sort can be mixed, because their forms cannot be reciprocally affected. Still, one might think that Aristotle would recognise obvious real-life cases of mixtures in which ingredients could be added in one stage or several to result in something qualitatively identical. If so, he would seem to have two options. He could claim that these are not proper mixtures, but rather aggregates. Here there is a question of to what extent he is constrained by common-sense views about what counts as a mixture. Alternatively, he could adopt a disjunctive theory of mixture, whereby some conform to Ascent and others to Leveling. However, in that case he would have to face the problems of both theories, and also give principled reasons why one or the other applied in any given case.

growth: at *G & C* I.5, 322a10-11, Aristotle tells us that growth is like mixture, in that it would be a case of mixture if the thing mixed were made like the thing into which it was mixed by the latter, and not *vice versa*. If mixing involves the reciprocal accommodation of forms, growth would be the special case where all of the accommodation is done by one of the forms. However growth cannot involve an increase in levels, since the thing that grows retains the same form (321a33-b7). In response to this, since growth is admittedly a special case, like mixture but not in fact a case of mixture, it seems as though the defender of Ascent could allow that when it occurs there is no increase in level.

VII. Problems for Leveling

These problems for Ascent do not affect Leveling, since they all arise from the assumption that mixing involves an increase in level. The main difficulty for Leveling concerns how it is supposed to meet requirement (4) – Containment. This is unproblematic for Ascent, since the ingredients are the matter of the mixture, but this is what Leveling denies. If the ingredients are to be parts of the mixture on Leveling, it will not be by being its matter. Fine defends the view that the forms of the ingredients are in the mixture, but the mixture also has its own form, and Leveling cannot explain their relationship by saying that one is 'beneath' the other, as Ascent can, so he needs to show how the various forms are related. Also, the form of a mixture is supposed to be a ratio of elements, but it is not clear how this is possible when its matter is not elemental.

Fine's defence of Leveling relies on two principles, which he calls 'the Doctrine of Intermediates' and 'the Doctrine of Derived Part'. The Doctrine of Intermediates holds that when we mix something hot and something cold together to get something whose form, Warm, is intermediate between these, we should understand the qualitative change

quantitatively: the intermediate is literally composed of certain amounts of hot and cold, which determine its nature. Aristotle appears to advocate this view in *Metaphysics* I.7, 1057a18 and 1057b27-9.[263] The main objection to this doctrine is that it requires that hot and cold should attach to the same body. If Aristotle thought that a warm body is uniformly both hot and cold, there would indeed be a serious problem. However, Fine points out that *P.A.* II.1, 646a16 and *G&C* II.2, 329b26-33 both suggest that Aristotle thinks of the contraries not as occurrent features of things, but rather as potentialities or powers (*dunameis*). Viewed this way, there is no longer a direct conflict involved in something being both hot and cold, but there will still be an indirect conflict: suppose the power (of) heat is to warm a non-hot body, and the power (of) cold is to cool a non-cold one. If we place two warm bodies next to one another, what is supposed to happen? They cannot be both warmed and cooled. In order to dissolve this conflict, we can distinguish between the qualified and unqualified presence of a potentiality: a potentiality is qualifiedly (or latently) present in an object if its normal operation is modified by the presence of another potentiality in the object; if its operation is unmodified, it is unqualifiedly (or patently) present.[264] In this way the direct and indirect conflicts can both be resolved: a warm body is both hot and cold in the qualified sense, which explains why it does not both heat and cool other bodies.

Although the distinction between qualified and unqualified potentialities deals with these logical difficulties, there is still a metaphysical worry: if we think of an object's potentialities as being its dispositions to act in certain ways, how are we to understand this talk of its qualified or latent potentialities? Fine compares the situation of two people

[263] Cf. *De Sensu* 3, 439b18-440b25, for the view that colours are combinations of white and black (and similarly for savours); at *Physics* viii.9, 265a14-16 and *De Caelo* 1.2, 268b17-20 Aristotle suggests that all locomotions are composed of linear and circular motions.

[264] Whether or not a potentiality is patent is independent of whether conditions for its realisation obtain: something can be patently hot when there are no bodies around to heat.

pulling on different ends of a rope. We may ask whether there is a single (resultant) force on the rope, or two forces pulling in opposite directions. Suppose both people double their efforts. If there were only the resultant force, this would make no difference, but if there are two forces, there would be a difference in both which cancelled each other out. Now, in the rope case, it seems clear that the two forces view is superior, since it allows us to account for a real difference in behaviour, manifested in the people pulling twice as hard. However, it is less clear whether we should allow that there could be objects with different qualified potentialities, when there was no manifest difference in behaviour to which these qualified potentialities gave rise.

Whether or not this is reasonable depends on how we understand claims about potentiality. Fine distinguishes two possibilities: when we say that an object has a potentiality to F, we may mean that it has some thing, a capacity to F (the 'existential' view); or we may mean that it is capable of Fing (the 'neutral' view). On the existential view, an object's disposition to behave in a certain way goes by way of an intermediate object, while on the neutral view it does not. According to the neutral view, one may still maintain that the object has a capacity, namely the property of being capable of Fing, but this cannot be considered the source of its Fing. If warmth is literally composed of hot and cold, hot and cold must exist, but this is consistent with identifying them with the property of being capable of warming/cooling. Whether or not the view is Aristotle's, it is at any rate perfectly metaphysically defensible. Fine draws another comparison with desires: suppose I have a desire to move left, and a conflicting desire to move right; these desires may result in the

same behaviour as if I had no desires at all (namely, standing still); nevertheless, in the one case, there exist states that, if they occurred alone, *would* result in certain behaviour.[265]

If the existential view disposes of the metaphysical worry, there is still a concomitant epistemological concern: there is a simple test for the presence of an unqualified capacity, since it is manifested in its object's behaviour, but how are we supposed to know whether or not an object has a particular qualified capacity? Fine identifies two conditions that a believer in qualified capacities must be able to fulfil: (1) there must be a way of determining the behaviour of an object (its unqualified capacities) based on the qualified ones; and (2) one of the many different ways of resolving unqualified capacities into qualified ones must be privileged. He then devotes Sections 13-15 of his paper to showing that Aristotle can meet these epistemological demands.

Allowing that the doctrine of intermediates is defensible, all that it shows is that there is a sense in which the forms of the elements are present in a mixture even under Leveling. Under Ascent, the elements themselves are present, as the mixture's constituent matter, and they possess their forms. According to Leveling, a mixture's form contains the elemental forms as parts. However, this does not explain how the elemental bodies, not merely their forms, are present. Thus far, Leveling looks similar to Bogen and Gill's accounts, which took the presence of the elements to mean the survival of their features (except it allows the features themselves to survive, as opposed to watered-down versions of them). However, we said that this sort of 'presence' by resemblance would not satisfy the sceptic. For that, we must show that the elements themselves survive. Suppose E is the form of earth, and F the form of fire. If m is the prime matter of the mixture, according to the

[265] Indeed, if a desire is a potentiality to act, this is a special case of the more general existential view about potentialities.

doctrine of intermediates, the mixture itself is the hylomorphic compound (E + F)m, but, in order to satisfy the sceptic, it must have Em and Fm as parts.

Fine employs the doctrine of derived part, to show how this is possible. He compares three cases: (1) there may be two different ways of specifying the same proposition – 'Socrates is wise and Socrates is Greek' = 'Socrates is a wise Greek'; (2) if we consider a block of butter, we can regard its matter as the juxtaposition of the parcels of matter of two half-blocks, which it contains – m = m1 + m2; the butter, Bm is also B(m1 + m2); then there will be two alternative ways of decomposing the butter into parts – B(m1 + m2) = Bm1 + Bm2; (3) finally, this account can also be applied to mixtures; they can be regarded as a compound of some matter and a 'mixed' form, or as a 'mix' of simple compounds – (E + F)m = Em + Fm. Each of these cases involves two different operations which are given wide and narrow scope: in (1) the operations are predication and conjunction; in (2) they are hylomorphic compounding and juxtaposition; and in (3) they are hylomorphic compounding and mixing. In each case, it is natural (though not necessary) to regard one side as basic, and one might think that this means that the other side is excluded, but Fine suggests it is better to say that both sides are equally legitimate, although one is derivative. Furthermore, he claims that Aristotle regards mixing as primarily applying to forms, or contraries, not to bodies. If this is right, the elemental bodies would be parts of the mixture only in a derivative way, i.e. in a manner compatible with their potential existence.

VIII. The relata of the mixing relation

Fine's defence of Leveling depends on two controversial theses: the doctrine of intermediates requires us to attribute the existential view of potentialities to Aristotle; and the doctrine of derived part demands that mixing primarily applies to elemental forms, and

the contraries that compose them, not to bodies. One might look for evidence for the first of these in *Metaphysics* θ; at any rate it is quite conceivable that Aristotle did subscribe to such a view. As for the question of what kinds of things are (primarily) mixed, one would expect to find Aristotle's answer in *G&C*. On the face of it, the evidence tells both ways.

At the beginning of I.10, Aristotle announced his intention to consider both what mixture is and what the thing (to be) mixed is: 'τί τ' ἐστὶν ἡ μίξις καὶ τί τὸ μικτόν' (327a32); and at the end of the chapter we are told that it is clear what sorts of things are mixed 'ποῖα μικτὰ τῶν ὄντων' (328b14-16). The conclusion is summarised thus: 'that is mixable which, being readily adaptable in shape, is such as to be acted upon and to act and to be mixed with something of the same sort' ('ἔστι μικτὸν μὲν ὃ ἂν εὐόριστον ὂν παθητικὸν ᾖ καὶ ποιητικὸν καὶ τοιούτῳ μικτόν', 20-22). Joachim comments[266] that in Aristotle's view 'The things of which μίξις is commensurately predicable – the 'combinables' – must be (a) reciprocally active and reciprocally passive bodies, which (b) are easily-divisible, and (c) are present in such amounts that their 'powers of action' are more or less balanced.' Indeed everything in this chapter suggests that the things mixed are bodies. At 327b15-17, we are told that properties (πάθη) cannot mix with things (πράγμασιν), for instance white with body; and at b17-21 that πάθη, such as white and knowledge, cannot mix with each other either, since they are not separate (χωριστόν). The implication is surely that the only things which can mix are bodies with other bodies. At 328a2-3, Aristotle speaks of wheat being mixed with barley,[267] and the second puzzle (327b33-28a17) involves talk of the things mixed being placed side-by-side, whereas forms (presumably) only have a location derivatively from the things which have them. Elsewhere in the chapter, we are informed

[266] Note ad 328a18-31.
[267] Admittedly this is an example of what we (pre-philosophically) call a mixture, as opposed to a mixture proper.

that liquids are the most mixable of bodies ('μικτὰ μάλιστα τῶν σωμάτων', 328b3). This may or may not imply that things that are not bodies can be mixed, but at any rate it is clear that the examples we are being given here are bodies (cf. also tin and bronze in 6-14). Admittedly there is nothing in I.10 which proves that Aristotle does not think that forms too can be mixed, or even that they are the fundamental relata of the mixing relation. However, it would certainly be odd, if this is his view, for him not to mention it in his most extended discussion of mixture, and for the characteristics that are attributed to the μικτὰ to be ones (especially being εὐόριστον) whose application to forms would be problematic to say the least.

In defence of his view, Fine cites II.7, 334b8-30. Here we are told, 'Thus all the other bodies will result from the contraries, or from the elements, in so far as these have been mixed; while the elements will result from the contraries', and 'Similarly, it is in virtue of a mean condition that the dry and the moist and the rest produce flesh and bone and the remaining compounds.'[268] Fine also suggests that Aristotle commits himself to a similar view about growth at I.5, 321b17-34, and about interaction in general at I.7, 324a4-11. The latter passage is particularly striking: 'And since patient and agent are generically identical (i.e. like) but specifically unlike, while it is contraries that exhibit this character: it is clear that contraries and their intermediates are such as to suffer action and to act reciprocally – for indeed it is these that constitute the entire sphere of passing-away and coming-to-be.'[269] Being παθητικόν and ποιητικόν were of course characteristics ascribed to the μικτά in I.10.

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[268] 'Ἔσται δὴ μιχθέντων τἆλλ' ἐκ τῶν ἐναντίων ἢ τῶν στοιχείων, καὶ τὰ στοιχεῖα ἐξ ἐκείνων...'; 'Ὁμοίως δὲ καὶ τὸ ξηρὸν καὶ ὑγρὸν καὶ τὰ τοιαῦτα κατὰ μεσότητα ποιοῦσι σάρκα καὶ ὀστοῦν καὶ τἆλλα.' (*G&C* II.7, 334b16-18, 28-30).

[269] 'Ἐπεὶ δὲ καὶ τὸ πάσχον καὶ τὸ ποιοῦν τῷ μὲν γένει ταὐτὰ καὶ ὅμοια τῷ δ' εἴδει ἀνόμοια, τοιαῦτα δὲ τἀναντία, φανερὸν ὅτι παθητικὰ καὶ ποιητικὰ ἀλλήλων ἐστὶ τά τ' ἐναντία καὶ τὰ μεταξύ· καὶ γὰρ ὅλως φθορὰ καὶ γένεσις ἐν τούτοις.' (*G&C* I.7, 312a5-9).

Nevertheless, we should not understand these passages to be asserting that the μικτά are contraries. Rather we should read them in the context of Aristotle's account of change. In *Physics* I.5, Aristotle agrees with his predecessors that the opposites (τάναντία) are the principles of change. By this he means that every change is a change from one opposite to another, involving the passing away of one and the coming to be of the other. This is not to say that the opposites are themselves subject to change. Indeed, on Aristotle's account there is a third principle, the subject (τὸ ὑποκείμενον), which changes, by having first the one opposite and then the other. In this sense, the contraries may be said to produce the elements, flesh, bone, etc., and even to 'constitute the entire sphere of passing-away and coming-to-be', as long as this is not taken to mean that they themselves are mixed, or grow, or are subject to any change whatsoever. Indeed it seems to be an insurmountable objection to Fine's view that it requires forms not merely to account for change, but to be subject to it. We know from I.10 that mixing requires the things mixed to change towards each other: 'each changes out of its own nature towards the dominant one' ('μεταβάλλει μὲν ἑκάτερον εἰς τὸ κρατοῦν ἐκ τῆς αὐτοῦ φύσεως', 328a29-30). One can imagine a view on which forms (if they are particulars), as well as compounds, might change over time, but for this to happen they would have to have their own meta-forms, if Aristotle's account of change were to remain intact. Given that there is not much evidence that Aristotle accepts such a view, one is inclined to think that forms are not the primary relata of the mixing relation; and, if they are not, the doctrine of derived part cannot succeed in showing how the elements may be potentially present in a mixture even under Leveling.

It follows, then, that Fine's defence of Leveling ultimately fails, since he is unable to show that it can satisfy the crucial adequacy constraint (4) - that the ingredients of the mixture be contained in it.

IX. Conclusion

In order to answer the sceptic about the possibility of mixture, Aristotle must provide us with an account of what a mixture is which is consistent with the phenomena – with what we observe in paradigm cases of mixing. However, his account must do more than this: it must also demonstrate that the things we think of as mixtures are really mixtures; that they satisfy the various requirements on being a mixture which emerge in the discussion of *G&C* I.10. Ascent and Leveling represent two different attempts to achieve this. The main problem with Ascent is that it seems to require mixtures containing the same elemental ingredients to be qualitatively distinct. We have seen that this need not be regarded as problematic. The main difficulty for Leveling is how it can maintain that the ingredients are present in the mixture. Fine's response to this difficulty involves claiming that the primary relata of the mixing relation are forms, not compounds. However, it is unlikely that Aristotle would have found this consequence acceptable. Therefore the best Aristotelian account of mixture is Ascent: a mixture is a compound of matter and form; its matter is its ingredients, which are collocated with the mixture and exist potentially; its form is the ratio of those ingredients.

Although mixtures are not substances, since they depend on the things whose parts they are, they demonstrate the importance of form in determining the identity of things in a more striking way than any we have hitherto seen. For, if our defence of Ascent is correct, two mixtures may be composed of exactly the same elements, in the same proportions, and

arranged in the same way (all of them completely overlapping), and yet be qualitatively different, because of a difference in their formal nature: the form of one is a ratio of elements, while the form of the other is a ratio of lower-order mixtures.

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