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inary way of thinking, taking there to be concepts that we do not ordinarily acknowledge and taking there to be objects that we do not ordinarily take to exist. Such additions to our thinking are familiar from science and mathematics and are even perfectly consonant with our ordinary way of thinking as long as its purview is limited to the objects it takes to exist.

However, the conflict is much more serious in the present case. In the first place, the 4D-er is not simply extending our current repertoire of concepts; he is supposing that some of the concepts we take ourselves to have are not genuinely intelligible. In the second place, he must dismiss a good many of our ordinary judgments even when they are restricted to the objects of our ordinary ontology. Although his theory may reasonably be expected to explain the truth of these judgments, he must maintain either that the judgments are mistaken or that there is no explanation of their truth. Such a lack of respect for our ordinary way of thinking is not to be taken lightly and it is only the most compelling considerations on the other side, which I very much doubt exist, that could possibly lead us to condone it.

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ARISTOTLE'S MEREOLGY AND THE STATUS OF FORM

Like many of his contemporaries and predecessors, Aristotle was puzzled by what we may call, "The Problem of the One and the Many," namely how and whether something that has *many* parts can at the same time be *one*. He states this problem very clearly in *Physics* I.2, where it is listed as among the questions concerning parts and wholes to be dealt with (somewhere):

There is, indeed, a difficulty about part and whole, perhaps not relevant to the present argument, yet deserving consideration on its own account—namely, whether the part and the whole are *one* or *more than one*, and in what way they can be one or many, and, if they are more than one, in what way they are more than one (*Phy.* I.2, 185b11–14; my emphasis).¹

Aristotle returns to the Problem of the One and the Many in the central books of the *Metaphysics*, and applies some of the apparatus he has developed in the interim to these questions concerning parts and wholes. In particular, in a difficult but fascinating passage at *Met.* Z.17, 1041b11–33, which will be cited in full and discussed in detail below, Aristotle is concerned to put forward a proposal, by means of a regress argument, designed to explain in the case of things that are "compounded" (σύνθετον), rather than "simple" (ἀπλοῦν), how a whole is "one" (ἓν) and "not like a heap" (σωρός) (*Met.* Z.17, 1041b11–12).² Very schematically, Aristotle suggests there that wholes, unlike heaps, contain or have present in them "something else" (ἕτερον τι) besides their *elements* (στοιχεῖα) or *matter* (ύλη), namely *form* (εἶδος) or *essence* (τὸ τί ἦν εἶναι),³ and that it is the presence of this additional component which accounts for the unity observed in wholes that is lacking in heaps.⁴ In general, Aristotle finds the "whole"/"heap"

¹ All translations in what follows come from Jonathan Barnes, ed., *The Complete Works of Aristotle: The Revised Oxford Translation*, Volume One and Two (Princeton: University Press, 1984), with two small exceptions where I have emended W.D. Ross's translation of the *Metaphysics* as indicated below.

² Often, the Greek term Aristotle uses to denote wholes is 'ὅλον'; however, in the passage at issue, the term translated as "whole" is 'τὸ πᾶν', literally "the all"; a similar use of 'τὸ πᾶν', to contrast with 'σωρός', ("heap"), can also be found at *Met.* H.6, 1045a8–10.

³ In what follows, I shall use the terms, 'form' and 'essence', interchangeably; since the goals of the present discussion are not to engage with Aristotle's conception of substance as a whole, but are rather more specifically mereological, I believe that nothing much hangs on this identification.

⁴ It is not obvious that *Met.* Z.17 itself contains much, if any, information on the question of *how* Aristotle thought form could help account for the sort of unity that

distinction to be a useful tool, to which he appeals at various places within and outside the *Metaphysics*, to contrast mereologically complex objects which he takes to be genuinely one or unified (wholes) with mereologically complex objects which lack the sort of unity under discussion (heaps).^{5,6}

In this paper, I examine two central issues to which Aristotle's proposal in *Met. Z.17*, concerning the role of form as the unifier of wholes or matter/form-compounds, gives rise: (i) the question of whether form itself is to be viewed, literally and strictly speaking, as *part* of the matter/form-compound; and (ii) the question of whether form is to be regarded as itself *having* parts.⁷

is present in wholes and absent in heaps. On one reading of the text, Aristotle answers this latter question in *Met. H.6*, by appeal to the *potentiality/actuality* distinction, if only by dismissing that there is in fact a genuine *problem* concerning the question of how matter and form are one (see also *DA II.1*, 412b4–9 for a similarly dismissive approach to the unity of matter/form-compounds). However, *Met. H.6* has also been read in a different way as concerning primarily the unity of form itself, and in general that of entities without matter, and as giving a deflationary answer as well for why these entities are one, namely, because they have their unity in a primitive undervived way; see, for example, Verity Harte, "Aristotle: *Metaphysics H.6*: A Dialectic with Platonism," *Phronesis*, xli (1996): 276–301, for a reading of this kind. (More on the unity of form in section II below.)

⁵ The "whole"/"heap" distinction is sometimes used even with respect to objects that are not material in any ordinary sense; see for example *Met. H.3*, 1044a2–6, for an application to the case of definitions and numbers. A prominent use of this distinction is to be found in a much-discussed passage at *Met. H.6*, 1045a9. See, for example, Paul A. Bogaard, "Heaps or Wholes: Aristotle's Explanation of Compound Bodies," *Isis*, lxx, 251 (1979): 11–29, note 4, for a variety of uses of the term, 'σῶρος' ("heap"); of course, not all of these uses contrast heaps with wholes, for sometimes Aristotle uses his term for heap in a nonmetaphysical way, just to talk about a bunch, pile, aggregate, conglomeration, and so on, of things, without commenting on the fact that the things under discussion fail to compose a genuinely unified entity.

⁶ I use the expression, 'mereologically complex object', neutrally to mean simply an object which has (proper) parts; as we will see, Aristotle's conception of wholes in many places is such that not every mereologically complex object qualifies as a whole (for example, in the context at hand, heaps do not). Mereologically complex objects thus contrast with what mereologists call "atoms," that is, objects which are treated by the theory in question as not further divisible into proper parts. "Proper parts" are to be distinguished from "improper parts": the former are numerically distinct from the objects whose parts they are, the latter are numerically identical to the objects whose parts they are; the relation of proper parthood is therefore *irreflexive*, while the relation of proper or improper parthood is *reflexive* (that is, a thing is its own improper part, but not its own proper part).

⁷ I take it to be an open question whether our mereological concepts are correctly described by "standard mereology," the classical statement of which in English, using the language of first-order predicate-logic, is Henry S. Leonard and Nelson Goodman, "The Calculus of Individuals and Its Uses," *Journal of Symbolic Logic*, v (1940): 45–55. Thus, when I say 'part' I do not necessarily have in mind the part-relation described by this particular axiom system.

The first question arises as follows. Since form is invoked in *Met. Z.17* to answer at least a particular incarnation of the question of how a thing that has parts can nevertheless be one or unified, it is thought that form *therefore* cannot itself be a part of the composite object it is intended to unify; moreover, Aristotle is read in *Met. Z.17* as himself saying that this is so.⁸ According to this anti-mereological reading, Aristotle argues in the passage at issue that the "something else," namely *form*, whose presence apparently distinguishes wholes from heaps, cannot be considered a further *part* [μέρος] of the compound, since otherwise a regress of some sort will ensue. More generally, it would seem, on this approach, that *Met. Z.17* provides reasons which would count against *any* version of what we might call *mereological hylomorphism*, that is, any account which not only views wholes as compounds of matter [*hylē*] and form [*morphē*], but which also takes both of these components (and, in particular, form) to be themselves *parts*, strictly and literally speaking, of the whole they compose. I thus consider it to be a matter of some importance, both for those interested in ancient conceptions of parthood and composition and for those approaching these issues from a contemporary angle, to examine whether, despite his remarks in *Met. Z.17*, Aristotle himself should be read as subscribing to a *mereological* version of the hylomorphic view; and whether, more generally, mereological versions of the hylomorphic approach to parthood and composition are indeed susceptible to a regress argument of the kind with which we seem to be confronted in *Met. Z.17*.⁹

The second question I want to examine in what follows concerns the unity of form itself. For we may wonder how it is that form can play

⁸ See, for example, Harte, *Plato on Parts and Wholes: The Metaphysics of Structure* (New York: Oxford, 2002), p. 11. Similar cautionary remarks, though not necessarily specifically with respect to Aristotle's regress argument in *Met. Z.17*, against taking form to be yet another part of the matter/form-compound are not uncommon: see, for example, Wilfrid Sellars, "Aristotle's *Metaphysics*: An Introduction," in *Philosophical Perspectives* (Springfield, IL: C.C. Thomas, 1967), pp. 73–124, p. 118; J.L. Ackrill, "Aristotle's Definition of *Psychē*," *Proceedings of the Aristotelian Society*, lxxiii (1972–73): 119–33; David Bostock, *Aristotle, Metaphysics, Books Z and H*, translated with a commentary (New York: Oxford, 1994), p. 229; Theodore Scaltsas, *Substances and Universals in Aristotle's Metaphysics* (Ithaca: Cornell, 1994), chapters 4–5; and Michael V. Wedin, *Aristotle's Theory of Substance: The Categories and Metaphysics Zeta* (New York: Oxford, 2000), p. 440. For discussion of this issue, see also Frank Lewis, "Aristotle on the Unity of Substance," *Pacific Philosophical Quarterly*, lxxvi (1995): 222–65; and "Substance, Predication, and Unity in Aristotle," *Ancient Philosophy*, xv (1995): 521–49.

⁹ A contemporary version of mereological hylomorphism is considered and rejected by Mark Johnston in "Parts and Principles: False Atoms in Mereology," *Philosophical Topics*, xxx, 1 (2002): 129–66, pp. 162ff.; Johnston himself advocates a *nonmereological* hylomorphic approach to parthood and composition.

the role of unifier-of-wholes, when Aristotle at the same time seems to be committed to the view that form itself, in the guise of definition, is *mereologically complex*; the parts of form are repeatedly identified as the parts of definition, namely, the genus and the differentiae.¹⁰ The possibility that form itself is mereologically complex would appear to give rise to a new version of the Problem of the One and the Many: If form itself has parts, then how is *it* one, rather than many? What, if anything, could act as the *further* principle of unity which holds together the parts of form? Unless this quandary can be put to rest in some way, either by meeting it head-on or by rejecting some of its presuppositions, the unity of form is called into question and, with it, also that of matter/form-compounds, which are said to depend on form as their source of unity.¹¹

I. THE REGRESS ARGUMENT IN *METAPHYSICS* Z.17

Let us begin then by examining the passage at issue from *Met. Z.17*:

As regards that which is compounded [σύνθετον] out of something so that the whole [τὸ πᾶν]¹² is one—not like a heap [σρωρός], however, but like a syllable,—the syllable is not its elements [στοιχεῖα]. ‘ba’ is not the same as ‘b’ and ‘a’, nor is flesh fire and earth; for when they are dissolved the wholes, i.e., the flesh and the syllable, no longer exist, but the elements of the syllable exist, and so do fire and earth.¹³ The syllable, then, is something—not only its elements (the vowel and the consonant)

¹⁰ For example, according to the fifth sense of ‘part’ Aristotle distinguishes in his entry on ‘part’ in the “Philosophical Lexicon” (*Met. Δ.25*), “the elements in the formula which explains a thing” (for example, the genus) are there called parts of the form (εἶδος) (*Met. Δ.25*, 1029b23–25); and the form is also, interestingly, itself referred to as a whole a few lines earlier at 1029b20.

¹¹ This second question concerning the unity of form is explicitly discussed, for example, in Harte, “Aristotle: *Metaphysics* H.6: A Dialectic with Platonism,” as well as Montgomery Furth, “Aristotle on the Unity of Form,” *Boston Area Colloquium in Ancient Philosophy*, II (1987): 243–67.

¹² Τὸ πᾶν is also the term used by both Plato and Aristotle to distinguish “mere” mereological sums or aggregates from genuine wholes (ὅλον); τὸ πᾶν is for example used in Aristotle’s entry on ‘whole’ in his “Philosophical Lexicon” (*Met. Δ.26*) for what Ross there translates as ‘totals’, that is, entities such as water which in Aristotle’s view lack the requisite degree of unity to be considered genuine wholes. But in the current context Aristotle is clearly using the term, τὸ πᾶν, in a broader sense, to include genuinely unified wholes as well, and is primarily interested in differentiating such a whole from a mere heap (σρωρός).

¹³ Notice that Aristotle is here appealing to a Leibniz’s Law-style argument for the numerical distinctness of wholes and their elements. Aristotle’s reasoning is that because a whole and its elements do not share all of the same characteristics (in this case, persistence conditions), they cannot be numerically identical (reading ‘the same’, in this context, as denoting the relation we would now call ‘numerical identity’); for the elements can survive “dissolution,” while the whole cannot. Aristotle’s employment of the concepts, “one” and “same,” do not always map in a completely straightforward way onto our contemporary notions of numerical identity and qualitative similarity; see, for

but also something else [ἐτερόν τι]; and the flesh is not only fire and earth or the hot and the cold, but also something else. Since, then, that something must be either an element or composed of elements [ἐκ στοιχείων εἶναι], (1) **if it is an element the same argument will again apply**; for flesh will consist of this and fire and earth and something still further, **so that the process will go on to infinity**; while (2) **if it is a compound**, clearly it will be a compound not of one but of many (or else it will itself be that one),¹⁴ so that again in this case we can use the **same argument** as in the case of flesh or of the syllable. But it would seem that this is something, and not an element, and that is the cause [αἴτιον] which makes *this* thing flesh and *that* a syllable. And similarly in all other cases. And this is the substance [οὐσία] of each thing; for this is the primary cause of its being; and since, while some things are not substances, as many as are substances are formed naturally and by nature, their substance would seem to be this nature [φύσις], which is not an element but a principle [ἀρχή]. An *element* is that into which a thing is divided and which is present in its matter [ύλη]; e.g. ‘a’ and ‘b’ are the elements of the syllable (*Met. Z.17*, 1041b11–33; Ross’s italics, my boldface).

Without attempting to do justice to all the intricacies of this rich and difficult passage, I want to comment now on just those features of Aristotle’s argument, which are immediately relevant to the first question identified above, namely whether the regress argument put forward in *Met. Z.17*, in Aristotle’s own view or from the perspective of the contemporary theorist, should be read as providing general

example, Stephen Makin, “Aristotle on Unity and Being,” *Proceedings of the Cambridge Philological Society*, CCXIV (1988): 77–103, for discussion.

By “Leibniz’s Law,” I mean the metaphysical principle concerning objects, properties and relations, also known as the *Indiscernibility of Identicals*, according to which numerically identical objects are qualitatively indiscernible (that is, for any objects, *x* and *y*, if *x* is numerically identical to *y*, then any properties and relations that apply to *x* also apply to *y*). This fairly innocuous principle is to be distinguished, first, from the much more controversial principle known as the *Identity of Indiscernibles*, which asserts conversely that qualitatively indiscernible objects are numerically identical; and, second, of various *linguistic* principles concerning the intersubstitutivity *salsa veritate* of co-referential expressions, which are sometimes called by the same name; see my “Almost Indiscernible Objects and the Suspect Strategy,” this JOURNAL, CII, 2 (February 2005): 55–77, for discussion.

¹⁴ I read Aristotle here as appealing to what Peter Simons calls the “Weak Supplementation Principle,” according to which an object which has a proper part must have at least another proper part disjoint from (that is, not overlapping or sharing parts with) the first; see Simons, *Parts: A Study in Ontology* (New York: Oxford, 1987), p. 28. Similarly, a compound, Aristotle says, cannot be composed of just one element, since the object in question would then be identical to its sole element (reading ‘being that one’ again as denoting in this context the relation contemporary metaphysicians call “numerical identity”).

reasons against a mereological hylomorphism, that is, against taking form to be yet another *part* of the whole or matter/form-compound. In what follows I develop a negative answer to this question.¹⁵

According to the reading of *Met. Z.17* I want to recommend, the passage just cited concerns the *second* of two broad categories between which Aristotle differentiates in the current context, namely, (i) things that are *simple* (ἀπλοῦν) and (ii) things that are *composite* (σύνθετον). In the lines just preceding the passage cited, Aristotle tells us that whatever proposal concerning unity is about to follow does not apply to things in category (i), that is, those that are simple, but only to things in category (ii), that is, those that are composite:

Evidently, then, in the case of *simple* things no inquiry nor teaching is possible; but we must inquire into them in a different way (*Met. Z.17, 1041b9–11*; my emphasis).

Perhaps, he has in mind here that the unity of things that are simple is not problematic in the same way in which the unity of composite things is problematic, precisely because the former are simple and the latter are composite; and perhaps he is thinking of form as an example of a kind of item which belongs into the category of simple things, since arguably its unity must be taken for granted, if form is to play the role of unifier of at least some of the items in category (ii). We may leave these questions concerning the unity of form open for now (though we will return to them below), since our present concern is primarily with Aristotle's remarks in *Met. Z.17* regarding the *second* category, namely, things that are composite; moreover, Aristotle in any case brings up the category of simple things in the passage just cited only to exclude it from whatever proposal he is about to put forward.¹⁶

¹⁵ My reading of *Met. Z.17* is referred to in a very condensed fashion in my review of Harte's *Plato on Parts and Wholes*, this JOURNAL, CI, 9 (September 2004): 492–96; for a more detailed development of my views concerning Aristotle's mereology, as well as concerning Harte's reading of Plato's theory of parts and wholes, see my *The Structure of Objects* (in progress), especially chapters 4–5.

¹⁶ Many of the commentators take Aristotle as having in mind forms under the rubric of 'ἀπλά' ('simple things'); see, for example, M.F. Burnyeat et al., *Notes on Book Zeta of Aristotle's Metaphysics* (Study Aids Monograph No. 1, Subfaculty of Philosophy, Oxford, 1979), p. 155; as well as Michael Frede and Günther Patzig, *Aristoteles, Metaphysik Z*, Text, Übersetzung und Kommentar, Zweiter Band (Munich: C.H. Beck, 1988), p. 318. That 'no inquiry nor teaching is possible' in the case of simple things is typically taken to mean that a *different* method of inquiry and/or teaching is applicable to the case of simple things, that is, different from that which is applicable to the case of composite things, not that *no* inquiry or teaching whatsoever is possible: as Aristotle goes on to say, "we must inquire into them in a *different* way" (my emphasis).

Among items in category (ii), that is, things that are composite, Aristotle evidently wishes to distinguish two further sub-categories, namely, (ii.a) *wholes*, or things that are *one*, like a syllable or flesh (his examples here for items that belong into category (ii.a));¹⁷ and (ii.b) *heaps* (for which he gives no direct examples in the passage under discussion). His proposal at 1041b11–33 concerns the question of how to draw this second distinction, between items in category (ii.a), wholes, and items in category (ii.b), heaps, both of which are taken to be composite.

The regress argument found in the middle of the passage at issue is meant to rule out a particular way of construing what it means to be a whole, which would collapse the category of wholes into the category of heaps; and this regress argument itself consists of two sub-cases:

Since, then, that something [present in wholes but absent in heaps] must be either an element or composed of elements, (1) *if it is an element the same argument will again apply*, for flesh will consist of this and fire and earth and something still further, so that *the process will go on to infinity*; while (2) *if it is a compound*, clearly it will be a compound not of one but of many (or else it will itself be that one), so that again in this case we can use the *same argument* as in the case of flesh or of the syllable (*Met. Z.17, 1041b19–25*; my italics).

Case (1) considers the possibility that the "something else," which Aristotle thinks is present in wholes but absent in heaps, is itself a further element; Case (2) considers the scenario in which the "something else" in question is a composite entity, composed solely of elements. Case (2) reduces to Case (1): for suppose we are dealing with a compound that is composed of further compounds, and so on; we can then ask about each of these smaller compounds what *they* are in turn composed of, and so on, until we get to a compound which is composed, not of further compounds, but of elements, in which case we now have something that has the shape of the first case.

Case (1), and hence Case (2) as well, in Aristotle's view, leads to a regress. (For the sake of simplicity, let us focus simply on Case (1), since Aristotle does not take Case (2) to introduce any significantly new considerations.) Suppose, then, we take the "something else" in question, which is present in a whole but absent in a heap, to be itself

¹⁷ It is frequently pointed out that Aristotle may, at the end of the day, view neither the syllable nor flesh as a genuine example of a unified entity (the syllable, because it is an artifact; and flesh, because it is present in an organism only potentially); it is, however, common Aristotelian practice to illustrate a metaphysical point by means of examples which may not fully instantiate the category under discussion: a case in point is Aristotle's widespread appeal to artifacts to illustrate distinctions which apply only to full-fledged substances, despite the fact that he is ambivalent about the status of artifacts within his metaphysics.

an element: for example, we might propose that what makes flesh a genuinely unified whole, rather than a heap, is the hitherto unrecognized presence of (say) *water*, in addition to its previously recognized elements, fire and earth.¹⁸ This proposal, so Aristotle reasons implicitly, would only leave us with a slightly "bigger" heap, that is, an object consisting now of the elements, fire, earth and water; but we would not thereby have succeeded in explaining what makes flesh a genuinely unified whole in the first place. (To illustrate why water cannot play the required role of unifier-of-whole, we might for example appeal again to the kind of Leibniz's Law-style argument for the numerical distinctness of wholes and their elements, to which Aristotle himself appeals just a few lines earlier: for fire and earth *and water* can all exist in isolation as well, without flesh existing, but flesh cannot exist once its elements have been dissolved.)¹⁹ Thus, the same question about the unity of wholes arises again, now about this new collection of elements consisting of fire, earth, and water: why do these elements compose a genuinely unified whole, rather than a heap? Using the same method as before, we would now have to point to a new element, for example, air, and the process will go on to infinity.

To break out of this cycle, Aristotle proposes that we consider a *third* option:²⁰ the "something else" in question, that is, form, which is present in wholes but absent from heaps, must belong to a *distinct ontological category*, that is, different from that of elements or entities which are composed exclusively of elements; he calls this new sort of constituent, a "principle" (ἀρχή), and aligns it at the end of the passage with form/essence, by way of the concepts, "cause" (αἴτιον), "nature" (φύσις) and "substance" (οὐσία) (in the relative sense of 'substance of'), while the category of elements is explicitly associated at the end of the chapter with matter.

On the reading of *Met. Z.17* I am recommending, then, Aristotle does not actually argue in the cited passage that a regress results in itself from taking the "something extra," that is, form, to be a *part* of the compound: rather, a regress threatens, in his view, only if the

¹⁸ I am here construing 'element' in a very literal fashion as denoting one of the four elements, that is, water, fire, earth, or air. Clearly, Aristotle thought that his notion of element was more widely applicable; but I take it that my very literal example does not distort Aristotle's point in the passage currently under consideration.

¹⁹ I have in mind here of course *living* flesh, that is, flesh that is part of a living organism; dead flesh, that is, flesh that has been separated from the living organism of which it was part, is in fact, by Aristotle's *Homonymy Principle*, flesh "in name alone," and is likened to a heap, for example, at *Met. Z.16*, 1040b5–10.

²⁰ I thus take Aristotle not completely seriously when he seems to suggest at 1041b19–20 that the "something else" in question "must be either an element or composed of elements" (my emphasis), as though Case (1) and Case (2) are our *only* two options.

"something extra" in question is taken to be of *the same ontological kind* as the other components which make up a genuinely unified whole, be they mereologically basic (that is, elements) or mereologically complex (that is, compounds of...compounds that are themselves composed solely of elements). The point of Aristotle's regress argument instead is to argue that genuinely unified wholes must be not only mereologically complex but also *ontologically complex*; that they must consist of entities which belong to distinct ontological categories, namely, form and matter, or principle and element.²¹

The explicitly anti-mereological reading of *Met. Z.17*, in contrast, turns on taking 'element' as synonymous with 'part'.²² And while *Met. Z.17* itself does not explicitly legislate on the question of

²¹ On my reading of *Met. Z.17*, Aristotle in this context thus takes heaps, as contrasted with genuinely unified wholes, to be entities which are mereologically complex but ontologically simple, in that they consist merely of elements, but lack a principle that "ties together" the elements into a genuinely unified whole. Wholes, on the other hand, in *Met. Z.17* are taken to be exclusively objects that are unified under a single form. In light of what Aristotle says elsewhere, however, for example, in his entries on 'part' and 'whole' in *Met. A.25–26*, it is sometimes more plausible to construe his use of the term, 'whole', more broadly, as applying also to objects that are mereologically complex and unified under *some* principle of unity (though not necessarily form); under this wider usage, then, the objects which are here called "heaps" might also count as wholes, namely, as objects that are mereologically complex and not unified under a single form, though possibly under a different, weaker, principle of unity; for example, a band which enforces physical contact among the wooden sticks in a bundle of wood might count as an example of a principle of unity of this kind that is weaker than form.

For a similar reading of *Met. Z.17*, see, for example, Theodore Scaltsas, "Substratum, Subject, and Substance," *Ancient Philosophy*, v (1985): 215–40, and Sally Haslanger, "Parts, Compounds and Substantial Unity," in Scaltsas, D. Charles, and M.L. Gill, eds., *Unity, Identity, and Explanation in Aristotle's Metaphysics* (New York: Oxford, 1994), pp. 129–71.

²² This further step is for example taken by Harte; after quoting a section from Aristotle's text, she says:

This "something else" is not a further *part* of the whole (cf. 1041b25–7), but it is rather its nature (φύσις) and principle (ἀρχή) (1041b30–1); and this, although Aristotle does not here explicitly use the term, is form (εἶδος) (Harte, *Plato on Parts and Wholes*, p. 133; my emphasis).

Although she does not say this explicitly in her book, Harte's unpublished Ph.D. dissertation suggests that she may have had in mind a reading of Aristotle which holds that form is a part of the compound, but only according to a sense of parthood ("form part") distinct from that which applies to matter ("material part"); see her *Parts and Wholes: Plato, Aristotle and the Metaphysics of Structure* (Cambridge: St. Edmund's College, 1994). This reading leaves open the possibility that 'element' in *Met. Z.17* may be taken as synonymous with 'part', as long as we are careful to understand 'part' in this context as meaning material part; moreover, on this reading, form would still come out as a proper part of the matter/form compound according to its own separate sense of 'part' ("form part"). Although I acknowledge that Aristotle often talks as if he means by 'part' material part, I take him in these contexts merely to be using a convenient shorthand; in what follows, I offer both textual and conceptual reasons against reading Aristotle as distinguishing a "formal" from a "material" sense of parthood.

whether form and matter are themselves *part* of the matter/form-compound,²³ a convincing case can, I think, be made for such a mereological construal of Aristotle's hylomorphism, once we combine his arguments in *Met. Z.17* with the following textual and conceptual considerations.

For one thing, Aristotle explicitly says in certain places that form and matter are both *part* of the matter/form-compound, as the following passage from *Met. Δ.25* (his fourth notion of 'part') illustrates:

Those into which a whole is divided, or of which it consists—the 'whole' meaning either the form or that which has the form; e.g. of the bronze sphere or of the bronze cube both the bronze—i.e. the matter in which the form is—and the characteristic angle are *parts* [μέρος] (*Met. Δ.25*, 1023b19–22; my emphasis).²⁴

This passage, somewhat obscurely, makes the point that both matter (the bronze) and form (the characteristic angle) are *part* of the matter/form-compound (the bronze sphere or cube). A striking feature of this passage from *Met. Δ.25* is that Aristotle explicitly takes the form and the matter to be part of the compound *according to a single sense of 'part'*; in other words, we do *not* find in *Met. Δ.25*, where his business is to say in how many ways 'part' is spoken of, *two separate* entries along the lines of "...and 'part' is spoken of in *one* way as the

²³ Here I am in agreement with Haslanger, who also endorses a mereological-reading of Aristotle's hylomorphism, but takes *Met. Z.17* in itself to be neutral on the question of whether 'part' can or should be read as synonymous with 'element' (see her "Parts and Compounds"). As I am about to suggest, however, I do think that the overall textual and conceptual evidence supports a mereological reading of Aristotle's hylomorphism. In a series of papers, Kit Fine has also defended a mereological hylomorphism, both as an interpretation of Aristotle and as the *correct* conception of parthood and composition from the perspective of contemporary metaphysics; see especially his "Acts, Events and Things," *Language and Ontology, Proceedings of the 6th International Wittgenstein Symposium* (Vienna: Hölder-Pichler-Tempsky, 1982), pp. 97–105; "Aristotle on Substance" (unpublished manuscript, 1983); "Aristotle on Matter," *Mind*, CI (1992): 35–57; "A Puzzle Concerning Matter and Form," in Scallias, Charles, and Gill, eds., *Unity, Identity and Explanation in Aristotle's Metaphysics*, pp. 13–40; "The Problem of Mixture," *Pacific Philosophical Quarterly*, LXXVI (1995): 266–369; "Mixing Matters," *Ratio*, XI, 3 (1998): 278–88; and "Things and Their Parts," *Midwest Studies in Philosophy*, XXIII (1999): 61–74.

²⁴ I have here emended Ross's translation by rendering his "the elements into which a whole is divided," in the first sentence of the cited passage, simply as "those into which a whole is divided," which, though less elegant in English than Ross's rendition, is closer to the text. The text does not contain an occurrence of the word, ὁμογενῆα, with which we have just been concerned in the context of *Met. Z.17*; rather, it contains merely a neuter plural relative pronoun, that is, something closer to the more literal "those into which a whole is divided"; 'elements' is inserted by Ross simply to fill out the meaning of the pronoun and is thus best construed in a neutral nontechnical fashion. Since Ross's insertion of "the elements" might be confusing in the context of the present discussion, since we have also been concerned with the technical use of the term, I have found it best simply to omit it from the passage at issue.

matter is part of the compound, and in *another* way as the form is part of the compound.²⁵ And while I of course concede that Aristotle speaks less often explicitly of the form as being itself part of the compound than he speaks of the matter as being part of the compound, I nevertheless want to urge that we accept both of these commitments as official Aristotelian doctrine.²⁶

In fact, given Aristotle's commitments, he does not have much choice, if he wants to avoid inconsistency, on whether to accept form literally as part of the matter/form-compound, according to the *same* sense of parthood in which matter is said to be part of the matter/form-compound. The commitments which are relevant to establish this outcome are the following three in particular: (i) Aristotle's endorsement of what Peter Simons calls the "Weak Supplementarity Principle" or (WSP),²⁷ (ii) his endorsement of a Leibniz's Law-style argument for the numerical distinctness of wholes and their elements or matter; and (iii) his quite explicit commitment to the view that the *matter* is literally part of the matter/form-compound.

²⁵ Form is also spoken of as part of a compound, for example, at *Met. Z.9*, 1034a21–30, and very explicitly at *Met. Δ.18*, 1022a32: "...for the soul, in which life directly resides, is a part of the man." Both matter and form are often spoken of as being "in" the compound in a way that seems quite overtly mereological, as for example at *Met. Z.8*, 1038b13–19. Matter is spoken of as part of the compound, for example at *Met. Z.7*, 1032b32–33. In general, *Met. Z.7–9* is a good place to find this kind of language, since Aristotle is there explicitly concerned with the question of how compounds of matter and form are brought into existence from [εκ] pre-existing ingredients. (See also Harte's PhD dissertation, *Parts and Wholes: Plato, Aristotle and the Metaphysics of Structure*, for helpful discussion of the connections between the entries for 'part' and 'whole' in *Met. Δ.25–26* and the entry for 'form' which immediately precedes them in *Met. Δ.24*.)

²⁶ Thus, it is of course undeniable that Aristotle often uses the term 'part' to single out merely the potentially existing matter-portion of a matter/form-compound. It is this use of the term, 'part', that is most conducive to Harte's reading of the regress-argument in *Met. Z.17*, which takes 'part' to be synonymous with 'element' (which in turn is identified with 'matter'). Among the numerous passages in which this use of Aristotle's term for part is prevalent, see, for example, *Phy. VIII.5*, 250a24–25, where Aristotle states, apparently only focusing on matter/form-compounds, that "no part even exists otherwise than potentially within the whole"; see also the entry for 'cause' [αἰτία] in *Met. Δ.2*, where Aristotle speaks of the parts as the material causes of the whole; as well as the entry for 'prior' and 'posterior' in *Met. Δ.11*, especially 1019a8ff. However, while I acknowledge that Aristotle often uses his term for part in this way, I take this usage to be mere shorthand for singling out the *nonformal* parts of a matter/form-compound.

²⁷ Simons, *Parts: A Study in Ontology*, p. 28. See note 14 for what I take to be textual evidence within *Met. Z.17*, documenting Aristotle's endorsement of (WSP). Notice that at that moment within the dialectic of *Met. Z.17* all the parts of the compound are taken to be either (i) elements or (ii) composed exclusively of elements; thus, *until* the "element"/"principle" distinction is introduced, it is appropriate to read 'part' as synonymous with 'element' (or 'compound of elements'), though *after* this distinction is introduced we must leave open the possibility that the compound has further parts besides its elements.

The argument runs as follows. Suppose, by (ii), that the matter of a matter/form-compound is numerically distinct from the matter/form-compound it helps to compose (since, for example, the elements or matter can exist in isolation, but the matter/form-compound ceases to exist as soon as the matter or elements are "dissolved").²⁸ Suppose further, by (iii), that the matter is a part of the matter/form-compound.²⁹ Then, given (ii) and (iii), matter must be a *proper* part of the matter/form-compound: for, by (iii), it is a *part* of the matter/form-compound and, by (ii), it is *nonidentical* to the matter/form-compound. But, by (WSP), a whole cannot have a single proper part ('<' denotes the relation of proper parthood; '1' denotes disjointness, that is, the relation which holds among objects which do not overlap or share parts):

(WSP) *Weak Supplementation Principle*: $(x < y) \rightarrow (\exists z) (z < y \ \& \ z \not< x)$

(WSP) states that if an object, x , is a proper part of an object, y , then y must have *another* proper part, z , besides x , which is disjoint from x : for why else, one might wonder, would x be considered a *proper* part of y , as opposed to an *improper* part of y ?³⁰ It follows, then, from (i), (ii) and (iii), that a matter/form-compound must have some *additional* proper part, besides its matter; and there is of course no better candidate, within Aristotle's ontology, for this additional part than form. Thus, if Aristotle wants to retain his commitment to (i), (ii), and (iii), he is best served by endorsing a *mereological* version of his hylomorphism, that is, by taking form to be itself a proper part of the

²⁸ *Met.* Z.17 certainly seems to speak in favor of Aristotle's endorsement of (ii), though a more detailed development of the current reading would have to account also for Aristotle's apparent statements to the contrary, for example, in *Met.* H.6. Since, for reasons of manageability, I currently want to avoid getting entangled in issues concerning Aristotle's potentiality/actuality distinction, I refrain from commenting on these statements within the confines of the current discussion; but see, for example, Haslanger, "Parts and Compounds," for a reading of *Met.* H.6 that makes room for a mereological construal of Aristotle's hylomorphism.

²⁹ See, for example, *Met.* Δ .25 as well as the passages cited in notes 25 and 26 for textual evidence that Aristotle did indeed support this claim.

³⁰ I share Simons's view that (WSP) is an exceedingly plausible principle governing the part-relation; Simons in fact takes (WSP) to be *constitutive* of our notion of parthood: How could an individual have a *single* proper part? That goes against what we mean by 'part'. An individual which has a proper part needs other parts in addition to *supplement* this one to obtain the whole (Simons, *Parts: A Study in Ontology*, p. 26).

Even if one were to dispute my attribution of (WSP) to Aristotle on *textual* grounds, a good case can I think still be made that, whether or not Aristotle explicitly endorsed (WSP), he *ought* to have done so on the basis that (WSP) reflects one of the minimal requirements to which one must appeal in the course of bringing out the *genuinely mereological* character of the part-relation, as compared to other partial orderings (like 'is taller than').

matter/form-compound, as he in fact explicitly states in *Met.* Δ .25 and elsewhere. Moreover, we might add that, if, contrary to the reading just suggested, Aristotle in fact had in mind a *nonmereological* variety of the hylomorphic view, we may justifiably complain that his approach has not succeeded in elucidating the nature of matter/form-compounds until the *nonmereological* composition-relation operative in this case has been further explicated; in this way, then, Aristotle himself would be subject to many of his own criticisms of the Platonist metaphysics, which in his view is overly reliant upon an unexplained mysterious participation-relation.³¹

I conclude, then, that the regress argument in *Met.* Z.17 does not present convincing evidence against a mereological reading of Aristotle's hylomorphism; in fact, I have tried to suggest that, for the sake of consistency, we ought to take Aristotle literally when he states that both the form and the matter are proper parts of a matter/form-compound, strictly and literally speaking, and according to a single sense of 'part'. This reading of Aristotle does of course leave us with the difficult question of how the unity of a whole is to be explained on a model which takes the "something extra," the *source* of the unity of the whole, as itself a proper part of the whole, alongside the remaining, nonformal components: certainly, the mere recognition of a particular kind of ontological complexity within a genuinely unified whole by itself does not yet solve the mystery of *why* it is that these entities of distinct ontological types (in Aristotle's case, form and matter, or principle and element) can come together to produce a single genuinely unified thing. But the existence of this *further* question does not in itself show that all mereological varieties of the hylomorphic conception must be abandoned in the face of the Aristotelian regress. Certainly, Aristotle himself did not seem to interpret his own regress argument in this fashion; rather, he seems to have thought that his distinction between "elements" and "principles" solves the regress and that other aspects of his metaphysics would speak to the question surrounding the unity of wholes, in particular the actuality/potentiality distinction. We should thus stick with the mereological interpretation of the hylomorphic approach, despite the regress, and deal with the problem of unity as best as we can. After all, even the proponent of the nonmereological model, in addition to

³¹ The argument just offered for why we should read Aristotle as endorsing a mereological hylomorphism is schematically the same as that offered in my *The Structure of Objects*, chapter 6, for why we should endorse a mereological hylomorphism, as the correct theory of parthood and composition, from the perspective of the contemporary metaphysician.

having to take recourse to an as-of-yet unexplained composition-relation, cannot completely escape the Problem of the One and the Many, if he is willing to allow, as seems plausible, that the *formal* component of a matter/form-compound may itself exhibit mereological complexity: for the Problem of the One and the Many arises for anyone who recognizes genuinely unified wholes that are composed of many parts, even when both the whole and the parts in question are formal.

II. IN SEARCH OF THE ULTIMATE MEREOLOGICAL ATOM

Let us turn now to the second difficulty isolated above which arises concerning the status of form within Aristotle's mereology, namely, the problem concerning the unity of form itself: the question before us here is how form can serve in the role just identified in *Met. Z.17* as the unifier of matter/form-compounds, when Aristotle at the same time seems to be committed to the view that form, in the guise of definition, is itself mereologically complex; for he repeatedly speaks of the parts of form as corresponding to the parts of definition, namely, the genus and the differentiae.³² I take this problem concerning the unity of form to be among the most central problems to which Aristotle's analysis of parthood and composition leads; moreover, it is a problem not just for his mereology proper but for his metaphysics at large.

At least in part to blame for the problematic status of form within Aristotle's mereology is the conceptual connection he sets up right from the start between the notions, "unity" and "indivisibility": "For in

³² Moreover, the problem just described is still with us, even if we ascribe to Aristotle the view (despite his occasional apparent pronouncements to the contrary) that form and definition cannot literally be *identified* (in the contemporary metaphysician's sense of "numerical identity"); for definitions after all are plausibly construed as *linguistic* entities (comparable to, according to Aristotle, but nevertheless of course different from, say, literary works like the *Iliad*), while forms presumably are not plausibly so construed. In that case, then, it might seem that, since definition and form are not literally identical, we need not expect the mereological structure of the one to mirror exactly that of the other. Unfortunately, Aristotle puts obstacles in the way of this possible escape route by endorsing a fairly strong *correspondence* principle between the *parts* of a definition or formula and the *parts* of the object described by it:

Since a definition is a formula, and every formula has parts, and as the formula is to the thing, so is the part of the formula to the part of the thing. . . . (*Met. Z.10, 1034b20-22*).

Thus, the recognition that forms and definitions belong to distinct ontological categories (the latter being a linguistic entity, or formula (λόγος), the former being what is properly described by at least some of these linguistic constructions) therefore does not remove the worry concerning the unity of form, since Aristotle holds in addition that the association between forms and definitions requires that the mereological structure of definitions accurately reflect the mereological structure of the objects described by them.

general those things that do not admit of *division* [διαίρεσις] are *one* insofar as they do not admit of it. . . ." (*Met. Δ.6, 1016b3-4*).³³ Thus, to be *one*, in Aristotle's view, is at bottom to be *indivisible* (ἀδιαίρετον); this is the core meaning of the term, 'one' ('ἓν'), and the common thread that ties together all the different uses of this notion he discerns. Moreover, Aristotle's continuation of the sentence just cited illustrates a feature of his conception of unity and indivisibility which is characteristic of the central notions of Aristotle's philosophy and which represents one of Aristotle's major innovations as compared to the metaphysical apparatus of his Platonist predecessors, namely, his *relativized* conception of unity or indivisibility: ". . . e.g., if something *qua* man does not admit of division, it is one man; if *qua* animal, it is one animal; if *qua* magnitude, it is one magnitude" (*Met. Δ.6, 1016b5-6*); in other words, to be *one* is always to be one *something-or-other*; the "something-or-other" in question supplies the *measure*, by means of which the thing in question is judged to be one or indivisible. Thus, in typical Aristotelian manner, something can be said to be *one* (or *many*) in a particular way, but not in another, without contradiction, just as things can be said to *be* in one way and not in another: to illustrate, 'ba' is taken by Aristotle to be *one* (syllable) because it is *indivisible* into parts relative to the measure, 'syllable'; but it is also *many* (letters) because it is *divisible* into parts relative to the measure, 'letter'.

Given Aristotle's link between unity and indivisibility into parts relative to some measure only an object that is a true *mereological atom*, that is, one that is indivisible relative to *all* conceivable measures in relation to which other objects turn out to be mereologically complex, could ever put to rest the threat of a never-ending demand for further principles of unity, by claiming to have its unity in a primitive and underived manner. All other objects are found to be many or divisible into parts by some measure; and we may thus, given Aristotle's general outlook, continue to ask about these objects from what source they derive their unity. There is in this way a powerful strand within Aristotle's thought according to which he has launched himself on a search for the ultimate mereological atom; and, despite the close ties between form and definition, there is evidence that Aristotle would like this search to end with form: on this view, form, and in general all things which are *without matter*, and which, for this reason, are viewed as *pure actuality*, are *simple*, and therefore lack all mereological and ontological complexity.

³³ For the connection between 'one' and 'indivisible', see also, for example, *Met. I.1, 1052b16*.

This suspicion is confirmed by consulting two crucial texts, which also constitute the most detailed development of *examples* of Aristotelian forms, namely, the discussion of the soul in *De Anima* and that of God in *Met. A*. In *Met. A.7*, for example, Aristotle is quite explicitly concerned to establish that God, the unmoved mover, is *without parts* (ἀμερής) and *indivisible* (ἀδιαίρετος), as the following passage illustrates:

It is clear then from what has been said that there is a substance which is eternal and unmovable and separate from sensible things. It has been shown also that this substance cannot have any magnitude, but is *without parts* [ἀμερής] and *indivisible* [ἀδιαίρετος] (*Met. A.7*, 1073a3–7; my italics).

Moreover, Aristotle goes to considerable lengths to argue in *Met. A.9* that the unmoved mover's activity (thought thinking itself) is directed at an object (the unmoved mover himself) which is not *composite* (σύνθετον):

A further question is left—whether the object of the thought is **composite** [σύνθετον]; for if it were, thought would change in passing from **part to part** of the whole. We answer that **everything which does not have matter is indivisible**.³⁴ As human thought, or rather the thought of composite objects, is in a certain period of time (for it does not possess the good at this moment or that, but its best, being something *different* from it, is attained only in a whole period of time), so throughout eternity is the thought which has *itself* for its object (*Met. A.9*, 1075a5–10; my boldface; Ross's italics).

As this passage illustrates, Aristotle's rationale for viewing the unmoved mover as *incomposite* is quite general and can thus be read as applying to *all* form: form is *incomposite* and hence *indivisible* and without parts, he states, precisely because it is completely free of matter, that is, pure actuality.³⁵ According to this strand within Aristotle's thought, then, it is a thing's association with matter which leads to its mereological complexity.

On the face of it, Aristotle's discussion of the form of *nondivine* living things, that is, the soul, in *De Anima*, seems to conflict with the

³⁴ I have here changed Ross's "everything which has not matter" to the less archaic sounding, "everything which does not have matter."

³⁵ The current reasoning does not apply to mathematical objects which, according to Aristotle, have a kind of matter (namely, "intelligible matter"). Similar passages to the effect that entities without matter have their unity in an undivided, primitive manner can also be found in *Met. H.6*, though there is some dispute among the commentators as to the exact nature of the entities Aristotle had in mind in this context (for example, form/essence versus the highest genera in the categories).

strand within Aristotle's thought just isolated, since he there appears to speak quite overtly of the soul as having *parts*. For example, the human soul is said to have as parts the faculties responsible for nourishment and growth, locomotion, perception and thought. However, when we look more closely at the text, we see that, in contexts in which Aristotle is being careful about his choice of words, he in fact expresses some uneasiness concerning the practice of referring to these "powers," "potentialities," or "capacities" (δυνάμεις) of the human body as *parts* of the soul in the strict mereological sense. For example, in *DA III.9–10*, Aristotle explicitly worries that, if the faculties really were to be viewed as genuine parts, the soul would, as a result of this view, be divided into an absurdly large number of such parts:

Those who distinguish parts [μέρη] in the soul, if they distinguish and divide in accordance with differences of power [δυνάμεις], find themselves with a very large number of parts, a nutritive, a sensitive, an intellective, a deliberative, and now an appetitive part; for these are more different from one another than the faculties of desire and passion (*DA III.10*, 433b1–4).

In fact, as the following passage from *DA I.5* seems to indicate, one of the reasons for Aristotle's reluctance to consider the faculties of the soul as, strictly speaking, parts of it, is precisely his sensitivity to the potential regress that would result from a conception of the soul as itself mereologically complex:

Some hold that the soul is divisible [μεριστήν], and that we think with one part and desire with another. If, then, its nature admits of its being divided, what can it be that holds the parts together? Surely not the body; on the contrary it seems rather to be the soul that holds the body together; at any rate when the soul departs the body disintegrates and decays. If, then, there is something else which makes the soul one, this would have the best right to the name of soul, and we shall have to repeat for it the question: Is *it* one or multipartite? If it is one, why not at once admit that *the soul is one*? If it has parts, once more the question must be put: What holds its parts together, and so *ad infinitum* (*DA I.5*, 411b5–14)?

This passage suggests that, despite Aristotle's loose way of speaking of powers as parts, he in fact takes it to be the best remedy against a potential regress of principles of unity simply to let the buck stop with form: if forms are mereologically simple, then the unity of the soul needs no further account, since it has no parts relative to any conceivable measure.³⁶

³⁶ Though this reading goes against the tenor of this passage, Aristotle could also be taken as suggesting another option: that the soul is mereologically complex and in fact

According to the reading I have suggested in the preceding paragraphs, then, both Aristotle's discussion of the unmoved mover in *Met. A* as well as, despite first appearances, his discussion of the soul in *De Anima* confirm the suspicion that form, in contexts in which it is *not* thought of as the object represented in a definition, plays the role of the ultimate mereological atom within Aristotle's system; it is precisely because of its mereological and ontological simplicity that Aristotle thinks form can perform the crucial task of putting to rest the potential regress consisting in a never-ending demand for further principles of unity.³⁷

III. UNITY AND INDIVISIBILITY

Aristotle in some ways backs himself into a corner by accepting certain assumptions which he thinks are needed to solve the Problem of the One and the Many, first and foremost among them the following two: (i) the conceptual connection he sets up right from the start between *unity* and *indivisibility* into parts; and (ii) the principle

contains a part which holds together the remaining parts. At least in the case of the human soul, the most plausible candidate for a part of the soul which could simultaneously act as the principle of unity holding together the remainder of the parts is of course the active intellect, which is discussed primarily in *DA* III.5. In a sense, this possibility merely brings us back to the preceding remarks concerning the incomposite nature of the unmoved mover, as described in *Met. A*: for Aristotle conceives of the active intellect as that faculty within us by means of which we most resemble God; though with some hesitation, he sometimes speaks of it as possibly separable from the body (and hence completely free of any association with matter) and is similarly concerned to establish (for example, in *DA* III.6) that this faculty and its activity are not divisible into parts. This second option is thus not incompatible with my reading, but merely adds another layer of complexity to Aristotle's conception of matter/form-compounds: for it now turns out that those forms, which hold together the parts of a matter/form-compound, are themselves hylomorphically complex and contain within themselves another principle of unity, a higher-order form, so to speak, which holds together the parts of the lower-level form. The search for the ultimate mereological atom, then, according to this second reading, does not end until we reach something which is completely free of any association with matter, namely, the highest-level form or principle of unity. Since it is not obvious, however, how we would account for the unity of form in the case of plants and nonhuman animals, on this reading (since they lack a God-like component in their souls), Aristotle might in fact be better served by taking the first route and letting the buck simply stop with form at the first level.³⁸ And even when Aristotle speaks of form in the sense of definition or formula of the essence, he appears to be driven by his general views on composition to identify even in this case a component within the definition that is aligned with *matter* (the genus) and a component that is aligned with *form* (the differentiae), or at least we see him going through great contortions (for example, in *Met. Z*.10–12) in his attempt to come up with a satisfying account of the apparently composite, yet unified, nature of form, when understood in the manner of definition. This would suggest that Aristotle in general adopts a hylomorphic approach to composition, even when the composite entity in question is not material in any ordinary sense.

that a mereologically complex object must always derive its unity from some *source*, whose own unity in turn cannot be open to further question. These two assumptions together threaten to lead to a never-ending demand for further principles of unity and in the end launch Aristotle on his search for the ultimate mereological atom: for only something that is indivisible relative to every conceivable measure, by claiming to have its unity in a primitive and underived manner, could ever put to rest the potential regress to which (i) and (ii) appear to give rise. I argued in the last section that, with some ambivalence, Aristotle takes form to play the role of the ultimate mereological atom within his system, on the basis of the general principle that things that have no association with matter (and hence are pure actuality) are not divisible into parts by any measure, though this strategy conflicts with other central metaphysical commitments that are dear to him, most notably the close association between form and definition, the latter of which is generally assumed by Aristotle to be mereologically complex.

In response to the difficulties to which the Aristotelian account gives rise, I recommend that we ask ourselves, first, whether the assumptions in (i) and (ii) are even particularly plausible and, secondly, whether they are in fact necessary for a solution to the Problem of the One and the Many; once we realize that neither is the case, we will see that the Problem of the One and the Many does not require the drastic measures to which Aristotle finds himself driven. Consider thus, first, the conceptual connection Aristotle sets up between the notions of unity and indivisibility: according to this conception of unity, something's being *one* according to some measure (that is, its being one *something-or-other*, where the concept used to fill the slot marked by the phrase 'something-or-other' supplies the measure in question) is taken to amount to its being not further divisible into parts according to the measure in question; in fact, the lack of divisibility seems to be identified by Aristotle as the reason for the object's status as a unified thing with respect to the measure at hand.

And while oneness and indivisibility may line up in this way in very many cases, Aristotle's close conceptual connection between these two notions in fact runs into trouble when applied across the board.³⁸

³⁸ Examples of the sort that follow are also used in my "Isolation and Non-Arbitrary Division: Frege's Two Criteria for Counting," *Synthese*, cxii, 3 (1997): 403–30, and "The Semantics of Mass-Predicates," *Notis*, xxxii, 1 (1999): 46–91, to make related points as they arise in the context of the so-called "mass/count-distinction," a linguistic distinction marked by a wide range of languages which represents the difference between what we *count* and what we merely *measure*. Count-nouns are almost universally regarded as being semantically different from mass-nouns in that their referents are indivisible into further parts by means of the measure supplied by the count-noun (or

For it is not difficult to think of cases in which it is perfectly natural to call something *a* or *one* something-or-other, even when the object in question is further divisible into objects of the same kind: for example, a building may be composed of proper parts which are themselves buildings; a particular pattern may be composed of proper parts which are themselves patterns (in fact, the objects in question may even be instances of the very *same* pattern, only on a smaller scale); many strings in the alphabet, {'a', 'b'}, are composed of proper parts which are themselves also strings in the same alphabet; a journey may be composed of smaller journeys; and so on.³⁹ In each case, the fact that an object is further divisible into proper parts which satisfy the same concept is no obstacle to its counting as *one* something-or-other, relative to the measure in question. Given the naturalness and intelligibility of cases of this sort, the presupposed connection between unity and indivisibility can at most be regarded as a useful rule of thumb, but not as a conceptual truth which correctly describes the domain of objects to which our practices of counting and individuation are directed.

Consider now the second crucial assumption driving the Aristotelian response to the Problem of the One and the Many, namely, the principle that a mereologically complex object must always derive its unity from some *source*, whose own unity in turn cannot be open to further question.⁴⁰ Again, there is at least in principle no reason why something that in itself has a relatively low degree of unity should not be able, when coming into contact with objects of the right kind, to

the concept associated with the noun): thus, the noun, 'human-being', for example, which is standardly used as a count-noun, applies to objects each of which is *a* or *one* human being; and, as in Aristotle's case, something's being *a* or *one* human being is taken to coincide with its being not further divisible into parts relative to the measure, 'human being'. The semantic properties in question are sometimes called "atomicity" (since the extension of a count noun is thought to consist of mereological atoms relative to the term in question) and "non-distributivity" (since it is not the case that *every* part of something that satisfies a count-noun itself also satisfies the noun in question, that is, the noun does not *distribute* over all of the proper parts of that to which it applies). For reasons similar to those brought up in the main text, I do not believe that properties like atomicity and distributivity can be used to mark the semantic contrast between mass- and count-nouns; see my "Isolation and Non-Arbitrary Division," "The Semantics of Mass-Predicates," as well as "Nouns, Mass and Count," in Donald M. Borchert, ed., *Encyclopedia of Philosophy*, 2nd ed. (Detroit: MacMillan Reference, 2006), for further discussion.

³⁹ The example, strings in the alphabet, {'a', 'b'}, comes from Richard Cartwright, "Notes on Aquinas" (unpublished manuscript, 1994); the case of journeys was brought to my attention by Andrew Loxley; thanks also to Leopold Stubenberg for helpful discussion in connection with the issues brought up in this and the next few paragraphs.

⁴⁰ Halper cites in this connection the following passage from *Met. α*, as suggesting a general principle from which it follows that the cause of unity must be unified to a *higher*

unify these objects to a higher degree than the degree of unity possessed either by the unifier or by the participating objects prior to this association. For example, imagine a particular kind of glue which is by itself chemically quite unstable (that is, in the sense of having a high propensity to disintegrate into its components), except when it is brought into contact with particular substances, such as wood or paper, in which case the glue and these substances together result in something whose parts hang together much more tightly than did the parts of either object taken by itself.

Thus, it seems that neither of Aristotle's two central assumptions represents a conceptual truth concerning the connection between the notions of unity and indivisibility into parts. Rather, an object apparently can be *one* something-or-other, relative to some measure, even when it is further divisible into proper parts by the same measure; moreover, there is no reason in principle to expect that the parts of a mereologically complex object must be held together by a principle of unity which possesses a higher degree of unity than the degree of unity it contributes to the whole it unifies. Given these results, then, we ought, first, to separate the notion of oneness or unity from that of indivisibility; and we ought, second, to abandon the expectation that principles of unity must themselves either be mereologically simple relative to any conceivable measure or, more generally, that they be themselves highly unified.

Once we realize that Aristotle's two crucial assumptions are in fact neither particularly plausible nor necessary for the solution of the Problem of the One and the Many, other strategies suggest themselves by means of which we may address the challenge posed by this problem, namely, to say how an object can be *one* despite the fact that

degree than the objects it unifies; see Edward Halper, *One and Many in Aristotle's Metaphysics: The Central Books* (Columbus: Ohio State UP, 1989), p. 154.

Now we do not know a truth without its cause; and a thing has a quality in a higher degree than other things if in virtue of it the similar quality belongs to the other things (e.g. fire is the hottest of things; for it is the cause of the heat of all other things); so that that which causes derivative truths to be true is most true (*Met. α.1*, 998b24–26).

This assumption incidentally is also reminiscent of a similar principle employed in Descartes' cosmological argument for the existence of God, according to which that which causes other objects to have a certain quality must itself exhibit the quality in question to a higher degree than the objects which derive this quality from it; similar examples are used by Descartes to illustrate the principle in question (for example, fire must be hotter than the objects which are heated by it, and so on). Also highly relevant in this context is Haslanger's discussion of extrinsic and intrinsic principles or sources of unity in her "Parts and Compounds," pp. 137ff.

it has *many* parts. Here, in the broadest of strokes, is what I take to be a plausible response to the Problem of the One and the Many along generally Aristotelian lines. What does it take, for example, for a particular specimen of the kind, *H₂O-molecule*, to be unified? Following Aristotle's relativized conception of unity, this question rephrases into the question of what it takes for something to be unified with respect to the measure, '*H₂O-molecule*', or, equivalently, what it takes for something to be *one H₂O-molecule*; and chemistry tells us how to answer this latter question. Specimens of the kind, *H₂O-molecule*, come into existence when two hydrogen-atoms and one oxygen-atom enter into the particular configuration of chemical bonding: objects of this kind are *unified* in the sense that they are *one* specimen of the kind in question, that is, *one* relative to the measure, '*H₂O-molecule*'; their material components hang together to the degree that hydrogen- and oxygen-atoms which enter into this particular configuration of chemical bonding can be expected to do so. That an object which counts as *one* or *unified* relative to the measure, '*H₂O-molecule*', has parts at all, that is, is divisible relative to some measures, poses no threat to its status as a particular specimen of the kind in question: rather, given what we know about the chemical composition of *H₂O-molecules*, nothing *could* be one specimen of this kind or unified relative to this particular measure without having as parts at least two hydrogen-atoms and one oxygen-atom; there is nothing further that the mereologist proper or the ontologist at large can add to what the scientist has already told us about the chemical composition of objects of this kind.⁴¹ The mereologist *can*, however, be held responsible for the task of devising a theory of parthood and composition which is responsive to the fact that there can be no *H₂O-molecule*, unless a particular plurality of material components satisfies certain formal requirements associated with this kind of whole, such as those concerning number, variety and configuration. And we ought to follow Aristotle in thinking that such a theory of parthood and composition takes the form of a mereological hylomorphism.

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⁴¹ Why, for example, are there *H₂O-molecules*? Presumably, the nonphilosopher's answer to this question would make reference to the laws of nature, the Big Bang (or whatever other initial state of the universe turns out to be accepted by our best scientific theory) and the complex intervening processes that lead to the formation of molecules. An answer of this kind is directed to the question of what conditions were required to obtain to make the formation of such objects possible and to sustain their continued existence. Neither the mereologist nor the ontologist at large can be expected to have anything of interest to contribute to this question.

OCKHAM'S METAPHYSICS OF PARTS

Much recent work on parts and wholes has been stimulated by two broad metaphysical issues about identity. One of these involves a family of puzzles about how something which is constituted is related to what it is constituted by. One of these puzzles is what has come to be called the problem of *material constitution*; it is classically illustrated by the example of a statue and the bronze or clay or marble out of which it is made, and the question whether these are the same thing.¹ The second issue involves a family of puzzles about how a thing is related to the various collections of parts into which it may be divided. The classic puzzle of this form is the one Diogenes Laertius says Chryseippus attributed to Epicharmus and which became known as the "Growing Paradox"—the puzzle of how a thing can be the same over time if it consists of different parts over time. A closely related puzzle is the one Peter Unger has called the "Problem of the Many" and others call the "Paradox of the 1001 Cats"—after Peter Geach, who introduced it as a problem about his cat, Tibbles, who has a great many proper parts each of which is not identical to Tibbles but differs only in ways (like lacking a single one of Tibbles's hairs) which are not essential to being a cat at all. It seems hard to deny that such a part would be a cat were Tibbles's offending hair removed. Why then is it not already a cat?²

Both broad metaphysical issues are ancient and both have (almost) continuous medieval histories.³ Little of those histories has yet been written. In what follows I focus on one medieval thinker, William

¹ Another is the question of whether there can be "innocent" alternatives to set theory, that is, theories which allow one to collect the putative members of a set without committing oneself to the collection being some thing other than the items collected.

² For the Growing Paradox, see David Sedley, "The Stoic Criterion of Identity," *Phronesis*, xxvii (1982): 255–75. Unger's discussion is to be found in his "The Problem of the Many," *Midwest Studies in Philosophy*, v (1980): 411–67. Geach's is in his *Reference and Generality* (Ithaca: Cornell, 1980, 3rd edition), section 110, pp. 215ff.

³ Even the examples are widely discussed in the Middle Ages. The example of the statue and the stone of which it is made is Abelard's central example, see, for example, *Logica Intractantibus* I, 79, 5–17; the example of the statue and the bronze of which it is made is Aristotle's and is regularly discussed in connection with commentary on *Metaphysics Z*, see, for example, Averroes, *In Metaphysicam Aristotelis*, t. c. 61 [*ad Met.* VII, 17, 1041b4–83]. Abelard and his followers, the *Nominales*, were notorious for their discussion of the sophism "Nothing Grows", and Abelard's discussion of the problem of the Many Men (as Andrew Arlig has called it—see his "Medieval Mereology," *Stanford Encyclopedia of Philosophy* (<http://plato.stanford.edu/entries/mereology-medieval>) (accessed