

Aristotle's hylomorphism without reconditioning¹

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A number of contemporary metaphysicians have recently argued that Aristotle's hylomorphism and its neo-Aristotelian versions need to be 'reconditioned' in order to be philosophically viable. In the first part of the paper I argue that these arguments in fact target only *mereological* hylomorphism, which is *not* Aristotle's; additionally, I submit, the proposed reconditioning opens up as many problems as it aims to solve. If mereological hylomorphism, as well as reconditioned mereological hylomorphism, are shown to be prey to difficulties, this is an important albeit indirect conclusion *in support of* Aristotle's own position. In the second part of the paper I investigate Aristotle's hylomorphism in its own right: I examine the metaphysical status of matter and form, and the unity of substance. I conclude that Aristotle's hylomorphism stands in need of no reconditioning, contrary to what others have recently argued.

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Part I. Three proposals for reconditioning hylomorphism

In its most general formulation, hylomorphism is the view that material objects have constituents; their constituents are matter and form. The status of matter and form and how they come together to compose a material object has been debated since antiquity. Plato had already distinguished two varieties of composed wholes: *mereological wholes* and *non-mereological wholes*.² A mereological whole is identical to its parts, i.e. matter and form in the case of hylomorphic composites. By contrast, a non-mereological whole is identical to its en-mattered form, and in this sense is part-less.

In the most recent metaphysical debate Aristotle is often presented as championing *mereological hylomorphism*, which treats the matter and form of a substance as *parts*

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² *Theaetetus* 201d-202c.

of the substance, and he is criticized for not offering adequate ways to account for the unity of the parts in a substance.³ In contrast to this trend in contemporary metaphysics, I side with the line of interpretation (which originated with Scaltsas 1994) according to which Aristotle is *not* a mereologicalhylomorphist. Matter and form for Aristotle are *not parts* of the substance they compose, because if they were, as we shall see, the substance in question would lack unity, and thus would not be a *new* thing over and above the sum of its parts. On the strength of Aristotle's arguments to this effect (which I discuss below), I submit that the following discussion about reconditioning hylomorphism does *not* in fact apply to Aristotle's position. The discussion is not however irrelevant for Aristotelianism; on the contrary, if mereological hylomorphism, as well as reconditioned mereological hylomorphism, are shown to be prey to difficulties, this is an important conclusion *in support of* Aristotle's position.

1. The mereological atom model

The crux for hylomorphism is to account for the unity of a substance with many constituents. Assuming that matter and form are parts of a substance, Koslicki (2008) develops an account of hylomorphic composition, which she attributes to Aristotle, according to which the unity of a substance is derived or *borrowed from the unity of one of its parts*. On Koslicki's view, to play this role, the part in question has to be the *ultimate mereological atom* in the substance, which is not further divisible. It is an important (albeit implicit) assumption in Koslicki's argument that she understands the required oneness of the mereological atom to amount to its simplicity, or lack of composition. (I will return to this point later).

Since for Aristotle the substantial form is what secures the unity of a substance, Koslicki assumes that for him the substantial form has to be a mereological atom. She describes the view she attributes to Aristotle thus:

The unity of a high-level whole or matter/form compound is, in this sense, borrowed from form: such objects inherit their status as highly unified objects from the forms which act as their principles of unity. (2008: 159, see also 147)

Koslicki however argues that Aristotle himself could not make this model of hylomorphic composition work, because the form itself is not in fact completely indivisible on Aristotle's own account. Koslicki derives her conclusion thus: the form of a substance, in the sense of its definition, is itself divisible into parts, that is, genus and species (e.g. a human being is a rational animal). But, Koslicki proceeds, to be one in Aristotle's view is at bottom to be indivisible, so, if the form is divisible into mereological parts, it is not one:

Aristotle seems to be committed to the view that forms themselves, at least in

³ Koslicki (2006: 727–8)

the guise of definitions, are mereologically complex: the parts of the form are repeatedly identified as the parts of the definition, the genus and the differentia. This of course gives rise to the following difficulty: if forms in fact have parts, all mereological complex objects that are genuinely unified must have their parts held together by means of some principle of unity; then 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 depend on form as their source of unity. (2008:159)⁴

There are two reasons why Koslicki's reconstruction of Aristotle's view is misguided. Firstly, from *Metaphysics* VII.17 (which we will examine in more detail later) we know that for Aristotle the form is *not a further element* in the whole on a par with the elements that make up the substance. *Even* a perfectly simple mereological atom, would not unify the substance by lending its unity to it in the way Koslicki describes; on the contrary for Aristotle adding an extra element in the compound for the sake of unifying it will only give rise to an infinite regress of increasing complexity. Additionally, Koslicki's complaint that the supposedly ultimate mereological atom is not actually one derives from a misunderstanding of Aristotle's criterion for indivisibility. Ultimately, for Aristotle the unity of a definition is of the same type as the unity of a substance, as we know from *Metaphysics* VII.12 where Aristotle parallels the genus-species relation in a definition to the matter-form relation in a substance. So Aristotle nowhere intends the unity of a substance to derive from the unity of an included simple; rather, for him it derives from the metaphysical unity attained in the hylomorphic compound. Koslicki does not display any awareness of this important point when claiming that for Aristotle,

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 ... 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. (2006: 733, my emphasis)

This account presents an "Aristotle" that I do not recognize, and it would lead me very far afield to show how foreign Koslicki's reconstruction is to his system. But

⁴ See also 2008: 141 footnote 43; 147 footnote 57; 139.

what is important to us here is that this account does not deliver substantial unity. In effect, it renders substances into formal logical atoms, where their materiality and their formal complexity are left outside the substance as dangling appendices.

In conclusion Aristotle does not hold the view that Koslicki attributes to him, and her criticisms against that view don't apply to Aristotle. The Aristotelian form is one, but a composite, and it is responsible for the oneness of the material parts of a substance by en-forming them, not by lending them simplicity. But leaving aside for the time being the issue of whether the hylomorphism Koslicki describes is Aristotle's or not, the more pressing point is to examine whether Koslicki's proposed reconditioning is apt and successful.

In essence Koslicki thinks that Aristotle's hylomorphism needs to be supplemented by a mechanism for unifying the parts. But what mechanism? It will be helpful to look at a direct citation from Koslicki, to understand her position:

For a whole to be unified is just for its material components to satisfy the *structural constraints* posed by the formal components associated with the kind to which it belongs. To illustrate, with respect to the kind, H_2O -molecule, a successful case of composition requires two hydrogen atoms and one oxygen atom to enter into the configuration of chemical *bonding* that is required to form a particular specimen of the kind in question. (2012, my emphasis)⁵

Koslicki proposes that entering into a *structure* is what will secure the unification of the parts of the substance. On her view, a substance is unified when all its material components occupy their position in a given structure, which Koslicki identifies with the substantial form of the substance. But structures *relate*; do they generate metaphysical oneness? Koslicki's H_2O -molecule example, rather than illustrating how entering into a structure supposedly unifies, appears to be a shift in strategy, as it suggests that material parts are bonded by *relations which fall under natural laws*, where emphasis is placed by Koslicki on the fact that the bonds are 'natural', generating 'naturally' unified compounds. Can *this* strategy lead to the unification of matter and form? The answer in brief is "no": are the leaves on a tree one? If not, why would the hydrogen and the oxygen atoms in H_2O be one? Rather, they are a bonded or connected plurality. But connectedness is not unity. Crucially, connectedness does not generate unity when it leaves unchanged the individualities of the connected items. For the reasons already given and related to Aristotle's arguments in *Metaphysics* VII 17, the addition of a natural bond as a further part of a substance is only an *extra* element in the compound and does not thereby bring about metaphysical unity.⁶

⁵ See also 2008: 7.

⁶ Scaltsas (1990, 2012) offers a series of arguments to the effect that the problem of the unity of hylomorphic compounds cannot be solved through relating or bonding the elements, no matter how strong the bond is, or how natural it is.

2. The incomplete parts model

Lowe (2012) investigates a more sophisticated model for hylomorphic composition, where unification is achieved by means of the mutual 'saturation' of the parts, which are understood to be (in a Fregean fashion) 'incomplete entities'. No additional bond is needed; it is the incomplete nature of the parts that secures that they get unified. Lowe characterizes the view (which he does not himself endorse) thus:

[A]ccording to this 'hylemorphist' Aristotelian picture, an individual substance is a 'combination' of matter and form ... The key point is that, on this view, individual substances exhibit 'internal' ontological complexity, *being combinations of 'incomplete' entities that are completed by each other in the substance*. (2012: 231, my emphasis)

Lowe explains this supposedly Aristotelian account of the unity of substance through the incompleteness of its parts thus:

The suggestion seems to be that, unless we can see the new substance as being a combination of items *neither of which can exist independently of the other in just such a combination*, rather than as merely being composed of other independently existing things, each possessing their own features, we shall be unable to justify the judgment that a new concrete object ... really has been brought into existence, rather than some previously existing things merely being rearranged. (2012: 235, my emphasis)

Lowe finds this presumed Aristotelian view problematic, I take it on the ground that incompleteness is an unexplained concept:

What I don't understand is what it means to say that the completed house's form – the way in which its 'matter' is organized – is an 'incomplete' constituent of the house which 'combines' together with that equally 'incomplete' matter to constitute the house, a complete substance. (2012: 236)

I agree with Lowe that what he describes above would not offer an explanation of the unity of substances. There is no reason anyone should expect that two incomplete entities could make up a complete one; e.g. half a pear and half an orange do not make up a whole fruit. But the two parts of a drawbridge over a river do make up a complete bridge. Why? Because of their *complementarity*. This is the sense in which, alone, they are *incomplete*. Complementary entities complete each other on account of a reason: what is *achieved* when they complement one another. The wholeness and oneness of the achievement is what licenses the description of the contributing entities as *incomplete*.

Complementary entities may be either existentially independent of each other, like a peg and a bookshelf; or dependent on each other, like a pregnant woman and the fetus she nourishes, or like quarks (which cannot exist alone). Their joint achievement

may be either a function that can be performed only together, e.g. the installation of a bookshelf on a bookcase; or a new entity they jointly bring about, e.g. a mother, or a baryon (consisting of three quarks). The nature of the achievement will determine whether the result is a function or a new entity. In the case of matter and form, if they are thought to be incomplete in a complementary way, the achievement of their mutual completion is a new entity. The difference between them and the case of the mother or the baryon is that the fusion between a pregnant woman and her fetus or between the quarks is physical; a physical bond. But the fusion of matter and form is *metaphysical*, and this has to be explained. Such an explanation is offered in the sections that follow. What is important to bear in mind here for the Aristotelian position is that, although the way things acquire new form is through physical processes, which do not involve any such entity as a 'form' (e.g. in the way a statue acquires its form by the sculptor), the acquisition of a 'form' has explanatory value which is to be cashed out in the metaphysical domain.

Aristotle's position is more complex than what Lowe presents on a further point. Matter is *not* dependent on *this* particular combination in which we find it, e.g. in a marble statue, but on being combined with form, generally, into some entity. Marble exists only as shaped in some way or another; it cannot exist as totally shapeless, any more than the shape of this marble can exist as matter-less. In other words, the matter of this particular substance is what is common between this substance and the substance that corrupted into this substance – consider the matter underlying vinegar made from wine; it is what is common between the degenerated wine and the generated vinegar. So matter is dependent on combination but independent from this particular vinegar combination. Similarly, form is common to all substances of this particular kind, so not dependent on this specific combination. (A fuller discussion of this would require us to explain the role of abstraction and similarity in metaphysical explanations, which are the central Aristotelian approach to the problem. This however would take us outside the scope of this paper).

Before coming to discuss Aristotle's own position, let us turn to the account of composition Lowe offers, as a way of reconditioning hylomorphism. Lowe gives the following example as an illustration of the view:

When ... the electron is captured by the proton and occupies an orbit around it, then indeed we have a new concrete object of a very different kind: a hydrogen atom ... In the newly created hydrogen atom, the proton remains exactly what it was before, just a *proton*, and the electron remains just an *electron*. A new form is instantiated ... The form does not, in any sense I can understand, 'combine' with the proton and the electron as to constitute with them the atom. The only things that do any 'combining' are the proton and the electron. (2012: 237, emphasis in the original)

It is clear that this reconditioned account has no room for the Aristotelian notion of matter; there is not metaphysical job for it to do. On Lowe's way of thinking about the given example, the proton and the electron are there before and after the creation of the hydrogen atom: there is no need for a material continuant that takes on a new form when a new substance is created, because nothing *takes on* a new form in this example, even if a new form is created of the composite. For Lowe jettisoning matter is actually a welcome move, on the ground that matter is not an intelligible notion for him.⁷ New difficulties however emerge from this proposed reconditioning of hylomorphism. The main one arises with the claim that the generation of a new substance leaves the constituting components *as they were*, e.g. when the hydrogen atom forms, the proton and the electron remain what they were before making up the atom. For Aristotle a hydrogen atom is, at best, an instance of substantial unity, but not a *model* for understanding substantial unity. The reason is that the reconditioned model does not serve to explain for us the generation of e.g. flesh out of bread and water. How do bread and water come to constitute flesh when we feed ourselves? Aristotle's ultimate solution, as we will see below p. ***, is that bread and water undergo re-identification in order to come to constitute flesh. Bread and water are re-formed, re-shaped qualitatively and functionally, to make up flesh. But what could one say in answer to the above question if one endorses Lowe's model? One might want to argue that *ultimately* bread and water *are protons and electrons*. This however would not serve to recondition *Aristotelian* hylomorphism, as for Aristotle the ultimate level of reality is the fundamental powers (hot, cold, wet and dry) and not a layer of particles (even conceding that protons and electrons are particles of a special kind).⁸ More generally, for anyone who does not believe that atomism is true, either of fundamental particles or of fundamental powers, because particles and powers transform into each other, an explanation would be required and it cannot be supplied by the hydrogen atom model.

A further set of questions that Lowe's account gives rise to is this: How are we to understand the claim that the proton and the electron *combine* into a hydrogen atom? That is, what is the metaphysical difference between the proton and the electron on the one hand, and the combined proton and electron on the other? It is widely assumed that the difference is not primitive, but rather one that metaphysics can explain. On the Aristotelian account, the proton and the electron would play the role of *matter* in combining, which 'receives' the *form* of the hydrogen atom. Hylomorphic composition is an attempt to explain what 'receiving' the form amounts to, metaphysically, the need for which Aristotle shows in *Metaphysics* XVII (which we will examine later).

⁷ He writes: "I have no serious need for the hylomorphist category of matter" (2012: 237).

⁸ See my 'Potentiality in Aristotle's Metaphysics' in Engelhard K. and Quante M. (eds.) *The Handbook of Potentiality* (Dordrecht, 2013).

3. The powers model

Rea (2011) re-examines hylomorphism from the viewpoint of dispositional monism:⁹

My proposal ... is to try to characterize everything that the hylomorphists want to say in terms of location and power... properties are powers ... objects can be reduced or identified with powers. (2011: 345)

However, Rea's conception of the metaphysical status of powers (on which his interpretation of the substantial form rests) is problematic. Rea rejects the distinction between universals and particulars, as fraught with difficulties and as one of the downfalls of hylomorphism. He thinks he can recondition hylomorphism and make it an acceptable metaphysical position by endorsing a dispositionalist monist view *on which powers are neither universals nor particulars*.

The first concern that Rea's view raises is this: how can he account for resemblance, which he does assume in his account, without the distinction between universals and particulars? Aristotle's motivation in introducing universals was just to explain *similarity* in nature. If Rea's position cannot address the question of what accounts for similarity, this is a very high cost his reconditioned hylomorphism comes with – in my judgment, an unaffordable cost. Secondly, one might wonder what powers are supposed to be, if they aren't universals or particulars – do they belong to some third kind of metaphysical category? Which is what? Rea doesn't help us understand his view better when saying that

Powers are in some ways *like* universals: they can be present in multiple regions, for example, and our talk about powers resembles our talk about universals. (We say, for example, that objects 'have' them.) Likewise, powers also in some ways resemble particulars. They enter into causal relations, for instance. The sharpness of a sword is among the powers of the sword and is likewise among the causes of the wounds inflicted by it. Similarly, it seems natural to believe that the presence of a power in a region is a matter of its being *located* there. The sharpness of a sword is located where the sword is, presumably along the blade. (2011: 346)

This description of the metaphysical status of powers is uninformative. It registers the fact that *similar powers* occur in different locations, but can offer no explanation of what it means for these powers to be similar. Here is an example that mimics Rea's explanation, but brings out the difficulty in it about the status of powers:

⁹ I started pursuing this research in advance of, and independently from Rea. See my research statement, submitted to the *European Research Council* in December 2009, award number 263484.

Hands are in some ways *like* universals: they can be present in multiple regions, for example, and our talk about hands resembles our talk about universals. (We say, for example, that objects 'have' them.) Likewise, hands also in some ways resemble particulars. They enter into causal relations, for instance...

But hands are clearly not universals. They are particulars, which resemble other particulars *of the same kind*. Rea does not allow for kinds in his ontology; so he is suggesting that particulars that resemble one another are 'like universals'(?). Since Plato we have understood that hands (or other kinds of particular) can be present in multiple regions *because* they belong to the same kind, which Aristotle showed to be universal. The kind, *being a hand*, is the form in a hand that qualifies the matter that constitutes the hand. Rea complains about the intelligibility of the sense in which a form is in a particular, e.g. the form of being a hydrogen atom is in a hydrogen atom: 'In the straightforward senses of 'in', nothing *in* a hydrogen atom looks like a kind property' (2011: 342). Aristotle's reply to this would be that the straightforward sense of 'in' is not the relevant sense, here, because it is not through physical division of an object that one can isolate the form in it, but through *division by abstraction*. The sense in which the universal form is 'in' a particular is that it can be abstracted *from* the particular. This is not a straightforward sense of being 'in', only because a universal is not a straightforward constituent of a physical particular. But the straightforward constituents of physical particulars cannot explain the similarity between particulars (as Plato concluded after an exhaustive range of thought experiments with the 'participation' relation in parts of, or whole Forms in the *Parmenides*). This is how universals acquired explanatory value in metaphysics.

Rea proceeds to deliver his account of 'reconditioned' hylomorphism in these terms:

- (T1) Natures are powers; the natures of *substances* are fundamental powers.
- (T2) The natures of composite objects *unite* other powers (in particular, the powers that are the natures of their parts).
- (T3) Natures can enter into compounds with *individuators*, and play the role of form. (2011: 345)

I take (T2) to be, in Rea's view, what explains hylomorphic composition, which is supposedly achieved by unification of the relevant powers, *by one power unifying the others*. Rea expands on T2 thus:

Thesis T2 is meant to express and do justice to that part of traditional hylomorphism that says that natures are principles of unity. The relation of *uniting* is to be understood roughly as follows: one power P unites some other powers just in the case that P is so connected to the other powers that *its manifestation depends upon the cooperative manifestation of the united powers* and, furthermore, the latter do not confer any powers on the object that has P that are both intrinsic to the object and independent of P. (my emphasis, 2011: 348–9)

This account however opens up a host of questions regarding how this power achieves what Rea requires of it; above all, the question whether P is a power at all, and if so, what it is that makes *it* a power, too, over and above the powers that it supposedly unifies. What is it that differentiates P from a structure of powers? In what sense is the manifestation of P over and above the manifestation of its constituent powers? Furthermore, how does the cooperative manifestation take place? There are alternative possible models: for instance, by means of holistic composition of the relevant powers, or by their arrangement in a structure, or by their being stimuli of the unifying power P's manifestation, etc.¹⁰ In which way does the manifestation of power P, supposedly unifying all the other powers, depend on their cooperative manifestation? By way of explanation Rea adds:

The manifestation of humanity in a region depends causally upon the cooperative manifestation of the natures of the simple parts of the human organism. Not just any sort of cooperative manifestation will do, however. Take all of the simple parts of a human and force-fit them into a one-quart cylindrical container and you will not have a human organism, even if, at that time, the natures of the erstwhile parts of the human are engaged in some sort of cooperative manifestation. Thus, the presence of humanity in a region depends upon a particular sort of cooperative manifestation of the natures of the relevant parts. (2011: 349, my emphasis)

This explanation alludes to the structural and functional organization of powers. But the dependence of a power's manifestation on the manifestation of other powers does not tell us anything about how this dependence organizes these powers structurally and functionally. Calling it a 'cooperative manifestation' gives it a name, but not an account that will deliver what Aristotle's substantial forms do, metaphysically, in substances. Rea describes the items in his ontology by negation, telling us what they do not do, but not how they can do what they are expected to do in his system.

In conclusion Rea offers the following reconditioned account of hylomorphic composition:

The natures of material objects play the role of the form, and they enter into compounds with things or stuffs that play the role of matter ... What natures enter into compounds with are *individuators* ... For simple objects, the individuators are regions—presumably point-sized, but perhaps not—of spacetime. I think of the powers of simple material objects as physically locatable properties—qualities that exist at multiple regions of spacetime. Thus, it is natural to regard the objects themselves as compounds whose matter is a spacetime region and whose form is the quality located at that region. What about complex material things? Here, it seems, we have fundamentally the same situation, but on a larger scale. (2011: 352)

¹⁰ I discuss some of these options in my 'Producing, Composing or Passing Around Powers?', forthcoming in *Metascience*

This seems to commit Rea to an ontology of power universals(!),¹¹ which are particularised upon being instantiated by spacetime regions. We therefore seem to be back in Aristotelian metaphysics. More generally, the explanatory jumps or gaps in Rea's own account quickly come to the surface, as we have seen already, and undermine his programme of reconditioning hylomorphism.

In conclusion, none of the three ways of reconditioning hylomorphism thus far examined from the contemporary literature applies to Aristotle's hylomorphism, or solves the difficulties that mereological hylomorphism is prey to with its assumption that matter and form are *parts* of an object.

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Part II. Why Aristotle's hylomorphism needs no reconditioning

Aristotle's hylomorphism is not mereological

It is a fundamental conclusion of Aristotle's metaphysics that matter and form are *not parts* of a substance, because if they were, the substance in question would not be unified. A key text for this conclusion is where Aristotle describes his *Homonymy Principle*, in the *Metaphysics*:

[The parts of a substance] cannot even exist if severed from the whole; for it not a finger in *any* state that is the finger of a living thing, but the dead finger is a finger only *homonymously*. (1035b24-25, last emphasis added)

The intuition the Homonymy Principle expresses is that substantial unity is not the result of addition or attachment of parts. If it were so, the parts of a whole would exist when severed from the whole. But the parts cease to be when severed. I here follow Scaltsas (1994) in taking Aristotle to establish that being unified into a whole *re-identifies* the parts in a way they cannot be when apart from the whole. The parts are re-identified according to the unifying principle of the whole, the substantial form. Once re-identified, they have *no distinctness* in the substance; they exist in it holistically.¹² If they were severed from the whole, they would lose their functional identity, which is conferred to them by the form, on the basis of their role in the whole substance. Thus, if severed, the parts would lose their form and become like (originative) matter is to the substance it can constitute. Aristotle writes in the *Metaphysics*:

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 exist, all of them, merely as matter) ... *all the parts must exist only potentially, when they are one and continuous by nature*. (1040b5-15, my emphasis)

¹¹ But Rea does not want to admit universals in his ontology; see above p. ***

¹² What can be extracted from the whole exists in it only potentially, in the sense that it derives from it.

Thus a consequence of Aristotle's account of the unity of substances is that partitioning a substance generates parts that are *not* parts of the substance. This conclusion is well brought out also by Aristotle's argument renowned as the Syllable Regress, in *Metaphysics* VII.17, which establishes that the unifying form in a substance cannot be of the same ontological standing as the items it unifies: if it unifies the parts of a substance, it cannot itself be a further part of the substance.¹³ Aristotle asks in this argument: Suppose two letters, 'b' and 'a', make up a syllable 'ba'; what unites two separate letters into one syllable? If it is a further element in the syllable that unites the two letters into a syllable, Aristotle continues, then the syllable is composed of three elements – the two letters and their unifier; what is it then that unites these three elements into one syllable? If further unifiers relate the three elements to one another, uniting them into a syllable, the argument applies again, questioning what unifies old and new elements into one syllable ... and so on *ad infinitum*:

That which is compounded out of something so that the whole is one – not like a heap, however, but like a syllable – *the syllable is not its elements, ba is not the same as b and a*, nor is flesh fire and earth [*contra* the mereological composition model]; 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. The syllable, then, is something – not only its elements (the vowel and the consonant) but also something else; 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, 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. (1041b11-22)

Importantly, Aristotle's conclusion from the regress is *not* that there are no unifiers, which Bradley concluded from his own version of the regress. Realizing that unifiers are needed to explain how the many are one, he concludes that there are indeed unifiers, but they cannot be further elements in the ontology on a par with the elements they unify:

But it would seem that this [i.e. the unifier of the elements in a syllable or in flesh] is something, and not an element, and that it is the cause which makes *this* thing flesh and *that* a syllable...And this is the substance [i.e. essence] of each thing; for this is the primary cause of its being; ... which is not an element but a *principle*. (1041b25-31, the latter emphasis is mine)

¹³ See my 'Do powers need powers to make them powerful?' From Pandispositionalism to Aristotle', *History of Philosophy Quarterly*, 26, 2009.

How does the substantial form unify the elements in a substance, e.g. how does the form of *human being* unify, as '*a principle*', the fire and earth into flesh? What could that mean? I submit that what Aristotle means is that the unification of the parts of a substance into one is not achieved by any item that relates them, or bridges the gap between them, or generally comes in between the parts and collects them somehow together into a whole. The Syllable Regress shows that there can be no such ontological item. In particular the argument shows that the unity of the syllable is incompatible with the distinctness of the elements that compose it. These elements, *b* and *a* are two when on their own, but they are one when in *ba*. What changes therefore is the distinctness of *b* and *a* in *ba*. This is precisely what the Syllable Regress shows us, from which Aristotle concludes that the substantial form that unifies the elements of a substance is a *principle*. Since what is needed is the shedding of only the distinctness of the elements, the role of this unifying principle must be just that: to strip the elements of their distinctness. I conclude, therefore, that the substantial form according to Aristotle is an *operation* on the elements of a substance, stripping them of their distinctness, rather than being an item in the ontology.¹⁴

What type of operation is the operation of the substantial form on the elements of a substance? The unification of elements is achieved through their *re-identification* in terms of the role allotted to them by the substantial form.

The elements are arithmetically and even qualitatively diverse, but are unified into a single entity by these elements *changing, i.e. transforming into something different*. A minimal change is what elements undergo when their physical boundaries are altered or defused in one way or another (as in the case of a dollop of honey becoming one with the rest of the honey in a jar); a maximal change is when the nature of the elements is changed in order to produce a unified new substance (as in the case of the ingredients that go into making a cake). Re-identification, rather than combination or relationality, is Aristotle's solution to hylomorphic unity. What unifies the parts is *not* any sort of external relation that bonds them together, as he says explicitly:

Owing to the difficulty about unity some speak of participation, and raise the question, what is the cause of participation and what it is to participate; and others speak of communion, as Lycophron says knowledge is a communion of knowing with the soul; and others say life is a composition or connection of soul with body. Yet the same account applies to all cases; for being healthy will be either a communion or a connection or a composition of bronze and triangle, and the fact that a thing is white will be a composition of surface

¹⁴ I here depart from Scaltsas' (1994) account of substantial holism, not with respect to the resulting holistic substance, but with respect to the mechanism I understand Aristotle as describing, which is my original development of Scaltsas' theory. Scaltsas thought what is needed is an item of a different ontological type. But what is needed is not an item but an operation on the elements, transforming them into a unified whole by re-identification.

and whiteness. The reason is that people look for a unifying formula, and a difference, between potentiality and actuality. (*Metaphysics*, 1045b8–18)

The difference between potentiality and actuality mentioned in the last sentence of the quote is not any item needed to take the one to the other. Rather, the potential *becomes* the actual. Similarly in the case of hylomorphic substances, what unifies the parts is what each part *becomes*, when the whole is generated according to the principle of the substantial form. Thus, egg, water and flour have the potentiality to become cake; and cake and water have the potentiality to become flesh. What unifies the initial ingredients into a substance is their transformation, which does away with their distinctness and unifies them into a substance according to the principle of the substantial form. A substance is *not* its parts (whether one of the parts is a form or not);¹⁵ and it is *not* its parts plus a form (of a different ontological type than the parts).¹⁶ *A substance is all its parts, re-identified.*

The form itself is one, Aristotle says: 'An essence is by its very nature [*euthus*] a kind of unity' (*Metaphysics*, 1045b3). What I take this to mean is that an essence (or substantial form) is a unity for Aristotle in the sense that is the *unit of being*. Units are not necessarily simple, but *because of the role they have in the context of measurement*, they are treated as unitary, as one. Substantial forms are the *units of measurement of what there is*, just as a meter is the unit of measurement of distances. Substantial forms demarcate the joints of nature; entities are unitary if they fall between these joints, that is, if they are *one* by the principle of a substantial form. This does not presuppose the *simplicity* of a form, but only its *fundamentality in nature*, for 'measuring' being.¹⁷ This is why Aristotle holds that oneness is not a property of substantial forms, because they *define* oneness of being. We can now see the full picture of the oneness of the parts that go into the makeup of a substance; in Aristotle's words,

¹⁵ This would be the case on the mereological composition model some metaphysicians attribute to Aristotle.

¹⁶ This would be the case on Scaltsas' model and some neo-Aristotelian composition models.

¹⁷ It will be helpful to contrast my explanation of Aristotle's account of the unity of substance to Koslicki's explanation of Aristotle (which is different from her neo-Aristotelian account of the unity of substance which I discussed above). According to Koslicki, for Aristotle a substance is one only in case it is matter-less (e.g. the prime mover), and its form is *simple*. Namely, the substantial form is 'indivisible relative to every conceivable measure ... [T]hings that have no association with matter (and hence are pure actuality) are not divisible into parts by any measure [not even genus and differentiae]' (Koslicki 2006: 733). So on Koslicki's reading of Aristotle, a substance is one if it can be *reduced* to a form that is simple in *every way*. By contrast, on my interpretation a substance is *unified* by the form, which is one but *not simple*. Most importantly, instead of reducing a substance to a simple, in order to show it to be one, following Aristotle, I show how the parts of the substance are unified by being transformed into something different from what they were, in accordance to the substantial form's principle of organisation.

People [wrongly] look for a unifying formula, and a difference, between potentiality and actuality. But, as we have said, the proximate matter and the form are one and the same, potentially, and the other actually. Therefore to ask for the cause of one is like asking the cause of being one; for each individual thing is one, and the potential and the actual are in a sense one. Thus there is no cause other than whatever initiates the development from potentiality to actuality. (*Metaphysics*, 1045b16-23)

Substantial oneness is achieved through the transformation of the material parts into a whole according to the principle of the substantial form, which is a unit of oneness of being. What I take Aristotle to mean when he describes the matter *as being potentially* the form, is precisely that unity is not achieved through relations between the material parts, but by re-identifying them to give them in actuality the form they possess in potentiality. The transition from potentiality to actuality is a change, not a connection.

The Determinable and the Potential

Aristotle raises the question of the unity of the definition of the substantial form or essence of a substance. The challenge is the plurality of forms *in one substantial form*, which becomes apparent in the definition of the form itself. Aristotle writes:

Wherein consists the unity of that, the formula of which we call a definition, as for instance in the case of man, two-footed animal; for let this be the formula of man. Why, then, is this one, and not many, viz. animal *and* two-footed? (*Metaphysics*, 1037b11-14)

Aristotle's answer consists in likening the genus to matter:

If, then, the genus absolutely does not exist apart from the species which it, as genus includes, or if it exists *but exists as matter* (for the voice is genus and matter, but its differentiae make the species, i.e. the letters, out of it [i.e. they give the genus a *determinate* form]), clearly the definition is the formula which comprises the differentiae. (*Metaphysics*, 1038a5-8, my emphasis)

In what sense is the genus like matter? I submit that Aristotle gives essentially the same answer to the question of the unity of matter and form in a substance, and the unity of forms in the definition of a substance. In likening genus to matter, Aristotle is showing that genus and matter relate to form in the same way: they are 'shaped' by it. Neither genus nor matter possesses the form that shapes each in the way a *subject* possesses its properties. The argument Aristotle gives for the case of the genus is that,

The genus is not thought to share in its differentiae [as subject]; for then the same thing would share in contraries; for the differentiae by which the genus is divided are contrary. (*Metaphysics*, 1037b19-20)

Similarly, matter does not possess the properties of a substance as subject. Matter is substratum, underlying the substantial form, whereas the properties of the substance are possessed by the substance itself as subject, namely by the composite of matter and form.

Aristotle is arguing that neither the genus nor the matter are the subjects, in the definition of a substance or in the substance itself, respectively. The subject is the substance itself, which is one; and it is its oneness Aristotle is explaining. The substance is a composite of matter and form, and yet *one*. The form is composed of many forms, as its definition shows, and yet is one. In neither case does the oneness come from the oneness of that which is shaped: neither the genus nor the matter are the subjects of their union with form. The genus is a *determinable*, and its differentia make it determinate; the matter is *potential* and the form gives it actuality. What is common between the determinable and the potential is that the *forms they receive somehow consume them fully*. This is why Aristotle says that the genus is either like matter or 'absolutely does not exist apart from the species' (*Metaphysics*, 1038a5–6). The potential is broader than the determinable, since there can be items that are potentially *f* which are fully determinate, e.g. the log that is potentially a statue. But the quantity of wood in the log is potential in the sense that the form that it can potentially receive shapes it in the way that the differentia shapes the genus animal. The sense in which the genus or the matter absolutely do not exist apart from the form is that when the form comes to them it fully appropriates their being and makes them its own. This is how the substantial subject is created.

Given a composite that is one, we can seek its oneness either in what underlies, or in what is composed. Aristotle argues that the oneness is achieved in what is composed:

The differentiae present in man are many, e.g. endowed with feet, two-footed, featherless. Why are these one and not many? Not because they are present in one thing; for on this principle a unity can be made out of any set of attributes. But surely all the attributes in the definition *must be one*; for the *definition* is a *single* formula and a formula of *substance*, so that it must be a formula of some one thing; for substance means a 'one' and a 'this', as we maintain. (*Metaphysics*, 1037b21–27)

I have argued that the oneness for Aristotle is achieved because of the *way* the composite is composed. The composite consists of matter and form, and the form consists of genus and differentiae. We do not 'discover' the oneness of a substance by decomposing it into its constituents until we find 'the one'.¹⁸ Rather, it is the way the constituents come together that makes up the one. The determinable and the po-

¹⁸ *Contra* Koslicki's mereological atom strategy, see above, pp.**

tential are fully integrated with the form that shapes them, not as subjects that come to possess the form, but as what is *incomplete* and is completed. (These divisions into incomplete entities are attainable either by abstraction, in the mind, or by change, in the world, but not by physical separation leading to distinctness.) The difference that Aristotle is pointing towards is that, if the genus and the matter acted as subjects, they would bring oneness to what attached to them; but they do not act as subjects. They act as incomplete entities which depend ontologically for completion on the form they receive; oneness is not presupposed, but achieved in their union with the form.

Conclusion

There are the following unities to be accounted for in a substance: the unity of the material parts; the unity of the matter and the form; the unity of the definition of the form. I have argued that Aristotle reduces these questions of unity to the question of the unity of the determinable with the determinate, and the unity of the potential with the actual; and that further, he considers these two types of unity as the same, namely *unity by completion, in the sense of integration of the one into the other, rather than by connection between the two*.¹⁹ Aristotle's hylomorphism stands in need of no reconditioning.

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¹⁹ It might add clarity to re-describe informally the unity by completion or integration in terms of 'absorption' of one item into the other.

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