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### Higher-Order One-Many Problems in Plato's Philebus and Recent Australian Metaphysics

S. Gibbons<sup>a</sup> & C. Legg<sup>a</sup>

<sup>a</sup> University of Waikato

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# HIGHER-ORDER ONE–MANY PROBLEMS IN PLATO'S *PHILEBUS* AND RECENT AUSTRALIAN METAPHYSICS

S. Gibbons and C. Legg

We discuss the one–many problem as it appears in the *Philebus* and find that it is not restricted to the usually understood problem about the identity of universals across particulars that instantiate them (the *Hylomorphic Dispersal Problem*). In fact some of the most interesting aspects of the problem occur purely with respect to the relationship between Forms. We argue that contemporary metaphysicians may draw from the *Philebus* at least three different one–many relationships between universals themselves: *instantiation*, *subkind* and *part*, and thereby construct three new ‘problems of the one and the many’ (an *Eidetic Dispersal Problem*, a *Genus–Species Problem*, and an *Eidetic Combination Problem*), which are as problematic as the version generally discussed. We then argue that this taxonomy sheds new and interesting light on certain discussions of higher-order universals in recent Australian analytic philosophy.

Keywords: *Philebus*, Plato, one–many problem, universal, Form, combination

## 1. Introduction: The Dispersal Problem

Discussions of ‘the one–many problem’ stretch back to the birth of philosophy. Any investigation into the nature of things seems to rely on individuating entities to talk or think about. Yet this exercise in itself raises thorny philosophical questions. In contemporary Australian metaphysics the problem is frequently understood to concern the relationship between so-called *particulars* and *universals* (or *Forms*, in Platonic terminology<sup>1</sup>). We will refer to this as a *hylomorphic* understanding of the one–many problem. We believe, however, that discussion of the problem in Plato's *Philebus* is just as much concerned with relations between universals themselves. To argue this, we identify and distinguish three problems which we believe lay equal claim to being ‘one–many’ problems raised by the dialogue. They turn on relations of *instantiation*, *subkind* and *part* amongst Forms. The claim is not so much that Plato himself was thinking in terms of this three-way taxonomy, as that it can be extracted from the dialogue in the light of contemporary understandings, whilst also raising issues so far unaddressed

<sup>1</sup>Forms are not quite the same as universals, but, in the light of the shared higher-order function of Forms and universals, certain observations about Forms are able to shed light on certain aspects of universals. For this reason we will treat the terms as equivalent in this paper.

in contemporary metaphysical literature. Although consideration of these issues threatens to render realism about universals much more complex, we argue that it also has the potential to advance the view by exposing much richer conceptions of how universals might *combine*.

The common contemporary understanding of the one–many problem is often drawn from Plato’s *Parmenides* as follows. When we use a general predicate (for instance, describing Otto as an ox), are we thereby referring to some *one* thing (‘oxhood’) which has a strange ‘spread-out’ character, constituted by every particular ox and nothing else in the Universe? This does not seem to capture the distinctive character of oxhood, because there seems to be not just a *part* of oxhood in each ox—as is the case for a particular object whose parts extend spatially, such as a tree and its branches. Oxhood seems to be in some strange way *wholly* in each ox, for if a particular ox is destroyed, oxhood itself is not diminished, as is the case with our tree when a branch is destroyed. However, on the other hand, if one does say that the universal is wholly in each thing which instantiates it, and is in that sense *many*, then it seems that, ‘being one and the same, it will be at the same time, as a whole, in things that are many and separate; and thus it would be separate from itself’ [*Parmenides* 131b1–2].<sup>2</sup> Described this way the very idea sounds ludicrous and logically impossible. How could something be separate from *itself*? There is thus a problem of how oxhood can be a single thing while also being spread out among the many oxen.<sup>3</sup> Let us call this statement of the one–many problem the *Dispersal Problem*.

## 2. Contemporary Responses to the Dispersal Problem: ‘Reified Hylomorphism’

Twentieth-century analytic philosophy, in so far as it has discussed the one–many problem, has almost entirely understood it to be the Dispersal Problem. Thus Armstrong claims, ‘I think that the main argument for the existence of universals is Plato’s ‘One over Many’ [1980: 440], and argues that one must postulate universals because there can be many tokens of the one type [1978a: 2; 1980; 1997], but this immediately raises the large question of what the type must *be* in order to be so dispersed. It is also worth noting that analytic philosophy has largely treated the problem as a problem in *ontology* construed, following Quine, as the attempt to list all the most general kinds of entities that *exist*. Quine’s [1953] clever technical identification of one’s ontological commitments with the values of one’s bound variables neatly sidesteps the issue of exploring the *natures* of the entities in question, and the ways they might inter-relate. In this way his influence was crucial in shelving a long tradition of philosophical inquiry

<sup>2</sup>All translations of Plato are from the Hackett edition [Cooper 1997]. The *Parmenides* translation is thus that of Gill and Ryan. Line references are to Burnet’s Oxford Clarendon Text. Any deviation from Hackett translations is noted.

<sup>3</sup>For a contemporary summary of the problem viewed in this light, see Landesman [1971: 1].

which systematically investigated *modes of being* (as opposed to invoking a catalogue of 'what there is').

The two main competing solutions to the Dispersal Problem are thus commonly regarded as positions concerning what exists. *Nominalism* is said to claim that only one kind of entity exists: particulars. Thus oxhood is a many (just the individual oxen). *Realism* is said to claim that two kinds of entities exist that are somehow fundamentally different on a metaphysical level, and yet related: particulars and universals. Thus oxhood is a one (over and above the individual oxen). This contemporary analytic realism about universals may therefore be referred to as a *reified hylomorphism*. As well as Armstrong it would appear to be advocated to at least some degree by the 'Australian realists'<sup>4</sup> Michael Tooley [1977, 1987, 1990], Peter Forrest [1986a, 1988], and Graham Oddie [1991, 2001].<sup>5</sup>

Logically this opposition between realism and nominalism has the form of a dispute concerning whether the universe contains just chairs or chairs and tables, with all the discussions of the benefits of ontological parsimony that such debates typically engender. Following Quine's professed taste for 'desert landscapes' [1953: 4], modern philosophers have largely come down on the side of the allegedly simpler theory and thus embrace nominalism.<sup>6</sup> Thus Michael Devitt [1980: 433] has described Armstrong as a 'mirage realist'. Likewise David Lewis initially claimed that the services universals render 'could be matched using resources that are Nominalistic in letter, if perhaps not in spirit' [1983: 343], and later this agnosticism turned 'atheist' in a paper [1986a] which will be discussed below.

Nevertheless, despite such criticisms, many of them extremely well argued, realism about universals never quite seems to lose all its adherents. An intuition always seems to remain that nominalism lacks the resources to offer some kind of fundamental metaphysical *explanation*. Armstrong [1980: 441] has expressed this intuition particularly starkly: 'I suggest that the fact of sameness of type is a Moorean fact. Any comprehensive philosophy must try to give some account of Moorean facts. They constitute the compulsory questions in the philosophical examination paper.' He adds that it seems that sameness of type should consist in identity of *something*. The alternative would appear to be to say that sameness of *token* (i.e. identity, straightforwardly understood) and sameness of *type* (i.e. resemblance) are not 'the same' [ibid.: 441–2]. Shouldn't *sameness*, of all things, be the same?

A focus on positing the shortest possible list of fundamental kinds of existent entities as the key work of metaphysics is so pervasive today that it largely goes unquestioned. A large assumption lies behind this approach, however. It presupposes that the most fundamental ingredients of the Universe, in a metaphysical analogue of Lego blocks, are always combined and recombined in world-making without changing their most fundamental

<sup>4</sup>Australian by association and methodological sympathies if not current residency.

<sup>5</sup>This is leaving aside those who advocate *tropes*, at least some of whom might also be argued to advocate reified hylomorphism of some form.

<sup>6</sup>For a notable exception see Lowe [2006].

properties. We will call this assumption *ontological additivity*.<sup>7</sup> This assumption is for instance an unacknowledged axiom of David Lewis's influential *Humean Supervenience*.<sup>8</sup> The assumption is axiomatic because if the 'local matters' supervened on were to alter in different contexts, this would effectively vitiate supervenience.<sup>9</sup> This neglects the possibility that the *arrangement* in which the constituents of the Universe are put together might affect how those constituents *are* in that context. We aim to explore this possibility.

We claim that (somewhat ironically) in fact we may identify more than one one-many problem.<sup>10</sup> We further claim that the one-many problem is logically prior to much current work in ontology, in the following sense.<sup>11</sup> Contemporary analytic hylomorphic realism, in attempting to 'solve' the one-many problem, reifies particulars and universals. That this approach could never fully corral and treat the problem, however, is shown by the fact that the problem has recently reappeared purely within the realm of so-called 'particulars'. Thus philosophers have lately begun to worry that, because objects such as clouds and cats comprise countless water droplets and hairs, and each cloud or cat *sans* one water droplet or hair would not be the same cloud or cat, there might be millions of clouds and cats in existence where common sense would see only one. Such discussions occupy a burgeoning recent literature on the so-called *Problem of the Many*.<sup>12</sup>

Less often noted is that the problem equally reappears in the 'one'—purely within the realm of so-called 'universals'. This will be the subject of this paper.

### 3. The *Philebus*: Setting the Scene

In the *Philebus* Socrates systematically pursues the question of which is superior in human life—Knowledge or Pleasure. Socrates argues that in fact 'a third state' wins this contest, namely the right balance, mixture or harmonious structure of the two. Very early in the dialogue issues arise concerning how the many can be one or the one many. For Socrates begins by noting that the heterogeneity of pleasures will complicate their ranking task:

If one just goes by the name it is one single thing, but in fact it comes in many forms that are in some way even quite unlike each other. Think about it: we

<sup>7</sup>The view is named thus in homage to Oddie, one of the few contemporary metaphysicians to isolate such an assumption and subject it to systematic analysis, in his [2001].

<sup>8</sup>'[T]he doctrine that all there is to the world is a vast mosaic of local matters of particular fact, just one little thing and then another' [1986b: ix].

<sup>9</sup>It might be argued that Humean Supervenience is not *restricted* to this assumption but also includes the claim that no new entities come into being at higher levels of reality; this might not be a further claim, though, if the new 'entities' in question were to consist in new or different *properties* in the local matters.

<sup>10</sup>Meinwald has already noted this [1996: 95].

<sup>11</sup>For a rich and subtle paper which argues this same position from the point of view of Plato and Aristotle scholarship, see Gerson [2004].

<sup>12</sup>See for instance Unger [1980], Lewis [1993] and Lowe [1995].

say that a debauched person gets pleasure, as well as that a sober-minded person takes pleasure in his very sobriety.

[*Philebus* 12c6–d2]<sup>13</sup>

Protarchus is willing to accept this fact at face value ('So let it be agreed that there can be many and unlike pleasures ...' [14a8]<sup>14</sup>). But Socrates draws his attention to the philosophical perplexity which it raises: 'For that the many are one and the one many are amazing statements, and can be easily disputed, whichever side of the two one may want to defend' [14c8–10]. However, Socrates immediately makes a distinction between what he considers to be more and less serious one-many problems. In the not-so-serious category Protarchus describes a problem concerning the way a single person can be truly said to have many diverse and even apparently opposing characteristics, such as being tall and short, heavy and light, and in this way be 'many "me's"'.<sup>15</sup> We might call this the *Inconsistent Properties Problem*. Socrates dismisses such concerns as 'childish and trivial but a serious impediment to argument if one takes them on' [14d7–8]. Socrates then dismisses a further problem which he describes himself. This problem puzzles over the way a single person is divisible into a variety of limbs and other physical parts, which are many, but is nevertheless one object:

when someone who first distinguishes a person's limbs and parts asks your agreement that all these parts are identical with that unity, but then exposes you to ridicule because of the monstrosities you have to admit, that the one is many and indefinitely many, and again that the many are only one thing.

[*Philebus* 14d8–e4]

The issue here seems to be that of how many physical things can come together to form a unified whole, and so we might call this the *Physical Combination Problem*.

One might argue that the latter is a real problem. Consider, for example, a table composed of four legs and a table-top. If a table is nothing but its parts, are we not unable to make a distinction between a table and a collection of table parts? Surely to be a table it must possess some sort of unity which makes it one thing, rather than five things organized in a particular way? Nevertheless, Socrates claims that no explanation is needed here. One might ask why Socrates mentions this problem if he thinks that it is so pointless. Meinwald plausibly argues that it structurally mirrors the problem in which he *is* interested [1996: 99; 1998: 166–7].

<sup>13</sup>The *Philebus* translation is Frede's; see note 2.

<sup>14</sup>Frede [1993: 5] translates 'many and unlike kinds of pleasure', but there is nothing in the Greek which corresponds to her phrase 'kinds of'.

<sup>15</sup>What precisely is the problem here? We believe a full answer to this question must examine the most fundamental motivation for Plato's positing of Forms over and above particulars, a vast undertaking. Thus since Socrates rejects this problem as not relevant to the subject at hand, for reasons of space we shall here do the same.

Socrates says the serious controversy occurs where ‘the *one* is not taken from the things that come to be or perish . . .’ [15a1–2]. In other words, he is talking about the Forms. He claims:

when someone tries to posit man as one, or ox as one, or the beautiful as one, and the good as one, zealous concern with divisions of these unities and the like gives rise to controversy . . . Firstly whether one ought to suppose that there are any such unities truly in existence. Then again, how they are supposed to be: whether each one of them is always one and the same, admitting neither of generation nor of destruction; and whether it remains most definitely one and the same, even though it is afterwards found again among the things that come to be and are unlimited, so that it finds itself as one and the same in one and many things at the same time. And must it be treated as dispersed and multiplied or as entirely separated from itself, which would seem most impossible of all?

[*Philebus* 15a4–b9]

This is reminiscent of the *Parmenides* passage cited above. The problem Socrates explicitly describes here seems to be how a Form can be one while it is spread out among its many sensible participants. Viewed in this way it looks a good deal like the Hylomorphic Dispersal Problem, and this is how it has frequently been read [Hackforth 1972: 20–1; Frede 1993: xxi–xxii, 6–7 of her translation; Benitez 1989: 29; Gosling 1975: 143].<sup>16</sup> The difficulty with this is that there is no apparent discussion in the rest of the dialogue addressing the relationship between Forms and sensible particulars [cf. Meinwald 1996: 96–7]. If this is the one–many problem, it is consequently ignored.

#### 4. The Genus–Species Problem<sup>17</sup>

In view of this apparent mismatch, Constance Meinwald has argued that a second one–many problem can be identified in the text. She gives another reading to 15b2–4: ‘how each of these, [though it is divided into many species and sub-species] while not admitting generation or destruction, is nevertheless most securely this one’.<sup>18</sup> She argues that this is a (rather cryptic) reference to the way a Form is one while being divisible into many species and sub-species, a version of the one–many problem she has dubbed

<sup>16</sup>Gosling goes on to point out the difficulties in treating the dispersal problem as the one–many problem [1975: 143 ff.].

<sup>17</sup>We name it thus following Meinwald [1998: 165]. Like Meinwald, we use ‘genus’ and ‘species’ merely as a convenient way to refer to this type of relationship.

<sup>18</sup>This is how Meinwald says we should understand these words [1996: 100], although her insertion makes this just as much an interpretation as a translation. There are two ways of punctuating the Greek here, and it has led to much discussion. Burnet’s OCT prints a question mark after ‘*tautéñ*’ in line 15b4, thus dividing the text there into three questions about Forms, rather than two. Many translators omit the question mark, preferring to read two questions [Frede 1993: 7, xxi–xxiii; Gosling 1975: 5, 143 ff.; Hackforth 1972: 20]. Gosling and Frede comment on the difficulties in making sense of a middle question [Gosling 1975: 145–6, 148–9; Frede 1993: xxii]; see also Benitez [1989: 25–30]. However, there is also agreement that the division into three questions is a more natural way to take the Greek [Gosling 1975: 145; Frede 1993: xxii; Benitez 1989: 25]. Meinwald argues that the alternative, of supposing that these lines say nothing much, is unpalatable, and that the context provides sufficient information for us to work out what is intended.



the *Genus-Species Problem*. In this way, she claims, we 'see the problem as arising from both positing monads and dividing them while denying that they admit generation and destruction' [1996: 101]. The denial of generation and destruction is significant since this would be one way for a one to become many or for many to become one, as in the way 'a large rough diamond can become many cut stones, or many pieces of wood a violin' [Meinwald 1996: 101]. Thus the genus-species problem can be contrasted with our earlier example of the table: the many table parts constitute one table because they came together physically (when the table was 'generated'). Such a solution is not available for eternal, unchanging Forms.

The genus-species relationship is interestingly different from the part-whole relationship. Cathood does not exhaust mammalhood (there are mammals that are not cats), and yet an individual cat is not a part of any individual mammal, nor does it instantiate some kind of part-mammalhood. Every cat *is* a mammal—fully. And yet, nevertheless, in *some* sense mammalhood comprises cathood (as well as foxhood, doghood and so on). So how does mammalhood manage to be the same (*one*) thing given that cats, foxes and dogs are different kinds of animals and their mammalhood thereby takes correspondingly different forms? More relevant to the dialogue is the example of Pleasure we began with. How does Pleasure manage to be one thing in, for instance, depraved serial killings and serene mathematical contemplations? What kind of a 'one' could that be?

Identification of this one-many problem has the significant advantage that genus-species relationships definitely figure in the text.<sup>19</sup>

### 5. The Eidetic Combination Problem

However, in our view, a further one-many problem may be extracted from the crucial lines [15a4–b9], which is even more relevant to the dialogue as a whole. The conclusion of the dialogue is that the good life is a mixed life, which must contain both Pleasure and Knowledge in their correct forms, and balanced correctly. When Socrates speaks of 'the Good Life' he is speaking not of individual instances of good lives, such as Socrates' life has been, but of some sort of abstract good life beyond its sensible instances. We can therefore refer to this as a 'Form' containing within it the correct mixture of Pleasure and Knowledge.

This is not a genus-species relationship. It is not that Pleasure and Knowledge are *types* or *kinds* of the Good Life. If they were, then someone who participated in Knowledge alone would thereby participate in the Good Life, just as an animal which participates in Cathood alone thereby participates in Mammalhood.<sup>20</sup> But this is not the case. Therefore Knowledge is not a *species* of the Good Life. Rather, the Good Life is a

<sup>19</sup>Pleasure is divided into types at 36c ff. Knowledge is thus divided at 55c ff. The dialogue includes other examples, such as the division of colour and shape at 12e.

<sup>20</sup>Or a person who is an angler is thereby a hunter: cf. *Sophist* 218e–221c. The method of collection and division, prominent in the *Sophist* and the *Statesman*, has the following feature: if Form A is divided into species B and C, and individual x participates in Form B, x must also participate in genus A.

complex object that somehow draws together two quite different and unrelated things *into one*. Nor is this an instance of the Dispersal Problem, since Pleasure and Knowledge themselves are not *instances* of the Good Life, merely *constituents* of it. In this sense, then, asking how exactly the two combine into one Good Life may be regarded as another, distinct sort of one–many problem. We might call this last problem an *Eidetic Combination Problem*. We now see the analogy between this and Socrates' rejected *Physical Combination Problem* (concerning objects such as bodies and tables), since it is a combination problem.

Why does the Combination Problem hit home for Forms? Its logical structure is as follows. Suppose objects A and B join together to make C. To be one thing, C has to be sufficiently united to constitute a one, and not just the concatenation of A and B. But if C is sufficiently united to yield a one, it may become sufficiently united to cease to be A and B at all.<sup>21</sup>

Let us once again consider a physical example for contrast. Suppose A and B are two puddles. With the addition of just a little extra water (or a strong wind), they become one puddle. But when they become one, the puddles A and B disappear. In so far as A and B remain, they can only ever be a collection of two distinct puddles. In so far as they become one, A and B are no longer identifiable. Thus this case does *not* present a one–many problem: puddles are either one *or* many, but not both.

In the Good Life, though, Knowledge and Pleasure are both still present—the liver of such a life does not cease to know or to enjoy. Thus here the one concerned is *also at the same time* a many. When the one is formed, the many which contribute to it remain distinct and identifiable, at the very same time as the object is a genuine one. (Note that the same is true of the Genus–Species Problem and the Dispersal Problem for Forms.) Socrates suggests that we lack an adequate account of how an object can be sufficiently united that it comprises a genuine unity, while simultaneously being internally complex.<sup>22</sup>

So the Eidetic Combination Problem is the difficulty of how disparate Forms such as Knowledge and Pleasure can be combined to form a genuine unity without thereby losing their distinctness. One might wonder, why doesn't the same one–many problem arise for physical objects which, unlike the puddles, have *heterogeneous* parts? The human body in Socrates' disdained example [14e] comprises arms, legs, a head, and other parts distinguishable by different shapes and functions. Why does not this diversity mean that a physical body is subject to this combinatorial one–many problem? The crucial difference is that, as generated objects, the complexity of physical objects can be analysed by means of their spatial arrangement, allowing an *independent* means of individuating such entities

<sup>21</sup>For Socrates, this is a general concern. Consider *Theaetetus* 203a–205e. If the syllable SO is just the letters S and O, then knowledge of S and O should be sufficient for knowledge of SO, and *vice versa*, but it is not [203d]. If SO is a new form arising from the combination of S and O, it ceases to have S and O as parts, and so can't be composed of them [204a, 205b]. Socrates summarizes these points at 205d–e.

<sup>22</sup>It is true of all three eidetic one–many problems that the object concerned must somehow be sufficiently united to constitute a genuine one, and yet it must have internal complexity without that complexity's compromising its unity. As this is a feature of all three one–many problems, it could be said to be *the* one–many problem.

<b>Problem</b>	<b>DISPERSAL</b>	<b>GENUS-SPECIES</b>	<b>COMBINATION</b>
<b>Relation Relata</b>	<b>R1: Instantiation</b>	<b>R2: Subkind</b>	<b>R3: Part</b>
<b>PHYSICAL (particular-particular)</b>	'The Problem of the Many', e.g. one cat, not many differing by a hair	<i>n/a</i> (R2 needs relata of at least first-order)	<i>trivial, solved by physical arrangement</i>
<b>HYLOMORPHIC (particular-universal)</b>	e.g. one oxhood in many different oxen	<i>n/a</i> (R2 needs relata of same order)	<i>n/a</i> (R3 needs relata of same order)
<b>EIDETIC (universal-universal)</b>	e.g. one goodness in military valour and charity work	e.g. one mammalhood in foxhood, cathood and doghood	e.g. one good life comprised of knowledge and pleasure

Figure 1: A taxonomy of one-many problems.

as having many parts whilst not being many things. My head is my head and not an independent object as it functions alongside my other body-parts in a spatially integrated organism. Forms, however, were not generated, and are not arranged, in space. One might therefore say that *the only individuation they have is eidetic*. This is why the one-many problem is harder for them. In other words, if serial-killer pleasure and mathematician pleasure differ as Forms, why are they not entirely different things?

We may now identify three one-many problems which, contrary to twentieth-century reified hylomorphic treatments of the problem, can be constructed purely in the realm of Forms. They turn on three different relations, *instantiation*, *subkind* and *part*, respectively listed below, and tabulated in Figure 1:

1. *The Eidetic Dispersal Problem*: How can a Form be one while dispersed throughout its participants? (For example, what is the ontological connection between goodness instantiated in military valour and in compassionate charity work?)
2. *The Genus-Species Problem*: How can a Form be one while divisible into species and subspecies? (For example, how is Mammal divisible into Cat and Dog, and yet still united in a seamless Form of mammalhood?)
3. *The Eidetic Combination Problem*: How can a Form be one while a mixture of disparate and unrelated ingredients? (For example, how is the Good Life one yet containing both Knowledge and Pleasure?)

## 6. Distinctness of the Problems

One might wish to argue that the Eidetic Dispersal Problem (unlike the Hylomorphic Dispersal Problem) collapses into the Genus-Species Problem, as the only way in which it is intelligible to talk of Forms dispersing over Forms is if the latter are *subkinds* of the former. Thus for instance one might argue that in our example, military valour and compassionate charity are both kinds of goodness. One can, however, distinguish in principle an

instantiation from a subkind relation between Forms.<sup>23</sup> For instance, consider the famous mixing of the kinds passage in the *Sophist*. There the relationship between the ‘great kinds’ is referred to as one of *participation* no fewer than 11 times.<sup>24</sup> The suggestion is that when Being participates in Difference it thereby becomes one of the things which are different—i.e. an *instance* of Difference—rather than a type or *species* of Difference. In other words, the claim, ‘Being is different from other Forms’ may be distinguished from, ‘All things which have being are things that are different’.<sup>25</sup>

In more contemporary terms, such a distinction exists in our set-theoretic framework which distinguishes between a *class–instance relation* which requires that the class possess an order one greater than its instance, and a *class–subclass relation* which does not trigger such ascension. Whether these twentieth-century mathematical tools are the last word in interpreting the relations of instantiation and subkind discernible in Plato (and if not those, which tools might or should one use) is a question deserving deep reflection.

Alternatively, one might worry that the Eidetic Dispersal and Combination Problems collapse together in that, as Forms are not spatiotemporally located, the distinction between their *parts* and their *instances* must be somewhat hazy. But the key logical issue is whether the part-or-instance of a Universal U may itself be said to ‘be (a) U’. (We might call this property *name inheritance*.) If not, it is a part. If so, it is an instance. As noted earlier, when Pleasure and Knowledge *combine* to form the Good Life it is not the case that either alone would constitute a good life. Rather, much of the point of the dialogue consists in establishing that this is not so. It was also noted above that one problem with claiming that instantiated oxen form *parts* of oxhood is that if an ox is destroyed it seems that oxhood itself is not in any way diminished (as is a tree when its branches—genuine parts—are destroyed).

The final duo within our triad to be considered, then, is the Genus–Species Problem and the Eidetic Combination Problem. Are these really distinct? One influential argument that they are not is provided by Lewis [1991], who seeks to reduce the *subclass* relation to the *part–whole* relation (where the latter receives a particular axiomatized interpretation within contemporary mereology), claiming, ‘One class is a part of another iff the first is a subclass of the second’ [ibid.: 4], and, ‘the subclass relation and the part–whole relation behave alike. Just as a part of a part is itself a part, so a subclass of a subclass is itself a subclass; whereas a member of a member is not in general a member’ [ibid.: 5].<sup>26</sup>

<sup>23</sup>The distinction is commonly made in the literature as a distinction between two kinds of *predication*. So, Vlastos distinguishes between ‘ordinary predication’ (which can be between Forms), and ‘Pauline predication’ (which according to his analysis functions like a class inclusion relationship) [Vlastos 1970, especially: 270–6]; Meinwald distinguishes between ‘tree predication’ (predication *pros heauto*) and ‘ordinary predication’ (predication *pros ta alla*) [Meinwald 1991: 56–75]. The different sorts of predication are used to assert different ontological claims, and thus deserve different ontological analyses.

<sup>24</sup>*Metallambanein* or *metechein* and their cognates are used at 251d7, 251e10, 255b1, 255b3, 255e5, 256a1, 256a7, 256b1, 256b6, 256d9, and 256e3.

<sup>25</sup>Vlastos [1970] shows the two types of claim are differentiable. Vlastos thinks Plato remains unaware of the distinction. We would dispute this, but cannot pursue it here. It will suffice that the distinction can indeed be drawn.

<sup>26</sup>In the latter parts of the book Lewis claims to ‘regain’ all of set theory, by deriving ‘[f]rom the axioms and definitions of mereological arithmetic ... the standard axioms for iterative set theory’ [Lewis 1991: 100].

We believe, though, that there are equally crucial logical differences between the two. One concerns *property inheritance*. If *Kitten* is a subclass of *Cat* then it follows that if all cats are mammals, all kittens are mammals. However, the fusion of *Cat Tails* is a mereological part of *Cat*, but it is not right to infer that if all cats are mammals, all cat tails are mammals. To avoid such a result, Lewis is forced to maintain a sharp ontological distinction between classes and individuals (his ‘Division Thesis’), and to hold that although Bruce’s tail is part of Bruce the cat, the singleton class containing Bruce’s tail is an entity metaphysically *distinct from Bruce’s (individual) tail*<sup>27</sup> and not a part of it, and it is not a subclass/part of any class containing Bruce.

This manoeuvring is arguably analogous to treating all circles as ‘squares with very rounded corners’. One may be able to translate all statements about circles into statements about rounded squares without rendering them false. But what of the distinct mathematical properties of the circle—for instance, that the ratio between circumference and radius is always  $2\pi$ ? In an ontology purely consisting of squares, either: i) this necessary connection is lost in ‘noise’ and unstatable, or ii) if the necessary connection is established and stated for a ‘special kind of square’, this constitutes acknowledgment by stealth of a distinct ontological category. Property inheritance through the subclass relation is such a necessary connection, and Lewis’s attempted reduction of subclass to part arguably promises i) but delivers ii).

In summary, then, through this section we have argued that relations R1, R2 and R3 are all *sui generis* and mutually irreducible. This constitutes a distinctive kind of *realism concerning relations* (which, moreover, is arguably not inappropriate to relations as opposed to particular things, for which the key question is, ‘Do they exist?’).

In the rest of this paper we hold our new taxonomy (Figure 1) up against contemporary Australian metaphysics. We begin in the next section with the views of D. M. Armstrong. We will see that he attempts to explain away our *genus–species* relations (R2) as partial identity between universals. He admits that in certain circumstances it is right to say that universals *instantiate* (R1) higher-order universals, but fails to follow up an inconsistency between this and his arguments for first-order realism. *Parthood* relations between universals (R3) receive his most complex discussion, regarding the possibility of ‘structural universals’. He admits such universals but we will argue that his account of their combination is excessively logically simple, and that, overall, he creates a *de facto* higher-order nominalism.

In §8 we consider Lewis. Lewis is of course a nominalist who would regard higher-order ontological commitments with dismay; still, he is interesting in the present context for two reasons. First, in his later work he may be understood as attempting wherever possible to reduce fundamental ontological relations to *mereology* (R3).<sup>28</sup> Such ambitious attempted

<sup>27</sup>This claim has caused puzzlement amongst metaphysicians, e.g. [Forrest 1991].

<sup>28</sup>Although his early work held the fundamental constituents of reality to be ‘possibilia—particular individual things . . .—together with the iterative hierarchy of classes built up from them’ [Lewis 1983: 343], 1991’s *Parts of Classes* sought the ambitious reduction mentioned above.

elegance provides valuable grist for metaphysical investigation. Second, in a little-discussed paper [1986a] he provides a useful critical discussion of Armstrong's views on structural universals, and in particular how they might *combine*. On the one hand he disagrees with Armstrong that structural universals exist, and claims that Armstrong's key examples should be understood as combinations not of universals but of individuals. On the other hand there are intriguing similarities in the two metaphysicians' treatments of key examples: both try to account for them using a single, simple combination relation which *joins components while leaving them unchanged*. This demand unites Lewis's earlier and later work, and in this way both Lewis and Armstrong commit to what we earlier dubbed 'ontological additivity'.

Given this, we close the paper (§9) by arguing that neither Armstrong nor Lewis can account for the *Philebus*' key example of combination: Pleasure and Knowledge combining to form the Good Life. This example is, we suggest, precisely intended to show the possibility of universals *blending* into structures which cannot be analysed by means of *any* univocal combination relation. The overall moral is that, if universals are relations, and they are many, the possible relations between universals must themselves be many, a thoroughgoing Platonic realism needs to allow for that, and there are *prima facie* reasons to believe such a realism is true.

## 7. Higher-Order Ones and Manies in Contemporary Australian Metaphysics I: Armstrong

Armstrong called the metaphysical explanation of sameness of type a compulsory question on the philosophical examination paper. One may postulate universals as an explanation of sameness of type between particulars if one wishes. We have seen, though, that once one postulates universals, sameness of type seems to occur between them also. So are we not faced with a further 'compulsory question'?

Armstrong gives some thought to this. He is loath to postulate higher-order universals, no doubt conscious that this will offend his ockhamist contemporaries further. He therefore claims that certain apparent examples of sameness of type in universals can be accounted for without this. Consider for instance, 'Red is more like orange than yellow'. He claims this consists in 'an internal relation, one that flows necessarily from the nature of the terms', adding, 'where we have an internal relation[s] there we do not have anything ontologically extra over and above the related terms' [1989: 100]. Of course the next obvious question is whether these internal relations, *albeit* not separate entities, require any metaphysical explanation. Armstrong considers the possibility that they might be primitive and unanalysable [*ibid.*: 105]. But this seems inconsistent in one who is so hard on first-order resemblance nominalism for resting on unanalysable resemblance. Thus Armstrong also considers the possibility of explicating



resemblance between universals as *partial identity* between them [ibid.: 106].<sup>29</sup>

We can now understand the (reasonably close) resemblance between the properties being five kilos in mass and being four kilos in mass . . . a four-kilo object is a large proportion of a five-kilo object. The bigger the part, the closer to identity, and so the closer the resemblance.

Where does this issue of colour-resemblance fall according to our taxonomy of one–many problems? Armstrong would seem to view it as a ‘Genus–Species’ rather than an ‘Eidetic Dispersal’ issue in so far as his refusal to ascend to a higher ontological level suggests (in our contemporary, post-Russell’s Paradox context) that he sees the internal relations which determine colour resemblance as sub-kind rather than instantiation.<sup>30</sup>

Armstrong does claim that higher-order universals are needed in some contexts, though—most notably to explain *scientific laws*. He believes that laws of nature are more than mere Humean regularities, rather, ‘a matter of the presence of one property ensuring, or probabilifying, the presence of another’ [ibid.: 101].<sup>31</sup> These relations, unlike colour relations, are external and therefore in need of further explanation and thus (by his lights) a new entity. However, we now have a target for our Eidetic Dispersal Problem. Imagine for instance that law of nature L consists in a necessary relationship between magnetic field M and attractive force F. This particular relationship between M and F holds in an indefinite number of situations. Why is this? In what sense are these *the same situation* and in what sense are they *different situations*? If it is objected that ‘they just are’ (the same), and some commonalities between situations are primitive, why cannot the same be said about commonalities between, say, individual oxen, which Armstrong claimed cried out for metaphysical explanation?

Finally, what of our Combination Problem? *Prima facie* it would appear that Armstrong opens the door to this problem by claiming that universals combine to form *structural universals* [1978b, 1986, 1989, 1997].<sup>32</sup> He postulates such universals initially in order to explain resemblance among universals, to truth-make scientific laws beyond a certain level of logical complexity, and to avoid begging the question whether entirely simple universals exist.<sup>33</sup> In his [1997] he distinguishes between genuine (‘paradigm’) structural universals (e.g. *methane*) and mere *conjunctive universals* (e.g. *green and round*). The difference is that in the former ‘[t]he constituent

<sup>29</sup>See also Armstrong [1978b: 48–52, 101–31].

<sup>30</sup>It may be objected that Armstrong’s problem of explaining colour-resemblance is not strictly isomorphic with our Genus–Species Problem as the latter asks for an explanation of sameness of type between a ‘parent’ and ‘child’ class (e.g. mammal and cat), while the former pertains to ‘siblings’ (fellow-children of the class of coloured things). Nevertheless it seems we could generalize our Genus–Species Problem to a problem concerning the grounds of any taxonomic relationship, the solution of which could then be generalized to the specific ‘family’ relationships above.

<sup>31</sup>See also Armstrong [1997: §15.2].

<sup>32</sup>Armstrong is not the only Australian metaphysician to commit to structural universals. See, for instance, Forrest [1986a, 1986b].

<sup>33</sup>Armstrong [1978b: 69–71].

properties and relations are instantiated by particulars that are proper parts of the particular that has the structural property' [1997: 32]. Thus, for instance, being *methane* consists in having a part that is hydrogen and not carbon, and another part that is carbon and not hydrogen, whereas for *green and round* the smallest unit of analysis is the whole thing which has both properties.

But what enables these proper parts to *combine*? Armstrong begins by suggesting: at least one further relation R (in the case of *methane*, R is the binary relation *bonded*). But he goes on to claim that *methane* (and thus any structural universal) is reducible to ('identical with') a conjunction of atomic states of affairs.<sup>34</sup> This arguably approaches higher-order nominalism in that logical conjunction might now be said to be his fundamental ontological combination relation. For when he examines the converse possibility (that every conjunction of states of affairs might constitute a structural universal) he does not deny this. He merely denies that every conjunction of states of affairs might constitute an '*interesting*' structural universal [ibid.: 35].

To sum up Armstrong, then, although he argues strenuously for first-order realism about universals, he largely seems to abandon realism at the higher-order, through what might be termed an eliminativism about genus-species relations, and a failure to raise the same Dispersal Problem at the higher order that he pursued at the first. He allows that universals combine, but does not seem troubled by our Eidetic Combination Problem. Whether he should be troubled will be discussed further below.

## 8. Higher-Order Ones and Manies in Contemporary Australian Metaphysics II: Lewis

The most extended discussion of 'problems regarding the combining of universals' is Lewis in his [1986a]. He rejects structural universals by offering three possibilities for how universals might combine, and arguing that all face irresolvable difficulties. First he offers a *linguistic conception*: that, '[a] structural universal is a set-theoretic construction out of simple universals, in just the way that a (parsed) linguistic expression can be taken as a set-theoretic construction out of its words' [ibid.: 31]. The problem with this is that because sets are constructed out of simples (there is a basic element relation), it does not cover the possibility of 'structures all the way down'.

The second possibility Lewis offers is the *pictorial conception*, according to which 'a structural universal is isomorphic to its instances' [ibid.: 33]. There is a methane universal which exists over and above all methane molecules and somehow manages to have the same shape or arrangement as they do. The problem here is that on this conception, 'a structural universal is an individual, not a set' [loc. cit.]. He claims this triggers an interesting 'new

<sup>34</sup>In the case of a methane molecule which has 4 atoms of hydrogen (labelled a–d) and 1 atom of carbon (c) the full conjunction would be: Ha & Hb & Hc & Hd & Ce & Bae & Bbe & Bce & Bde.



problem of one over many within the structural universal itself' [ibid.: 39] as follows:

Each methane molecule has not one hydrogen atom but four. So if the structural universal *methane* is to be an isomorph of the molecules that are its instances, it must have the universal *hydrogen* as a part not just once, but four times over . . . But what can it mean for something to have a part four times over? What are there four of? There are not four of the universal hydrogen . . . there is only one.

[Lewis 1986a: 34]<sup>35</sup>

To address this, Lewis considers that one might abandon the idea that the structural universal is *isomorphic* to its instances, but continue to 'hold that a structural universal is a mereological composite, having as parts the simpler universals that it involves' [ibid.: 36]. The problem here though is that, once one fails to individuate structural universals by their structure, different structural universals might be composed of the same ingredients. For example there is now no difference between *butane* and *methane* which are both composed of *carbon*, *hydrogen* and *bonded*. And for Lewis that 'two different things' might be 'composed of exactly the same parts' is unacceptable. In other words, a mereological part–whole relation between individuals is the only combination–relation.<sup>36</sup>

Finally, Lewis offers the *magical conception*, according to which 'a structural universal has no proper parts' [ibid.: 41]. The problem here is that one lacks any metaphysical explanation of the universal's nature and necessary connections. Thus in our example of methane, one can no longer claim that burning methane *must* emit carbon dioxide because it has a carbon *part*. 'This necessary connection is just a brute modal fact' [loc. cit.]; '[a]lthough we understand just what necessary connections are supposed to obtain, we are given no notion how they possibly could' [ibid.: 42]. To sum up Lewis, then: in keeping with his Humean Supervenience, he claims that the only ontological combination relation consists in mereological summing over individuals, and denies the existence of structural universals for this reason.

Forrest [1986b] argues that Lewis's entire attack on structural universals is predicated on a thesis Forrest dubs *Mereology or Magic*, which, he claims, trades on a crucial ambiguity between being *part of* and being *a part of*. The latter, he maintains, is what Lewis has in mind when he speaks of parts, and consists in a mere listing of discrete ingredients. But, Forrest goes on, the former has an equal claim to the meaning of our English 'part', and the

<sup>35</sup>In [1986: 88] Armstrong proffers a solution to this challenge in terms of some universals being '*particularizable*', and thus repeatable, but it is not clear why this should happen in the case of some universals (e.g. *hydrogen atom*) and not others (e.g. *lead*).

<sup>36</sup>In fact, Karen Bennett [forthcoming] points out that, *even granting that the mereological part-whole relation between individuals is the only combination-relation*, Lewis's claim that two different things cannot be composed of the same parts does not follow. This is because a distinction can be drawn in principle between 'entities that are parts' and 'parthood slots', which is intuitively obvious in the case of other relations which may obtain 'many times over', such as cousinhood. This allows that a given set of entities might fill a given set of parthood slots in a number of different ways. She presents a well worked-out formal mereology embodying the distinction.

components it refers to are not discrete. Rather they are not individuable apart from *the means by which we choose to carve them out*. By assuming Mereology or Magic Lewis unjustly neglects this option. Forrest [ibid.: 89] writes:

Our childhood paradigms of the latter concept are the bits and pieces of construction toys. Our childhood paradigms of the part/whole relation are more concerned with the division of fairly homogeneous items, as when we only got part of the cake.

This use of the construction toy metaphor is telling, and grist for our attack on ontological additivity. Nevertheless, examples we discuss below will suggest that Forrest's identification of the latter, 'human-carved' ontological analysis with 'fairly homogeneous items' is a red herring.

### 9. The Combination Problem Reconsidered: What is Combination? What is the Problem?

Now, however, we should ask whether Lewis's 'problems regarding the combining of universals' are the same as our Combination Problem. In fact there are some important differences. The key issue in the *Philebus* is how Pleasure and Knowledge combine in the Good Life. Ontological additivity assumes that the key issue in 'world-making' is identifying the fundamental ingredients. After that, what remains is a simple concatenation of quantities of each type via some simple, single combination relation (mereology for Lewis, and for Armstrong, logical conjunction of atomic states of affairs).

But the combination of Pleasure and Knowledge in the Good Life is much more than any mere concatenation of 'atoms of pleasure' and 'atoms of knowledge'. These entities are richly structured and systemic—both within themselves and in the combination which results in the best human life.<sup>37</sup> The largest part of the dialogue is in fact devoted to exploring that structure.<sup>38</sup>

Kenneth Sayre [2002: 181] has argued that this discussion of eidetic structure is part of an evolution in Plato's theory of Forms, from an earlier logical atomism to a more complex picture:

In the account of the *Phaedo* and the *Republic*, a form's reality lay in its utter simplicity, hence in its inability to admit opposing properties. The Beautiful itself was in no way ugly . . . By the time of the *Sophist* . . . this tenet has been modified to allow Sameness to be different from other forms, and Difference to be the same as itself. Moving into the *Philebus*, we find ourselves dealing with forms that not only lack simplicity but that stand outside of any relation of opposition (what is the opposite of Middle C?). The reality of these forms lies

<sup>37</sup>In the same vein, Rosen has written, 'The cosmos is not a totality of homogeneous and neutral monads but a harmony or communion of reciprocally enabling natures' [unpubl. ms: viii].

<sup>38</sup>The structure of Pleasure is explored at 31b to 55c. The structure of Knowledge is explored at 55c to 59d. In 59e–64e their proper mixture is discussed.

instead in their being single and fixed, and hence independent of temporal change. They are single in virtue of being one . . .

To hold that Forms are single *merely in virtue of being one*, skates dangerously close to tautology. (Under the earlier, more logical atomist, view of universals one can invoke something that might be termed ‘eidetic homogeneity’ to ground the unity of a universal, but not now.) We suggest that this throws extra emphasis on the one–many problem, lending support to our contention that it is a crucial structuring problem in the *Philebus*.

Arguably the key presentation of the Combination Problem occurs right near the end of the dialogue:

That any kind of mixture that does not in some way or other possess measure or the nature of proportion will necessarily corrupt its ingredients and most of all itself. For there would be no blending in such cases at all but really an uncontrolled medley, the ruin of whatever happens to be contained in it.

[*Philebus* 64d9–e3]

The message here is that the nature of the combination can *change everything* in a mixture, in a way which is not at all like Lego, where one can rearrange the parts in all kinds of ways but they themselves remain the same. Consider for example a person's character. It is possible that just a touch more pride, turning the person to hubris, might spoil all their other good qualities—thus what could manifest as perseverance turns to stubbornness, what could manifest as courage turns to rashness, and so on.

Thus our Combination Problem may in fact be understood to have a number of levels:

- i) *A problem of wholes*. How is it possible that by combining A and B one obtains something emergent, C, and yet A and B are *still present*? One might argue that Lewis's account falls at this problem, by failing to do justice to there being a C to speak of. (His mereological approach allows only the many, and gives no convincing account of a one.<sup>39</sup>) Armstrong on the other hand arguably copes with this problem by defining a structural universal as having proper parts, yet not being identical to them in so far as they are combined by a further structural relation R.<sup>40</sup> In this way he can explain C's being something more than merely A and B *via* the addition of R, and he can explain the continued presence of A and B in C by stating that they are proper parts of it.
- ii) *A problem of structure*. How is it possible that mixing A and B one way might result in C and mixing them in another way might result in something quite other (D)? This is a possibility Lewis strictly forbids, but here his commitment to mereology seems to produce demonstrably problematic consequences. In fact Armstrong notes that in this regard Lewis faces a much more general problem than a relatively recondite concern about structural universals—he is forced to

<sup>39</sup>A very useful extended critique of Lewis' reductive mereological account of combination is given by Harte [2002: 20–7]. She calls the reductive view Lewis invokes ‘ontological innocence’ concerning combination, but also astutely notes that he in fact resiles from full commitment *in the letter* to this position by the qualificatory phrase ‘so to speak’ [2002: 22]. The end result is a sweeping reductionism slightly muddled.

<sup>40</sup>In the case of methane, strictly speaking, R is a particular complex of instances of the relation *bonded*.

deny that any atomic state of affairs  $aRb$  might differ from  $bRa$  [Armstrong 1986: 85]. Once again, though, it appears that Armstrong can handle such cases, by claiming that the difference is that in C, A and B are combined with relation R, and in D, A and B are combined with another relation (S).<sup>41</sup>

- iii) *A problem of blending*. However, these formulations of the problem do not yet speak to our final quotation from *Philebus* 64d9–e3. Here the nature of the combination is more ‘intimate’ than we have yet done justice to. Its formal structure might perhaps be indicated as follows: A and B combine and *blend utterly*—the metaphor offered by the dialogue is mixing two liquids in a cup [61c]—such that *A’s very relationship with B enables A to manifest as C* and *B’s very relationship with A enables B to manifest as D*.<sup>42</sup>

This is the true denial of ontological additivity. Although Armstrong’s account of structural universals adds a further relation R, in the posited structural universal, R, A and B all remain the same. In a methane molecule carbon is still carbon, hydrogen is still hydrogen and bondedness is still bondedness. By contrast, in the case of Knowledge and Pleasure combining to form the Good Life, the constituents are not the end-product’s *proper parts*. Arguably there is no part of the Good Life that is all Knowledge and no Pleasure, and *vice versa*. Relatedly, there *is no relation* R combining the two whose nature is describable independently of the structured natures of the key ingredients of Knowledge and Pleasure, which determine how they mingle. (We might say that in this case, ‘K and P themselves are R’.)

Yet at the same time this is not like the conjunctive universal *green and round*, since A blended with B is not the same as A alone (and *vice versa*), whereas *green* is *green* whatever shape it is instantiated in. Thus Armstrong’s account of universal-combination falls *here*. Yet only at this third level of the Combination Problem do we finally meet the key questions concerning the Good Life in the *Philebus*: How does Knowledge inform and structure Pleasure? How does Pleasure enliven Knowledge? What is the correct blend and harmony between the two in actual lived human lives?

One moral of this discussion is that Forms as invoked in the *Philebus* are more individually structured and more richly integrated with one another than much discussion of their descendent ‘universals’ in contemporary metaphysics would suggest. Their integration is as important as their ideality for the philosophical work they do. By missing this, Lewis arguably fails to see an obvious answer to his problem with the pictorial conception of structural universals. Given that every methane molecule contains four hydrogen atoms, he asked, ‘What can it mean for something to have a part four times over? What are there four of? There are not four of the universal hydrogen ... there is only one ... The pictorial conception as I have presented it has many virtues, but consistency is not one of them’ [Lewis 1986a: 34]. Here, however, he appears to take for granted that the ingredient

<sup>41</sup>To spell this out in the simplest logical form possible:  $(Aa \ \& \ Bb \ \& \ Rab)$  and  $(Aa \ \& \ Bb \ \& \ Sab)$  are obviously not logically equivalent.

<sup>42</sup>These words have been extremely carefully chosen. It is tempting to say that the presence of B *turns A into C*, and the presence of A *turns B into D*. But the problem with this is that Forms, being ‘not taken from the things that come to be or perish ...’ [*Philebus* 15a1–2], cannot themselves alter.

universals must be *hydrogen*, *carbon* and *bonded*. One candidate he failed to consider was *four*. But this is precisely the kind of structure that might really assist in explaining methane's properties and behaviour.<sup>43</sup>

How does all this speak to our eidetic one–many problems? Each universal is one, but also many. An explanation of how a universal is many has to do much more than note its maniness, or bundle that maniness together into a one—it has to be able to describe how that maniness is *organized*. That principle of organization will itself be complex, because a universal can be complex in more than one way, as we have seen, and to make the matter even more complex the very act of combination may alter how the ingredients *are* in that context. Reified hylomorphism is ill-equipped to deal with this.

Plato's own answer to the one–many problem in the *Philebus* therefore arguably involves abandoning the notions of 'one' and 'many' in favour of *peras* and *apeiron*, frequently translated as 'limit' and 'the unlimited'. Using these concepts he builds an account which we believe allows him to deal with unity and complexity in all its forms. But that is a story for another paper.

## 10. Conclusion

We have identified three new one–many problems which occur purely in the realm of Forms, turning respectively on the relations of *instantiation*, *subkind* and *part*, which we have argued are all mutually irreducible. For a reified hylomorphism to postulate universals to attempt to explain first-order sameness of type and simultaneously ignore these problems seems inconsistent. Moreover we now see that ontological additivity with its degenerately simple combination relations begs important questions concerning the reality of relations. A more profound and objective debate on this question would be both enjoyable and instructive.<sup>44</sup>

*University of Waikato*

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<sup>43</sup>If there is a book of Nature, it is written in the language of mathematics' (attributed to Galileo). Once again, the distinction drawn by Bennett [forthcoming], between parthood slots and their occupiers, is of use in clarifying that a structural relation may be irreducible to a list of its relata, *even where that structural relation is the part-whole relation*.

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