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Title: Varieties of Plenitude
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Varieties of Plenitude

Abstract.   *Material Plenitude* is the view that there is an abundance of coincident objects wherever there is any material object. Although plenitude has garnered increased attention from metaphysicians in recent years, it has yet to be well-understood beyond its slogan from. The goal of this article is to explore a few places for puzzlement about plenitude; in particular, how we ought to motivate and formulate the target view. I'll suggest along the way that an investigation of plenitude is not merely of interest in its own right, but can provide valuable insights into abundant ontologies more generally.

There are many ways to be permissive about what there is. *Permissivists* about ontology might hold, for example, that abstracta (like properties, propositions, or sets) are abundant, or that material things have an abundance of parts we don't ordinarily recognize. The permissivist label also paradigmatically includes those who endorse *mereological universalism*, according to which any collection of things composes something. This article concerns an important -- but far less familiar -- variety of permissivism: *material plenitude,* the view that every material object coincides with an abundance of other objects. In particular, plenitude says that there is an object corresponding to every consistent "*modal profile*", where an object's modal profile specifies its modal persistence conditions (roughly; the changes or circumstances that it can and cannot survive).[1]

Plenitude is usually motivated by a certain reaction to the puzzles of material constitution.[2] Consider: a sculptor sits in her workroom admiring her newest vase. Were she now to take issue with the

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[1] Varieties of plenitude have been defended by, among others, Fine (1982, 1999), Yablo (1987), Hawthorne (2006), Leslie (2011), Jago (2016), Fairchild (2019), and Kurtsal (ms). Other varieties of permissivism that allow for a plenitude of coincident objects include those discussed in Eklund (2006, 2008) and Thomasson (2007, §9.6 and 10.3), (2015, §6.1).

[2] See Paul (2010) for an overview.

size of the mouth of the vase or the width of the bottom, she could make a number of changes without destroying the vase. But were she instead to squash it completely, the vase would be destroyed, but the lump of clay that made it up would survive. *Pluralists* about material constitution say that the vase and the lump of clay that make it up are distinct; *serious pluralists* insist that this is so regardless of whether the clay actually outlives the vase. According to serious pluralism, distinct material objects can occupy the same region of space for the duration of their existence. We say that these permanently coinciding objects have different modal profiles; they are able to survive through different circumstances, and have different properties *essentially* and *accidentally*. (For example: the vase may have its rough shape essentially, but the lump has that shape only accidentally. The lump may have its component matter essentially, while the vase may be able to survive the loss of some parts, and so has those parts only accidentally.)

But, having admitted that there are distinct coincident objects corresponding to different modal profiles, it seems that it would be objectionably arbitrary to stop with *just* the vase and the lump. Why should a world rich enough to contain spatiotemporally coincident objects contain *only* those objects corresponding to familiar modal profiles, and not relevantly similar (but nonetheless unfamiliar) ones? Why not, for example, something coincident with the vase which cannot survive even very slight changes to its shape? Why not also something that is created when a bouquet of flowers is put in the vase, but cannot survive their death or replacement? Having acknowledged that the world is varied in the ways the serious pluralist suggests, and absent any satisfying answers to these questions, we seem to be driven to the view that *every* consistent profile corresponds to an object.

Thus, many metaphysicians sympathetic to pluralism have been led to the conclusion that there are coincident objects witnessing the *full* range of modal variation.[3] And although it is often on grounds of anti-arbitrariness considerations like these that philosophers have found varieties of plenitude so appealing, plenitude promises other advantages as well. For example, if we take mereological universalism as a paradigm of permissivist ontology, we have some reason to expect that permissivist pictures in general will be both more powerful and more elegant than more conservative alternatives. More powerful, in that they promise to provide resources for addressing or dissolving long-standing puzzles in metaphysics, and more elegant, in that they are usually characterized by simple, general principles. However, whether and how an abundant ontology of coincident objects equips us to address familiar problems in metaphysics will depend heavily on the details, and, as we'll see, pinning down the details of plenitude is not entirely straightforward.

The goal of this article is to introduce and explore a few places for puzzlement about plenitude. I'll suggest along the way that an investigation of plenitude is not merely of interest in its own right, but can provide valuable insights into abundant ontologies more generally. Although what follows is far from a comprehensive survey, my hope is that it will provide a foothold for further exploration into recent debates.

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[3] I'll here remain mostly neutral on whether by "coincidence" we mean mere spatial coincidence (sharing of location), material coincidence (sharing of some or all material parts), or something else. Much of what follows assumes only that the objects guaranteed by plenitude are *co-located*, and leaves open whether they stand in more intimate mereological relations. This is in part because each of the varieties of plenitude we'll consider in Section 3 comes with its own set of choice-points for how plenitude interacts with mereology, raising questions that are unfortunately beyond the scope of this article.

I begin in Section 1 by briefly situating plenitude within a broader investigation of varieties of permissivism, and then turn in Section 2 to some of the motivations for plenitude that help shape our understanding of the target view. Despite its importance, plenitude often isn't well understood beyond its slogan form, and much of our grip on what it could mean to insist that "every consistent modal profile is instantiated" comes from reflecting on the challenges that motivate the view. In Section 3, I distinguish three 'varieties of plenitude' on offer in recent literature -- each corresponding to a different way of filling out the slogan -- and discuss some of the questions illuminated by each.

1   Plenitude and Permissivism

Following recent literature, I'm using 'plenitude' as a label for a very specific permissivist thesis, concerning the extent of modal variation between coinciding objects, but it has a much broader legacy as a permissivist term. 'Plenitude' has been employed to label -- for example -- permissivist theses about possible worlds, properties, and mathematical structures. Most famously, 'the principle of plenitude' is the name given by historian A. O. Lovejoy to the idea that "the universe contains all possible forms of existence"; that everything that can exist, does exist. (Lovejoy, 1936) A (somewhat more tame) version of *that* thesis has more recently been called 'maximalism':

> "What maximalism says is that for any type of object such that there can be objects of that type given that the empirical facts are exactly what they are, there are such objects." (Eklund, 2008)

Maximalism thus glossed purports to guarantee not *just* an abundance of coincidents, but also perhaps bizarre fusions, abstracta, and other 'pleonastic entities'.[4] Although maximalism has much more radical consequences, plenitude (as we're understanding it) shares a driving idea with its maximalist namesake: they both mean to capture the thought that ontology is (in the relevant respects) "*full to the brim*".

It can therefore be instructive to think about plenitude alongside maximalism and other radically permissivist theses. Despite important differences between varieties of permissivism, maximally liberal positions in ontology tend to face a family of challenges that can be mutually illuminating. For example, like some of the varieties of plenitude we'll explore below, maximalism is *wickedly* difficult to formulate consistently. Eklund himself acknowledges that the reference to consistency with empirical facts "at best fudges things", and even plausible precisifications of the gloss above face the challenge of incompossible objects. (That is: we can generate pairs of objects such that each is compatible with the empirical facts as they are, but which are such that it is impossible for them *both* to exist.[5]) Certain versions of plenitude

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[4] On 'pleonastic entities', see Schiffer (2003, Chapter 2). Maximalism has its roots in debates in the philosophy of mathematics that will unfortunately take us too far afield here, but see Eklund (2006) and Linnebo (2012) for related overviews. The 'simple realism' developed in Thomasson (2015) has many affinities with Eklund-style maximalism; see especially the discussion in §6.1-6.3.

[5] See, for example, *xhearts* and *xlivers* in Eklund (2006, 112). See also Thomasson (2015, Chapter 8) on the relevant generalization of the "bad-company problem" for Neo-Fregeanism.

similarly require us to carefully distinguish between what is metaphysically possible (eg. what patterns of essential and accidental properties it is possible for something to have) and what is "locally compatible". As we'll see in Section 3, inquiry into those very same versions of plenitude reveals new resources for thinking about these challenges. Further exploration of these connections, I hope, will entitle us to the preliminary but optimistic conclusion that the tools we draw on to better understand plenitude can inform our study of even more unwieldy varieties of permissivism.

2   Motivations for Plenitude

We've seen above how an aversion to 'objectionable arbitrariness' -- as well as, perhaps, an aversion to settling ontological questions in favor of the familiar -- can motivate radically permissive ontologies. These lines of reasoning are sometimes called *the argument from arbitrariness* and *the argument from anthropocentrism*, respectively, but it is not entirely clear how we should spell out the details of either. Consider the following representative passages [6]

> "Even if we do not ourselves recognize essentially juvenile or mature entities, it is not hard to imagine others who would; and to someone who, in addition to the statue and the piece of clay, discerned a statue-cum-shards, not everything coincident with the statue would be fragile. Conversely, we recognize things, say, essentially suitable for playing cribbage, or cutting grass, which others do not, or might not have. To insist on the credentials of the things *we* recognize against those which others do, or might, seems indefensibly parochial. In metaphysics, unusual hypothetical coloring can be no ground for exclusion. Since this is metaphysics, everything up for recognition must actually be recognized; and, when this is done, there are coincidents enough to witness the hypotheticality of every hypothetical property." (Yablo, 1987, p307)

> "Isn't it anthropocentric to suppose that the ontology of the world matches (more or less) exactly what human speakers have words for? (...) The simplest exercises of sociological imagination ought to convince us that the assumption of such a harmony is altogether untoward, since such exercises convince us that it is something of a biological and/or cultural accident that we draw the lines that we do. If we are to be charitable to ourselves without being unduly chauvinistic, it seems that we should posit ever so many more objects than we habitually talk about, in order not to credit ourselves with too much luck or sophistication in hitting ontological targets most of the time." (Hawthorne, 2006, p105)

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[6] For similar appeals, see Cartwright (1975, 158),Van Cleve (1986, 145), van Inwagen (1990, 66-69, 126), Sosa (1987, 178), Sosa (1999, 178), Sidelle (2002, 119-120), Hawthorne (2006, vii), Van Cleve (2008, 323-333), Leslie (2011, 281), Thomasson (2015, 214), Fairchild (2017, 34), and Uzquiano (forthcoming). For replies and criticism, see eg. Korman (2010, 2015).

"The argument from arbitrariness turns on the claim that there is no difference between certain of the familiar kinds that we intuitively judge to exist and certain of the strange kinds that we intuitively judge not to exist that could account for the former's but not the latter's having instances. In short, there is no ontologically significant difference between the relevant strange and familiar kinds." (Korman, 2010, p123)

We find in the above a number of connected motivational threads. One strand turns on the thought that if we begin with a presumption of optimism in favor of certain of our ontological judgments, then the only acceptable metaphysics will be a radically permissive one. Perhaps, as one passage seems to suggest, this is due to the suspicion that *if* a more conservative metaphysics were right, then our ontological successes would be "too lucky" to be knowledge. Or, maybe, the presumption of optimism about ordinary judgments leads us to permissivism because any *non*-permissivist metaphysics capable of validating such optimism would be bizarre or unpalatable in some other way. (See Hawthorne and Fairchild (2018), especially Section 4.) On the other hand, the appeals to 'indefensible parochialism' and 'biological and/or cultural accidents' suggest a more direct attack on conservative metaphysics in the form of a debunking argument, which aims instead to undermine our ordinary ontological beliefs. (The rough idea here is that the judgments some conservative ontologies aim to validate are rendered epistemically illegitimate when we reflect on their origins.) However, Korman (2015, §7.3) argues convincingly that there is no stable argument *for permissivism* in the vicinity of this latter line, in part because shoring up *already* suspect ontological beliefs by positing a plenitude of objects does nothing to improve their epistemic standing.[7]

Both lines of argument turn on contentious commitments about the status of our ordinary ontological judgments.[8] For this reason, the kind of argument described (but not endorsed) by Korman in the final passage above seems to me a much more promising line. The crucial underlying idea there is that the world doesn't admit of *parity* violations: the best metaphysics must treat like cases alike. So, for example: the only way for it to be that there is something coincident with this ball that is essentially red and accidentally round, but that there isn't *also* something that is accidentally red and essentially round is for there to be some "ontologically significant difference" between these modal profiles.[9] Pessimism about the presence of such differences pushes us away from moderate metaphysics, and towards ontological extremes.[10]

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[7] On this final point, it is interesting to compare Linksy & Zalta (1995) and Balaguer (1995)'s responses to the epistemological argument against mathematical Platonism.

[8] Though see also Thomasson (2015) for helpful discussion of an argument from Bricker (forthcoming) that appeals to a kind of anti-parochialism in defense of certain radically permissive pictures. His complaint is not that particular theories are objectionably anthropocentric, but rather that the virtues we appeal to in metaphysical theory choice provide only parochial grounds for believing theories.

[9] To get a sense of what it might be to deny this, consider Markosian (1998).

[10] Fairchild (ms) discusses at length whether and how this line of thought can be developed as a positive argument for plenitude.

Once untangled, each of these threads might well support forceful arguments for plenitude. However, it is worth noting that developed versions of arguments along these lines will turn on substantive epistemic and metaphysical hypotheses which have rarely been as fully explored in the context of plenitude as they have when it comes to (for instance) mereological universalism. We shouldn't be surprised if there turn out to be some important differences here: for example, even by the debunkers' lights, the origins and epistemic standing of ordinary judgments about composition may well come apart from that of ordinary judgments about survival, essence, and accident. Similarly, depending on how we conceive of 'ontologically significant differences', questions about whether restrictive theories of composition involve drawing some kind of parity-violating distinction between cases may be largely independent of whether restrictive accounts of *coincidence* do as well.

In general, arguments paradigmatically employed to motivate mereological universalism might not always carry over as smoothly to the case of plenitude as we might hope. For example, the version of the *argument from vagueness* found in Lewis (1986, p212) and later developed in Sider (1997, 214) turns on the idea that if only *some* pluralities have mereological fusions, then there must either be some sharp cut-off for when compostion occurs, or there must be borderline cases of composition (ie. there must be pluralities such that its indeterminate whether they compose something). But there can't be any borderline cases of composition, and any such cut-off would be objectionably arbitrary, so (the argument goes) either every plurality has a fusion or none does.[11]

Much of the action in Sider's discussion and in the large subsequent literature is in defense of the former conjunct. Here we find at least one potential point of departure when we consider how the corresponding argument for plenitude might go: the usual case against borderline cases of composition relies on the rejection of a certain kind of 'worldly indeterminacy'. But notice that even those who find it implausible that the world could fail to settle whether some things compose might be significantly more sympathetic to the thought that the world might fail to settle whether some property is had essentially or accidentally. The plausibility and consequences of *this* kind of metaphysical indeterminacy will hinge on questions about the delicate interaction between modality and indeterminacy, not easily reduced to any of the issues driving the current literature on vagueness arguments for mereological universalism.[12] Moreover, *all* of the foregoing will be sensitive to *which* formulation of plenitude we have in mind. As we'll see in the next section, there are a number of different frameworks for interpreting the target idea, and each might be differently suited to the sorts of arguments we've considered so far.

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[11] See Korman (2010) for an overview.

[12] Compare Wallace (2014), which presents a version of the vagueness argument for the thesis that ordinary objects are 'trans-world sums' of modal parts. The resulting picture is a version of plenitude that maintains analogies between a family of permissivist theses about synchronic, diachronic, and modal composition, but in so doing builds in a more contentious background metaphysics than many permissivists will want to endorse. (See Wallace (2019) for further discussion.) Korman (2015) also presents and responds to a modalization of the vagueness argument that is formulated as a more direct analog of Sider's argument for *diachronic* universalism. For relevant critical discussion of the extension of the argument to the diachronic case, see especially Magidor (2015).

A final source of motivation for plenitude comes from the potential for fruitful applications to longstanding puzzles. For example, Bennett (2004) argues that serious pluralists must endorse plenitude not just to avoid arbitrariness, but in order to provide an adequate answer to the grounding problem. Leslie (2011) argues that material plenitude allows us to dissolve a family of 'paradoxes of essentialism' involving 'tolerant' essences. Dasgupta (2016) proposes a solution to Parfit's Non-Identity problem in ethics that relies on material plenitude, while Sider (2017, p2476) suggests that plenitude might provide the right framework for theorizing about Haslangarian social structures.

Each of these applications will similarly be sensitive to the details of plenitude. Some -- like the appeal to plenitude as a response to the grounding problem -- seem to require a version of plenitude that makes good on the elusive 'fullness' idea. (As Bennett puts it: "...because all of the complete modal profiles possible in a given spatiotemporal location are instantiated there, there is no contrast to be drawn between those that are instantiated and those that are not." (ibid, p355)) Others require only *enough* abundance to guarantee objects with certain sorts of modal profiles. Sider's proposed application, for instance, requires spatiotemporally scattered objects whose persistence conditions are sensitive to their socio-political environment. To understand the prospects for plenitude, then, we'll need a much better sense of the details.

3   Varieties of Plenitude

3.1   Occupational Plenitude and the Ambitions of Plenitude

Perhaps the clearest version of plenitude is developed in Hawthorne (2006). We'll say that a *modal occupation profile* is a function from worlds to matter-filled regions of spacetime. An object is described by a modal occupation profile *iff* for each world *w* at which it exists, it occupies exactly the regions *f(w)* there. What we'll call *occupational plenitude* then says:

Occupational Plenitude. There is an object described by every modal occupational profile.

Occupational Plenitude (OP) has the virtue of being both straightforward and stable. But OP also illuminates important questions about the ambitions of plenitudinous metaphysics and, thus, reasons we might have to investigate other ways of thinking about material plenitude. In particular: occupational plenitude might fall short of guaranteeing the variety we'd hoped for from plenitude, if we grant that there are material objects whose patterns of survival aren't exhaustively characterized by their occupational profiles.

Hawthorne (2006) suggests that OP might help us to accommodate things like *restaurants,* which are distinct from any of the buildings they occasionally coincide with. But it seems that restaurants can also sometimes survive without occupying any particular spatial region (for example, if they survive through periods where their proprietors have closed one location and are scouting another, or during certain legally complex transfers of ownership). Food trucks may make this especially vivid: like brick-and-mortar

restaurants, 'mobile restaurants' are distinct from the vehicles with which they sometimes coincide, and moreover seem able to persist without being spatially located. Imagine the Sleepy Burrito; a 'mobile restaurant' that is only open on Saturdays. To avoid the cost of owning a truck, the proprietor instead rents vehicles from another company, and it is often not until Friday that the company settles which she will be able to take out on any given weekend. We might then think that the Sleepy Burrito isn't (exactly) located *anywhere* on weekdays.[13] But it seems that the Sleepy Burrito still *survives* the rest of the week; the restaurant isn't destroyed each Sunday and revived anew each Friday afternoon.

Occupational Plenitude can guarantee that there is some object (call it 'a *concrestaurant*') described by the modal occupation profile that picks out exactly the regions occupied by the Sleepy Burrito whenever it is coincident with *some* vehicle. The concrestaurant and the Sleepy Burrito (necessarily) have the same modal occupation profile, but because there are things that the Sleepy Burrito persists through that the concrestaurant can't survive (like Mondays), they don't have the same "modal persistence conditions". So, while OP might deliver concrestaurants, it won't on its own give us the resources to distinguish between restaurants and *concrestaurants.*

To be clear: I don't take the case of the Sleepy Burrito to be a *problem* for OP. If anything like the above is right, then Occupational Plenitude is at least partial hypothesis about what there is that plenitude-lovers should be happy to accept. The Sleepy Burrito suggests only that Occupational Plenitude might not live up to the ambitions of the target idea -- of accounting for the 'full range of modal variation between coincidents'.

But is even this too hasty? After all, the version of plenitude we're interested in is typically advertised as a thesis about the material world.[14] Is the Sleepy Burrito really a *material object*? On the one hand, the Sleepy Burrito *seems* like the sort of thing that I could kick; that is some evidence in favor. On the other hand, it is tempting to think (as Markosian (2000) does) that material things are essentially spatiotemporally located, and so whatever the Sleepy Burrito is, it can't be material. In a recent paper, Korman (forthcoming) defends an immaterialist picture of establishments, arguing that although things like restaurants can be located, they are never constituted by anything and so (strictly speaking) don't have any material parts at all.

For our present purposes, I think it is best to set aside disputes about materiality and focus instead on a corresponding choice point about the ambitious of plenitude. We might hope for plenitude to help answer a range of different questions for us: What material objects are there? How much modal variation is there between spatiotemporally coincident things? What sort of ontology is rich enough to describe a world populated by electrons, vases, lumps, cats, food trucks, and soccer teams? Occupational plenitude may satisfy the one inquiry and still leave us curious about others, especially if we are willing to

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[13] Or maybe it has a location, but lacks an *exact* location. You might imagine yourself saying: "There's this great new food truck in Ann Arbor that you should try; you should find out where it will be this weekend."

[14] Though, strictly speaking, the gloss we started with leaves open whether the coincidents delivered by plenitude must themselves be material. (Also left open is whether our preferred notion of coincidence is liberal enough to allow immaterial things to coincide with material things.)

acknowledge that (on something like Korman's conception of materiality) material ontology exhausts neither the world of spatially located things, nor the world of everyday interest. Insofar as our ambitions track the latter two questions, cases like the above reveal that we have at least some reason to investigate other ways of thinking about plenitude.

3.2   Essentialist Plenitude and Consistency

Our initial case for plenitude was formulated not in terms of differences in possible spacetime paths, but rather in terms of differences in the essential and accidental properties of coinciding objects. This suggests formulations of plenitude that treat 'modal profiles', roughly, as partitions of properties into those had essentially and accidentally. Here's how Bennett (2004) puts it:

> "The story is really very simple. It is this: every region of spacetime that contains an object at all contains a distinct object for every possible way of distributing 'essential' and 'accidental' over the non-sortalish properties actually instantiated there."

(By 'non-sortalish', Bennett means to exclude things like modal, kind, and sortal properties. More on this below.) I'll call varieties of plenitude formulated with something like this notion of modal profiles '*essentialist'* varieties of plenitude. Essentialist formulations of plenitude -- on the face of it -- have better resources for accommodating the ambitions we worried about living up to above. But attempts to formulate plenitude in this way face other challenges. Fairchild (2019) distinguishes two: the *consistency* problem (corresponding roughly to the task of finessing the 'for every possible way' clause in Bennett's gloss) and the *bad eggs* problem (corresponding roughly to the task of finessing Bennett's restriction to 'non-sortalish' properties).

First, bad eggs. A central motivation behind plenitude is the idea that many of an object's properties are had essentially by something coincident with it. For nearly every change I undergo, there is something hereabouts that cannot survive it: something coincident with me is essentially sitting, and destroyed when I stand, something is essentially typing, and destroyed when I pause. Plenitude similarly purports to guarantee that very many of my properties are had accidentally by something coincident with me -- for example, something here is only accidentally living, and survives my last breath. But this can't go for *all* properties: certain properties *can't* be had essentially and others can't be had accidentally, even for the ontologically ambitious plenitude-lover. Any consistent formulation of essentialist plenitude, then, will have to build in *some* restriction on the properties used to 'build' a modal profile. (We've seen in Bennett's proposal the suggestion that we exclude things like modal, kind, and sortal properties, though see Fairchild (2019) for worries about that strategy.[15])

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[15] See also Spencer (forthcoming) for a related argument that trying to find a general answer to the question "Which properties can be had essentially?" is probably hopeless.

Leslie (2011) instead suggests that we restrict to sets of *strongly modally independent* properties. Roughly, the idea here is to base modal profiles on sets of properties such that it is possible for something to have any subset of them while lacking the others. This approach has the added advantage of engaging the second challenge for essentialist plenitude: the *consistency* problem. Roughly, the idea here is that there are some partitions of apparently innocent properties that yield impossible modal profiles. For example, nothing has *being red* as an essential property and *being colored* as an accidental property. Partitions like this correspond to modal profiles that are in some sense 'inconsistent': they're ruled out on general metaphysical grounds. Leslie's restriction to modally independent properties avoids many of these sorts of challenges, but may face others.

For one thing, the resulting version of plenitude will turn out to be extremely conservative. The variation we can account for when we restrict ourselves to profiles based on sets of properties satisfying such a strong independence condition will be much less rich, it seems, than what is suggested by the target idea. A simplified illustration: we won't be able to generate distinctions between an object that is essentially colored and essentially red and an object that is essentially colored but only accidentally red. More worryingly, though, the independence condition might not *even* suffice to address the consistency problem. Fairchild (2019) discusses this problem in detail, but the rough idea is this: a consistent formulation of plenitude demands not only that eligible modal profiles be 'internally' consistent, but also that they be 'locally' consistent: roughly, compatible with how things stand at a given world. (To see this, notice that a consistent profile based on some object o's properties is of no use to the plenitude lover if it can't be instantiated by something coincident with o.[16])

3.3   Hylomorphic   Plenitude   and   Individuation

Hylomorphic formulations of plenitude trade the elusive ideology of 'modal profiles' for that of *forms*. Very broadly, on a hylomorphic conception of material objects, we distinguish between the *matter* that makes up an object and the *form* it embodies. Conceptions of form differ, but most contemporary hylomorphists regard forms as immaterial components of material objects that somehow unify, mold, or structure their material parts. Hylomorphic frameworks are thus well-suited to serious pluralism: the vase and the lump of clay are made up of the same matter, but embody different *forms*. Although not all hylomorphists (or even all hylomorphic pluralists) adopt a plenitudinous ontology, some of the most well-known discussions of plenitude assume a kind of hylomorphic background picture.[17]

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[16] Yablo (1987) is especially interesting in connection with this. At one point, he assumes strong independence. However, because his statement of plenitude (the 'fullness condition' in fn18) more closely resembles the functional approach to modal profiles exemplified by Hawthorne's *occupational plenitude*, the versions of the *bad eggs* and *consistency* problems that arise will look slightly different.

[17] For some contemporary discussions of (non-plenitudinous) hylomorphism, see Koslicki (2008, 2018) and Evnine (2016). I discuss Finean plenitudinous hylomorphism at length below, but see Johnston (2006) for another plenitude-friendly version of hylomorphism, especially p696-698.

For example, Sosa (1987, 1993, 1999) famously describes the plenitudinous "explosion" of reality as a consequence of a "broadly Aristotelian conception" of material objects:

> "We are supposing a snowball to be constituted by a certain piece of snow as constituent matter and the shape of (approximate) roundness as constituent form. Compare now with our ordinary concept of a snowball the concept of a "snowdiscall", which we may define as an entity constituted by a piece of snow as matter and as form any shape between being round and being disc-shaped. At any given time, therefore, any piece of snow that constitutes a snowball constitutes a snowdiscall … Now, there are infinitely many shapes S_1, S_2,.. between roundness and flatness of a piece of snow, and for any shape S_i, having a shape between flatness and S_i would give the form of a distinctive kind of entity (....). Whenever a piece of snow constitutes a snowball, therefore, it constitutes infinitely many entities all sharing its place with it. Under a broadly Aristotelian conception, therefore, the barest flutter of the smallest leaf creates and destroys infinitely many things, and ordinary reality suffers a sort of "explosion". " (Sosa, 1999, p132-133)

Hylomorphic frameworks illuminate yet another family of questions about plenitude and permissivism. I'll mention just one of the many interesting issues in the vicinity: the interaction between permissivist principles and individuation, and the related challenges of generalizing to pluralized formulations of plenitude.

Kit Fine's *theory of embodiments* delivers a particularly revealing version of hylomorphic plenitude. The most straightforward entry point is through what Fine (1982) calls *qua-objects*: a qua object o/G (pronounced o-*qua*-G) is a hylomorphic compound with material component o and form G, and exists whenever object o has the property G. Qua-objects are a special case of what Fine (1999, 2008) calls *rigid embodiments*, which are governed by a principle of plenitude generalized to cover plural cases:

Existence (1999, p66)   The rigid embodiment a, b, c, d… / R exists at t iff the relation R holds of a, b, c, d… at t.

So, whenever we have some flowers and they stand in the relation *being bunched,* there is the rigid embodiment: those flowers in the relation *being bunched* ("what might ordinarily be called "a bunch of flowers.""). (ibid, p65) Forms, for Fine, are (one- or many-place) relations that somehow "modify or qualify" the material components of the hylomorphic compounds of which they are parts. (Importantly, the operation of embodiment forms a new kind of structured whole; a material object rather than a *fact* or a *state*.)

The final part of the Finean picture concerns *variable embodiments*: given some function F from times to objects, the variable embodiment /F/ is the object constituted at each time by whatever the value of F is then. At any given time, my bicycle is constituted by some rigid embodiment, but unlike any rigid

embodiment, the bike can survive the replacement of its material parts. Thus, according to Fine, my bicycle is itself a *variable* embodiment: at any time it has some structured whole as its immediate material part, but it might be constituted by different structured wholes at different times.

I've alluded here to the *existence* principles for rigid and variable embodiments, but Fine's picture (like other hylomorphic theories) also requires corresponding *identity* principles. These are principles that tell us the individuation conditions of embodiments (ie. under what conditions we have distinct material objects). For example, in the case of rigid embodiments, Fine proposes:

> **Identity** (ibid, p66)   The rigid embodiments $a,b,c,.../R$ and $a',b',c',.../R'$ are the same iff $a = a'$, $b = b'$, $c = c'$, . . . and $R = R'$.

He later suggests that this might yield a more "embarrassing diversity" of objects than we'd like: for example, if relations are individuated finely enough, wherever there are two stacked blocks a,b we'll have distinct objects corresponding to a,b/*being beneath* and b,a/*being on top of*.

In this way, hylomorphic frameworks -- perhaps in contrast to the other plenitudinous pictures we've seen so far -- make vivid the importance of the role individuative principles play in generating abundance. Compare, for example, a version of hylomorphism on which we understand 'embodiment' weakly enough that one object can embody *many* distinct forms, and so hylomorphic compounds turn out to be as 'coarse grained' as the matter they're based on. Such a picture could be governed by a plenitudinous existence principle, but it seems it would be (at best) deeply misleading to call it a variety of plenitude.

The interaction between generative existence principles and individuative principles is high stakes in another way, thanks to the nearby threat of inconsistency. This threat takes different forms: for example, Uzquiano (2018, 428) argues that given a sufficiently liberal theory of relations, **Existence** and **Identity** are inconsistent with the assumption that there is more than one object. The idea, very roughly, is that the proliferation of 'fine-grained' rigid embodiments runs afoul of a theorem of plural logic which says that there are more pluralities of objects than objects. (Jacinto & Cotnoir (2019, 913) discuss a Cantorian complaint to the same effect, while Fairchild (2017) raises a related Russellian puzzle for the *theory of qua-objects*.) Of course, the threat here needn't be fatal: as each of these pieces argue, the plenitudinous hylomorphist has a range of ways to stabilize things. However, *every* option puts pressure on the widely shared difficulty of juggling a general commitment to non-arbitrariness while maintaining a metaphysically plausible approach to individuation.

4   Final Remarks

We've surveyed some of the motivations for and varieties of plenitude, but a number of questions remain. Most saliently, I've remained almost entirely silent on the relationships between the above frameworks. How, for example, varieties of hylomorphic plenitude relate to their essentialist cousins? If and when they do come apart, does one or the other of these formulations provide a better framework for understanding

the target view? Do these frameworks fare equally well with respect to the arguments for (and against) plenitude?

All of these questions provide fruitful directions for future work. However, as I currently see things, we'll do far better to investigate each of the kinds of abundance delivered by different ways of spelling out the slogan with which we began. In part, this is because each framework helps to illuminate metaphysical issues close to the heart of plenitude, having to do with materiality, coincidence, individuation, essence, and modality. More importantly, however, my hope is that a more expansive inquiry into plenitude will better prepare us to tackle the tangled terrain surrounding even more radical varieties of permissivism.

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