Neo-Aristotelian Plenitude

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Abstract

Plenitude, roughly, the thesis that for any non-empty region of spacetime there is a material object that is exactly located at that region, is often thought to be part and parcel of the standard Lewisian package in the metaphysics of persistence. While the wedding of plentitude and Lewisian four-dimensionalism is a natural one indeed, there are a hand-full of dissenters who argue against the notion that Lewisian four-dimensionalism has exclusive rights to plentitude. These 'promiscuous' three-dimensionalists argue that a temporalized version of plenitude is entirely compatible with a three-dimensional ontology of enduring entities. While few would deny the coherence of such a position, and much work has been done by its proponents to appease critics, there has been surprisingly little by way of exploring the various forms such an ontology might take as well as the potential advantages of one plenitudinous three-dimensional ontology over another. Here I develop a novel form of plenitudinous three-dimensionalism, what John Hawthorne (2006) has called "Neo-Aristotelian Plenitude," and argue that if one is inclined to endorse an abundant three-dimensional ontology, one is wise to opt for a plenitude of accidental unities.

1 Diachronic Plenitude

Let's begin by defining a *modal occupation profile* as a function from worlds to sets of non-empty regions of spacetime in those worlds: each world w is assigned a set of filled regions of spacetime in w. The modal occupation profile of w, then, is the set of filled spacetime regions in w, call it P_w.[1] With this in mind, we can then define the thesis of *plenitude* as follows:

[1] See Hawthorne (2006a: 53).

> PLENITUDE: for any subset, *s*, of P_w, there is at least one object, *o*, that exactly occupies *s*.

As a piece of metaphysical machinery, plentitude is often thought to go hand in hand with four-dimensionalism of a Lewisian stripe, the view that objects persist by being temporally extended and are mereological fusions of their temporal parts or stages.[2] That is, a plenitudinous ontology *just is* one consisting of a plenitude of temporal stages.[3]

Let's unpack this a bit. Moving from the occupation profile of *worlds* to *worms*, the four-dimensionalist holds that the occupation profile for each persisting object is the set of non-empty regions of spacetime for that object's spatiotemporal career (for each worm there is assigned a set of non-empty regions of spacetime), call it P_o. With this in place, the four-dimensionalist goes on to state that for *any* subinterval, *s*, of a persisting object's occupation profile, P_o, together with a function *f* assigning a non-empty class of objects *f(s)* to each *s*, there is an object *o* that exactly occupies that interval and is composed of exactly the objects in *f(s)*.[4] This rather liberal cross-temporal principle is known as *diachronic plenitude* and can be stated as follows:

> (DP) DIACHRONIC PLENITUDE: for any subinterval *s* of P_o, and any function *f* assigning a non-empty class of objects *f(s)* to each *s* in P_o, there is at least one object *o* that exactly occupies *s* and is composed of all and only the objects in *f(s)*.

Let us call the objects specified by DP "plenitudinous objects."[5] As is familiar, the four-dimensionalist construes the plenitudinous objects generated by DP as temporal parts of either zero or non-zero temporal extant (both of which are themselves fusions of the temporal parts of the objects in *f(s)*).[6]

[2]Here I limit my discussion to standard four-dimensionalism and thus ignore various non-standard varieties such as stage theory (Sider 2001) and 4D-Partism (Hudson 2001). Henceforth, "four-dimensionalism."

[3]Sider (2001: 134-149) argues from unrestricted composition to a plenitude of temporal parts.

[4]Hawthorne (2006b: 116).

[5]For my purposes in this paper, I rely on the particular formulation of DP as it pertains to the filled regions of spacetime within the boundaries of persisting objects recognized by common sense. The full application of the principle, of course, admits much more besides.

[6]The notion of a fusion here is that of which satisfies the fusion axiom of classical extensional mereology. See Sider (2001: 8).

2 Plenitudinous Three-Dimensionalism

While the wedding of DP and four-dimensionalism is a natural one indeed, there are a hand-full of dissenters who argue against four-dimensionalism having exclusive rights to DP.[7] The view that a superabundance of plenitudinous objects as prescribed by DP is entirely compatible with a three-dimensional ontology has come to be known as "promiscuous" or "plenitudinous" three-dimensionalism. As a result, plenitudinous three-dimensionalists contend that an influential argument from diachronic vagueness in favor of four-dimensionalism is either blocked or severely crooked indeed.[8]

The argument, in brief, is as follows. Pace mereological essentialism, ordinary objects undergo mereological alteration over time without thereby ceasing to exist. The question of *how much* mereological alteration over time an ordinary object (Socrates, say) can undergo without ceasing to exist raises the question of whether an object can have vague temporal boundaries. While we may certainly admit that Socrates may survive the loss of a handful of cells or even an entire limb, there appear to be borderline cases where it is indeterminate as to whether or not Socrates, upon undergoing certain changes, continues to exist at that particular time.

As a result, there appear to be cases where Socrates is diachronically vague in so far as he exists at t_1 and it is vague whether he exists at t_2. Diachronic vagueness is easily accommodated on a four-dimensional ontology equipped with a plenitude of temporal parts. If one takes the plenitudinous objects generated by DP to be a superabundance of temporal parts of extended spacetime worms, then one can help oneself to a multitude of distinct, albeit overlapping, temporal parts of Socrates (*Socrates-at-*t_1 and *Socrates-at-*t_1*-and-*t_2*, etc.)*. Given a plenitude of temporal parts, the four-dimensionalist can avoid countenancing ontic vagueness regarding the existence of Socrates and chalk up diachronic vagueness to the semantic imprecision of our language, that is, it being semantically vague as to which of the plenitude of temporal parts 'Socrates' refers to.

The problem is not so easily resolved using the resources of a standard three-dimensional ontology. If objects fail to be temporally extended and thus are wholly present at each moment of their existence as per three-dimensionalism, and it is diachronically vague whether or not some particular collection of cells suffices to compose Socrates over time, then it is sometimes vague whether or not Socrates exists. And in so far as existence claims

[7] Hawthorne (2006), Koslicki (2003), Lowe (2005), Miller (2005, 2008), and Steen (2010).

[8] See Koslicki (2003) and Miller (2005, 2008) in particular.

of this sort can be formulated using a logical vocabulary that is entirely devoid of semantic vagueness, the three-dimensionalist is saddled with the claim that the vagueness at work is either epistemic or ontic. Without a plenitude of candidates on which to pin vague terms, the three-dimensionalist is unable to avail themselves of a semantic solution to the problem of diachronic vagueness.

Not so, argues the cohort of plenitudinous three-dimensionalists. If four-dimensionalism does not have exclusive rights to DP and the abundant ontology that follows suit, then neither do they have a monopoly on a semantic solution to the problem of diachronic vagueness. In fact, they argue, with DP in hand they have at their disposal a semantic solution to diachronic vagueness that is structurally similar to four-dimensionalism yet one that retains a robust ontology of enduring entities.

As a representative of plenitudinous three-dimensionalism, let us consider the account put forward by Kristie Miller.[9] Miller (2005: 323-4) defines a *synchronic fusion* as simply "the fusion of the members of a set at a time" and a *diachronic fusion* as "the fusion of two or more synchronic fusions." She then goes on to state the following:

> For there is nothing in three dimensionalism per se that prohibits the three dimensionalist from holding that there exists any enduring object composed of arbitrary combinations of things at times. Even if the three-dimensionalist accepts that there exist instantaneous objects (fusions-at-times), she need not concede that persisting objects are the fusions of these objects. She could instead hold that for every synchronic fusion, there is some enduring object x that is constituted by those fusions at those times. Call such an object a *diachronic object*. (2005: 324)

By Miller's lights, the three-dimensionalist is entirely within her rights to adopt the view that for any fusion that exactly occupies some arbitrary subinterval of a persisting object's occupation profile, there is a diachronic (enduring) object that is constituted by that fusion and is wholly present at that subinterval.

In contrast to the four-dimensionalist's equating a plenitudinous ontology with a plenitude of temporal parts, Miller points out that DP is entirely neutral as to the *type* of entity that is taken to exactly occupy the relevant subinterval as well as the relation between plenitudinous objects and ordinary persisting objects. Plenitudinous objects, claims Miller, need not be

[9] See Miller (2005, 2008). See footnote 7 for other advocates of this line of thinking or something very similar.

identified with the temporal parts (nor fusions thereof) of perduring spacetime worms but, rather, may be fusions which are said to constitute enduring entities. Equipped with an abundance of continuant-constituting fusions, the three-dimensionalist has equal access to the requisite pincushions for vague terms: it is semantically vague as to which continuant-constituting fusion (*Socrates-at-*t_1 *Socrates-at-*t_1*-and-*t_2, etc.) 'Socrates' refers to.

Not all are congenial to the prospects of a three-dimensional appropriation of DP. Achille Varzi (2007) contends that while DP is entirely compatible with a three-dimensional ontology, there is little reason to endorse the view and a compelling reason to reject it. He takes the wedding of DP with three-dimensionalism to generate a diachronic variant of the problem of the many. His concern trades on what he takes to be a crucial asymmetry between three and four-dimensionalism regarding the relationship between the many plenitudinous objects generated by DP.

To help get clear on Varzi's worry, let us introduce 'is located at' as a primitive relation that obtains between an object and a region of spacetime, and proceed to define the following location relations:[10]

> x is *entirely located* at $r =_{def}$ x is located at r, and there is no region of spacetime disjoint from r at which x is located.
>
> x is *wholly located* at $r =_{def}$ x is located at r, and there is no proper part of x not located at r.
>
> x is *partly located* at $r =_{def}$ x has a proper part entirely located at r.

Varzi asks us to consider the following: how many *wholly located* objects occupy a particular region at a time? The four-dimensionalist has a straightforward answer: one. Given DP, for any arbitrarily chosen subinterval, s, of a persisting object's occupation profile, there is at least one plenitudinous object that exactly occupies s and is composed of all and only the objects assigned to s by $f(s)$. Call the object that exactly occupies this subinterval O. Now, consider the following three subintervals of a persisting object's occupation profile: s, s_2, and s_4. Exactly occupying s, s_2, and s_4 will be at least one plenitudinous object composed of all and only the objects assigned to these subintervals by $f(s)$ as prescribed by DP. Call this object O_1. In addition to O_1 there will be other numerically distinct plenitudinous objects such as the fusions of the occupants of s and s_2 as well as the fusion of the occupants of s and s_4, call them O_2 and O_3, respectively. In virtue of sharing O as a common temporal part, $O_1 - O_3$ are each partly located at s and have

[10] Parsons (2007).

the same synchronic compositional base at s. Thus, $O_1 - O_3$ are not wholly located at s, only their common temporal part, O, enjoys this elite privilege. Despite the many overlapping plenitudinous objects at s, only one of these objects is wholly located at s on four-dimensionalism.

On Miller's three-dimensionalism, by contrast, we have wholly located objects in spades in so far as $O_1 - O_3$ each individually constitute a numerically distinct enduring entity (diachronic object) at s. Each enduring entity that is constituted by $O_1 - O_3$ has precisely the same synchronic compositional base at s, thereby generating a multitude of distinct mereologically coincident continuants; where we thought there was a single enduring entity, there are very many indeed. As a result, Varzi contends that the three-dimensionalist who endorses DP is saddled with a host of distinct coincident entities each of which are wholly located at the interval in question, a diachronic variation of the problem of the many.

Now, Miller and company have replied to the charge of the problem of the many non-identical overlapping continuants raised by Varzi.[11] My aim here is neither to evaluate these responses nor examine the overall grounds for affirming a plenitudinous over a non-plenitudinous three-dimensionalism. Instead, I want to spend the rest of the paper trying to persuade those three-dimensionalists who are inclined to adopt DP that a particular brand of three-dimensional plenitude, one that countenances a plenitude of accidental unities qua hylomorphic compounds, is worthy of their consideration.

3 Neo-Aristotelian Plenitude

In this section I develop a novel brand of plenitudinous three-dimensionalism, what John Hawthorne (2006) has called "Neo-Aristotelian Plenitude" (NAP). In the sections to follow, I offer independent motivating factors in support of the wedding of a plenitudinous three-dimensional ontology to hylomorphism in general, and conclude by showing how NAP is well-suited to deal with some of the difficulties surrounding a three-dimensional appropriation of DP.

We have seen thus far that the two main contenders for the role of plenitudinous objects are the four-dimesnionalist's temporal parts and Miller's synchronic and diachronic fusions which constitute enduring entities. Here, I want to offer a third alternative for the status of plenitudinous objects–accidental unities–that takes its cue from the longstanding hylomorphic ontology of the Aristotelian tradition. While Hawthorne (2006b: 116) relies

[11] See Miller (2008) and Steen (2010).

explicitly on Kit Fine's (1981) the notion of a "qua-object" (which is in turn inspired by Aristotle) in his three-dimensional appropriation of DP, I take as my guide a general medieval Aristotelian ontology of material objects as put forward by Thomas Aquinas.[12]

3.1 A Plenitude of Accidental Unities

On Aquinas' hylomorphic ontology, material objects are best construed as compounds of matter (*hyle*) and form (*morphe*). As Jeffrey Brower (2012) has aptly pointed out, Aquinas construes matter and form in *functional* terms. What Aquinas calls 'matter' refers to that which plays the role of the enduring subject of change, 'form' being that with respect to which the enduring subject changes.[13] For my purposes here, we can follow the interpretation of Aquinas that construes forms (the substantial form of human persons being a notable exception here) in trope-theoretic terms as non-transferrable individualized properties.[14] A hylomorphic compound, then, is simply that which exists in virtue of matter possessing a form. For Aquinas, the combining of matter and form results in a hylomorphic compound that is numerically distinct from its matter and configuring form.

For Aquinas, there are two different kinds of hylomorphic compounds—substances and accidental unities—each distinguished by the sorts of entities that are said to play the role of matter and form in their constituent makeup. More relevant for our purposes here is Aquinas' notion of an accidental unity as a form-matter compound whose immediate proper parts are a substance (or substances) and an accidental form.[15] In contrast to substantial forms, accidental forms are said to modify previously existing substances and thus do not confer on matter their modal profiles.[16] What plays the matter role for accidental unities is *not* a non-individualized portion of stuff as with substances, but a full-fledged individual substance in its own right.

Consider a rather well-worn example of an accidental unity, *seated-Socrates*. For Aquinas, *seated-Socrates* is a genuine hylomorphic compound whose immediate proper parts consist of Socrates and the inhering mode of *seatedness*.[17] The modal profile of *seated-Socrates*–its existence and identity–is

[12]In relying on Aquinas' general hylomorphic framework to unpack NAP, I in no way want to suggest that Aquinas himself would have endorsed a view along the lines of DP.

[13]Aquinas (1993: 67-68).

[14]See Brower (2012), Brower and Brower-Toland (2008) and Leftow (2003: 2).

[15]See Aquinas (1964) 5.7.842ff. Where x is an *immediate proper part* of $y =_{def} x$ is a proper part of y and there is no other proper part of y, z, such that x is a proper part of z.

[16]See Aquinas (1965: ch. 7).

[17]For a treatment of accidental unities in Aristotle see Matthews (1982).

grounded in Socrates' being modified by the accidental form of *seatedness*. Consequently, *seated-Socrates* exists at every moment at which Socrates is seated, that is, it is essential to *seated-Socrates* that it have Socrates and *seatedness* as its immediate proper parts.

How might Aquinas' accidental unities be put to use in constructing a novel plenitudinous three-dimensional ontology? To start, NAP will include both synchronic and diachronic accidental unties, roughly tracking Miller's distinction between synchronic and diachronic fusions mentioned above. Synchronic accidental unities are compounds whose immediate proper parts are a substance and an accidental form (trope) at a time (*seated-Socrates-at-t*). Diachronic accidental unities, on the other hand, are accidental unities whose immediate proper parts are other synchronic accidental unities.[18]

To illustrate, take the arbitrarily chosen subinterval of Socrates' occupation profile consisting of the two intervals s_1 and s_5, where Socrates is sitting at s_1 and Socrates is teaching at s_5, call it *s*. As per NAP, there is a diachronic accidental unity that exactly occupies *s* and is composed of all and only the objects assigned to both s_1 and s_5 by *f(s)*. This diachronic accidental unity, call it *seated-teaching-Socrates*, will have two synchronic accidental unities as (immediate) proper parts, *seated-Socrates-at-*s_1 and *teaching-Socrates-*s_5 and whose (remote) compositional base will include all and only those objects that compose its constituent synchronic accidental unities at their respective subintervals. The proponent of NAP will contend that instead of taking s to be exactly occupied by either one of the many temporal parts of a perduring entity or a fusion which constitutes an enduring entity, it is exactly occupied instead by a diachronic accidental unity with a substantial enduring entity as a proper part at a level of decomposition.

DP, of course, gives rise to more bizarre and gerrymandered diachronic accidental unities than *seated-teaching-Socrates*. In this way, DP is indiscriminating in its admittance of plenitudinous objects both within Socrates' spatiotemporal boundary as well as those that have no relation to him whatsoever. Take the filled regions of spacetime that are occupied by my clenched right hand at t_1 and Tom Cruises' sunglasses at t_4, call it *r*. DP demands that there is a diachronic accidental unity, *clenched hand-sunglasses*, that exactly occupies *r* and has the synchronic accidental unities *clenched hand-at-*t_1 and *Tom Cruises'-sunglasses-at* t_4 as immediate proper parts and is composed of all and only the objects assigned to t_1 and t_4 by *f(s)*.

Here it is vital to point out that the synchronic accidental unity *seated-Socrates-at-*s_1 and the diachronic accidental unity *seated-teaching-Socrates*

[18]See Rea (1998: 356, n. 15) for discussion on how DP, being a cross-temporal variation of mereological universalism, might be deemed 'Aristotelian.'

mereologically overlap at s_1. While these two distinct accidental unities share the same synchronic compositional base at s_1, they nevertheless differ in the manner by which they are located at the relevant subinterval in question. According to NAP, synchronic accidental unities are wholly located at their respective subintervals: there is no proper part of *seated-Socrates-at-*s_1 that is not located at s_1. Diachronic accidental unities, on the other hand, are partly located at the subintervals occupied by each of their synchronic constituents. Thus, while *seated-Socrates-at-*s_1 and *seated-teaching-Socrates* coincide at s_1, only the former is wholly located at that subinterval.

NAP, however, does not identify ordinary persisting objects with synchronic accidental unties. At the heart of the view is a substance ontology in which an enduring particular, e.g. Socrates, is wholly located at the distinct subintervals of its spatiotemporal career. Socrates qua one and the same enduring entity enjoys the privileged status of being wholly located at more than one time. While synchronic accidental unities are wholly located at their momentary instants, they do not persist such that they are wholly located at more than one such instant. Hence, in our example above, Socrates is a substantial enduring entity that is wholly located at s_1 as a proper part of *seated-Socrates-at-*s_1 and is wholly located at s_5 as a proper part of the distinct synchronic accidental unity *teaching-Socrates-at-*s_5.

4 Putting Neo-Aristotelian Plenitude to Work

Here I want to offer several considerations to help independently motivate the wedding of plenitudinous three-dimensionalism to a hylomorphic ontology in general. Wholly apart from its ability to solve the diachronic problem of the many as well as offer a novel solution to the problem in its traditional guise, the neo-Aristotelian ontology of material objects that undergirds NAP is remarkably fruitful in its wider application to debates in metaphysics.[19] Here I put on display some of the virtues of a hylomorphic ontology as it pertains to two issues in particular: the problem of temporary intrinsics and truthmaking.

4.1 A Plenitude of Bearers of Temporary Intrinsics

To begin, accidental unities prove fruitful in grounding a novel response to the problem of temporary intrinsics. As Jeffrey Brower (2010) has suggested, a hylomorphic ontology provides the resources for a neglected fourth

[19]For more on the fruitfulness of a hylomorphic ontology in contemporary metaphysics see Brower (2010), Johnston (2006), Koslicki (2008), Oderberg (2007), and Rea (1998b).

solution—what he calls *the constituent solution*—that is both robustly endurantist and structurally similar to an appeal to an ontology of temporal parts.[20] On this line of thinking, enduring entities undergo intrinsic change in virtue of successively entering into numerically distinct accidental unities at different times. Socrates qua enduring entity changes from being pale at t_1 to being swarthy at t_2 by being a proper part of the synchronic accidental unities *pale-Socrates-at-*t_1 and *swarthy-Socrates-at-*t_2 which essentially possess the intrinsic features *being pale* and *being swarthy* as immediate proper parts.

This hylomorphic variant of endurantism is structurally similar to an appeal to an ontology of temporal parts as a solution to the problem of temporary intrinsics. Like temporal parts, accidental unities are essentially defined by their intrinsic features, where both temporal parts (*Socrates-at-t*) and accidental unities (*seated-Socrates-at-t*) are the primary bearers of intrinsic properties. In addition, both accounts are of the opinion that persisting objects exemplify (albeit derivatively) the relevant intrinsic property in virtue of standing in a relation to the primary property bearer, whether a temporal part or an accidental unity.

Unlike the plenitudinous objects of four-dimensionalism (temporal stages) and Miller's three-dimensionalism (synchronic and diachronic fusions), Aquinas' accidental unities are neither proper parts of persisting objects nor do they constitute such objects. Rather, they are complex objects of which persisting enduring objects are immediate proper parts. As a result, NAP offers the three-dimensional proponent of DP an abundance of accidental unities as the bearers of temporary intrinsics.

4.2 A Plenitude of Things Qua Truthmakers

Let us turn now to the bearing accidental unities have on the issue of truthmaking. The fundamental insight driving the commitment to truthmakers is that truth is determined by reality. To say that something *determines* some particular truth is to say that it is the metaphysical ground of that truth, its existence explains why that truth is true. Few would deny that for the singular existential proposition <*e* exists> it is *e* itself that serves as the truthmaker for such a predication; *e* determines the truth of <*e* exists>. The story is a familiar one.

I limit my discussion here to the relevant modal import that characterizes

[20]The standard solutions being (i) presentism and (ii) property relativization and (iii) the doctrine of temporal parts. Here I assume a general understanding of the problem of temporary intrinstics.

the truthmaking relation, what is commonly referred to as *truthmaker necessitarianism*. The proponent of truthmaker necessitarianism claims that if x is the truthmaker for <p> in some world w, then x is the truthmaker for <p> not only in w but in every possible world in which x exists. Most truthmaker theorists agree that truthmakers necessitate the propositions they make true.

Given truthmaker necessitarianism, it is widely agreed upon that the truthmaking role of *things* or *objects* is restricted only to essential predications involving those objects. As Jonathan Schaffer (2008) points out regarding things qua truthmakers, "Indeed objects could serve as well (in principle), if rendered as being essentially exactly as they are." While the existence of Socrates necessitates his *being human* and thus the truth of the essential predication <Socrates is human>, this is not so for accidental predications such as <Socrates is pale>. After all, given the warm Athenian sun, Socrates could have been (was?) swarthy. This has, to a large extent, sent truthmaker theorists in search of non-objectual entities such as states of affairs or tropes to ground the truth of accidental predications.[21]

Enter NAP. A neo-Aristotelian plenitudinous ontology offers a fully general account of truthmaking for both accidental and essential predications in terms of hylomorphic compounds. For Aquinas, all true predications concerning composite entities, or at least all true (positive) predications concerning composite entities of the form <x is F> are to be explained in terms of hylomorphic compounds.[22] Hylomorphic compounds themselves serve as the truthmakers for both essential predications and singular existentials such as <Socrates is human> and <*seated-Socrates* exists>, in this case Socrates and *seated-Socrates* respectively. The applicability of hylomorphic compounds to such predications, I assume, is straightforward.

More noteworthy is the application of NAP to accidental predications. On this view, the truthmaker for the accidental predication <Socrates is seated> is the accidental unity composed of Socrates and the mode *seatedness*, *seated-Socrates*. Aquinas states it as follows: "When I say, 'Man is white,' the cause of the truth of this enunciation is the combining of whiteness with the subject"[23] and "'Man is worthy,' is true, i.e., by some worthy man existing, is the same as the reasoning by which 'Man is shameful' is true, i.e., by a shameful man existing."[24]

Note that it is precisely because the existence of accidental unities neces-

[21]See Armstrong (1997) and Mulligan et. al (1984), respectively.

[22]In particular Aquinas (1964) 9.1.11, para. 1898. I owe this citation as well as the citations below to Pawl (2012). See Inman (2012) for more on hylomorphic truthmakers and medieval notions of truthmaking in general.

[23]Ibid.

[24]Aquinas (1962) b.1, 1.11, para. 10.

sitate the existence of their proper parts—Socrates and *seatedness*—that they are able to satisfy the necessitation requirement for truthmaking. More precisely, *seated-Socrates* essentially necessitates *Socrates' being seated* and not merely the co-existence of two, unrelated entities: Socrates and *seatedness*. In so far as the essence or real definition of *seated-Socrates* involves reference to Socrates *as modified by his inhering mode of seatedness*, its existence essentially necessitates Socrates' being seated and, ipso facto, the accidental predication <Socrates is seated>.

On an extremely liberal construal of the particularized properties that partly define accidental unties, the above point can be generalized to range over *any* subset of Socrates' occupation profile: for any subinterval of his spatiotemporal career at which he is accidentally characterized by a mode *F-ness*, there is an accidental unity, *F-Socrates*, whose existence necessitates the truth of the predication <Socrates is *F*> and thereby serves as the truthmaker for that predication.

Interestingly enough, David Lewis (2003) has suggested a thing qua truthmaker account that broadly resembles Aquinas' hylomorphic account in many respects. Lewis remarks:

> Imagine something, call it Long qua black, that is very like Long in most ways, but differs from him in essence. Long is accidentally black, and might have been striped, orange all over, or even green. Long qua black, however, is essentially black. Long has counterparts of many colours, whereas all counterparts of Long qua black are black. Indeed, the counterparts of Long qua black are all and only the black counterparts of Long. Long qua black, if there were such a thing, would be a truthmaker for the truth that Long is black. Every world where Long qua black had a counterpart would be a world where Long is black. (Lewis 2003: 30)

While the neo-Aristotelian may quibble with Lewis' counterpart theoretic construal of *de re* modality as being a "half-hearted and flexible essentialism" (Lewis 2003: 27), his Long qua black bears a striking resemblance to Aquinas' *seated-Socrates* qua accidental unity as well as the application of such an entity to the task of truthmaking. The crucial difference being that where Lewis goes on to claim that Long qua black *is identical to* Long (albeit as prescribed under different counterpart relations), Aquinas appears to endorse a non-reductive gloss on accidental unities as being genuinely 'over and above' their proper parts. Consequently, the wedding of a hylomorphic ontology and plenitudinous three-dimensionalism is suited to provide not

only a plenitude of bearers of temporary intrinsics, but also a plenitude of things qua truthmakers for positive accidental predications.

4.3 Why Neo-Aristotelian Plenitude?

We have seen that the wedding of plenitudinous three-dimensionalism with a hylomorphic ontology in general enjoys ample independent motivation. Let me conclude by highlighting some of the specific advantages of NAP in mitigating some of the untoward consequences of endorsing a plenitudinous three-dimensional ontology. We have seen that on NAP for any arbitrarily chosen subinterval, s, there are a multitude of distinct diachronic accidental unities $O_1 - O_3$ that are each partly located at that subinterval in virtue of sharing a synchronic accidental unity O as a common proper part. It is the synchronic accidental unity O qua common proper part of $O_1 - O_3$ that is wholly located at s.

Given the grounding structure that characterizes accidental unities and substances, all synchronic accidental unities are (ultimately) grounded in their substantial proper parts. Consequently, with four-dimensionalism, NAP takes diachronic plenitudinous objects to be partly located at each time at which they exist. With three-dimensionalism, however, NAP takes both synchronic plenitudinous objects as well as the enduring ordinary objects that are proper parts of such objects to be wholly located at every moment at which they exist. It is only enduring entities, however, that are wholly located at more than one time.

With its plenitude of accidental unities both synchronic and diachronic, NAP provides the requisite three-dimensional ontology to underpin a semantic solution to the problem of diachronic vagueness. If the four-dimensionalist's synchronic and diachronic temporal parts (and fusions thereof) are sufficient to serve as the candidates for vague terms, then so are the neo-Aristotelian's synchronic and diachronic accidental unities. While the two views are structurally similar in this respect, there is an important difference at their core. On NAP, neither synchronic nor diachronic accidental unities are proper parts of ordinary persisting objects. Rather, persisting objects are proper parts of accidental unities and are wholly located at different instants; not so on four-dimensionalism.

Note also that this structural feature of NAP distinguishes it not only from four-dimensionalism but also from Miller's own preferred account involving the relation of constitution. As stated above, NAP gives a straightforward *mereological* rendering of the relationship between plenitudinous objects and ordinary persisting particulars: enduring particulars are not constituted by plenitudinous objects (accidental unities); they are, rather, proper

parts of those objects. I take this to be an added advantage of NAP in so far as some may be weary of relying on the relation of constitution as heavily as Miller does in her three-dimensional appropriation of DP.

Most importantly, the neo-Aristotelian ontology underpinning NAP is well suited to dispense with Varzi's diachronic variant of the problem of the many as well as soften the problem in its traditional guise. Recall that the diachronic problem of the many turned on the fact that Miller's three-dimensional appropriation of DP generated a plethora of wholly located diachronic objects (constituted by $O_1 - O_3$) that mereologically overlap at a particular subinterval (s). While we still have the many in the form of our plenitude of synchronic and diachronic accidental unities (which serve as the basis for a semantic solution to diachronic vagueness), only the former are said to be wholly located at s according to NAP. While a very many diachronic accidental unities mereologically overlap at s in virtue of sharing a synchronic accidental unity as a common proper part, there are no diachronic overlappers that are *wholly* located at s. There is, then, no unique diachronic variant of the problem of the many on NAP.

There remains, however, a multitude of distinct overlapping synchronic accidental unities that are wholly located at s (e.g. *seated-Socrates*, *wise-Socrates*, *teaching-Socrates*, etc.), thereby generating the traditional problem of the many. I think the hylomorphic ontology undergirding NAP is particularly insightful when it comess to this thorny problem in metaphysics. Here I offer just two responses that stem from a hylomorphic ontology of material objects.

One hylomorphic solution to the problem of the many overlapping synchronic accidental unities would be to say that while such objects are numerically distinct *hylomorphic compounds*, they are one and the same *material object*.[25] There is, then, a relation—numerical sameness without identity—that is weaker than numerical identity but stronger than numerical distinction. More specifically: for any hylomorphic compounds x and y, where $x \neq y$ and any time t, x is numerically the same material object as y at t if and only if x and y exactly materially overlap at t. Recall that 'matter' for Aquinas is characterized in functional terms as that which plays the role of the enduring subject of change, that is, whatever literally survives the diachronic alteration in question. For accidental unities in particular, we noted above that the role of 'matter' is played by substances in so far as the latter retain their identity through time. On this view, since each distinct synchronic accidental unity wholly located at s shares the same matter at the time of overlap, namely Socrates, they are numerically identical material objects.

[25] See Rea (1998b) and Brower (2010).

A second, novel, hylomorphic response to the many synchronic overlappers trades on Aquinas' categorical distinction between substances and accidental unities as different kinds of hylomorphic compounds, particularly with respect to the order of the grounding structure that obtains between such objects and their proper parts. Accidental unities, as we have seen, are entirely dependent on their proper parts for their existence and identity, they are what we might call "grounded wholes." In positing a multitude of overlapping synchronic accidental unities at s, the proponent of NAP is committed to a vast array of distinct overlapping grounded wholes whose metaphysical grounds consist of substantial entities (together with their modifying tropes) located at s.

On one interpretation of Aquinas, however, mereologically complex substances are ontologically prior to their proper parts, they are what we might call "grounding wholes."[26] One implication of a substance's being a grounding whole is that, as a basic unit of being, it fails to have other substances as proper parts.[27] This is precisely because the proper parts of substances, for Aquinas, are modally constrained in such a way that their existence and identity are tied to the substantial whole of which they are a part. While substantial wholes exhibit mereological structure, the proper parts of these elite material objects are not substantial or metaphysically basic in their own right.[28]

As a result, Aquinas endorses a particular gloss on what Jonathan Schaffer (2010) has recently labeled "fundamental mereology."[29] According to Aquinas' preferred fundamental mereology which prohibits mereological overlap between distinct substantial wholes, any filled region of spacetime that is exactly occupied by a substance is occupied at most by a single substance. We might say that as basic units of being, substances monopolize the spacetime regions they occupy.[30] It follows from the unique grounding structure

[26]See, for example, Brown (2005), Stump (2003: 40-41) and Toner (2008). For Aquinas, see his (1947) Ia, q. 76, a. 8.

[27]In particular, see Aquinas (1964) bk. 7, lec. 13, nn. 1588-1591 and lec. 16, nn. 1631-1633.

[28]For more on the application of this particular feature of Aquinas' mereology see Brown (2005) and Toner (2008).

[29]Note in particular Schaffer's (2010) "tiling constraint" which conforms to the maxim "no gaps and no overlaps" between composite substances.

[30]From the no mereological overlap constraint on composite substances it follows that composite substances monopolize their occupying spacetime regions. Suppose composite substances *s* and *s** both exactly occupy region *r* at time *t*. If so, then both *s* and *s** are composed of all and only the objects that occupy the subregions of *r* at *t*. This follows from the plausible maxim: sameness of occupying region is sufficient for sameness of spatiotemporal proper parts. If composite substances are governed by the no overlap constraint, then

of substances that the many overlapping grounded wholes that are wholly located at s all share one and the same (ultimate) substantial ground at s: the underlying substance–e.g. Socrates–that is a proper part of each synchronic accidental unity located at s.

Given Aquinas' categorical distinction between substances and accidental unities, together with his distinctive fundamental mereology, the proponent of NAP takes there to be a single substance—Socrates—that occupies s. What is objectionable in positing the existence of the many synchronic overlappers at s, the proponent of NAP might argue, is not the existence of the overlappers *per se*, but the multiplication of overlapping *substances* that occupy one and the same region. Here the defender of NAP might follow Schaffer (2009: 361) in endorsing a revised gloss on Occam's Razor in terms of substances: "Occam's Razor should only be understood to concern substances: *do not multiply basic entities without necessity*."As no substances are multiplied on this line (let alone without necessity), the defender of NAP is innocent of excess where it matters most. While spacetime regions may opt for promiscuity when it comes to hosting accidental unities, they are unrelentingly monogamous when it comes to their substantial occupants.

As a novel three-dimensional plenitudinous ontology, NAP delivers precisely what the three-dimensional plenitude lover seeks and more. In addition to providing the requisite three-dimensional underpinning for a semantic solution to diachronic vagueness, NAP offers a plenitude of bearers of temporary intrinsics and things qua truthmakers for accidental predications. Even more, NAP is uniquely suited to solve the diachronic problem of the many as well as mitigate the objectionable overlap generated by the problem in its traditional guise. Consequently, if one is inclined to adopt a three-dimensional plenitudinous ontology, one is wise to opt for a plenitude of accidental unities.[31]

if s and s^* exactly occupy r at t and are composed of all and only the objects that occupy the subregions of r at t, then $s{=}s^*$.

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