Getting Priority Straight

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Consider the kinds of macroscopic concrete objects that common sense and the sciences allege to exist:[1] tables, raindrops, tectonic plates, galaxies, and the rest. Are there any such things? Opinions differ. *Ontological liberals* say they do; *ontological radicals* say they don't. Liberalism seems favored by its plausible acquiescence to the dictates of common sense abetted by science; radicalism by its ontological parsimony. *Priority theorists* claim we can have the virtues of both views. They hold that tables, raindrops, *etc.*, exist, but they aren't fundamental. The ontological liberal's ontology provides the correct inventory of existent individuals. The ontological radical's more restricted ontology provides the correct inventory of fundamental individuals. The priority theorist claims that the derivative individuals are "no addition in being" to the fundamental ones,[2] so we can have our cake and eat it too. It would be nice if priority theorists were right. In this paper I argue, with regret, that they are not. One upshot is that explanations of the sort which underwrite the priority theorist's distinction between fundamental and derivative individuals do not mitigate our ontological commitments. Another is that we still have to choose between the charms of liberalism and radicalism.[3]

Here is the plan. I will start by trying to get a little clearer on what the

[1] Quine (1948) was prepared to give the word "exists" to philosophers who wanted to distinguish claims about what there is from claims about what exists. I am for stylistic reasons unwilling to be so generous. So when I talk about a particular thing's existing I always have in mind the claim that there is something identical to that thing. Likewise, when I speak generically, saying, "F's exist", I always have in mind the claim that there are some F's.

[2] The metaphorical expression "no addition to being" is borrowed from (Armstrong, 1997, p. 12).

[3] I am assuming throughout that what Quine (1948) called the ontological question, "what is there?" is both meaningful and univocal, and that radicalism and liberalism provide competing partial answers to that question. No choice between radicalism and liberalism will be necessary if this assumption fails.

priority theorist claims (§1). Then I will articulate a constraint on the kind of explanation central to the priority theorist's view (§2). I will show how that constraint makes trouble for the priority theorist (§3). I will review two avenues of response available to priority theorists, and provide reasons for thinking that neither are satisfactory (§4). Next I will articulate a more cautious variant of priority theory that avoids the trouble, and show that it nevertheless faces similar problems (§5). I will conclude with a brief discussion of the prospects for retaining the spirit of priority theory while abandoning its letter (§6).

1 Modesty, Explanation, Sparsity

Priority theory is founded on three ideas. First, priority theorists exhibit a kind of philosophical *modesty*: they accede to the claims of common sense abetted by science concerning the existence and features[4] of macroscopic concreta. But they don't think that these claims are the end of the story in ontology. This is where the second idea comes in: according to the priority theorist, the ontologist needs to ask not just whether macroscopic concreta exist, but also what *explanations* might be offered of their existence and features. The explanations in question are those that tell us what it is in virtue of which the macroscopic concreta exist and have the features they do.[5] The priority theorist holds that the existence and features of all macroscopic concreta are fully explicable solely by reference to the existence and features of other things.[6] Those other things are in this sense prior to the familiar macroscopic individuals. Ultimately, the explanation bottoms out in a relatively sparse inventory of entities, whose

[4] When I use the term "feature", I have in mind qualitative properties and relations. Following the standard terminology, a *qualitative* property or relation is one which can be adequately specified without reference to any particular individual.

[5] My use of "explain" and its cognates is artificially narrow. In every case, I have in mind the relation targeted by "in virtue of." Ethicists may tell us what it is in virtue of which murder is wrong; epistemologists may tell us what it is in virtue of which we are entitled to rely on our senses; and scientists may tell us what it is in virtue of which iron is a good conductor. In each case, we have been given an explanation. Thus, when I talk about "what explains P" or "an explanation of P," I have in mind the facts in virtue of which P is the case. I will use "because" in the same artificially narrow way. You should read "because" as a stand in for "in virtue of the fact that".

[6] Schaffer (Schaffer, forthcoming-c) has suggested that the fundamental idea for priority theorists is not explanation but *grounding*. We explain facts by reference to other facts, but, by Schaffer's lights, grounding may obtain between items of any category, including objects, facts, and properties. Schaffer, however, concedes the claim that grounding requires explanation: the existence and features of the entities that ground an individual completely explain its existence and non-relational features (private correspondence). The determination argument of §3 thus applies.

existence and features have no further explanation.[7] According to the third idea, these explanations thereby confer ontological *sparsity*. The priority theorist holds that, since the existence and features of raindrops can be explained solely by reference to the existence and features of other things, the world is no more ontologically lush for containing raindrops than it is for containing those other, more fundamental entities. Admitting the existence of raindrops is "no addition to being."[8]

In brief, a priority theorist claims that the world contains all (or at least most) of the individuals and kinds alleged by common sense abetted by science; but the world is nonetheless ontologically sparse, since those macroscopic individuals aren't needed to explain what goes on.[9] Call a fact *fundamental* if it is not explained by any other fact. Call an entity or kind *fundamental* if reference to it must be made in any complete statement of all of the fundamental facts. Priority theory, then, can be characterized as the conjunction of three claims.

(MODESTY) The claims of common sense abetted by science about the existence and features of macroscopic concreta are roughly correct: there are tables, raindrops, tectonic plates, galaxies, *etc.*

(EXPLANATION) The existence and features of the macroscopic concrete objects alleged by common sense abetted by science can be completely explained solely by reference to the existence and properties of other things.

(SPARSITY) The ontological sparsity of the world is determined by the number and variety of fundamental entities and kinds.

Reduction provides a more traditional way to achieve ontological sparsity without giving up the claims of common sense abetted by science. If claims

[7] Priority theory is neutral on whether the fundamental entities are concrete, so the existence and features of even the most fundamental concrete entities might themselves be explicable solely by reference to other things, *e.g.*, tropes, properties, or the mind of God. For ease of exposition, I assume that some concrete objects are fundamental, but the arguments of this paper do not rely on this assumption.

[8] Contemporary developments of priority theory are presented in (Armstrong, 1997), (Cameron, 2008), (Melia, 2005), and (Schaffer, 2007, 2009, forthcoming-a). If Schaffer's historical claims in (Schaffer, forthcoming-a) and (Schaffer, 2009) are correct, then priority theory has a long and distinguished pedigree reaching back to Plato.

[9] One striking feature of priority theory that is not represented in my exposition is that it has been developed in the pursuit of Armstrong-style truth-maker metaphysics. Here I assume that truth-making incurs an explanatory commitment. I also put the view in the material mode, as a view about what explains certain facts, rather than a view about what makes certain truths concerning those facts true. In this, I follow (Lewis, 2001).

concerning the existence and features of raindrops could be reduced to claims that mentioned only, *e.g.*, microphysical entities, then our apparent commitment to the existence of raindrops could be paraphrased away.[10]

I confess that I find such reductive claims implausible. But for present purposes we can just set them aside. The priority theorist proposes to use explanation, rather than reduction, to achieve ontological sparsity. Explanation is weaker than reduction. It is plausible to maintain that the average of my wife's and my heights is 5'6" solely in virtue of the fact that she is 5'4" and I am 5'8". But it is implausible to think that the fact that the average of our heights is 5'6" reduces to our having those particular heights, since it is possible for a different combination of heights to yield the same average. There is a reduction of average height ready to hand, but that should not distract us from the conceptual point: one fact can be explicable in terms of another without being reducible to it. The priority theorist does not, then, propose to reduce all talk of macroscopic concreta to other terms. She thinks (EXPLANATION) provides a better alternative. Truths concerning macroscopic concreta may not be reducible to other terms, according to the priority theorist, but they are explicable in other terms.[11] For the purposes of this paper, then, I will assume that the claims under discussion concerning the existence and features of macroscopic concreta cannot be reduced to claims which neither mention nor quantify over macroscopic concreta.

(EXPLANATION) says that a certain class of individuals – macroscopic concreta – are not fundamental. This leaves unanswered the question of what is fundamental. Different answers to this question yield different flavors of priority theory.[12] I'll mention just two. *Priority microphysicalism* holds that the fundamental concrete individuals are very small. On this view, the existence

[10] What I am calling a reduction of one claim to another involves the identification of the facts reported by those claims; and a reduction of one fact to another involves the identification of those facts. No particular epistemological status is indicated, since an identity that undergirds a reduction, like many other identities, may not be *a priori*. A hallmark of reduction is necessary equivalence: if one claim is reducible to another, then, as a matter of necessity, they have the same truth value; and if one fact is reducible to another, then "they" obtain at exactly the same possible worlds. By way of contrast, explanation does not require necessary equivalence; it does require (see §5 below) that the *explanans* be modally sufficient for the *explanandum*, but it does not require the converse.

[11] See (Melia, 2005, p. 76) who explicitly draws a contrast between explanation and reduction.

[12] All priority theories hold that the relevant kind of explanatory priority is a partial ordering with minimal elements, so there are some fundamental facts. This assumption is explicit in (Schaffer, forthcoming-a).

and features of tables, raindrops, tectonic plates, and galaxies are ultimately explicable solely by reference to the existence and features of particles,[13] including which particles are arranged table-wise, tectonic-plate-wise, *etc.* *Priority monism* holds that there is only one, very large fundamental concrete object, the entirety of the concrete cosmos. On this view, the existence and features of tables, raindrops, tectonic plates, and galaxies are explicable solely by reference to the existence and features of the concrete cosmos of which they are all parts, including its being arranged table-wise here, tectonic-plate-wise there, and so on.

Priority theory opposes ontological radicals, who deny (MODESTY). Radicals reject (MODESTY) on the basis of a wide variety of disparate arguments.[14] On the basis of one or another of these arguments, they think it would be better if our ontology weren't so crowded. For instance, some radicals suggest that the macroscopic concreta aren't needed to explain the complete causal goings-on in the natural world.[15] Thus, such things as raindrops and tectonic plates are "explanatory danglers." Since invoking them is not necessary for explaining anything, Ockham's Razor should be applied to reject them.

There are many different radical positions. I'll mention just two. One radical position, *existence microphysicalism*, holds that every concrete object is very small. On this view there are no tables, raindrops, tectonic plates, or galaxies; there are only particles arranged table-wise, raindrop-wise, tectonic-plate-wise, and galaxy-wise. Another radical position, *existence monism*, holds that there is only one, very large concrete object, the entirety of the concrete cosmos. On this view there are no tables, raindrops, tectonic plates, or galaxies. There is only the cosmos arranged table-wise here, raindrop-wise there, and so on.[16]

The ontological liberal, on the other hand, embraces (MODESTY). He holds that the universe is chock full of a wide variety of macroscopic concreta. By

[13]Strictly speaking, the microphysical entities in question needn't be particles: they could instead be fields, wave functions, vibrating strings, or something even more exotic. I'm just using "particle" as a stand-in for whatever microphysical entity kind is taken as fundamental.

[14]See, *e.g.*, arguments developed in (Merricks, 2001), (van Inwagen, 1990), (Dorr, 2001), (Horgan and Potrč, 2000, 2006). See also discussion at (Schaffer, 2007).

[15]This line of reasoning is cited as a key argument for the two radical views sketched below in (Schaffer, 2007). Schaffer traces this style of argument to (Kim, 1993), where it concerns causal explanations involving mental states; it is applied to macroscopic concreta by (Dorr, 2001) and (Merricks, 2001). This is only one among a wide array of different arguments used by radicals; see n. 14 for references.

[16]I borrow the "priority/existence" terminology from (Schaffer, 2007), though he confines its use to the correlative monist positions.

the liberal's lights, the radical's denial of macroscopic concreta is implausible.[17] According to the influential conception of ontology articulated by Quine (1948), the ontological sparsity of the world according to a theory is determined by what must be in the range of that theory's quantifiers for the theory to be true. This influential conception of ontology underwrites the view that (MODESTY) requires an ontology that is *lusher* than the radical's: in the absence of a reduction, (MODESTY) requires the existence of macroscopic concreta. On the Quinean view, considerations of ontological simplicity favor the radical's ontology, other things being equal. Quinean liberals hold that other things are not equal; the cost of (MODESTY) in ontological simplicity is adequately compensated by a gain in plausibility.

Priority theorists argue that we don't have to choose between plausibility and ontological simplicity; the Quinean view is wrong.[18] The priority theorist endorses (SPARSITY), which says that the ontological sparsity of the world according to a theory is given by the entities mentioned in what we might call the *minimal explanatory base* of the theory: the minimal set of claims which suffice to state the facts that the theory treats as fundamental.[19] Assume, for instance, that the priority microphysicalist is correct to think that the existence and nature of raindrops can be explained solely by reference to particles. Compare her ontology to existence microphysicalism, according to which the only concrete objects are particles, and so there are no raindrops. According to the priority theorist, her ontology is no less sparse for implying the existence of raindrops than is existence microphysicalism. The judicious use of Ockham's Razor will never leave existence microphysicalism and priority microphysicalism on different sides of the cut.[20]

Is (SPARSITY) true? A thorough assessment would require an explication of the notion of ontological sparsity. One feature of ontological sparsity which is crucial for present purposes is the link between comparative sparsity and the application of Ockham's Razor: other things being equal, Ockham's Razor

[17] Schaffer characterizes the radical view as "*crazy*" (emphasis original) (Schaffer, 2007, p. 181).

[18] (Schaffer, 2007, p. 189), (Schaffer, 2009, §§1.2, 2.1), (Cameron, 2008), (Melia, 2005, pp. 77-8).

[19] As I said in n. 12, the priority theorist assumes that explanatory priority is a partial ordering with minimal elements. On this assumption, there are some fundamental facts; so any candidate theory should be rejected if its minimal explanatory base is empty.

[20] (Schaffer, 2009, 2007), (Cameron, 2008), and (Melia, 2005) are explicit on the contrast with the traditional Quinean view. See also the discussion at (Lewis, 1992, p. 216).

favors a sparser theory over a lusher one. But this is only a start. A more thorough explication of the notion of sparsity would be required to determine whether (SPARSITY) is true.

I will make no serious attempt to assess (SPARSITY) here. Some priority theorists use the metaphor of what God would have had to do to create macroscopic concreta. The idea is that the minimal explanatory base of a theory specifies what God would have to do to create this world.[21] If, for instance, all God would have had to do to create a raindrop is to arrange some particles raindrop-wise, then, the priority theorist urges, the existence of the raindrop is not something in addition to the existence and arrangement of the particles. I remain unsure whether this or other motivations for (SPARSITY) succeed. For present purposes, I'll simply assume that (SPARSITY) is true.

The attractions claimed by priority theorists are considerable. The priority theorist proposes to avoid the implausibilities of radicalism, at no apparent cost in ontological simplicity. What's not to love? Priority theory looks like the best of both worlds, an "ontological free lunch".[22] Unfortunately the free lunch promised by priority theory turns out to be unavailable. It turns out that (EXPLANATION) faces difficulties that merit its rejection. In order to see why, we need to look a bit more carefully at the sort of explanations on which the priority theorist relies.

2 The Determination Constraint

What sort of explanation does (EXPLANATION) promise? It needs to be the sort of explanation which underwrites the idea backing (SPARSITY), that entities whose existence and nature can be explained solely by reference to other things are "no addition to being." This means that the explanation cannot just be causal. Suppose we explain the existence of a certain raindrop r, together with the features it has at its inception, solely by reference to the properties of the cloud from which it came, the causal laws governing its production, and the antecedent surrounding circumstances. It would be absurd to insist that, since we now understand the causes of r's existence and of its initial features, it is "no addition to being" to also claim that r exists. Causal explanations are not

[21] See, *e.g.*, (Schaffer, 2009, §1.2).
[22] See (Armstrong, 1997, p. 12), (Schaffer, 2007, p. 189), and (Schaffer, 2009, §2.1).

enough by themselves to buy an ontological free lunch. The kind of explanation in question is not (or not just) causal explanation.

Certainly there are relatively familiar scientific explanations that do not seem to be causal. A given isotope of gold has a certain atomic mass in virtue of containing a certain number of protons and neutrons. Ethanol is miscible in water in virtue of containing a hydroxide group. Diamond is hard because each carbon atom in its crystalline structure is bonded to each of its neighbors. In none of these cases does it seem correct to say that the *explanans* causes the *explanandum*.[23]

Consideration of how explanatory proposals of this sort may fail points the way to constraints on the sort of explanation at issue in (EXPLANATION). The most important constraint for present purposes is that the explanation of the existence and features of macroscopic concrete objects must trace how those facts are determined. A good explanation of r's having a certain feature F in terms of facts $g_1, g_2, \ldots$ should show why r had to be F, given $g_1, g_2, \ldots$. The *explanans* thereby provides means for distinguishing r from individuals which are not F, and thus showing why r, unlike those other things, is F. Explanatory proposals that fail in this regard are inadequate.

This consideration motivates a constraint on adequate explanations that causes trouble for (EXPLANATION) and thus priority theory. The idea is, roughly, that there's something wrong with or missing from an explanation of r's being F if there is a situation in which something is just is like r so far as the *explanans* goes, but lacks F. This rough statement can be made somewhat more precise if we help ourselves to some apparatus. Think of a fact as a distribution of certain properties and relations over certain individuals, which I will term the individuals *involved* in the fact.[24] For instance, *being male* is possessed by George Bush; this is a very simple way in which this property is distributed over the individual in question. Likewise, Bush bears *being the husband of* toward

[23] A note on terminology. I am using "*explanans*" to denote the fact reported by the "because" clause of a given explanatory proposal. When I want to speak of the clause itself, I will call it the "*explanans* clause". Similar remarks apply to my use of "*explanandum*".

[24] What about facts which seem to involve no particular individuals? For instance,

(1) No Nobel Laureates are Supreme Court justices

states a fact that seems to involve no particular individuals. We can get around this worry by remembering that *being such that no Nobel Laureates are Supreme Court justices* is a property, and thinking of the relevant fact as the distribution of this property over a single individual, *e.g.*, the number 0.

his spouse Laura; this is a somewhat less simple way in which this relation is distributed over those two individuals. The latter fact involves both spouses; the former involves only George. An explanatory proposal for the fact that r has some feature F says that this fact obtains in virtue of certain further facts, each of which is to be identified with a distribution of certain properties and relations over certain individuals. Thus, a proposal to explain r's having F can be expressed by a claim of the form,

(Prop) r is F because $\phi(r, t_1, \ldots, t_n)$

where all of the individuals involved in the *explanans* are denoted by exactly one term among $r, t_1, \ldots, t_n$, and ϕ says how the properties and relations in question are distributed over those individuals.[25] When an explanatory proposal is expressed by a claim of this sort, I will say that the claim *perspicuously articulates* the proposal. A perspicuous articulation of an explanatory proposal names names: it specifies exactly which individuals are involved in the proposed *explanans* and *explanandum*. Thus, the claim, "the raindrop r is transparent in virtue of the transparency-wise arrangement of certain particles" fails to be a perspicuous articulation of any microphysicalist explanatory proposal; on the other hand, if $p_1, \ldots, p_n$ name the particles in question, then "r is transparent in virtue of the transparency-wise arrangement of $p_1, \ldots, p_n$" is a perspicuous articulation of a microphysicalist explanatory proposal. I will assume that every explanatory proposal that meets the needs of (EXPLANATION) has a perspicuous articulation.[26]

Given an explanatory proposal of the form (Prop), call a situation in which some individuals $t, a_1, \ldots, a_n$ satisfy $\phi(x, y_1, \ldots, y_n)$,[27] but t does not satisfy Fx, a *confounding case* for the proposed explanation: it's a situation in which

[25] A word about syntax: I am not assuming that any formula of the form $\phi(r, t_1, \ldots, t_n)$ contains r (or, for that matter, any of the t's).

[26] This assumption might be resisted on a variety of grounds. (For instance, it might be held that some facts concerning the existence and features of macroscopic concreta can be adequately explained only by facts involving infinitely many individuals, and that no infinitary perspicuous articulation exists.) If the assumption fails, then the argument of this paper will have to be made at the level of facts. This can be done by representing a fact (in the actual world) by a pair containing the set of individuals I it involves and the set of properties and relations P it involves. The fact represented by $\langle I, P\rangle$ is the distribution of the properties and relations in P over the individuals in I. These representations can, in effect, play the role of perspicuous articulations of explanatory proposals. This is not the place to work out the details of this alternative approach, so for present purposes I will rely on the assumption.

[27] That is, the assignment of t to x, a_1 to y_1, *etc.*, satisfies $\phi(x, y_1, \ldots, y_n)$. I assume that $\phi(x, y_1, \ldots, y_n)$ is the result of uniform substitution of all occurrences of r with x, t_1 with y_1, *etc.*, and that all of the variables $x, y_1, \ldots, y_n$ are pairwise distinct.

some individual t is just like r so far as the *explanans* goes, but fails to be F. Consider, for example, an explanation of the hardness of a particular diamond d in terms of its crystalline structure. The explanation has the form

(2) d is hard because *Structure*(d),

where *Structure* is a predicate picking out the crystalline structure in question. A confounding case for this explanatory claim would be situation in which an individual d^* has the crystalline structure in question, but is not hard.

We are now in a position to state the constraint on explanations which causes trouble for priority theory. An explanatory proposal is *at best incomplete* if there is a confounding case for it: the proposal is either off on the wrong foot entirely, or requires supplementation. Call an explanatory proposal *good* if it's both true and complete (so an explanatory proposal is at best incomplete iff it's not good). This, then, is the constraint:

(Determination Constraint) If an explanatory proposal of the form, "r has feature F because $\phi(r, t_1, \ldots, t_n)$" is good, then there is no confounding case for it.

Here is an intuitive way of appreciating the point. A standard way to show that a proposed explanation "x is F in virtue of being G" is inadequate is to identify a confounding case: another object that's G but not F. Thus "x is a stable nucleus in virtue of being an oxygen nucleus" is a transparently inadequate explanation, given the existence of short-lived radioactive oxygen isotopes.

The determination constraint says that good explanations don't have confounding cases. Consider again a perspicuously articulated explanatory proposal of the form

(Prop) r is F because $\phi(r, t_1, \ldots, t_n)$

A confounding case for this explanatory proposal would be a situation in which some object r^*, along with some other objects $a_1, \ldots, a_n$, has the properties required to satisfy the *explanans* clause ϕ, but in which r^* lacks F. Thus, r^*, together with $a_1, \ldots, a_n$, witnesses the truth of

(3) $(\exists y_1, \ldots, y_n)(\exists x)(\phi(x, y_1, \ldots, y_n) \wedge \neg Fx)$.

So, the determination constraint implies that any perspicuously articulated explanatory proposal of the form (Prop) is associated with a universal generalization

(4) $(\forall y_1, \ldots, y_n)(\forall x)(\phi(x, y_1, \ldots, y_n) \Rightarrow Fx)$.

According to the determination constraint, if the explanatory proposal is good, then its associated universal generalization is true.[28]

3 An Objection to Priority Theories

Priority theory has difficulty accommodating the determination constraint. To flesh out the difficulty, it will be useful to note a consequence of (EXPLANATION). (EXPLANATION) says that the existence and features of all of the macroscopic concreta can be completely explained solely by reference to other things. Fundamental facts just are those facts which have no further explanation. All of the distributions of features over macroscopic concreta are non-fundamental according to (EXPLANATION). Thus, the priority theorist is committed to:

(Priority) The fundamental facts do not include any distributions of features over ordinary macroscopic concreta, including tables, raindrops, tectonic plates, galaxies, and the like.

(Priority) says what the fundamental facts do not include. Each of the two moderate views we have already encountered says something about what the fundamental facts do include.

[28] Dancy (2004, p. 87) has argued that an explanation of the moral wrongness of an act need not imply the associated universal generalization in the way required by the determination constraint. He distinguishes between explanatory factors ("features that make an act wrong") and background conditions ("enabling conditions"). There may be situations in which the explanatory factors are in place, but the *explanandum* fails, so long as those are also situations in which some background condition also fails. It is not obvious that Dancy and the priority theorists have in mind the same sort of explanation. But even if they do, the argument of the next section could be carried through. We would need to replace the statement of the determination constraint in the main text with a weaker determination relation that required only that there be no confounding case in which both the fundamental facts and the background conditions were preserved; in effect, we would need to add a conjunct specifying the background conditions to the antecedent of the associated universal generalization (and close with universal quantifiers as appropriate). And we would need to attribute to the priority theorist the idea that neither the fundamental facts nor the background conditions involve any macroscopic concreta. Thanks to Geoffrey Ferrari.

Priority Monism The fundamental facts are distributions of features over the entirety of the concrete cosmos.

Priority Microphysicalism The fundamental facts are distributions of features over particles and spacetime regions.

Here is an intuitive way to understand the problem for (EXPLANATION) and its consequence (Priority). Suppose that r and t are a raindrop and a tectonic plate, respectively; and that there is a feature F that r has and t lacks. According to (Priority), r's being F ultimately obtains in virtue of facts which *do not involve* r *at all*. We get some explanation which is perspicuously articulated by a claim of the form, "r is F because ϕ", where ϕ says how certain properties and relations are distributed over individuals other than r. That means that t meets exactly the same conditions: ϕ will be equally true of t.[29] Since t is not F, the determination constraint implies that the explanation is no good. For instance, a priority microphysicalist might propose that r is transparent because there are some particles arranged transparency-wise at a certain location.[30] But it is equally true of t that there are particles so-arranged at that location. The tectonic plate is not transparent, and so presents a confounding case for the proposed explanation. Application of the determination constraint yields the conclusion that the proposed explanation is not good.

Here is the more general and more formalized version of the argument. Let r be a raindrop and t be a tectonic plate. According to (Priority), any fact involving the possession of a feature F by r has a good explanation perspicuously articulated by a claim of the form,

(5) r is F because $R(t_1, \ldots, t_n)$,

where R stands in for some (possibly very complex) relation, and none of the terms $t_1, \ldots, t_n$ denote r. On priority microphysicalism, for instance, the fundamental facts are all distributions of features over particles and spacetime regions. A priority microphysicalist will therefore hold that the *explanans* clause $R(t_1, \ldots, t_n)$ reports the instantiation of various properties and relations by the

[29] More technically, the result $\phi(x)$ of uniform replacement of x for r in ϕ is just ϕ itself. So, if an assignment of r to x satisfies $\phi(x)$, then so does an assignment of t to x.

[30] Recall that we are assuming that r's transparency is not reducible to the fact that some particles are arranged transparency-wise at the relevant location. This assumption is highly plausible in this case, since it's highly plausible to think that r might have been transparent even though there was something opaque at the relevant location.

particles and spacetime regions represented by the t's. Since r is neither a particle nor a spacetime region, the *explanans* does not involve r. But the *explanans* clause $R(t_1, \ldots, t_n)$ is also of the form, $\phi(r, t_1, \ldots, t_n)$ (see the syntactic remark in n.25). So the explanation in question is also of the form

(6) r is F because $\phi(r, t_1, \ldots, t_n)$.

The determination constraint implies that this explanation is good only if its associated universal generalization

(7) $(\forall y_1, \ldots, y_n)(\forall x)(R(y_1, \ldots, y_n) \Rightarrow Fx)$.

is true. Since $R(t_1, \ldots, t_n)$ is r-free, standard quantificational logic yields

(8) $((\exists y_1, \ldots, y_n)R(y_1, \ldots, y_n) \Rightarrow (\forall x)Fx)$.

An explanatory proposal is good only if the *explanans* clause is true. In this case, that requires that $R(t_1, \ldots, t_n)$ be true. But then the antecedent of (8) is satisfied, and so t is also F. Our choice of F was arbitrary, so r and t do not differ on any qualitative property if (Priority) is true. But this beggars belief. The raindrop r and the tectonic plate t differ in many qualitative ways. The raindrop is transparent, in liquid state, *etc.*; the tectonic plate is opaque, (mostly) solid, and so on. It is difficult to imagine two more different macroscopic concrete objects. Thus, (Priority) seems to imply the highly implausible view that r and t are qualitatively indiscernible.

Call this argument from the determination constraint to the falsity of (EXPLANATION) *the determination argument*. The determination argument does not turn on how permissive we are about the properties that get mentioned in the explanations the priority theorist may offer, so long as macroscopic concreta like r are excluded from the *explanans*.[31] There is an air of triviality to the priority microphysicalist's proposal to explain r's transparency in terms of the transparency-wise arrangements of particles.[32] But the determination argument shows that, no matter how trivial-sounding, the proposed explanation is

[31] An important qualification: the argument would fail if we allowed in the *explanans* non-qualitative properties of the form *being such that r is F*. But then the evidently correct view is to hold that it's r's F-ness that's doing the explanatory work. If we can't ultimately get r out of the picture, then (EXPLANATION) fails.

[32] It is not clear that this apparent triviality poses any problem for priority microphysicalism. Even if it does, priority microphysicalists may suggest that talk of transparency-wise arrangement is just a stand-in for some less trivial, hideously complicated specification.

inadequate. The individuals r and t are indiscernible with respect to the locations and arrangements of particles in the world which they jointly inhabit.[33]

Once the determination argument is stated, it is not difficult to see what's missing from the explanations offered by priority theorists. For instance, in order to supplement her explanatory proposal, the priority microphysicalist needs to add fundamental facts which show what the salient features of the relevant particles have to do with r. Suppose, for instance, that we add the fact that r is composed of certain particles to the priority microphysicalist's proposed explanation of

(9) r is transparent.

The new explanatory proposal is that r is transparent not just because some particles are arranged transparency-wise, but because *its* particles are arranged transparency-wise. This proposal does not succumb to the determination argument; it is crucial for that argument that the *explanans* not involve r. Only then will the *explanans* clause make no mention of r. If the *explanans* clause mentions r, then the argument is invalid.[34]

But admitting fundamental facts involving r means giving up on (Priority), and hence (EXPLANATION). The determination argument shows that there is an explanatory gap in any priority theorist's explanatory proposal. But the most straightforward way of filling this explanatory gap is unavailable to the priority theorist. The moral of the determination argument is: *barring reduction, there do not exist two non-fundamental individuals x and y that differ on some feature F*. Thus, in the absence of reductions that paraphrase claims like (9) so as to eliminate apparent reference to the raindrop r, not every qualitative fact involving r can be completely explained solely in terms of the properties of other things.

The determination argument might be thought to show more than it does. It does not show that every fact regarding macroscopic concreta is fundamental. For instance, the argument does not show that we must accept that claims like

(10) r is a raindrop.

[33]Similar comments would apply if a priority monist proposed that r is transparent in virtue of the fact that the concrete cosmos has the feature *being arranged transparency-wise in such-and-such a location*.

[34]To be precise, the step from the analogue of (7) to the analogue of (8) is blocked. Similar comments apply to the proposal to fix priority monism by adding to its minimal explanatory base the fact that r is the only concrete object in such-and-such a location.

are fundamental. (10) imputes a sortal, "raindrop" to our friend r. Perhaps it is implausible to suggest that *being a raindrop* is a fundamental sort, in the sense that there is no explanation available for anything's being a raindrop. But the conclusion of the argument does not suggest otherwise. The argument does not establish that r's raindrophood appears among the fundamental facts. All it establishes is that some fact or other involving r appears among the fundamental facts. And, as our discussion of what's missing from the priority microphysicalist's explanation should make clear, the fundamental facts involving r need not also involve *being a raindrop*, so far as the determination argument goes. In general, the determination argument only shows that some of the facts involving r are fundamental; it does not show that any particular fact involving r is fundamental.

For this reason, the determination argument cannot show that there is no metaphysical utility in pursuing the explanation of such facts as (9) and (10) in partly microphysical terms. The determination argument does not provide any reason to doubt that these claims have explanations at all. It only provides a reason to doubt that they have explanations well-suited to the ontological purposes of priority theory.

Further, no claim about the epistemological status of the fundamental r-involving facts is required by the argument. For all the argument says, the missing facts might be knowable *a priori*.[35] For instance, the priority microphysicalist might argue that

(11) r is the concrete object in such-and-such a location

is knowable *a priori*.[36] If so, when stating the proposed microphysical explanation of r's transparency to a suitably sharp audience, the crucial facts might "go without saying." The determination argument shows that they still have to be

[35] See, *e.g.*, (Chalmers and Jackson, 2001) for a defense of the claim that the successful explanation of various features of water in microphysical terms requires that, for subjects like us, "water is the liquid (if there is one) which falls from the sky as rain, collects in streams and rivers, *etc.*" is knowable *a priori*. The view sketched in this paragraph is the analogue of Jackson and Chalmers's claim for successful explanation of r's features.

[36] Indeed, he might hold that some term we use to refer to r abbreviates or disguises the definite description "the concrete object in such-and-such a location", so long as such claims as

(12) The concrete object in such-and-such a location is made of particles x_1, x_2, ...

are interpreted so as to involve reference to, or at least quantification over, r. Thus, he might hold that sentences stating the facts needed to supplement the explanation are not only *a priori*, but also analytic.

among the fundamental facts, no matter what their epistemological status. The alleged *a priority* of fundamental r-involving facts does not buy an ontological free lunch.[37]

The priority theorist, then, cannot evade the argument by suggesting that the needed facts involving macroscopic concreta are *a priori*, are stateable by analytic sentences, or have some other epistemological or semantic status that makes them easy to overlook. She has two other options for resisting the argument.

4 Resisting the Determination Argument

The first response available to the priority theorist is to claim that the raindrop r and the tectonic plate t are qualitatively indiscernible. Then, the universal generalization associated with the priority theorist's explanation of r's existence and features would be true. But, we are assuming, r is transparent and liquid, while t is neither. So this response would implausibly require that such discerning features as transparency and liquidity are not qualitative: none of these properties can be adequately specified except by reference to a particular individual.

Denying the qualitative discernibility of r and t comes at a high cost in plausibility. Perhaps that cost is offset by the gain in ontological parsimony that the priority theorist offers, though frankly I doubt it. Nevertheless, the priority theorist should not avail herself of this response. Part of the point of priority theory was to accommodate the dictates of common sense abetted by science. There is no scientific evidence for the claim that such properties as transparency, liquidity, *etc.*, are not qualitative. And the common sense position is that no particular individual need be mentioned to specify these properties. Indeed, they are paradigmatic instances of qualitative properties. So, even if the cost in plausibility were outweighed by the gain in ontological simplicity, denying the qualitative discernibility of r and t does not comport with the motivation for pursuing priority theory in the first place. The whole idea was supposed to be that we don't have to choose between plausibility and ontological parsimony.

[37] Likewise, the *a priority* of mathematical facts concerning numbers does not by itself imply that Platonism about numbers offers an ontological free lunch.

The second response the priority theorist might make is to deny the determination constraint.[38] This does not require her to abandon the claim that there is *some* sense in which the fundamental facts fix everything else; there are, for instance, lots of supervenience relations in the literature which would cause no trouble.[39] But the determination constraint is intuitively well-motivated; may the priority theorist nevertheless deny it?

I think not. Recall that the determination constraint was motivated as a generalization from cases. Consider again the explanatory proposal

(14) This nucleus is stable because it is an oxygen nucleus.

This proposal is transparently inadequate, given that there are radioactive oxygen nuclei. The proposal does not suffice to explain why this nucleus, unlike those other, radioactive nuclei, is stable; it doesn't tell us what makes this nucleus different from those radioactive nuclei. It's inadequacy is a direct result, then, of its failure to meet the determination constraint.

This is no isolated phenomenon. Read any substantial swath of philosophy, and you will encounter explanatory proposals of the form

(Exp) x is F because $\phi(x)$.

You will also encounter arguments against such proposals of the form:

> y is not F, but y is such that $\phi(y)$
>
> ---
>
> (Exp) is at best incomplete.

The determination constraint says, in effect, that these arguments are valid. Consider a crude example. A utilitarian ethicist might propose that certain

[38] She might argue, for instance, that the determination constraint sets too stringent a standard. But note that lots of plausible explanatory proposals satisfy the determination constraint. For instance, the explanation

(13) A and B's heights average 5'6" because A is 5'4" and B is 5'8"

passes easily. Any function which preserves A's and B's respective heights will also preserve their average height. So the determination constraint doesn't set a standard that's in principle impossible to meet.

[39] For instance, she can affirm *coincidents-friendly* supervenience (see (Zimmerman, 1995, p. 88) and (Rea, 1997)), or weaker forms of global supervenience, including *weak* (see (Stalnaker, 1996, p. 227), (McLaughlin, 1997, p. 214), and (Sider, 1999, p. 915)) and *intermediate* global supervenience (see (Bennett, 2004a, p. 503)). A comprehensive roundup of various supervenience relations can be found at (McLaughlin and Bennett, Fall 2008). Thanks to an anonymous referee for suggesting this response.

courses of action, like giving a substantial proportion of your income to OXFAM, are obligatory in virtue of the fact that they maximize utility. Others have objected that there are confounding cases for this explanatory proposal: courses of action, like framing and punishing an innocent person to stop a crime wave, that maximize utility but are not obligatory.[40] The utilitarian may dispute the premise, arguing, for instance, that framing the innocent in such circumstances is obligatory. The utilitarian may amend the original explanatory proposal, arguing, for instance, that giving to OXFAM is obligatory in virtue of being enjoined by a rule the adoption of which maximizes utility.[41] The utilitarian may *not* blithely accept the premise and stick with her explanatory proposal. The argument is valid, just as the determination constraint requires.

To take a less crude example, consider the state of the debate over material constitution. In the standard test case, a lump of clay Lumpl and a statue Goliath are coincident throughout the entirety of their careers. They are made of the same particles, subject to the same physical pushes and pulls, *etc.* *Pluralists* about material constitution hold that Lumpl and Goliath are nevertheless distinct, typically on the grounds that they differ in their sortal and modal properties. For instance, a pluralist typically argues that Lumpl differs from Goliath in that Lumpl, unlike Goliath, can survive being squashed. A common objection[42] to pluralism is that the pluralist cannot explain the sortal and modal differences he alleges between Lumpl and Goliath. This argument, called *the grounding problem*, uses an instance of the determination constraint. The idea is that Lumpl and Goliath are indiscernible with respect to all of the salient *explanans*. Lumpl, like Goliath, is composed of certain particles, in certain arrangements, and bearing certain causal and spatiotemporal relations to other things. Thus, on the pluralist's view, any perspicuously articulated explanatory proposal of the form

(15) Goliath cannot survive squashing because it is composed of particles $p_1, \ldots, p_n$ in such-and-such arrangement

will find a confounding case presented by Lumpl, which can survive squashing.

[40] See (Carritt, 1950). It might be objected that Carritt's confounding case is merely possible, and that the determination constraint says only that good explanations have no actual confounding cases. I will argue in §5 below that the determination constraint should be strengthened to exclude merely possible confounding cases. For now it's enough to note that if Carritt's case supports the stronger principle, then it also supports the weaker principle.

[41] See the discussion in (Smart, 1973).

[42] In fact, Wasserman (2002) dubs it "the standard objection."

This is a reason, as the determination constraint says, to think that any such explanation is at best incomplete.[43]

Faced with this problem, pluralists either supplement the explanatory proposal (see, for instance, (Fine, 2008)), suggest that the salient sortal and modal features of Lumpl and Goliath are fundamental (see, for instance, (Bennett, 2004b)), or deny that Lumpl and Goliath are discernible in the relevant ways (see (Sider, 2008)). But if the determination constraint is rejected, they needn't bother: they can just blithely accept that the *explanans* clause fits Lumpl as well as Goliath, even though Lumpl lacks the modal and sortal features in question. This response is evidently unreasonable.[44] The determination constraint should not be rejected.

Perhaps it might be urged that the determination constraint overgeneralizes from these cases. The examples we have considered so far all concern an explanatory proposal for some individual's being F in terms of further features of that individual. We considered, for instance, the claim that Goliath cannot survive squashing in virtue of a further feature it has: its being composed of particles in a certain arrangement and bearing certain relations to other things. Perhaps the determination constraint should be restricted so that it does not apply when we offer proposals for explaining a certain individual x's being F in terms of facts that don't involve x at all. These are just the sorts of explanations that are offered by priority theorists. If the determination constraint may plausibly be restricted so that it does not cover such explanations, then the priority theorist is off the hook.

But no such restriction of the determination constraint is plausible. No explanatory proposal of the form

x is F because x is G

whose inadequacy is revealed by a confounding case can be repaired by taking away facts from the *explanans* so that x is no longer involved in any of the

[43]Thus, (Fine, 2008, p. 107):

> For if I use the fact that a given object ϕ's, for example, to explain why it has the modal profile that it does, then I had better be sure that a coincident object with a different modal profile does not also satisfy ϕ.

[44]The grounding problem is discussed by many authors. See (Bennett, 2004b) for a useful discussion, and (Olson, 2001) for a vigorous development of the objection.

allegedly more fundamental facts. Consider again the proposal

(14) This nucleus is stable because it is an oxygen nucleus.

The inadequacy of (14) is attested by the fact that there are radioactive oxygen isotopes. This problem cannot be avoided by replacing reference to the nucleus with reference to its constituent protons $p_1, \ldots, p_8$, as in

(16) This nucleus is stable because $p_1, \ldots, p_8$ are protons arranged oxygen-wise.

This new explanatory proposal has the same problem as the old one. There is a confounding case for it: a situation in which eight protons are arranged oxygen-wise, but in such a way as to form a radioactive oxygen nucleus.[45] Similarly, the pluralist's problems explaining the modal features of Goliath would not go away if he were careful to avoid mention in the *explanans* clause of facts involving Goliath, and instead relied on facts involving only the relevant particles. The restricted version of the determination constraint is not strong enough.

The determination constraint is therefore justified as a generalization from cases. It is also favored by more general reflections on what a complete explanation must provide. The idea that animates the determination constraint is that a complete explanation of an individual x's having some feature F must show why that individual, unlike, say, some non-F individual y, is F. It must therefore mention what distinguishes x from y in respect of F-ness; more colloquially, together with the explanation for y's lacking F, it must provide the means for saying what *makes them different* in this respect.

In summary, abandoning the determination constraint presents the priority theorist with two challenges. First, she must state a plausible alternative constraint on adequate explanation with two features: (*i*) like the determination constraint, it correctly diagnoses the inadequacy of the explanatory proposals discussed in this section; but (*ii*) unlike the determination constraint, it cannot be used to establish the failure of (EXPLANATION). Second, she must say why the complete grounds for one individual's being F, together with the complete grounds for another individual's lacking F, need not provide the means for saying what makes these two particular individuals different in this particular way.

[45] If the determination argument is accepted, this explanatory proposal has some new problems as well, since it has other kinds of confounding cases. But the important point for present purposes is that it inherits (14)'s problem. The fact that it has more problems besides is not relevant.

Prospects seem dim for managing these difficulties, so I will simply assume that the priority theorist must accept the determination constraint. Readers who reject this assumption may treat this paper as an argument for a number of conditional claims whose antecedents state the determination constraint.[46]

5 Explaining Existence

Suppose then that the priority theorist accepts the premises of the determination argument. The falsity of (EXPLANATION), and thus of priority theory, seems to follow. Perhaps, however, the moral is just that the conjunction of (MODESTY), (SPARSITY), and (EXPLANATION) does not adequately capture the idea animating the priority theorist. So far, we have been reading the ontological commitments of a theory off the inventory of entities mentioned in the theory's minimal explanatory base. This is the view articulated by (SPARSITY): ontological sparsity is reckoned by taking an inventory of entities which must be mentioned in order to explain *all non-fundamental qualitative facts*. But there is an alternative view available. The alternative view would reckon sparsity instead by taking an inventory of entities which must be mentioned to explain only the *non-fundamental existence facts*: explanations of other qualitative facts are irrelevant.

Call an entity a *fundamental existent* if its existence is inexplicable in terms of the existence and features of other things. Then the alternative view of ontological commitment can be stated thus:

(SPARSITY)$^-$ The ontological sparsity of the world is determined by the number and variety of fundamental existents.

If she adopts (SPARSITY)$^-$ in place of (SPARSITY), then the priority theorist is relieved of the necessity of defending (EXPLANATION) against the determination argument. She may instead hold

(EXPLANATION)$^-$ The existence of the macroscopic concrete objects alleged by common sense abetted by science can be completely explained solely by reference to the existence and properties of other things.

[46]Thanks to Ross Cameron, Andrew Cortens, Jonathan Schaffer, and Jason Turner for extended discussions of the merits of the determination constraint.

(EXPLANATION)$^-$ is strictly weaker than (EXPLANATION). While, for instance, (EXPLANATION) requires the explicability in other terms of not only r's existence, but also all of its features, (EXPLANATION)$^-$ requires only the explicability of r's existence.

Call the conjunction of (MODESTY), (SPARSITY)$^-$, and (EXPLANATION)$^-$ an *existential priority theory*. Existential priority theory seems to offer all of the charms of priority theory, without the drawback revealed by the determination argument. Like the priority theorist, the existential priority theorist thinks we can combine the liberal's modest acquiescence to common sense with the radical's ontological parsimony. Unlike the priority theorist, the existential priority theorist is happy to admit that facts involving macroscopic concreta are among the fundamental facts. Some of r's properties will be mentioned in any adequate explanation of r's transparency. Nevertheless, claims the existential priority theorist, r exists solely in virtue of the existence and features of other things, and so is "no addition to being."

As a consequence of (EXPLANATION)$^-$'s relative weakness, the determination argument does not undermine it, and thus leaves existential priority theory untouched. Recall that the result that caused all the trouble for (EXPLANATION) was that all of the features possessed by the raindrop r were also possessed by the tectonic plate t; (EXPLANATION) requires that r and t share transparency, liquidity, *etc.* The reasoning to this result uses the priority theorist's claim that there are good explanations of all of r's features in terms of facts that don't involve r. The existential priority theorist says instead that there is a good explanation only of r's existence in r-free terms. If we apply the reasoning of the determination argument, the analogous result is: according to (EXPLANATION)$^-$, r and t both exist. But this result isn't absurd; it's the plain truth, if (MODESTY) is any guide. One response to the determination argument, then, is to abandon priority theory for existential priority theory.

It turns out that a variant of the determination argument can be mounted against existential priority theory. The argument relies on two new assumptions. The first new assumption is that the explanation of the existence of r should also provide fodder for the explanation of the *actual* existence of r.[47] Suppose we're given the explanation for the existence of an actual individual

[47] I am here using "actual" in the way defined in (Kaplan, 1989), so that "actually ϕ" is true at a world w iff ϕ is true at the actual world.

x in terms of the distribution of certain features $F_1, F_2, \ldots$ over certain individuals $x_1, x_2, \ldots$. This explanation concerns the existence of x in the actual world. We can therefore generate an explanation for the actual existence of x from the distribution of features *actually* F_1, *actually* $F_2, \ldots$, over $x_1, x_2, \ldots$. Consider the case of the singleton set {Socrates}. If that set exists in virtue of the existence of the man Socrates,[48] then {Socrates} actually exists in virtue of the actual existence of Socrates.[49] In brief, if a claim of the form "x exists because ϕ" is true, then so is the correlative claim of the form "x *actually* exists because *actually* ϕ." Call this assumption *actualization*.[50]

The second new assumption constrains the range of candidates for explaining r's existence. Let r, t, *etc.*, exhaust the actual existent individuals. The second assumption, which I'll call *permissiveness*, is that the explanation (if any) of the existence of r does not entail that the only individuals are r, t, *etc.*[51] Let's say some facts provide a *basis* for a fact f if they are fundamental and jointly provide an adequate explanation of f. The assumption of permissiveness implies that no basis for r's existence rules out a world in which all facts in that basis obtain and yet there are some *aliens*: some objects which don't actually exist.[52] For instance, if r exists in virtue of the raindrop-wise arrangement of certain particles, then permissiveness says that there is a possible world containing

[48] This view is suggested by (Johnston, 2006) and (Fine, 1994).

[49] The explanation of actuality facts can come apart from the explanation of the corresponding ordinary facts in non-actual worlds. Consider a world w in which Gore won in 2000. It is plausible to think that the explanation in w of the fact that either Bush or Gore won is that Gore won. But, in w, the fact that either Bush or Gore actually won is explained instead by Bush's actual victory.

[50] Note that the necessitation of actualization – *i.e.*, the claim that it is necessary that if "x exists because ϕ" is true, then so is "x actually exists because actually ϕ" – would be implausible. My wife and I have an average height of 5'6" in virtue of the fact that she is 5'4" and I am 5'8". But it is possible that we have had an average height of 5'6" in virtue of the fact that she is 5'9" and I 5'3". In such a case, the claim that our heights *actually* average 5'6" in virtue of the fact that she is *actually* 5'9" and I am *actually* 5'3" would have been false.

[51] Strictly speaking, the assumption needed for the argument is that there is at least one macroscopic concretum whose existence does not entail that there are no individuals other than r, t, *etc.* But it is plausible that r fits the bill if anything does.

[52] Permissiveness will be rejected by anyone who rejects the possibility of aliens (*e.g.*, (Linsky and Zalta, 1994)). It will also be rejected by anyone who thinks that part of the basis for r's existence is a "that's all" fact, to the effect that there are no individuals other than the actual individuals. (See (Chalmers and Jackson, 2001) for a discussion of "that's all" clauses of this type.) So r's existence, according to permissiveness, does not depend on the non-existence of aliens. Notice, however, that permissiveness does not rule out the claim, favored by priority monists (*e.g.*, (Schaffer, forthcoming-a)), that all actual concreta are interdependent, so the existence of r depends on the existence and features of each of the rest. It just rules out the claim that the existence of r depends on the *non*existence of something *else*.

not only those particles in a raindrop-wise arrangement , but also a non-actual individual. Permissiveness is very plausible in this case. For instance, it seems that the truth of

(17) $p_1, \ldots, p_n$ are particles arranged raindrop-wise

at a world does not rule out the existence of alien macroscopic concreta elsewhere in that world.[53]

Our variant of the determination argument will rely on a strengthening of the determination constraint. The determination constraint says that good explanations don't have actual confounding cases. But even the mere possibility of a confounding case demonstrates the inadequacy of a proposed explanation. Consider again the claim that a certain nucleus is radioactive in virtue of the fact that it is an oxygen nucleus. If there actually are some short-lived radioactive oxygen nuclei, then the proposed explanation is at best incomplete. But suppose now that there happen not to be any short-lived radioactive oxygen isotopes, though it is possible to make some in a certain kind of research reactor. The proposed explanation is still at best incomplete. Thus, explanations are also subject to a strengthened version of the determination constraint:

(Modal Determination Constraint) If an explanatory proposal of the form, "r has feature F because $\phi(r, t_1, \ldots, t_n)$" is good, then there neither is nor could have been a confounding case for it.

The modal determination constraint implies that a perspicuously articulated explanatory proposal of the form

(Prop) r is F because $\phi(r, t_1, \ldots, t_n)$

is true only if an associated necessity claim

(18) $\Box(\forall y_1, \ldots, y_n)(\forall x)(\phi(x, y_1, \ldots, y_n) \Rightarrow Fx)$.

is.

Now for the variant of the determination argument. If (EXPLANATION)$^-$ is true, then our raindrop r's existence can be explained solely by reference

[53]Similar comments would apply to a monist explanation of r's existence in terms of the raindrop-wise arrangement of the concrete cosmos at a certain location. This arrangement of the concrete cosmos does not on its face rule out the possibility of aliens elsewhere.

to distributions of features $F_1, F_2, \ldots$ over other individuals. As before, this explanation can be perspicuously articulated by a claim of the form

(19) r exists because $R(t_1, \ldots, t_n)$,

where R stands in for some (possibly very complex) relation, and none of the terms $t_1, \ldots, t_n$ denote r. The actualization assumption requires that this proposal is good only if

(20) r actually exists because actually $R(t_1, \ldots, t_n)$

is good too. On the modal determination constraint, the truth of this explanatory proposal requires the truth of the associated necessity claim

(21) $\Box(\forall y_1, \ldots, y_n)(\forall x)(\text{Actually } R(y_1, \ldots, y_n) \Rightarrow \text{Actually } x \text{ exists})$.

Since $R(t_1, \ldots, t_n)$ is r-free, standard quantificational logic plus the axiom schema (K) yields

(22) $\Box((\exists y_1, \ldots, y_n)\text{Actually } R(y_1, \ldots, y_n) \Rightarrow (\forall x)\text{Actually } x \text{ exists})$.

Applying permissiveness, we are given a non-actual world w in which $x_1, x_2, \ldots$ have exactly the same features $F_1, F_2, \ldots$ as in the actual world, but there is also an alien individual a. Since a does not actually exist, the world w witnesses the falsity of the necessity claim (22). So (EXPLANATION)$^-$ is not true. Call this argument the *alien existence argument*.

As in the case of the determination argument, there is an underlying intuitive idea driving the alien existence argument. (EXPLANATION)$^-$ says in effect that r exists in virtue of facts which *do not involve* r *at all*. We get some explanation which is perspicuously articulated by a claim of the form, "r is F because ϕ", where ϕ says how certain properties and relations are distributed over individuals other than r. By the actualization assumption, if this explanation is adequate, so is an explanation of r's actual existence along relevantly similar lines. So, if (EXPLANATION)$^-$ is true, we get some explanation perspicuously articulated by a claim of the form, "r *actually* exists because *actually* ϕ," where "actually ϕ" says that certain individuals $x_1, x_2, \ldots$ actually have certain features, but does not mention r. For instance, a priority microphysicalist might propose that r exists because particles $p_1, p_2, \ldots$ are arranged raindrop-wise at

a certain location.[54] Applying actualization yields the claim that r actually exists because $p_1, p_2, \ldots$ are actually arranged raindrop-wise in the relevant location. Given permissiveness, there is a world w in which there is an alien a, existing alongside $p_1, p_2, \ldots$. The alien a is indiscernible from r so far as the *explanans* goes: it will be equally true of a that (in w) $p_1, p_2, \ldots$ are actually arranged raindrop-wise. By hypothesis, however, a does not actually exist, and so there could have been a confounding case for the proposed explanation of r's actual existence. Applying the modal determination constraint, the proposed explanation of r's actual existence is at best incomplete. We conclude by applying *modus tollens* to yield the failure of (EXPLANATION)$^-$.

The quick fix for the determination argument also works for the alien existence argument. Just admit as fundamental facts some of r's relations to other things. A microphysically-oriented explanation might claim that r exists partly in virtue of being composed of certain particles. A monistically-oriented explanation might claim instead that r exists partly in virtue of being a concrete individual located at such-and-such a place. There are lots of other ways of adding r's features to the *explanans*. All of them avoid the alien existence argument. But all of them also abandon (EXPLANATION)$^-$.

And, as before, the argument should not be taken to show more than it does. The alien existence argument does not show that there are no interesting explanations for r's existence. Indeed, both the microphysical and monistic quick fixes proposed in the last paragraph provide interesting explanations worth exploring. If the microphysical one pans out, there is even a respectable sense in which the relevant particles are "ontologically prior" to r: their existence and features help explain r's existence, but r's existence and features do not help explain their existence.[55] Similarly, if the monistic one pans out, then there is a respectable sense in which the concrete cosmos is "ontologically prior" to r. The point of the argument is just that (EXPLANATION)$^-$ cannot be used to reconcile (MODESTY) and ontological parsimony.

[54] Once again we are assuming that r's existence is not reducible to the fact that those particles are arranged transparency-wise at the relevant location.

[55] Similarly, there is a perfectly respectable sense in which r is not "fundamental:" r's existence is partly explicable by reference to other things. But this notion of fundamentality is useless for the existential priority theorist's purposes, and different from the notion, defined in §1, that I have been using throughout.

6 Ontologically Innocent Features?

It seems that both priority theory and existential priority theory face significant challenges. But perhaps we can still reject the letter of both views, while preserving their spirit. The animating idea for both views is that the fact that the existence and features of macroscopic concreta can be explained by reference to other things indicates that modest acquiescence to claims like

(9) r is transparent

is ontologically innocent. Our ontology is no lusher for containing tables, raindrops, tectonic plates, and galaxies, than it is for containing the entities (arranged in the right way) in whose terms their existence and/or features are explained. Both the determination argument and the alien existence argument take aim at the idea that the relevant *explanans* contain no reference to macroscopic concreta at all – that the existence (and/or features) of tables, raindrops and the rest, are explicable *solely* by reference to other things. Somehow or other, we have to let some of r's features in on the action.

But perhaps ontological innocence can be gotten more cheaply. Intuitively, the r-involving facts we need to add supply the missing explanatory link between r and the individuals the priority theorist recognizes as fundamental. Call the fundamental facts involving a given macroscopic concretum the *link facts* for that individual. Perhaps the link facts for r needed to evade the two arguments are themselves ontologically innocent. So, at any rate, someone sympathetic to priority theory might insist.

This insistence may seem reasonable in light of the sort of facts that immediately suggest themselves as link facts. Consider once again the priority microphysicalist's proposed explanation of

(9) r is transparent.

We saw that one way to supplement the proposal to evade the determination argument was to add the fact that r is composed of certain particles $x_1, x_2, \ldots$. What links r to the particles is composition. And some, independently of the issue at hand, have suggested that such part-whole relations are ontologically innocent. On this view, our ontology is no lusher for containing an object than it is for containing its parts.[56] So long as the only fundamental features of

[56] Theodore Sider suggested this line of response in private correspondence. For the claim

macroscopic concreta concern which particles compose them, Ockham's Razor does not favor existence microphysicalism, which accepts the parts but rejects the wholes. Similarly, it might be held that our ontology is no lusher for containing an object's parts than it is for containing the object itself. The priority monist might then argue that his ontology is no less sparse for containing the raindrop r than it is for containing the entirety of the concrete cosmos of which r is a part. So long as the link facts for macroscopic concreta concern their composing the cosmos, Ockham's Razor does not favor radical existence monism, which accepts the whole but rejects the parts.

There are two facts worth quickly noting about the alleged ontological innocence of part-whole relations. First, there is a salient difference between microphysicalism and monism with respect to the usefulness of the alleged ontological innocence of part-whole link facts. Assume that part-whole relations involving r really are ontologically innocent. Also assume that the fact that particles $p_1, p_2, \ldots$ jointly compose r is a link fact we use to fill the gap in the priority microphysicalist's proposed explanations of the existence and features of r. This augmented explanatory proposal evades the determination argument. Suppose instead that we fill the gap in the priority monist's proposed explanations by adding the fact that r is a part of the concrete cosmos. This explanatory proposal does not evade the determination argument. No salient difference between r and t is marked by the claim that r is a part of the concrete cosmos. The tectonic plate t is as much a part of the concrete cosmos as r is. Thus, the universal generalizations associated with the monist's explanations of the features of r imply that t also has those features. I have suggested that the monist augment her explanation by adverting instead to link facts concerning r's location. But it is implausible to think that *being located at such-and-such a place* is ontologically innocent. An ontology that asserts that a certain massive individual is located in a certain place is surely lusher than an ontology that is otherwise similar except for denying that there is anything there, even if they both assert the existence of a common store of locations.[57] So the alleged on-

that part-whole relations are ontologically innocent, see (Lewis, 1991, pp. 81-7). For discussion, see (Yi, 1999). Ryan Wasserman (2002) argues independently that part-whole relations should be taken to be fundamental.

[57] Jonathan Schaffer has noted in personal correspondence that a monist may respond by adopting the Cartesian view that material objects are identical to the space-time regions they occupy; the view is sometimes called *supersubstantivalism*. Since on this view *being (exactly) located at R* just is *being identical to R*, location turns out to be ontologically innocent: commitment to the existence of a location involves commitment to the existence of

tological innocence of the part-whole relation helps the microphysicalist much more than it does the monist.

Second, in certain other philosophical debates we do not take part-whole relations to be ontologically innocent. It seems that philosophers who distinguish the statue from the lump of clay of which it is made have a lusher ontology than those who identify them. It seems wrong to suggest that the two-thinger's ontology is no lusher than the one-thinger's on the grounds that both ontologies assert the existence of a common store of parts. On the contrary, Ockham's Razor seems to apply here if it applies anywhere: other things being equal we should prefer the one-thinger's ontology to the two-thinger's on grounds of ontological parsimony. But this is inconsistent with the claim that our ontology is no lusher for containing a whole than it is for containing its parts.

A partisan of the ontological innocence of part-whole relations might dispose of the two-thinger's claim to ontological innocence by arguing that part-whole relations are innocent only when composition is unique. Those who assert the ontological innocence of the part-whole relation typically also endorse the uniqueness of composition. Lewis (1991) argues, for instance, that the composition of a whole by some parts is so close to identity that asserting the existence of the whole incurs no ontological commitment additional to a commitment to the parts. If composition weren't unique, then composition would be much less like identity. Lewis would therefore claim that part-whole relations are ontologically innocent so long as composition is unique. Sider (2007) argues explicitly from the claim that composition is identity-like to the uniqueness of composition. The two-thinger seems to deny the uniqueness of composition: the statue and the clay are both exhaustively composed by the same material parts.[58] The two-thinger's view rejects the very feature of composition which renders parthood ontologically innocent. That's why she can't avail herself of the innocence

its occupant, though this implication need not be evident to us. See (Schaffer, forthcoming-b) for a defense of Cartesianism. This is not the place to assess the merits of the Cartesian view. I will content myself here with two notes of caution. Note *first* that adopting the Cartesian view exacts an unexpected – and, to my mind, high – intuitive price, since common sense abetted by science holds that macroscopic concreta have mass, angular momentum, solidity, crystalline structure *etc.*, while spacetime regions don't. (Schaffer doesn't think the price very high; see esp. (Schaffer, forthcoming-b, §4)). *Second*, for this reason the Cartesian view embodies an immodesty about the dictates of common sense abetted by science concerning the features of macroscopic concreta, and so comports badly with the motivations for priority theory.

[58] Some two-thingers have views consistent with the uniqueness of composition. They hold that the statue and the lump differ on non-material parts. See (Fine, 1999, 2008) for a defense of the view that material objects have non-material parts.

of part-whole relations.

What about the converse innocence claim, that our ontology is no lusher for containing some parts than it is for containing their whole? This claim seems even worse off. Consider two views, one of which alleges the existence of three proper parts of the concrete cosmos, and the other of which alleges the existence of seventeen.[59] The seventeen-thinger seems to have a lusher ontology, other things being equal. It would be wrong to suggest that the seventeen-thinger's ontology is no lusher than the three-thinger's on the grounds that both theories assert the existence of a common store of wholes. Ockham's Razor applies here if it applies anywhere. But this is inconsistent with the claim that our ontology is no lusher for containing some parts than it is for containing the whole which they compose.

The example of the seventeen-thinger presents a challenge to anyone who proposes to argue for the ontological innocence of part-whole relations on the grounds that composition either is identity or is close enough for ontological work. Identity and other identity-like relations are symmetric. If the thesis of *composition as identity* (or *as sufficiently identity-like*) licenses the claim that ontological commitment to the whole is "nothing over and above" ontological commitment to the parts, then it also licenses the claim that ontological commitment to the *parts* is "nothing over and above" ontological commitment to the *whole*. This second claim clearly lets the seventeen-thinger off too easily. The challenge, then, is to rehabilitate the application of Ockham's Razor (or some suitable substitute) to favor (*ceteris paribus*) the three-thinger's ontology over the seventeen-thinger's without giving up the idea that part-whole relations are ontologically innocent.[60]

It is not my aim to settle here the question of whether part-whole relations are ontologically innocent. I have only posed challenges in an attempt to show

[59] I assume it is possible for theories to agree that a certain whole exists, but disagree about its parts. For instance, I might hold that you have three arms, while you quite sensibly hold that you have at most two. We agree that you exist; we disagree about the existence of certain of your parts. Other things being equal, my ontology is lusher.

[60] Nolan (1997, pp. 335-8) provides an historical example of a scientific theory which seems to be favored over an alternative on grounds of parsimony, even though both theories assert the existence of a common store of wholes. The example involves Avogadro's conclusion that oxygen molecules are composed of two oxygen atoms bonded together. Nolan notes that it was consistent with Avogadro's evidence that oxygen molecules were composed of any even number of oxygen atoms. But the "O_2" hypothesis seems clearly favored over the "$O_{32,000}$" hypothesis on grounds of parsimony. See (Baker, 2003) for a discussion which suggests that this sort of parsimony is not a fundamental virtue of theories.

that the idea requires further elaboration and defense. Instead, I want to close by drawing two morals from our discussion. Assume as we have throughout that no reduction is available for the claims made by common sense abetted by science concerning the existence and features of r. The first moral is that (MODESTY) requires that some of r's features be fundamental. The second moral follows from the first: the only reasonable way to combine the modesty of ontological liberalism with the sparsity of ontological radicalism in the absence of reduction is to argue for the ontological innocence of the link facts involving r. This is where we should concentrate our efforts, if we are drawn by the charms of priority theory. Explanation alone will not serve the priority theorist's purposes. In the absence of an argument for the ontological innocence of fundamental facts involving macroscopic concreta, we cannot have (MODESTY) for free.[61]

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