Grounding and Its Limits

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For Rachel

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Introduction

Reality appears to be hierarchically structured—some entities appear to be derivative upon other, more fundamental entities. Recently, analytic metaphysicians have become more willing to take the appearance of hierarchical structure at face-value. For example, it is now relatively standard—though of course not uncontroversial—to assume that sets are less fundamental than their members, that highly disjunctive facts and properties are less fundamental than simpler ones, that either material wholes are less fundamental than their composing parts or vice-versa, and so on.

Skeptics may see this recent trend as naïve at best and objectionably dogmatic at worst. After all, appearances can be deceiving. Despite appearances to the contrary, perhaps reality is after all completely "flat" rather than structured. That is, perhaps everything is absolutely fundamental.[1]

In this dissertation I do not defend the appearance of hierarchical structure from skeptical attacks. Instead, I try to answer the following question: what must reality be like, in order for there to be genuine hierarchical structure? In other words, my goal is to see what does and what does not follow from the assumption that some things really are more and less fundamental than other things.

I focus specifically on the *grounding approach*, which is currently the dominant approach to fundamentality and structure in analytic metaphysics.[2] Metaphysical grounding, or simply grounding, is a relation of non-causal or metaphysical determination whereby one entity is said to exist "in virtue of" or "because of" some other entity or entities. On the grounding approach, every

[1] Bennett 2017 pp. 214-230 dubs the view that everything is fundamental "flatworldism."
[2] Canonical papers on grounding include Fine 2001 and Fine 2012, Schaffer 2009, Rosen 2010, and Audi 2012a and 2012b.

existing thing is located somewhere in a great web of grounding relations—every existing thing is either grounded in something else, grounds something else, or both. For an entity to be derivative or non-fundamental is for it to be grounded in something else. Every grounded entity is less fundamental than that which grounds it. And for an entity to be absolutely fundamental, if there is any such entity, is for it to be completely ungrounded.

There are of course other popular approaches to hierarchical structure. For example, not long ago, defenders of hierarchical structure gave pride of place to the merely modal relation of supervenience.[3] More recently, metaphysicians have turned to more fine-grained notions like metaphysical analysis, truthmaking, ontological dependence, and naturalness to illuminate structure, fundamentality, and derivativeness.[4]

I have chosen to focus on the grounding approach, in part, because grounding's advocates make many unique and interesting claims on its behalf. In particular, grounding has been given a much bigger role in metaphysics over and above the limning of hierarchical structure. For example, as we shall see in Chapter One, grounding has been used to reduce the theoretical cost of permissive and abundant ontologies. Certain philosophical theses like physicalism and naturalism have been given grounding-based formulations. And, as we shall see in Chapter Three, one of grounding's advocates has even claimed that entire enterprise of metaphysics is—or should be—primarily about what grounds what.[5]

[3] For example, see Wilson 2005 for an overview of supervenience-based formulations of physicalism.
[4] See Dorr 2017 and Rosen 2015 on analysis or real definition; see Armstrong 2004 and Cameron 2008 and 2010 on truthmaking; see Fine 1994 and Lowe & Tahko 2015 on ontological dependence; and see Lewis 1983 and Sider 2011 on naturalness.
[5] See Schaffer 2009.

In this dissertation I argue that grounding cannot do much of this additional work. However, I also argue that grounding has a genuine place in the discipline of metaphysics. Grounding, I conclude, has both its place and its limits.

Assumptions

I make six basic assumptions about metaphysical grounding in this dissertation. The first five assumptions enjoy the status of virtual orthodoxy among grounding's advocates, and I will offer very brief versions of the standard arguments in their favor. The sixth assumption is more controversial, however, so I will say a bit more about why I am licensed to make it.

First, grounding is *explanatory*—if x grounds y, x non-causally or metaphysically explains y. After all, grounding is typically introduced as the relation corresponding to such expressions as "in virtue of" and non-causal uses of "because" and "explains."[6]

Second, grounding is *irreflexive*—if x grounds y then x is not identical with y.[7] For if x grounds y then x metaphysically explains y. Yet, plausibly, nothing metaphysically explains itself. It follows that, where x grounds y, x and y are numerically distinct.[8]

Third, grounding is *asymmetric*—if x grounds y then y does not ground x.[9] For, plausibly, if x metaphysically explains y then it is not the case that y metaphysically explains x. In other

[6] There is a dispute among grounding's advocates about what it is for grounding to be explanatory. For Kit Fine and his followers, grounding is explanatory in the sense that the grounding relation *just is* the relation of metaphysical explanation. See Fine 2012, Dasgupta 2014, and Litland 2015. For others, grounding is explanatory in the sense that grounding is that worldly relation that "backs" true sentences, propositions, or statements about what explains what. See Audi 2012a and Schaffer 2009. My assumption that grounding is explanatory is officially neutral on this debate.

[7] The only contemporary advocate of grounding who rejects grounding's irreflexivity is Jenkins 2011.

[8] Raven 2013 offers this explanation-based defense of grounding's irreflexivity.

[9] See Raven 2013 for this explanation-based defense of grounding's asymmetry. And see Barnes forthcoming for a defense of symmetric ontological dependence. Plausibly, her defense of symmetric dependence would work *mutatis mutandis* as a defense of symmetric metaphysical explanation.

words, metaphysical explanation cannot be circular. Since grounding is a form of metaphysical explanation, it follows that if x grounds y then y does not ground x.[10]

Fourth, grounding is *transitive*—if x grounds y and y grounds z then x grounds z. For, plausibly, metaphysical explanation is transitive—if x metaphysically explains y and y metaphysically explains z then x metaphysically explains z. Since grounding is a form of metaphysical explanation, it follows that grounding is transitive.[11]

Fifth, grounding is *necessitating*—necessarily, if x grounds y then, necessarily, if x exists then y exists.[12] Grounding is standardly taken to be the fullest or most complete form of explanation—where x grounds y, x fully explains why y exists. And it is hard to see how x could completely explain y if x could exist without y.[13]

The sixth and most controversial assumption concerns what kinds of things can serve as the relata of the grounding relation. There are two main views in the literature. According to the fact-only view, grounding can relate only worldly facts or Armstrongian states of affairs (for more on worldly facts see Chapter One, Section III).[14] According to the category-neutral view, grounding can take as its relata entities from a variety of ontological categories including worldly facts, particulars, and properties.[15]

I shall assume the category-neutral view. This assumption is not as controversial as it might seem. For, at least in principle, all category-neutral grounding claims have fact-only counterparts. To see this, consider the following grounding claims:

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[10] See Raven 2013 and Bennett 2017.
[11] Schaffer 2012a gives some counterexamples to the transitivity of partial grounding. However, it is still standard to assume grounding's transitivity. For discussion see Raven 2013.
[12] Skiles 2014 is one of the few defenses of contingent grounding.
[13] Trogdon 2013 defends necessitation in a similar way.
[14] The fact-only view is held by, among others, Fine 2012, Rosen 2010, and Audi 2012a and 2012b.
[15] Advocates of the category-neutral view include, among others, Schaffer 2009 and 2010, Cameron 2007, and Bennett 2017.

Category-Neutral Particular-Particular: Socrates grounds {Socrates}.

Category-Neutral Property-Property: Crimsonness grounds redness.

Category-Neutral Particular-Fact: Socrates grounds the fact that either Socrates exists or Plato exists.

Each of the above grounding claims says that there is at least one non-fact that either grounds, is grounded, or both. So no fan of the fact-only approach can endorse any of the above claims. However, a fan of the fact-only approach could accept one or more of the following analogous grounding claims:

Fact-Only Particular-Particular: the fact that Socrates exists grounds the fact that {Socrates} exists.

Fact-Only Property-Property: the fact that crimsonness exists grounds the fact that redness exists.

Fact-Only Particular-Fact: the fact that Socrates exists grounds the fact that either Socrates exists or Plato exists.

More generally, a category-neutral claim of the form ‘x grounds y’, where x and y are not facts, has a fact-only analogue of the following form: ‘the fact that x exists grounds the fact that y exists.’

So fans of the fact-only view could, at least in principle, reformulate the various theses and arguments discussed in this dissertation into their fact-only counterparts. However, many of those theses and arguments are more naturally expressed in category-neutral language; their fact-only analogues are complicated and unwieldy. For the sake of concise and readable prose, then, I will write as if particulars, properties, as well as worldly facts can be the relata of the grounding relation.

Summary

Chapter One: Grounding and Ontological Innocence

According to the Ontological Innocence Thesis (OIT), grounded entities are “ontologically innocent” relative to—or are “nothing over and above” or are an “ontological free lunch” relative to—their grounds. Many advocates of grounding defend some version of OIT. Moreover, so I argue in the first section of Chapter One, OIT has an important methodological implication—anyone who endorses OIT should be radically permissive about the number and kind of grounded entities they postulate.

Chapter One’s main conclusion is that OIT is false. My argument against OIT turns on the notion of a *groundmate*, where some grounded entity y is another grounded entity x’s groundmate just in case x and y are numerically distinct and there is some entity z such that both x and y are fully grounded in z. I begin by assuming OIT for *reductio*. I then argue that if OIT is true then some grounded entity has a groundmate. Next I argue that if OIT is true then it is not the case that some grounded entity has a groundmate. Therefore, so I conclude, it is both the case that some

grounded entity has a groundmate and it is not the case that some grounded entity has a groundmate. This is a contradiction. So OIT, which I assumed for *reductio*, is false.

At the end of Chapter One, I point out a second implication of my argument against OIT. I argue that if there are any grounded entities at all then every grounded entity has a groundmate. And if every grounded entity has a groundmate then, so I argue, there is a fundamental fact about every grounded entity. So, I conclude, either there are no grounded entities at all or else there is a fundamental fact about every grounded entity.

Chapter Two: Against Purity

According to Theodore Sider, "fundamental truths involve only fundamental notions."[16] Many of grounding's advocates have endorsed the following analogue of Sider's claim: no fundamental fact has any derivative entity as a constituent. Or, more loosely, there are no fundamental facts about any derivative entity. This is the Purity principle.

I begin Chapter Two by arguing that Purity, together with the standard ground-theoretic account of the fundamental/derivative distinction, implies another substantive thesis, the Grounding Grounding Thesis (GGT). According to GGT, every "grounding fact"—a fact about what grounds what—is itself grounded. GGT thus prohibits there from being any ungrounded or fundamental facts about what grounds what.

Chapter Two's main conclusion is that Purity is false. My argument against Purity has a similar structure to Chapter One's argument against OIT. I argue that if Purity is true then it is both the case that some grounded entity has a groundmate and it is not the case that some grounded entity has a groundmate. So Purity entails a contradiction. I conclude that Purity is false.

[16] Sider 2011, pp. 106-7.

Chapter Two's secondary conclusion is that GGT is also false. For, so I argue, the falsity of Purity undercuts the main motivation for GGT. Moreover, the truth of GGT implies that there is an infinite regress of grounding facts. I argue that, in light of OIT's falsity, this infinite regress of grounding facts is objectionably unparsimonious. Since we should reject any philosophical thesis that is both objectionably unparsimonious and unmotivated, I conclude that we should reject GGT. I conclude the chapter by making some suggestions about which grounding facts are the fundamental ones.

Chapter Three: Grounding and Its Limits

In Chapters One and Two I present distinct but related arguments for the conclusion that—contra Purity—there are some fundamental facts about some grounded entities. However, one might wonder, precisely *which* facts about grounded entities are the fundamental ones? In Chapter Three I defend a general account of which facts about grounded entities are fundamental and draw out a few of that account's most important implications.

My account turns on Karen Bennett's notion of a "building fact", a fact about which building relation—broadly mereological relations like composition, set-formation, and functional realization—a given entity bears to the entity or entities from which it is built. Roughly, my account says that there is a fundamental building fact about every single grounded entity. These fundamental building facts, so I argue, serve to individuate any given grounded entity from each of its groundmates. On the resulting view, grounded entities have hylomorphic complexity, where an entity's grounds play the role of its matter and its fundamental building fact plays the role of its form.

In the second half of Chapter Three, I draw out a few implications of this account. First, so I argue, the account implies that all grounded entities—not just some of them—are genuine "additions to being" over and above their full grounds. As a result, I argue, we should not be maximally permissive about which grounded entities we admit into our ontology. I conclude the chapter by arguing that, if my account is correct, then grounding's theoretical utility is genuine but limited. In particular I argue that the discipline of metaphysics, contra Jonathan Schaffer, is not exclusively—nor even primarily—about what grounds what.

Chapter Four: Grounding and Vagueness

A Sorites series for baldness involves a man losing his hair, one at a time, until he is clearly bald. It is—at least arguably—implausible to claim that there is a "sharp cut-off" somewhere in the baldness Sorites. Yet, as Trenton Merricks has pointed out, it is not—not even arguably—implausible to claim that there is a sharp cut-off in a "pseudo-Sorites", such as a series of cases in which pebbles are piled on a trap door, one at a time. Surely the addition of a single pebble, all by itself, might pop the trap door open. But *why* are sharp cut-offs—at least arguably—implausible in the baldness Sorites, and not in the trap door series? In other words, *what is it* for a series of cases to be a Sorites series for F? I call this The Sorites Question.

In Chapter Four I take up The Sorites Question and propose an answer to it. According to my answer, for a series of cases S to be a Sorites series for F is for all of the following to obtain: (1) F is a grounded feature; (2) possibly, x's being F is grounded in x's being G, and G admits of minute differences of degree; (3) the grounding facts about F—the facts about what grounds something's being F on any particular occasion—are all grounded in further, more fundamental facts; and (4) what grounds the grounding facts about F is—at least arguably—not fine-grained

enough to ground that x's being some precise degree of G grounds x's being F, while x's being some minutely different degree of G does not ground x's being F.

After proposing and defending my answer to The Sorites Question, I argue that my answer provides a new response to the Vagueness Argument against restricted composition. One of the Vagueness Argument's key premises says that if composition is restricted then there can be a Sorites series for composition. However, if the facts about how composition is grounded are themselves fundamental—as I suggested at the end of Chapter Two—then there cannot be a genuine Sorites series for composition. My response to the Vagueness Argument, unlike other extant responses, both avoids "ontic" or worldly vagueness and does not require us to take the composition relation itself to be a "brutal" or fundamental relation.

Chapter Five: Grounding and Debunking

Debunking arguments attempt to undermine our beliefs in the existence of facts in a particular domain, the F-facts, by claiming that these beliefs, our F-beliefs, can be completely explained by certain *other* set of facts, the G-facts. Debunking arguments appear in a variety of philosophical domains, including meta-ethics, the philosophy of mathematics, the metaphysics of material objects, and the philosophy of religion.

In Chapter Five I develop a new response to a debunking argument in the metaphysics of material objects, which is a version of Trenton Merricks' well-known Overdetermination Argument. The debunking argument begins by noting that our beliefs about which composite objects there are can be completely explained by certain cultural and evolutionary facts together with facts about the causal activities of certain atomic simples and how those simples are arranged. Once we are made aware of this explanation, the argument continues, we thereby receive a "defeater" for whatever initial justification our object beliefs enjoyed.

In response, I first point out that the debunker's explanation must reference the activities of atoms arranged in certain ways as the proximate causes of our object experiences and object beliefs. However, I go on to argue, the existence and activities of those atoms are precisely what would *give ground* to composite material objects, if such objects existed. Next I argue that, in general, the initial justification for our F-beliefs are not defeated by any explanation of those beliefs that makes essential reference to the very facts that would give ground to the F-facts, if the F-facts obtained. Thus, I conclude, the debunking argument targeting our object beliefs fails.

Chapter 1

Grounding and Ontological Innocence

Jonathan Schaffer says:

> … Armstrong makes crucial use of the notion of 'the ontological free lunch': "[W]hatever supervenes… is not something ontologically additional to the subvenient, or necessitating, entity or entities. What supervenes is no addition to being." [I]n Aristotelian terms, there is a straightforward way to understand Armstrong: *whatever is dependent is not fundamental*, and thus *no addition to the sparse basis*. Thus, Armstrong's notion of an ontological free lunch seems best understood against an Aristotelian background.[17]

So, according to Schaffer, grounded entities are an "ontological free lunch." In a more recent paper, Schaffer explains why grounded entities are an ontological free lunch:

> …[D]erivative entities are an 'ontological free lunch', in the sense that they are genuinely new and distinct entities but they cost nothing by measure of economy…. Derivative entities are additional commitments, but they cost nothing. More precisely: derivative entities cost nothing *further*, beyond the cost incurred for positing their fundamental grounds.[18]

By postulating a grounded entity, Schaffer says, one thereby incurs an additional ontological commitment, but a commitment that costs nothing over and above the costs one has already incurred by postulating that entity's fundamental grounds.[19]

In a similar vein, Ross Cameron says:

[17] Schaffer 2009, p. 353.
[18] Schaffer 2014, pp. 647-8.
[19] Karen Bennett makes similar remarks as Schaffer on p. 222 of Bennett 2017. Also see Bennett 2011a, p. 32 and Bennett 2017 pp. 192-196.

> Derivative entities don't *lack* being, but their being is *inherited* from their grounds, and so… acknowledging that there are these things incurs no *further* ontological commitment over acknowledging their ultimate grounds.[20]

Cameron agrees that grounded entities are ontologically innocent, but goes one step further than Schaffer does. By acknowledging a grounded entity, Cameron says, one does not even incur an *additional* commitment over and above the commitments one incurs by acknowledging that entity's ultimate grounds.

Finally, Kit Fine says that the grounded "consists in nothing more than" its grounds.[21] For Fine, this is because of the particularly tight way in which the grounded is explained by its grounds:

> …[A]ll that is properly implied by the statement of (metaphysical) ground itself is that there is no stricter or fuller account of that in virtue of which the [grounded] holds. If there is a gap between the grounds and what is grounded, then it is not an explanatory gap.[22]

For Fine, it is because there is no "explanatory gap" between the grounds and the grounded that the grounded consists in nothing more than its grounds.

Thus many of grounding's prominent advocates hold that grounded entities are—in some sense—ontologically innocent relative to their grounds.[23] The number and prominence of its defenders aside, the thesis of the ontological innocence of the grounded has important implications

[20] Cameron 2014, p. 100.
[21] Fine 2001, p. 15.
[22] Fine 2012, p. 39.
[23] Others who claim that grounded entities are somehow ontologically innocent relative to their grounds include Rosen 2017, Inman 2014, and Jenkins 2011. The small handful of dissenters includes deRosset 2010, Audi 2010, and more recently Turner 2016.

for ontology and the methodology of metaphysics. For example, as we shall see in this chapter's first section, anyone who believes that thesis should also be radically permissive about the number and type of grounded entities they postulate.

This chapter's main conclusion is that grounded entities are not—in any sense—ontologically innocent relative to their grounds. My argument against the thesis of the innocence of grounded entities relies on the notion of a *groundmate*—some entity x has a groundmate just in case, roughly, there is some numerically distinct entity y with which x shares its full grounds. First I shall argue that if grounded entities are ontologically innocent relative to their grounds then at least one grounded entity has at least one groundmate. Next I shall argue that if grounded entities are ontologically innocent relative to their grounds then no grounded entity has a groundmate. So I will conclude that the thesis of the ontological innocence of the grounded entails a contradiction, and therefore should be rejected.

Moreover, if I am right about *why* grounded entities are not ontologically innocent relative to their grounds then, so I shall argue in this chapter's final section, we are left with three options regarding reality's structure. And, since each of these three options has its own revisionary implication for reality's structure, I shall argue that we are in for an additional surprise no matter which option we choose.

I. The Ontological Innocence Thesis

Again, Schaffer, Cameron, Fine and others hold that grounded entities are—in some sense—ontologically innocent relative to their grounds. Below I shall give an official formulation of this thesis. Before doing so, however, I will make a few clarificatory remarks.

Here is the first clarificatory remark. Note that although Schaffer, Cameron, and Fine agree that grounded entities are ontologically innocent relative to their respective grounds, they appear to understand the notion of ontological innocence in three different ways. For Schaffer, what it is for an entity x to be ontologically innocent relative to an entity y is for one's commitment to x to be no more theoretically costly than one's commitment to y. For Cameron, what it is for for x to be ontologically innocent relative to y is for one's commitment to x to be the very same commitment as one's commitment to y. And for Fine, what it is for x to be ontologically innocent relative to y is for there to be no explanatory gap between x and y.

Despite these differences between how Schaffer, Cameron, and Fine, I shall formulate this paper's main target as a single thesis—the thesis that grounded entities are ontologically innocent relative to their grounds. This is justified because, as we shall see, the success of this paper's main argument does not turn on which of the three ways one chooses to understand the notion of ontological innocence. *However* that notion is understood, so I shall argue, the thesis that all grounded entities are ontologically innocent should be rejected.

The second clarificatory remark involves the common distinction between full grounding and partial grounding.[24] Suppose that x exists and that y exists. Now consider the conjunctive fact that x and y exist. Intuitively, the conjunctive fact that x and y exist is merely partially grounded

[24] For more on this distinction, see Fine 2012 p. 50.

in the fact that x exists, taken all by itself. And, intuitively, the conjunctive fact is fully grounded in the fact that x exists and the fact that y exists, taken together.

Presumably Schaffer, Cameron, Fine, and others are not claiming that grounded entities are ontologically innocent relative to their mere *partial* grounds. After all, by acknowledging the conjunctive fact that x and y exist one clearly incurs an additional—and more theoretically costly—commitment than if one merely acknowledges the fact that x exists. Moreover, there is clearly a genuine explanatory gap between the fact that x exists, on the one hand, and the conjunctive fact that x and y exist, on the other. So I shall instead understand these philosophers to be making the more plausible claim that grounded entities are ontologically innocent relative to their *full* grounds.

In light of these clarifications, here is the thesis that is this paper's main target:

> **The Ontological Innocence Thesis (OIT)**: necessarily, for any entities x and y, if x is fully grounded in y then x is ontologically innocent relative to y.

The rest of this section will be devoted to laying out two important implications of OIT. Considering these two implications will help us to see more clearly what OIT says. Doing so will also set the stage for my argument against OIT.

Many of those who endorse OIT also endorse what I shall call *permissivism* about grounded entities. Suppose that entity x, if it exists, is fully grounded in fundamental entity y. Now suppose that fundamental entity y exists. Does grounded entity x exist as well? According to permissivism

about the grounded, yes, grounded entity x exists as well.[25] More generally, permissivism about the grounded says that we should be permissive about which grounded entities we postulate, given that we already accept those grounded entity's putative full grounds.

To make this more concrete, suppose that tables, if they exist, are fully grounded in physical particles arranged table-wise. And suppose that there are some physical particles arranged table-wise. Are there tables? Permissivism answers: yes, there are tables. Or, suppose that sets, numbers, and highly disjunctive properties are such that, if they exist, they are fully grounded in some things we already believe in. Are there sets, numbers, and highly disjunctive properties? Permissivism answers: yes, all these things exist.

It is no accident that many of those who endorse OIT also endorse permissivism about grounded entities. For it would be objectionably arbitrary to endorse OIT and yet, at the same time, to be restrictive about which grounded entities one believes in. To see this, suppose you believe that sets, if they exist, are ontologically innocent relative to their members. For example, suppose you believe that the set {A,B, C}, if it exists, is ontologically innocent relative to A, B, and C. Now add that you already believe that A, B, and C exist.

What reason could you have for continuing to believe that A, B, and C exist and yet denying that {A,B, C} exists? You think that {A,B, C}, if it exists, is ontologically innocent relative to the very things you already believe in, namely, A, B, and C. So you do not think that commitment to {A,B, C} is an additional ontological commitment, over and above the commitments you already

[25] See especially Schaffer 2009, Schaffer 2014, Bennett 2017 Chapter 8, and Fine 2009. Schaffer 2009 also endorse a more general permissivism, according to which *all* existence questions have positive answers. Note that this more general permissivism *entails* permissivism about the grounded. For if all existence questions have positive answers, then existence questions about grounded entities have positive answers. Also see Thomasson 2007 and 2014 for a defense of a permissive approach to existence.

have. Or, at least, you do not think that commitment to {A,B, C} brings with it any additional theoretical costs over and above the costs associated with the commitments you already have. Or, to use Fine's expression, you deny that there is any "explanatory gap" between the entities you already believe in, on the one hand, and the set {A,B,C}, on the other.

As a result, it is hard to see what could justify your continuing to believe in A, B, and C, while at the same time denying that {A,B, C} exists. More generally, whatever attitude you hold toward A, B, and C—belief, disbelief, agnosticism, etc.—you should also hold toward {A,B, C}. To treat them differently would be objectionably arbitrary. Since you already believe that A, B, and C exist you should—on pain of arbitrariness—take the same attitude toward {A,B, C}. That is, you should believe that {A,B, C} exists as well.

Now suppose you endorse OIT—you think that *every* grounded entity is such that, if it exists, it is ontologically innocent relative to the entity or entities in which it is fully grounded. Add to this that you already believe in the putative full grounds of some grounded entity. Then you should—on pain of arbitrariness—believe that the relevant grounded entity exists as well. Thus anyone who endorses OIT should—on pain of arbitrariness—be permissive about which grounded entities they believe in.[26]

The truth of permissivism about the grounded is the first implication of OIT. In order to see OIT's second implication, begin by considering the following version of Theodore Sider's "purity" principle:

[26] See Section III, footnote 18 for discussion of the similarities and differences between my argument from OIT to premissivism and the Merricks-Sider argument from composition as identity to unrestricted composition.

Purity: there are no fundamental facts about any grounded entity.[27]

Let us say that x's being F is a *fundamental fact* about x just in case x's being F is not in any way completely metaphysically explained by any other facts. Thus, x's being F is fundamental just in case x's being F is neither completely analyzed in terms of any other facts, nor fully reduced to any other facts, nor has an exhaustive "real definition" in terms of any other facts, nor is metaphysically grounded in any other facts.

The truth of Purity is OIT's second implication. That is, if OIT is true then Purity is also true. I shall defend this claim by arguing for its contrapositive: if Purity is false then OIT is false.

Begin by supposing that Purity is false. So suppose that there is at least one fundamental fact about some grounded entity. For example, suppose that entity x is a grounded entity, that x is F, and that x's being F is a fundamental fact about x. The supposition that x's being F is a fundamental fact about grounded entity x has three implications. And each of these implications gives us a reason to conclude that grounded entity x itself is not ontologically innocent relative to its full grounds, entity y.

First, if there is a fundamental fact about grounded entity x then acknowledging entity x really does incur an additional and theoretically costly commitment over and above the commitments incurred by acknowledging its full grounds, entity y. For acknowledging entity x

[27] This is a ground-theoretic version of Theodore Sider's "purity" principle, according to which "fundamental truths involve only fundamental notions." See Sider 2011 pp. 106-7. One of the main conclusions of Chapter Two is that Purity is false. There I will formulate the principle as follows: no fundamental fact contains a derivative or grounded entity as a constituent. I have formulated Purity differently in this chapter only because I have not yet introduced and defined the notion of constituency in a fact.

incurs a commitment to the fact that x is F. The fact that x is F is a fundamental fact. So acknowledging entity x incurs a commitment to a new fundamental fact. And it is completely uncontroversial that commitment to a new *fundamental* fact is an additional, theoretically costly commitment over and above any commitments one already has.

In light of this, suppose that what it is for a grounded entity to be ontologically innocent relative to its full grounds is a matter of either the number of additional commitments incurred or the theoretical costliness of the additional commitments incurred by acknowledging a grounded entity. Then grounded entity x is *not* ontologically innocent relative to its full grounds, entity y. For, as we have just seen, acknowledging grounded entity x really does incur an additional, theoretically costly commitment over and above the commitments incurred by postulating x's full grounds, entity y.

Second, if there is a fundamental fact about grounded entity x then there really is an explanatory gap between grounded entity x and its full grounds, entity y. For there is a fact about entity x that is fundamental. So there is a fact about entity x that is not in any way metaphysically explained by any other facts. So, among other things, that fact about x is not metaphysically explained by any fact or facts about entity y. Thus neither y itself nor any facts about y metaphysically explain everything about entity x—there is thus a real "explanatory gap" between x and y.

In light of this, suppose that what it is for a grounded entity to be ontologically innocent relative to its full grounds is for there to be no explanatory gap between that grounded entity and its full grounds. Then grounded entity x is not ontologically innocent relative to its full grounds, entity y. For, as we have just seen, there really is an explanatory gap between x and y.

Third, and metaphorically, if there is a fundamental fact about grounded entity x then one could not finish writing the "book of the world"—the book cataloguing all and only the fundamental facts—without mentioning grounded entity x by name. One could mention every other entity that exists, including entity y, and then go on to list all the facts about each of these entities. Still, the book of the world would not be complete until one wrote a sentence stipulating whether or not entity x is F.

However the notion of ontological innocence is to be understood—in terms of ontological commitment, explanatory gaps, or some other way—surely no entity that must be mentioned by name before the book of the world can be complete is ontologically innocent relative to any other entity. So surely no entity that must be mentioned by name in that book is ontologically innocent relative to its full grounds. Thus, however the notion of ontological innocence is to be understood, grounded entity x is *not* ontologically innocent relative to its full grounds, entity y.

We began by supposing that Purity is false. And that supposition has led us to the conclusion that grounded entity x is not—in *any* sense—ontologically innocent relative to its full grounds. So that supposition has led us to the conclusion that—no matter how we understand the notion of ontological innocence—OIT is false. I conclude that if Purity is false then OIT is false. Therefore, by contraposition, if OIT is true then Purity is true.

We have just seen two important implications of OIT—permissivism about the grounded and the truth of Purity. These two implications will play a key role in my argument against OIT. The argument is a *reductio*. So, predictably, here is its first premise:

(1) OIT is true (assume for *reductio*).

Premise 1, together with the argument's three other main premises, entails a contradiction. The task of the next section of the paper will be to articulate and then defend Premise 2. And the task of the subsequent two sections will be to articulate and then defend Premise 3 and Premise 4, respectively. After articulating and defending each controversial premise, we will then be in a position to lay the argument out in its entirety.

II. Property Fixing

Consider the following thesis:

> **Property Fixing Thesis**: if some entity x has some qualitative properties F1…Fn and x is fully grounded in some entity y and y has qualitative properties G1…Gn then, necessarily, for any entity z, if z is fully grounded in y and y has G1…Gn then z has qualitative properties F1…Fn.

Intuitively, the Property Fixing Thesis says that the existence and properties of an entity's full grounds 'fix' that entity's qualitative properties. Put another way, where x is a grounded entity, the Property Fixing Thesis says that any possible entity that is 'grounds-indiscernible' from x is also qualitatively indiscernible from x.[28]

[28] Consider a case of "grounding overdetermination," where a single entity x is fully grounded in y and is fully grounded in a distinct entity, w. The Property Fixing Thesis says, roughly, that indiscernibility with respect to a *single* full ground suffices for qualitative indiscernibility. This is because an entity's single full ground, all by itself, fixes the entire qualitative nature of the grounded entity without any remainder. So an entity's overdetermining full ground adds nothing *new* or non-redundant to the grounded entity's qualitative nature. Thanks to Nevin Climenhaga for helpful discussion of this point.

We can now state the second premise of this paper's main argument:

(2) If OIT is true then the Property Fixing Thesis is true.

My defense of Premise 2 begins by arguing for the following conditional claim: if Purity is true then the Property Fixing Thesis is true. I will defend this conditional's contrapositive: if the Property Fixing Thesis is false, then Purity is false.

Suppose that the Property Fixing Thesis is false. So suppose that there is some grounded entity x that *violates* the Property Fixing Thesis. That is, suppose that grounded entity x is fully grounded in entity y. And suppose that entity y has some qualitative properties G1…Gn. Next suppose that grounded entity x has qualitative property F. Finally, also suppose that the following is possible: entity y exists and has qualitative properties G1…Gn and yet there is some entity z such that z is fully grounded in y and z does *not* have qualitative property F.

It follows that from everything that has been supposed that grounded entity x's being F is not metaphysically explained by—i.e. is neither analyzed as, reduced to, grounded in, etc.—the following: entity y's existing, y's having qualitative properties G1…Gn, and y's fully grounding entity x. For if x's being F *were* metaphysically explained by—analyzed as, reduced to, grounded in, etc.—y's existing, y's having the properties it does, and y's fully grounding x then, necessarily, if y exists and has the same qualitative properties then *any* entity that is fully grounded in y would

also be F.[29] But we are supposing that, possibly, entity z is fully grounded in y and yet z fails to be F.

Now, if grounded entity x's being F is not metaphysically explained by—not analyzed as, reduced to, grounded in, etc.—entity y, y's properties, and y's grounding x, then entity x's being F is not metaphysically explained by *anything at all*. For surely nothing else besides the existence and properties of x's full grounds could serve to metaphysically explain why x is F. So grounded entity x's being F is a fundamental fact about grounded entity x.

I began by supposing that some grounded entity x violates the Property Fixing Thesis. That supposition led to the conclusion that there is at least one fundamental fact about some grounded entity x. I will draw two conclusions from this.

First, I conclude that there is a fundamental fact about *any* grounded entity that violates the Property Fixing Thesis. After all, grounded entity x was chosen arbitrarily. So if I had begun by assuming that some other grounded entity violates the Property Fixing Thesis, the same form of reasoning would have lead to the conclusion that there is at least one fundamental fact about *that* grounded entity.

Second, I conclude that the following conditional is true: if the Property Fixing Thesis is false then Purity is false. Equivalently, I conclude that if Purity is true then the Property Fixing Thesis is true.

[29] I have not here relied on the truth of the Property Fixing Thesis. Instead, I have relied on the truth of a distinct principle about the generality of metaphysical explanation: necessarily, for any x and any y, if x's being F is fully metaphysically explained by x's being G then, necessarily, if y is G then y is also F. See deRosset 2010 for discussion of a similar principle.

Recall that in Section I above I defended another conditional claim: if OIT is true then Purity is true. And I just defended the following conditional: if Purity is true then the Property Fixing Thesis is true. It follows that if OIT is true then the Property Fixing Thesis is true. And that is exactly what Premise 2 says. This ends my defense of Premise 2.

III. Groundmates

Let us say that, for some numerically distinct entities x and y, entity y is entity x's *groundmate* just in case there is some z (or some zs) such that z fully grounds x and z fully grounds y.[30] To put it another way, let us say that for some grounded entity x to have some other grounded entity y as its groundmate is for x and y to share one or more of their full grounds.[31]

Here is the third premise of this chapter's main argument:

(3) If OIT is true then some grounded entity has a groundmate.

[30] Groundmates thus violate a principle Noël Saenz calls "Oneness" in Saenz MS, according to which any x and y that share at least one of their full grounds are numerically identical. Shamik Dasgupta endorses a limited version of a similar principle. See Dasgupta 2014a, pp. 573 and Dasgupta 2014b, p. 12.

[31] I say that x and y's sharing "one or more" of their full grounds is sufficient for being one another's groundmates because—as is widely accepted—it is possible for a grounded entity to have more than one full grounds. For example, where the fact that p obtains and the fact that q obtains, the disjunctive fact that p or q is both fully grounded in p and fully grounded in q. Cases in which a grounded entity has more than one full grounds are thus cases of "grounding overdetermination"—the additional full grounds are completely redundant, in the sense that they contribute nothing extra to metaphysically explaining or grounding the relevant grounded entity over and above what is contributed by the single full grounds alone. That is why I say that two entities' sharing a single full ground is sufficient for their being groundmates. Thanks to Nevin Climenhaga for helpful discussion on this point.

I shall offer three defenses of Premise 3. Each defense relies on the connection between OIT and permissivism—a connection I defended in Section I—together with certain paradigm cases of metaphysical grounding.

III.1 First Defense—Sets

My first defense of Premise 3 begins with an observation. Sets, if they exist, are fully grounded in their members. For example, consider {Socrates}, the set containing only Socrates. {Socrates}, if it exists, is fully grounded in Socrates. Indeed, the grounding of sets in their members is a paradigm case of grounding—surely if there are *any* cases of grounding, and if there are sets, then sets are grounded in their members.[32]

Next recall that, as I argued in Section I, anyone who accepts OIT should be permissive about which grounded entities there are. Thus anyone who accepts OIT, who believes that some entity y exists, and who furthermore thinks that entity x, if it exists, is fully grounded in y, should also believe that entity x exists. Sets, if they exist, are grounded in the individuals that are their members. So anyone who accepts OIT (and who believes that there some individual things) should also believe that there are sets.

Finally note that, if there are sets, then some set has a groundmate. For example, the set {Socrates} has Socrates as its sole member. Sets are fully grounded in their members. So

[32] Indeed, the grounding of sets in their members is often used to help us understand the very idea of metaphysical grounding. See, for example, Fine 1994 and 1995, Schaffer 2016, p. 53, Correia and Schnieder 2012, p. 1, and Koslicki 2012, p. 188.

{Socrates} is fully grounded in Socrates. Now consider the singleton set of {Socrates}, {{Socrates}}. The set {{Socrates}} has {Socrates} as its sole member. So {{Socrates}}, if it exists, is fully grounded in {Socrates}. Thus {{Socrates}} is fully grounded in {Socrates} and {Socrates} is fully grounded in Socrates. Full grounding is transitive.[33] Therefore, {{Socrates}} is fully grounded in Socrates.

So Socrates fully grounds both {Socrates} and {{Socrates}}. Now, {Socrates} and {{Socrates}} are clearly non-identical. After all, {Socrates} has properties that {{Socrates}} does not. For example, since set-membership is intransitive, {Socrates} has Socrates as a member while {{Socrates}} does not have Socrates as a member. Therefore, there is some entity numerically distinct from {Socrates}, namely, {{Socrates}}, with which {Socrates} shares its full grounds. Therefore, {Socrates} has at least one groundmate, namely, {{Socrates}}.

I conclude that anyone endorses OIT should believe that there are some grounded entity, namely, a set, has a groundmate. So anyone who endorses the antecedent of Premise 3 should also endorse its consequent. This is my first defense of Premise 3.

II.2 Second Defense—Composite Objects

My second defense of Premise 3 also begins with an observation. The following is a paradigm case of grounding: if there are composite material objects, then they are fully grounded in their

[33] Schaffer 2010 offers some putative counterexamples to the transitivity of *partial* grounding. But no one has rejected the transitivity of *full* grounding.

composing parts and how those parts are arranged.[34] For example, if there is a table here, the table is fully grounded in its microphysical parts and how those parts are arranged.[35]

Anyone who endorses OIT should, in light of the above observation, believe that there are some composite material objects. For, once again, anyone who endorses OIT should—as I argued in Section I—also endorse permissivism about the grounded. The argument from OIT to the existence of composite objects is a bit more complicated than the argument from OIT to sets, though, so I will run through the former move in a bit more detail here.

First consider some arbitrary microphysical particles, the xs, and however the xs happen to be arranged. Let object O be the object that the xs compose if they compose anything at all. If there are composite objects, then they are fully grounded in their parts and how those parts are arranged. Thus object O, if it exists, is fully grounded in the xs and how they are arranged.

Next suppose that OIT is true. So suppose, among other things, that if object O exists then it is ontologically innocent relative to the xs and how the xs are arranged. Now ask: should you believe that object O exists? It would be arbitrary of you—for reasons discussed in Section I—to

[34] Skiles 2014, Saenz 2015, Korman 2015, p. 73, Cameron 2014, and many others endorse this view.

[35] According to priority monism, the composite whole that is the Cosmos is metaphysically prior to or fully grounds its parts, rather than vice-versa. Defenders of priority monism will thus object to my fourth defense of Premise 3, which assumes that the composite whole is fully grounded in its parts. However, if priority monism is true, then some grounded entity has a groundmate. To see this, note that the priority monist must distinguish herself from the existence monist, who claims that the Cosmos is the only object there is. To distinguish herself from the existence monist, the priority monist must claim that there are objects in addition to the Cosmos—its parts. Either the Cosmos has one part, or it has more than one part. Pretty clearly, no defender of priority monism should hold that the Cosmos has just one part. So it has more than one part. But, if it has more than one part, then it fully grounds each of those parts. As a result, any arbitrary part of the Cosmos will have each of the other parts of the Cosmos as groundmates. So the priority monist should endorse Premise 3. For more on priority monism, see Schaffer's defenses in 2010a and Schaffer 2010b. For more on existence monism vs. priority monism, see the exchange between Horgan and Potrc 2012 and Schaffer 2012b.

continue believing in the xs and how they are arranged, and yet deny that object O exists. Thus you should believe that object O exists.

So anyone who endorses OIT should believe that there are some composite material objects. But why should the defender of OIT stop at belief in only *some* composite objects? After all, our selection of the xs and how they are arranged was completely arbitrary. Take any things whatsoever, and however those things happen to be arranged. If OIT is true, then it would be objectionably arbitrary—again, for reasons discussed in Section I—to believe in those things and their arrangement and yet deny that there is an object those things compose. In other words, anyone who believes that OIT is true should endorse the thesis of unrestricted composition, according to which any things whatsoever compose a further object.[36]

But why should the defender of OIT stop at unrestricted composition? If there is a table here, then it is fully grounded in its microphysical parts, the zs, and how those parts are arranged. Moreover, if there is a hunk of wood here, then it is fully grounded in those very same microphysical parts, the zs, and how they are arranged. Now suppose OIT is true. Then it would be objectionably arbitrary of the defender of OIT to continue believing in the zs and their arrangement, yet deny that there is a table composed of those zs. Likewise, it would be

[36] One way for composite objects to be ontologically innocent is for composite objects to be numerically identical with their composing parts. This is the thesis of composition as identity. Trenton Merricks and Theodore Sider have argued that composition as identity entails unrestricted composition. My argument that the ontological innocence of grounded entities leads to unrestricted composition resembles the Merricks-Sider argument from composition as identity to unrestricted composition. However, the Merricks-Sider argument is susceptible to Ross Cameron's objection based on the conceptual possibility that some ways of arranging the xs are necessary and sufficient for many-one identity, while other ways of arranging the xs are not. This is because the Merricks-Sider argument moves from the mere existence of the xs to their composing a further object. My argument from the Ontological Innocence Thesis to unrestricted composition, on the other hand, moves from the existence of the xs *together* with how those xs are actually arranged to the xs' composing a further object. As a result, my argument is neither susceptible to Ross Cameron's objection nor any analogue of that objection. For the Merricks-Sider argument, see Merricks 2005 and Sider 2007. For Ross Cameron's objection, see Cameron 2012.

objectionably arbitrary to continue believing in the zs and their arrangement, and yet deny that there is a hunk of wood also composed of those zs.

So anyone who endorses OIT should believe in both the table and the hunk of wood. Yet the table and the hunk of wood, despite sharing the same material parts, are numerically distinct. After all, the table can lose one of its legs while the hunk of wood cannot. In other words, anyone who endorses OIT should believe that there are mereologically coincident objects, numerically distinct objects share all of their material parts at the same time.

Finally, note that if there are mereologically coincident objects then some composite objects have groundmates. For example, the table is fully grounded in the zs and how they are arranged. And the hunk of wood is fully grounded in the very same zs and how they are arranged. So the table has at least one groundmate, namely, the hunk of wood with which it mereologically coincides.

Therefore, if OIT is true then there are some grounded entity—namely, a coincident material object—has a groundmate. This ends my second defense of Premise 3.

II.3 States of Affairs

My third and final defense of Premise 3 targets any defender of OIT who also believes that there are so-called "worldly facts." Let a fact be a worldly state of affairs or Russellian proposition that

has particulars, properties, and logical connectives as its constituents.[37] For example, the fact that ball B is blue has ball B and the property of being blue as constituents.

Some worldly facts are fully grounded in other, lower-level facts. Indeed, the grounding of certain higher-level facts in certain lower-level facts are among the paradigm cases of metaphysical grounding. For example, here is Gideon Rosen on the grounding of disjunctive facts in the facts that are their true disjuncts:

> Some of the clearest examples of grounding involve facts that stand in simple logical relations. Thus it seems quite clear that if there are disjunctive facts then a disjunctive fact is grounded in its disjuncts. If Fred is in New York then Fred is either in New York or Rome. Moreover, the fact that Fred is either in New York or Rome obtains *in virtue of the fact that Fred is in New York.*[38]

Thus, if the simple fact that Fred is in New York obtains, and if there are disjunctive facts, then the disjunctive fact that Fred is either in New York or Rome is fully grounded in the fact that Fred is in New York.

Suppose you endorse OIT. If you endorse OIT then you should—for reasons discussed in Section I—endorse permissivism about the grounded. And, as we have just seen, higher-level disjunctive facts are such that, if they exist, they are grounded entities. So if you endorse OIT then you should—for reasons discussed in Section I—also believe that there are disjunctive facts.

Moreover, if there are disjunctive facts then some disjunctive facts have at least one groundmate. For example, suppose the fact that Fred is in New York obtains. And suppose the

[37] For example., see Armstrong 1997 for Armstrong's account of states of affairs.
[38] Rosen 2010, p. 117.

disjunctive fact that either Fred is in New York or Fred is in Rome obtains. That disjunctive fact is fully grounded in the fact that Fred is in New York. However, now consider another disjunctive fact, which also obtains: the fact that either Fred is in New York or Fred is in Paris. The latter disjunctive fact is *also* fully grounded in the fact that Fred is in New York.

Of course, the disjunctive fact that either Fred is in New York or Fred is in Rome is numerically distinct from the disjunctive fact that either Fred is in New York or Fred is in Paris. After all, the latter fact has the fact that Fred is in Paris as a constituent, while the former fact does not. Therefore, the disjunctive fact that either Fred is in New York or Fred is in Rome has at least one groundmate, namely, the fact that either Fred is in New York or Fred is in Paris.

Anyone who endorses OIT and who already believes that there are lower-level facts like the fact that Fred is in New York should also believe that there are higher-level disjunctive facts. And if there are disjunctive facts then some disjunctive facts have at least one groundmate. Therefore, anyone who endorses OIT—and who already believes that there are some lower-level facts—should believe that some grounded entities, namely, disjunctive facts, have at least one groundmate. This is my third defense of Premise 3.

My third defense focuses specifically on disjunctive facts. However, it is worth briefly noting that analogous defenses could be given using other kinds of facts. For example, consider facts involving determinable properties and their determinates. The fact that the ball is red is fully grounded in the fact that the ball is crimson. Moreover, the fact that the ball is colored is fully grounded in the fact that the ball is crimson. Therefore, the fact that the ball is red has a groundmate, namely, the fact that the ball is colored.

Or consider existentially quantified and doubly negated facts. The fact that something exists is fully grounded in the fact that the ball exists. Moreover, the fact that it is not the case that it is not the case that the ball exists is fully grounded in the fact that the ball exists. Thus the existentially quantified fact that something exists has the latter doubly negated fact as its groundmate. Of course these examples can be mixed and matched to reveal still further groundmates. The upshot is that if there are worldly facts or states of affairs then many grounded facts have many groundmates.

IV. Ontological Innocence and Groundmates

No grounded entity has a groundmate just in case, for any grounded entity x, x does not share any of its full grounds with any numerically distinct grounded entity. We can now state the fourth premise of this chapter's main argument:

(4) If the Property Fixing Thesis is true then no grounded entity has a groundmate.

I will defend Premise 4 by arguing for its contrapositive: if some grounded entity has at least one groundmate, then the Property Fixing Thesis is false.

Here is the Property Fixing Thesis again, for ease of reference:

Property Fixing Thesis: if some entity x has some qualitative properties F1…Fn and x is fully grounded in some entity y and y has qualitative properties G1…Gn then, necessarily, for any entity z, if z is fully grounded in y and y has G1…Gn then z has qualitative properties F1…Fn.

In the last section I described three types of entities which, given OIT, have at least one groundmate—some sets have groundmates, some composite objects have groundmates, and some worldly facts or states of affairs have groundmates. If any one of these grounded entities exists and has at least one groundmate then the Property Fixing Thesis is false.

To see this, consider the set {Socrates} and its groundmate {{Socrates}}. The set {Socrates} has the following property: having Socrates as a member. The set {Socrates} is fully grounded in Socrates. And Socrates has various qualitative properties H1…Hn. Yet the set {{Socrates}}, just like {Socrates}, is fully grounded in Socrates. And Socrates, being self-identical, has qualitative properties H1…Hn. Nevertheless, {{Socrates}}, unlike {Socrates}, lacks the property of having Socrates as a member. Thus, the grounded entity {Socrates} and its groundmate {{Socrates}} violate the Property Fixing Thesis.

Of course, the grounded entity {Socrates} and its groundmate {{Socrates}} were chosen arbitrarily. So the above argument would apply *mutatis mutandis* to *any* type of groundmates discussed in Section III. The statue has the property of being a statue while its groundmate, the lump of clay, does not. So the statue and lump violate the Property Fixing Thesis. The fact that p or q has the property of having disjunction as a constituent while its groundmate, the fact that it is not the case that it is not the case that p, does not. So those two facts violate the Property Fixing Thesis. And so on.

More generally, if any grounded entity whatsoever has a groundmate then the former grounded entity violates the Property Fixing Thesis. So I conclude that the following conditional is true: if some grounded entity has a groundmate then the Property Fixing Thesis is false. By contraposition, I conclude that if the Property Fixing Thesis is true then no grounded entity has any groundmate. This ends my defense of Premise 4.

I have now articulated and defended each of the main premises of my argument against the following thesis:

> **The Ontological Innocence Thesis (OIT)**: necessarily, for any entities x and y, if x is fully grounded in y then x is ontologically innocent relative to y.

Here my argument against OIT, in its entirety:

(1) OIT is true (assume for *reductio*).

(2) If OIT is true then the Property Fixing Thesis is true.

(3) If OIT is true then some grounded entity has a groundmate.

(4) If the Property Fixing Thesis is true then no grounded entity has a groundmate.

(5) Therefore, some grounded entity has a groundmate (from 1 and 3).

(6) Therefore, no grounded entity has a groundmates (from 1, 2, and 4).

(7) Therefore, some grounded entity has a groundmate and no grounded entity has a groundmate (from 5 and 6).

(8) Therefore, OIT is false (from 1 and 7).

Premise 1 is assumed for *reductio*. I defended Premise 2 in Section I, Premise 3 in Section II, and Premise 4 in Section III. Premises 5 and 6 validly follow from Premises 1-4. Premise 7, which is a contradiction, follows from Premises 5 and 6 by conjunction introduction. Thus OIT, which was assumed for *reductio*, is false.

V. Three Surprising Options

This chapter's main conclusion is that OIT is false—grounded entities are not ontologically innocent relative to their full grounds. Notice that this first conclusion, all by itself, tells us nothing about which grounded entities there actually are. In particular, it does not tell us whether the paradigmatically grounded entities we encountered in Section III—sets, higher-level worldly facts, and composite material objects—exist or do not exist. In fact, neither does this chapter's main conclusion tell us whether, if those paradigmatically grounded entities do exist, they really are grounded rather than fundamental.

However, there are only three options regarding the existence of these paradigmatically grounded entities and their status as grounded. Option One: at least some of these entities really do exist and really are grounded. Option Two: at least some of these entities exist, but are fundamental rather than grounded. Option Three: none of these entities exists. Each of these three options, so I shall argue, has its own surprising implication about reality's structure. So, even after we have rejected the OIT, we are in for another surprise.

On Option One, some paradigmatically grounded entities like sets, higher-level facts, and composite material objects exist and are grounded in more fundamental entities. So far, Option

One should seem completely standard and unsurprising. To begin to see what *is* surprising about Option One, consider Jonathan Schaffer's gloss on the grounding relation:

> [Grounding is] the metaphysical notion on which one entity depends on another for its nature and existence.[39]

Thus, for Schaffer, both the existence and nature of a grounded entity depends on that entity's grounds. Louis deRosset codifies Schaffer's gloss on grounding as the following principle:

> **Link**: e1…en are the entities that ground entity e only if e's existence and features are all explicable solely by reference to the existence and features of e1…en.[40]

deRosset's Link principle says that all of the features of a grounded entity—not just the features that are constitutive of that entity's "nature"—are explained by or obtain in virtue of the existence and features of that entity's grounds.

Schaffer and deRosset's remarks should be reminiscent of a principle we encountered in Section I of this chapter:

> **Purity**: there are no fundamental facts about any grounded entity.

[39] Schaffer 2010b, p. 345, emphasis added.
[40] deRosset 2013, p. 5.

Indeed, Schaffer and deRosset's remarks both entail the truth of the Purity principle. For suppose, per Schaffer and deRosset, that every fact about every grounded entity is fully grounded in some fact about that entity's full grounds. Then no fact about any grounded entity are ungrounded. More generally, no fact about any grounded entity is completely metaphysically unexplained. Thus, as Purity says, no fact about any grounded entity is a *fundamental* fact.

Option One's surprising implication is that Purity is false. In Section IV, I defended the following claim: any grounded entity with a groundmate violates the Property Fixing Thesis. For example, we saw that if the set {Socrates} has {{Socrates}} as a groundmate then {Socrates} violates the Property Fixing Thesis. For—contra the Property Fixing Thesis—{Socrates} has a property, the property of having Socrates as its sole member, that {{Socrates}} lacks.

In Section II, moreover, I defended the claim that there is at least one fundamental fact about any grounded entity that violates the Property Fixing Thesis. Thus it follows that there is at least one fundamental fact about any grounded entity with a groundmate. For example, it follows that, where {Socrates} has {{Socrates}} as a groundmate, there is at least one fundamental fact about {Socrates}.[41]

Moreover, I shall now argue, if Option One is true then every grounded entity has a groundmate. To see this, consider some arbitrary grounded entity, entity x, which is fully grounded in some entities, the ys. If Option One is true, then there are either sets or higher-level facts or composite material objects, or all three of these types of grounded entities. And, regardless of

[41] In Chapter Three, I shall give a general account of which facts about grounded entities with groundmates are fundamental and which are derivative. I do not assume the truth of that particular account anywhere in this chapter.

which of these types of grounded entity exist, our arbitrary grounded entity x has at least one groundmate.

First suppose that there are sets and that sets are fully grounded in their members. And consider the set containing all and only the ys, {the ys}. Since sets are fully grounded in their members, the set {the ys} is fully grounded in the ys. Either grounded entity x is identical with the set {the ys} or it is not identical with {the ys}. Either way, grounded entity x has a groundmate.

Suppose that grounded entity x is not identical with {the ys}. As we assumed above, grounded entity x is fully grounded in the ys. But the set {the ys} is also fully grounded in the ys. Therefore, grounded entity x shares at least one of its full grounds with a numerically distinct grounded entity, namely, {the ys}. Thus, grounded entity x has a groundmate.

On the other hand, suppose that grounded entity x is identical with {the ys}. Now consider the singleton set of {the ys}, {{the ys}}. The latter set is fully grounded in its sole member, {the ys}. And {the ys} is fully grounded in its members, the ys. Full grounding is transitive. So {{the ys}} is fully grounded in the ys. Yet {{the ys}} and {the ys} are numerically distinct, yet share at least one of their full grounds, namely, the ys. In other words, {the ys} has a groundmate. But {the ys}, we are assuming, is identical with our arbitrarily chosen grounded entity x. Therefore, grounded entity x has a groundmate.

Second suppose that there are higher-level worldly facts, like disjunctive, determinable, doubly negated, and existentially quantified facts. Consider the existentially quantified fact that the ys exist. Existentially quantified facts, as we saw in Section III, are fully grounded in each of their instances. So the fact that the ys exist is fully grounded in the ys. Either grounded entity x is

identical with the fact that the ys exist or else it is not identical with the fact that the ys exist. Either way, grounded entity x has a groundmate.

Suppose that grounded entity x is not identical with the fact that the ys exist. As we assumed above, grounded entity x is fully grounded in the ys. But the existential fact that the ys exist is also fully grounded in the ys. Thus, grounded entity x shares at least one of its full grounds with a numerically distinct grounded entity, namely, that existential fact. Therefore, grounded entity x has a groundmate.

On the other hand, suppose that grounded entity x is identical with the existential fact that the ys exist. Now consider the disjunctive fact that either the ys exist or the moon is made of cheese. Disjunctive facts, as we saw in Section III, are fully grounded in each of their true disjuncts. So that disjunctive fact is fully grounded in the fact that the ys exist. The fact that the ys exist is fully grounded in the ys. Grounding is transitive. So that disjunctive fact is fully grounded in the ys. As a result, the existential fact that the ys exist shares at least one of its full grounds with the disjunctive fact that either the ys exist or the moon is made of cheese. These two facts are numerically distinct. Thus, the existential fact that the ys exist has a groundmate. We are assuming that the existential fact that the ys exist is identical with our arbitrarily chosen grounded entity x. Therefore, grounded entity x has a groundmate.

Finally, suppose that there are composite material objects, which are fully grounded in their composing parts. Either composite material objects are the only grounded entities there are, or there are grounded composites and other kinds of grounded entities, such as sets or higher-level facts. Either way, grounded entity x has a groundmate.

Suppose that there are other kinds of grounded entities besides composite material objects. Then grounded entity x has a groundmate. For, if there are sets, then—as I argued above—grounded entity x either has {{x}} or {the ys} as a groundmate. And, if there are higher-level facts, then—as I argued above—grounded entity x has either the existential fact that the ys exist or the disjunctive fact that either the ys exist or the moon is made of cheese as a groundmate.

On the other hand, suppose that composite material objects are the only kind of grounded entities there are. Then our arbitrary grounded entity, entity x, is a composite material object. So, presumably, the ys that fully ground entity x are its composing parts. Now consider a numerically distinct composite object, entity z, which mereologically coincides with grounded entity x. Since entity z mereologically coincides with grounded entity x, it is also composed of, and thus fully grounded in, the ys. So both grounded entity x and numerically distinct grounded entity z are fully grounded in the ys. Therefore, grounded entity x shares its full grounds with a numerically distinct grounded entity. That is, grounded entity x has a groundmate.

On Option One, at least one kind of paradigmatically grounded entity exists and is grounded. I just argued that, regardless of which kind of paradigmatically grounded entity exists, some arbitrary grounded entity, entity x, has a groundmate. I conclude that, in general, if Option One is true then every grounded entity has a groundmate.

We have seen that there is at least one fundamental fact about any grounded entity with a groundmate. And we have seen that if Option One is true then every grounded entity has a groundmate. It follows that if Option One is true then there is at least one fundamental fact about every grounded entity. Purity says that there are no fundamental facts about any grounded entity. Therefore, if Option One is true then Purity is false. The falsity of Purity is Option One's surprising implication.

If Option One is true then Purity is not just violated in a few, rare cases. Rather, violations of Purity are ubiquitous. Recognizing the ubiquity of fundamental facts about grounded entities should influence the way we approach non-fundamental metaphysics. In particular, we should expect brute or fundamental facts to turn up in our non-fundamental metaphysics. Thus pointing out that a theory implies that there are such facts does not, all on its own, constitute a special reason to reject that theory. As an illustration, consider the so-called "grounding problem" for the statue and the lump of clay.[42]

The grounding problem begins by noting that the statue and the lump have different 'sortalish' properties—different persistence conditions and kind properties.[43] However, the statue and the lump of clay share all their material parts and are situated in the same surrounding environment. So the grounding problem concludes that the statue and the lump's differing sortalish properties are brute or metaphysically unexplained or fundamental differences between them. This bruteness is then deemed unacceptable, and so coincident material objects like the statue and the lump are rejected.

However, if Option One is true, there are fundamental facts about *every* grounded entity. Thus, if Option One is true, there may be nothing any more or less objectionable about the brute or fundamental facts accompanying the statue and the lump of clay than the fundamental facts accompanying every other grounded entity.[44]

[42] For example, see Burke 1992, Merricks 2001, and Olson 2001.
[43] The term 'sortalish' comes from Bennett 2004.
[44] Defenders of coincident material objects often try to solve the grounding problem by claiming that the statue and the lump do not, after all, share their full grounds. For example, Sutton 2012 claims that the statue is grounded in relations that the xs bear to human creative intentions, while the lump is not. And Noël Saenz 2015 claims that the statue and the lump are grounded in different arrangements simultaneously exemplified by their shared parts. These differing grounds for the statue and the lump are then poised to ground or explain the statue and the lump's differing sortalish properties. Perhaps defenders of coincident

The proponent of the grounding problem, then, must do more than simply argue that defenders of coincident material objects are committed to fundamental sortalish facts about those objects. In addition, the proponent of the grounding problem must say why there is something *particularly* troubling about these fundamental facts, in contrast with the fundamental facts accompanying every other type of grounded entity. (I do just this in Section IV of the Chapter Three).

So much for Option One. Here is Option Two. Either sets, higher-level facts, composite objects, or all three types of entities do exist, but they are not grounded after all. However, sets, higher-level facts, and composite material objects are paradigm cases of grounded entities. So surely these entities are grounded if *anything* at all is grounded. Equivalently, if these entities exist but are not grounded, then surely no other entity is grounded either. In other words, on Option Two, *every* entity is fundamental rather than grounded. This is Option Two's surprising implication.

Karen Bennett calls the view that everything is fundamental "flatworldism." Here she nicely expresses one natural reaction to flatworldism:

> [I]f nothing is grounded, then the world is flat. Everything is metaphysically on par. Everything is absolutely fundamental… I have no knockdown argument against the claim that the world is flat. But every fiber of my being cries out in protest…. I have no real argument against it. I will simply say that flatworldism is, to borrow a colorful word from a friend, "crazypants".[45]

material objects are right about this. My only point here is that, even if they are not right, the statue and the lump of clay are not in any trouble. Or, at least, they are in no more trouble than the various other groundmates we are stuck with anyway.

[45] Bennett 2011a, pp. 2-3.

As Bennett makes clear, Option Two represents a radical departure from the layered picture of reality painted by grounding's advocates.

So Option One says that sets, higher-level facts, and composite objects exist and are grounded. Option One also implies that there are fundamental facts about these grounded entities. Option Two, on the other hand, says that sets, facts, and composite objects exist but are fundamental. It is worth pausing to ask whether, at the end of the day, there is any metaphysical difference between these two options. What is the difference between a grounded entity involved in a fundamental fact, on the one hand, and a fundamental entity on the other? Does the difference lie in how we choose to use the term "grounding," or is there some deeper, metaphysical difference? For now, I must postpone answering this question. I take it up again, and attempt to answer it, in Chapter 3.

Finally, on Option Three, sets, higher-level facts, and composite material objects do not exist. Thus on Option Three, ontology is significantly sparser than we might have initially thought. Indeed, perhaps the most principled version of Option Three is a wholesale eliminativism about putatively grounded entities. For every type of putatively grounded entity, there are no entities of that type. Of course, for any metaphysician inclined toward a more abundant ontology, Option Three's sparse reality is unwelcome.

Note this principled version of Option Three, like Option Two, is a form of flatworldism. After all, on this principled version of Option Three, every entity is fundamental. The difference between Option Two's flat world and Option Three's flat world is that while Option Two admits that there are sets, facts, composite objects and their ilk and subsumes them all into reality's

fundamental level, Option Three eliminates these entities altogether. In other words, on Option Two, reality is flat but abundant. And on Option Three, reality is both flat and sparse.

I have argued that we must choose between three options regarding paradigmatically grounded entities. I have also argued that each of these options has a surprising implication about reality's structure. So, no matter which option we choose, we are in for an additional surprise—there are fundamental facts about every grounded entity, or reality is flat and abundant, or reality is flat and sparse.

Chapter 2

Against Purity

Theodore Sider writes:

> I think we ought to make [the following assumption about fundamentality]—what I call "purity": *fundamental truths involve only fundamental notions*. When God was creating the world, she was not required to think in terms of nonfundamental notions like city, smile, or candy….Suppose someone claimed that even though cityhood is a nonfundamental notion, in order to tell the complete story of the world there is no way to avoid bringing in the notion of a city—certain facts involving cityhood are rock-bottom. This is the sort of view that purity says we should reject.[46]

Thus Sider claims that the fundamental truths are "pure" in the sense that they involve only fundamental notions—the fundamental truths are thus not "infected" with non-fundamental notions like city, smile, or candy.[47] The purity of the fundamental truths ensures that one can write the complete "book of the world" without mentioning cities or smiles or candy.

Sider's formulation of the purity principle presupposes that linguistic items like "truths" and "notions" are the primary bearers of fundamentality and derivativeness. Advocates of grounding, on the other hand, take the primary bearers of fundamentality and derivativeness to be non-linguistic items—worldly facts or Armstrongian states of affairs and the particulars, properties, and logical connectives that are the constituents of those facts. For example, consider a concrete particular, electron e. The fact that electron e has some property F, which we can represent using square brackets as [e is F], has electron e and the property of being F as its constituents. For advocates of grounding, entities like electron e and worldly facts like [e is F],

[46] Sider 2011, pp. 106-7. For a discussion of and an objection to Sider's purity principle see Merricks 2013, pp. 5-13.
[47] Sider 2011, pp. 144.

rather than linguistic items like truths and notions, are the bearers of fundamentality and derivativeness.

Just as Sider's principle prohibits derivative notions from being involved in fundamental truths, some advocates of grounding have defended an analogous prohibition against derivative entities being constituents in any fundamental fact. For example, Louis deRosset formulates and endorses the following principle:

> **CORR** An entity *e* is fundamental if *e*'s existence or its possession of some feature is fundamental….CORR says that, if one were to detail all and only the fundamental facts, then one would mention only fundamental entities: derivative entities aren't part of the fundamental story of the world.[48]

Suppose that entity e is F. And suppose the fact that e is F, which we can represent using square brackets as [e is F], is a fundamental fact. Then deRosset's CORR principle entails that entity e itself is a fundamental entity. More generally, deRosset's CORR principle implies that for any entity x, where [x is G] is a fundamental fact, entity x is a fundamental entity.

Along the same lines, Gideon Rosen says:

> Say that a fact is fundamental (or brute) if it does not obtain in virtue of other facts, and that a *thing* is fundamental if it is a constituent of a fundamental fact. Then we might say that fundamental ontology seeks a catalog of the fundamental things.[49]

Rosen, like deRosset, endorses the purity-like claim that fundamental facts contain only fundamental entities or things as constituents.

[48] deRosset 2013, pp. 6-7.
[49] Rosen 2010, p. 112.

In the same vein, Shamik Dasgupta defends grounding-based formulations of physicalism from the "Siderean worry" that the facts about the explanatory connection between the physical and the non-physical are not themselves "purely" physical.[50] And in response to this worry, Dasgupta formulates a version of physicalism according to which all the fundamental facts are purely physical, in the sense that they involve only physical phenomena.[51]

I take deRosset, Rosen, Dasgupta, and others, to all be endorsing the following non-linguistic version of Sider's purity principle:[52]

Purity: no fundamental fact contains a derivative entity as a constituent.

This version of the purity principle—henceforth just "Purity"— prohibits derivative entities from being constituents of fundamental facts. For example, Purity prohibits derivative entities like cities, smiles, and candy from being constituents in any fundamental fact. To use Sider's metaphor, Purity ensures that the complete "book of the world"—the book detailing all the fundamental facts—makes no reference to derivative entities like cities, smiles, and candy.

In this chapter I will argue for two main conclusions. First, I shall argue that Purity is false—there are, so I shall argue, some fundamental facts about some derivative entities. My argument against Purity, just like Chapter One's argument against the Ontological Innocence

[50] See Dasgupta 2014, Section II for his development of the "Siderean worry."
[51] Dasgupta 2014, pp. 580-592. As we shall see, Dasgupta's formulation of physicalism does permit *ungrounded* facts containing non-physical or derivative constituents. This is because Dasgupta argues that not all ungrounded facts are fundamental. For more details on Dasgupta's view, see Section II.3 below.
[52] Also see Michael Raven, who advocates the use of grounding to "purge" the non-fundamental from fundamental reality: "…A desirable application of ground [is] to purge the non-fundamental. The idea is that something can be purged from fundamental reality if the facts about it are grounded in facts not about it. Thus, we might wish to purge wars from fundamental reality by establishing that all facts about wars are grounded in facts not about wars." Raven 2015, pp. 328-9. Also see Raven 2016 for more on his "purging" requirement. Also see Bennett 2011b, p. 1.

Thesis, is a *reductio*. If Purity is true then, so I shall argue, a contradiction follows. So I shall conclude that Purity is false.

Second, I shall argue that the falsity of Purity—together with some conclusions drawn in Section V of Chapter One—entails the falsity of yet another popular thesis about grounding. According to this latter principle, every "grounding fact"—a fact about what grounds what—is itself grounded rather than fundamental. This chapter's second main conclusion is that, contra this popular principle, some grounding facts are fundamental rather than grounded.

I. Purity and Grounding Grounding

In this section I shall argue that Purity implies another important thesis about grounding. Before doing so, however, I must state two basic assumptions. First, I shall adopt a broad use of the term "entity", where every worldly item, including concrete particulars, abstracta, properties, relations, and worldly facts or Armstrongian states of affairs, are all entities.

Second, unless otherwise noted, I shall also assume the standard ground-theoretic analysis of the fundamental/derivative distinction. According to the standard analysis, an entity is fundamental if and only if it is ungrounded and an entity is derivative if and only if it is fully grounded. On the standard analysis, then, the categories of fundamental and derivative are thus exhaustively defined by the categories of ungrounded and fully grounded, respectively.

Purity's truth has an important implication for the "grounding facts" or the facts about what grounds what. To begin to see this, consider Socrates and his singleton set, {Socrates}. And suppose, as is standard, that {Socrates} is fully grounded in Socrates (see Chapter One, Section III). Now consider the following "grounding fact", represented using square brackets: [Socrates

fully grounds {Socrates}]. Like all worldly facts, this fact has other entities as constituents. In particular, this fact has Socrates, {Socrates}, and the full grounding relation, as its constituents.

Suppose that Purity is true. On the standard analysis, an entity x is derivative if and only if it to be fully grounded. {Socrates} is fully grounded. Thus, given the standard analysis, {Socrates} is a derivative entity. Since the grounding fact [Socrates fully grounds {Socrates}] has {Socrates} as one of its constituents, it follows that [Socrates fully grounds {Socrates}] has a derivative entity as one of its constituents.

Now, Purity prohibits any fundamental fact from having a derivative entity as a constituent. Therefore, [Socrates fully grounds {Socrates}] is not a fundamental fact. Instead, it is a derivative fact. Moreover, on the standard analysis, a fact is derivative if and only if it is fully grounded. Therefore, the grounding fact [Socrates fully grounds {Socrates}] is itself fully grounded in some further fact(s) or entity (entities).

I just argued that if Purity is true then the grounding fact [Socrates fully grounds {Socrates}] is fully grounded. Notice that the choice of that particular grounding fact was completely arbitrary. We could have started with *any* grounding fact x, assumed the truth of Purity, and then concluded that x is itself fully grounded. Thus, we could have assumed the truth of Purity and then concluded that the facts about what fully grounds composite material objects are themselves fully grounded. Or we could have assumed the truth of Purity and then concluded that facts about what fully grounds determinable properties are themselves fully grounded. Likewise for facts about what fully grounds logically complex facts. And so on.

Indeed, if Purity is true then even the facts about what *partially* grounds what are themselves fully grounded. To see this, suppose that Socrates partially grounds the following conjunctive fact: [Socrates and Plato exist]. And then consider the following grounding fact:

[Socrates partially grounds [Socrates and Plato exist]]. The conjunctive fact [Socrates and Plato exist] is fully grounded in Socrates and Plato, taken together. So, given the standard analysis, that conjunctive fact is derivative rather than fundamental. As a result, the grounding fact [Socrates partially grounds [Socrates and Plato exist]] has a derivative fact as a constituent. Since Purity prohibits any fundamental fact from having a derivative constituent, it follows that [Socrates partially grounds [Socrates and Plato exist]] is itself derivative. Therefore, this partial grounding facts—and, more generally, every partial grounding fact—is itself fully grounded in something else.

I conclude that—where a "grounding fact" is any fact about what fully grounds what or what partially grounds what—Purity entails the following thesis:

The Grounding Grounding Thesis (GGT): every grounding fact is itself fully grounded.

Like Purity, GGT is also relatively popular among grounding's advocates. It has been endorsed by, among others, Karen Bennett, Louis deRosset, Shamik Dasgupta, Kit Fine, Michael Raven, and Gideon Rosen.[53] In fact, virtually all of those who have endorsed Purity have also endorsed GGT.[54] This is no accident. For those who endorse GGT generally do so primarily because they are committed to Purity and because they see that Purity's truth implies the truth of GGT.[55]

[53] See Bennett 2011b, Dasgupta 2014, deRosset 2013, pp. 74-80 of Fine 2012, and Section 13 of Rosen 2010.

[54] The only exception is Jon Litland 2017, who accepts Purity but denies that the grounding facts are grounded. But, it is worth noting, he also does not hold that the grounding facts are *un*grounded. Instead, he argues that the grounding facts are "zero-grounded."

[55] Thus deRosset 2013 argues that his CORR principle, together with the assumption that the grounding facts are fundamental, leads to a contradiction. And, since he accepts CORR, he concludes that the grounding facts are not fundamental and hence are grounded. Bennett 2011b cites Sider's purity principle

I mention Purity's role in motivating GGT because it helps to illustrate that the following conditional, which I just argued for above, should be relatively uncontroversial among Purity's advocates: if Purity is true then GGT is true. This conditional claim will play a key role in my argument against Purity. In fact, it is the argument's second premise. The argument's other two main premises draw on Chapter One's notion of a *groundmate*, where a grounded entity x has a groundmate y just in case y is numerically distinct from grounded entity x and yet x and y share at least one of their full grounds.

Here is my argument against Purity, in its entirety:

(1) Purity is true (assume for *reductio*).

(2) If Purity is true then GGT is true.

(3) If GGT is true then some grounded entity has a groundmate.

(4) If Purity is true then no grounded entity has a groundmate.

(5) Therefore, some grounded entity has a groundmate and no grounded entity has a groundmate (from 1, 2, 3, and 4)

(6) Therefore, Purity is false (from 1 and 5).

The argument is valid. Premise 1 is assumed for *reductio*, and a contradiction is reached at Premise 5. I have already defended Premise 2. In the next two sections, I shall defend Premise 3 and Premise 4, and thus the argument's soundness.

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as one of her two main reasons for concluding that the grounding facts are all grounded. Dasgupta 2014 denies that any fundamental fact features a non-physical entity and, since the grounding facts feature non-physical entities, he argues that the grounding facts are themselves all grounded. Gideon Rosen 2010 accepts Purity and GGT, although he does not explicitly cite the former as a motivation for the latter. In encyclopedia entries, such as Bliss and Trogdon's SEP article, versions of purity are usually cited as the *only* motivation for the claim that the grounding facts are all grounded.

II. Grounding Grounding and Groundmates

In this section I shall give two defenses of Premise 3:

(3) If GGT is true then some grounded entity has a groundmate.

Suppose GGT is true, that each and every grounding fact is itself fully grounded. Now ask: *what*, exactly, fully grounds the grounding facts? There are only four answers to this question in the current grounding literature.

In my first defense of Premise 3, I shall argue that each of these extant accounts of what grounds the grounding facts entails that some grounded entity has a groundmate. In my second defense of Premise 3 I shall argue that *any* plausible account of what grounds the grounding facts, whatever that account looks like, will entail that some grounded entity has a groundmate.

II.1 Bottom-up Particularism—Bennett and deRosset

Karen Bennett and Louis deRosset both advocate what I shall call *Bottom-up Particularism*.[56] Suppose that Socrates (either partially or fully) grounds {Socrates}. According to Bottom-up Particularism, [Socrates grounds {Socrates}] is itself fully grounded in Socrates, the particular entity at the "bottom" of the grounding fact. More generally, according to Bottom-up Particularism, if x grounds y, then [x grounds y] is itself fully grounded in x.

If Bottom-up Particularism is true then some grounded entity has a groundmate. To see this, suppose that x grounds y. And suppose that, as Bottom-up Particularism claims, [x grounds

[56] See Bennett 2011b and de Rosset 2013. And for discussion see Dasgupta 2014 and Carnino 2016.

y] is fully grounded in x. Now consider the following grounding fact: [x fully grounds [x grounds y]]. What fully grounds *that* grounding fact? Bottom-up Particularism answers: *x* fully grounds [x fully grounds [x grounds y]]. Moreover, x fully grounds [x fully grounds [x grounds fully grounds [x groundsy]]]. And so on, *ad infinitum*: there are an infinite number of grounding facts, all fully grounded in x.[57]

Figure 1 represents this result of Bottom-up Particularism. The square brackets represent facts, the letters represent constituents of those facts, and the arrows represent the relation of full grounding:

Figure 1

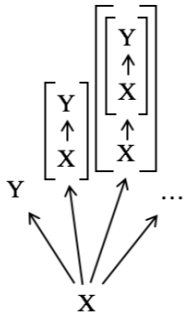


Figure 1 makes it easy to see that, given Bottom-up Particularism, some grounded entity has a groundmate. Grounded entity y is fully grounded in entity x. But so is the numerically distinct grounded entity, [x fully grounds y]. As is [x fully grounds [x fully grounds [x grounds y]]]. And so on, ad infinitum. Therefore, grounded entity y has not just one groundmate, but infinitely many groundmates.[58]

[57] Bennett 2011b and de Rosset 2013 both point out that Bottom-Up Particularism implies this infinitude of grounding facts, all grounded by the bottom entity.
[58] Saenz MS also points out that if Bottom-up Particularism is true, then multiple, distinct facts share their full grounds.

I conclude that if Bottom-up Particularism is true, then some grounded entity has a groundmate.

II.2 Top-down Particularism—Fine

Bottom-up Particularism claims that the grounding facts are fully grounded in the particular entity at the "bottom" of the original grounding fact. In contrast, *Top-down Particularism* claims that the grounding facts are fully grounded in something about the particular entity at the "top" of the grounding fact.

Suppose that y grounds x. According to Kit Fine, Top-Down Particularism's only advocate, the grounding fact [y grounds x] is fully grounded in some fact about what lies in the nature or essence of the particular thing at the "top" of the grounding fact:

> …[W]hat explains the ground-theoretic connection is something concerning the nature of [the entity at the top of the grounding fact] and not of [the entity at the bottom]. Thus what explains the ball's being red or green in virtue of its being red is something about the nature of what it is for the ball to be red or green (and about the nature of disjunction in particular) and not something about the nature of what it is for the ball to be red. It is the fact to be grounded that 'points' to its ground and not the grounds that point to what they may ground…. Thus the asymmetry supports a top-down approach in which we start with the facts to be grounded and work our way down to their grounds, rather than the other way around.[59]

Later on, Fine illustrates how Top-down Particularism works with the following example.[60] The existentially quantified fact [someone is a philosopher] is grounded in [Socrates is a philosopher]. So we have a grounding fact: [[Socrates is a philosopher] grounds [someone is a

[59] Fine 2012, p. 76.
[60] Fine 2012, p. 75.

philosopher]]. According to Top-down Particularism, the grounding fact [[Socrates is a philosopher] grounds [someone is a philosopher]] is itself fully grounded in a fact about the nature of [someone is a philosopher]. In particular, that grounding fact is itself grounded in the following: its lying in the nature of [someone is a philosopher] that, for all x, if x is a philosopher, then [someone is a philosopher] is grounded in [x is a philosopher].

In Fine's illustration of Top-Down Particularism, we already have an example of a grounded entity with a groundmate. For now consider [Plato is a philosopher]. The existentially quantified fact [someone is a philosopher] is grounded in [Plato is a philosopher]. So we have another grounding fact: [[someone is a philosopher] is grounded in [Plato is a philosopher]]. Moreover, according to Top-Down Particularism, [[someone is a philosopher] is grounded in [Plato is a philosopher]] is itself fully grounded in the following: it is in the nature of [someone is a philosopher] to be such that, for all x, if x is a philosopher, then [someone is a philosopher] is grounded in [x is a philosopher].

Thus the nature of the existentially quantified fact [someone is a philosopher] is doing double-duty. It fully grounds two, distinct grounding facts—[[Socrates is a philosopher] grounds [someone is a philosopher]] and [[Plato is a philosopher] grounds [someone is a philosopher]]. Thus the grounding fact [[Socrates is a philosopher] grounds [someone is a philosopher]] has another grounding fact, namely, [[Plato is a philosopher] grounds [someone is a philosopher]], as a groundmate. Therefore, some grounded entity has a groundmate.

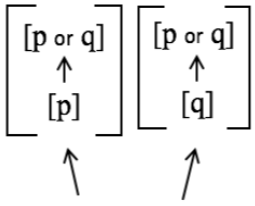
Fine focuses on grounding facts involving existential quantification. But he claims that other sorts of grounding facts are grounded in analogous ways. And it is easy to see how these other cases would go.

For example, consider a grounding fact involving disjunction: [p grounds [p or q]]. On Top-Down Particularism, that grounding fact is fully grounded in its lying in the nature of [p or q] to be such that, for any fact [φ] and any fact [ψ], if [φ] is a disjunct of [p or q] and if [φ] obtains, then [p or q] is grounded in [φ].

Cases of disjunction like this one also lead to grounded entities with groundmates. To see this, suppose that [q] also obtains. Then the disjunctive fact [p or q] is grounded also in [q]. So we have another grounding fact: [[p or q] is grounded in [q]]. And, on Top-Down Particularism, that latter grounding fact is fully grounded in its lying in the nature of [p or q] to be such that, for any fact [φ] and any fact [ψ], if [φ] is a disjunct of [p or q] and if [φ] obtains, then [p or q] is grounded in [φ].

As a result, on Top-Down Particularism, the nature of [p or q] is doing double-duty—it fully grounds both [[p or q] is grounded in [p]] and [[p or q] is grounded in [q]]. Thus, the grounding fact [[p or q] is grounded in [p]] has another grounding fact, namely, [[p or q] is grounded in [q]], as a groundmate. So some grounded entity has a groundmate. This situation is illustrated in Figure 2:

Figure 2



I conclude that if Fine's Top-Down Particularism is true, then some grounded entity has a groundmate.

II.3 Simple Generalism—Dasgupta

Shamik Dasgupta advocates a slightly more complicated account of what grounds the grounding facts, which I shall call *Simple Generalism*.[61] Dasgupta agrees with Bottom-Up Particularism that, where x grounds y, the grounding fact [x grounds y] is at least *partially* grounded in the entity at the "bottom" of the grounding fact, entity x. However, Dasgupta argues, x does not *fully* ground [x grounds y]. In addition, [x grounds y] is also grounded in some general principle "connecting" the kind of thing x is to the kind of thing y is. He explains:

> …[C]onsider a particular philosophy conference, an event lasting a few days, and call the event *e*. Then, arguably, the fact that *e* is a conference is not brute, but holds in virtue of the fact that *e* contains people engaged in various conference-conducive activities (some are giving papers, others listen and ask questions, and so on). Call these kinds of activities "C-activities." Then we have:
>
> > (F) The fact that *e* contains people engaged in C-activities grounds the fact that *e* is a conference.
>
> …Our question is: What (if anything) grounds (F)?... A very natural answer has to do with the kind of thing that conferences are, in general. A conference is the kind of thing that you get when people engage in those activities; that is why, when those particular people in *e* engaged in them, the result was a conference. This is to ground (F) in a general connection between conferences and activities.[62]

[61] Dasgupta calls his view, which he develops and defends in Dasgupta 2014, the "connectivist" account of what grounds the grounding facts.
[62] Dasgupta 2014, pp. 566-568.

Thus, where x grounds y, the grounding fact [x grounds y] is partially grounded in x and partially grounded in a general principle about y-type entities that connects them to x-type entities.

What are these general connective principles that help to ground the grounding facts? According to Dasgupta, the connective principles are very general "essence facts" about the kind of entity at the "top" of the grounding fact.[63] For example, the grounding fact [Socrates grounds {Socrates}] is fully grounded in Socrates together with a general essence fact about sets, such as the following: [it lies in the essence of sets that if something S is a set, and S has the xs as its only members, then S is grounded in the xs].[64]

In a moment, I am going to argue that Dasgupta's Simple Generalism, and indeed any other variation of Simple Generalism, entails that some grounded entities have a groundmate. First, though, I want to pause in order to note an important component of Dasgupta's view. According to Dasgupta, the general essence facts that help ground the grounding facts are themselves all ungrounded. However, he is careful to argue that the general essence facts are not thereby *fundamental*. For Dasgupta, the general essence facts that help ground the grounding facts, then, are ungrounded yet non-fundamental.

The key distinction at work here is Dasgupta's distinction between an *autonomous* fact and a *non-autonomous* fact. Autonomous facts are "inapt" to be grounded or not even eligible to be grounded. These are facts about which "the question of why it obtains does not legitimately

[63] Dasgupta and Sider both consider, but do not endorse, the view that the grounding facts are grounded in the "laws of metaphysics." See Dasgupta 2014, p. 12 and Sider 2011, p. 145. And, for more on the laws of metaphysics, see Wasserman 2014, Wilsch 2015 and 2016, Glazier 2017, and Schaffer 2017b.

[64] Dasgupta is officially agnostic between this formulation of the essence fact, which includes information about grounding, and a mere conditional formulation that does not include information about grounding. This does not matter for our purposes, however. See Dasgupta 2014, p. 568 for discussion.

arise."[65] Non-autonomous facts, in contrast, are those that *are* apt or eligible for grounding. These are facts about which the question of grounding does legitimately arise.

With this distinction in hand, Dasgupta distinguishes between two kinds of ungrounded facts. First, a fact can be both ungrounded and non-autonomous. These are facts that are apt to be grounded, and yet are ungrounded. Second, a fact can be both ungrounded and autonomous. These are facts that are ungrounded, but that are not even apt or eligible for grounding in the first place. Only ungrounded and non-autonomous facts, for Dasgupta, are truly *fundamental*.[66]

Dasgupta argues that although the general essence facts that help ground the grounding facts are ungrounded, they are nevertheless autonomous or ineligible for grounding. As a result, Dasgupta claims that the general essence facts, though ungrounded, are not fundamental.[67]

In the following passage, he explains why the general essence facts should be counted as autonomous rather than fundamental:

> ...[S]uppose… that it is essential to knowledge that someone knows only if she truly and justifiably believes…. In virtue of what (the question is) is it part of *what knowledge is* that someone knows only if she truly and justifiably believes? It is difficult to know how to respond. One is tempted to say that this is *just what knowledge is*… In saying this one is most naturally heard not as trying to explain this fact about knowledge in any serious sense but rather as deflecting the demand for explanation.[68]

Autonomous facts are those facts about which the question of grounding cannot even "legitimately be raised."[69] And, Dasgupta claims, a request for the grounds of a general essence fact should be

[65] Dasgupta 2014, p. 575.
[66] Premise 2 says that if Purity is true then GGT is true. In my defense of Premise 2, I relied on the standard view that a fact is fundamental if and only if it is ungrounded. Dasgupta says that a fact is fundamental if and only if it is both ungrounded and non-autonomous. So Dasgupta would reject my defense of Premise 2. However, Dasgupta does accept Purity. And he does think GGT is true. This is because he thinks that the grounding facts are both ungrounded *and* non-autonomous. So although Dasgupta would accept a slightly different defense of Premise 2, one that adds an additional premise.
[67] Dasgupta 2016, p. 383.
[68] Dasgupta 2016, p. 386.
[69] Dasgupta 2014, p. 575.

met with deflection, rather than an attempted answer. The request is not a legitimate one. So, Dasgupta concludes, the general essence facts are autonomous rather than fundamental.

I mention all of this because in Section I of this chapter I noted that advocates of GGT are primarily motivated by Purity. And Purity says that no derivative entities are constituents of fundamental facts. Yet Dasgupta's general essence facts contain derivative entities as constituents—for example, the general essence fact about sets contains the property of being a set as a constituent. If Dasgupta claims that the general essence facts are ungrounded then, one might wonder, how can his view be consistent with, much less be *motivated* by, the truth of Purity?

The answer is that while Dasgupta admits ungrounded facts containing derivative constituents, he does not admit *fundamental* facts containing derivative constituents. For, he claims, the ungrounded facts containing derivative constituents are autonomous rather than fundamental. The fundamental facts, even on Dasgupta's view, are all completely "pure" in the sense that they contain no derivative constituents. Purity is preserved. We will revisit Dasgupta's notion of autonomy in Section III.

If Dasgupta's Simple Generalism is true, then some grounded entity has a groundmate. First consider a case of disjunction. Suppose [p] obtains, and grounds the disjunctive fact [p or q]. Now consider the following grounding fact: [[p] grounds [p or q]]. According to Dasgupta's Simple Generalism, the grounding fact [[p] grounds [p or q]] is itself fully grounded in [p] together with a general essence fact about disjunction, such as the following fact: [it lies in the essence of disjunction to be such that, for all facts [φ] and [ψ], if [φ] obtains and if [φ] is a disjunct of [φ or ψ], then [φ or ψ] is grounded in [φ]].

Now note that [p] grounds many other disjunctive facts, in addition to [p or q]. For example, [p] grounds the disjunctive fact [p or r]. Moreover, according to Dasgupta's Simple Generalism,

the grounding fact [[p] grounds [p or r]] is itself fully grounded in [p] together with the general essence fact about disjunction: [it lies in the essence of disjunction to be such that, for all facts [φ] and [ψ], if [φ] obtains and if [φ] is a disjunct of [φ or ψ], then [φ or ψ] is grounded in [φ]].

Thus we have two numerically distinct grounding facts: [[p] grounds [p or q]], and [[p] grounds [p or r]]. And, on Dasgupta's Simple Generalism, these two distinct grounding facts have precisely the same full grounds: [p], together with the general essence fact about disjunction. Therefore, the grounding fact [[p] grounds [p or q]] has another grounding fact, namely, [[p] grounds [p or r]], as a groundmate. Thus, some grounded entity has a groundmate.

Here is another example. Facts about determinate properties ground facts about their corresponding determinables. For example, [the rose is scarlet] grounds [the rose is red]. According to Dasgupta's Simple Generalism, the grounding fact [[the rose is scarlet] grounds [the rose is red]] is itself fully grounded in [the rose is scarlet] together with a general essence fact about determinables, such as: [it lies in the essence of a determinable property F to be such that, if property G is a determinate of F, and if x has G, then [x is F] is grounded in [x is G]].

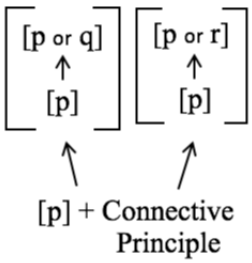
However, note that [the rose is scarlet] also grounds [the rose is colored]. Thus we have another grounding fact: [[the rose is scarlet] grounds [the rose is colored]]. According to Dasgupta's Simple Generalism, this grounding fact is fully grounded in [the rose is scarlet] together with the general essence fact about determinables.

So the grounding fact [[the rose is scarlet] grounds [the rose is red]] shares its full grounds with a numerically distinct grounding fact, namely, [[the rose is scarlet] grounds [the rose is colored]]. Both are fully grounded in [the rose is scarlet] together with the general essence fact about determinables. Therefore, the grounding fact [[the rose is scarlet] grounds [the rose is red]] has a groundmate.

It is worth noting that any other possible version of Simple Generalism will be committed to other kinds of groundmates for similar reason. For example, consider a version of Simple Generalism that replaces Dasgupta's general essence facts with the general "laws of metaphysics."[70] On this version of Simple Generalism, the following the grounding facts [[p] grounds [p or q]] and [[p] grounds [p or r]] would exactly the same full ground—[p], together with a general metaphysical law about disjunction. More generally, any version of Simple Generalism will assign [[p] grounds [p or q]] and [[p] grounds [p or r]] the same very full grounds—[p], together with some general "connective" principle about disjunction.

So *any* version of Simple Generalism will end up with a picture like Figure 3:

Figure 3



I conclude that Dasgupta's Simple Generalism, and indeed any possible version of Simple Generalism, entails that some grounded entity has a groundmate.

II.4 Complex Generalism—Rosen

[70] Advocates of metaphysical laws include Wasserman 2014, Wilsch 2015 and 2016, Glazier 2017, and Schaffer 2017b.

Like Dasgupta's Simple Generalism, *Complex Generalism* says that, where x grounds y, the grounding fact [x grounds y] is itself partially grounded in x and partially grounded in a general principle connecting x-type entities to y-type entities. However, Complex Generalism adds one last factor. In addition to the bottom entity and the general connective principle, the grounding fact [x grounds y] is also partially grounded in something about the particular entity at "top" of the original grounding fact, entity y.

Gideon Rosen is Complex Generalism's only advocate.[71] Here he explains the view using the case of disjunction:

> The disjunctive fact [pvq] is grounded in [p]. Why? Let's make the explanation as explicit as possible. [pvq] is grounded in [p] because:
>
> (a) P is true
> (b) [p v q] is a disjunctive fact with p as one of its disjuncts
> (c) In general, if p is true, then [p v q] is grounded in [p].
>
> And why is (c) true? Because:
>
> (d) It lies in the essence of disjunction that, for all p, q: (if p is true, then [pvq] is grounded in [p])[72]

Thus, on Rosen's Complex Generalism, the grounding fact [[p or q] is grounded in [p]] is itself fully grounded in (1) the "bottom" fact, [p]; (2) the "top" fact [p or q]'s being a disjunctive fact with [p] as a disjunct; and then, ultimately, (3) a general essence fact about disjunction. For brevity, I will refer to these three facts as "Facts (1)-(3)."

[71] Rosen develops this view briefly in Section 13 of Rosen 2010.
[72] Rosen 2010, p. 130.

If Complex Generalism is true then some grounded entity has a groundmate. It may help to start with a quick warm up. Consider the following fact: [Jim is taller than Peter]. And consider the existentially quantified fact [Jim is taller than *someone*]. In general, as both Rosen and Fine claim, existentially quantified facts are fully grounded in each of their instances.[73] [Jim is taller than Peter] is an instance of the existentially quantified fact [Jim is taller than someone]. So the existentially quantified fact [Jim is taller than someone] is fully grounded in [Jim is taller than Peter].

Plausibly, [Jim is taller than Peter] is fully grounded in some other facts. For example, perhaps [Jim is taller than Peter] is fully grounded in the [Jim is 5'11"] together with [Peter is 5'10"]. Perhaps we might want to add some other facts to this list as well. Let us call the facts that together fully ground [Jim is taller than Peter], whatever they are, the "T-facts."

We have seen that the existentially quantified fact [Jim is taller than someone] is fully grounded in [Jim is taller than Peter]. And we have seen that [Jim is taller than Peter] is fully grounded in the T-facts. Full grounding is transitive.[74] So the existentially quantified fact [Jim is taller than someone] is fully grounded in the T-facts. Thus the T-facts fully ground two, numerically distinct facts—[Jim is taller than Peter] and [Jim is taller than someone]. Therefore, [Jim is taller than Peter] has a groundmate, namely, [Jim is taller than someone].

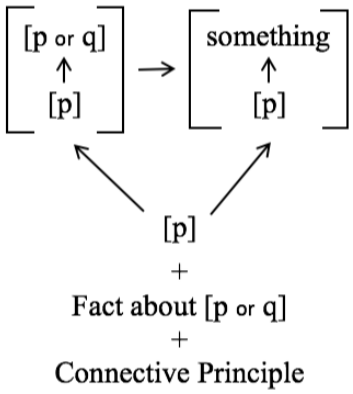
That was the warm up. Now consider the grounding fact [[p or q] is grounded in [p]]. According to Rosen's Complex Generalism, that grounding fact is itself fully grounded in Facts (1)-(3). Next consider the existentially quantified fact [[p or q] is grounded in something]. That fact, like all existentially quantified facts, is fully grounded in each of its instances. The grounding fact [[p or q] is grounded in [p]] is an instance of [[p or q] is grounded in something]. Therefore,

[73] See Fine 2012 pp. 27-34 and Rosen 2010 p. 117.
[74] See the Introduction of this dissertation for more on the transitivity of grounding.

the existentially quantified fact [[p or q] is grounded in something] is fully grounded in the fact that [[p or q] is grounded in [p]].

We have seen that the existentially quantified fact [[p or q] is grounded in something] is fully grounded in the grounding fact [[p or q] is grounded in [p]]. And we have seen that the grounding fact [[p or q] is grounded in [p]] is fully grounded in Facts (1)-(3). Full grounding is transitive. So the existentially quantified fact [[p or q] is grounded in something] is fully grounded in Facts (1)-(3). Thus Facts (1)-(3) fully ground two, numerically distinct facts—[[p or q] is grounded in [p]], and [[p or q] is grounded in something]. This is illustrated in Figure 4 below:

Figure 4



As Figure 4 shows, the grounding fact [[p or q] is grounded in p] has a groundmate, namely, the grounding fact [something is grounded in p]. Therefore, some grounded entity has a groundmate.

Therefore, if Rosen's Complex Generalism is true then some grounded entity has a groundmate.

II.5 A General Defense

My first defense of Premise 3 drew on the four extant accounts of what grounds the grounding facts, and argued that each of them is committed to some grounded entity having a groundmate. My argument in the last subsection set the stage for a second, more general defense of Premise 3. I shall argue that if GGT is true then, *whatever* account of what grounds the grounding facts turns out to be correct, some grounded entity has a groundmate.

Suppose GGT is true. And suppose that x is fully grounded in y. Then the grounding fact [x is fully grounded in y], like every other grounding fact, is itself fully grounded. Let the "G-factor" be whatever fully grounds [x is fully grounded in y]. Perhaps one of the above four views gives the correct account of the G-factor. Or perhaps none of them is correct, and the G-factor is something else entirely. The only thing that matters is that the G-factor, whatever it turns out to be, fully grounds the grounding fact [x is fully grounded in y].

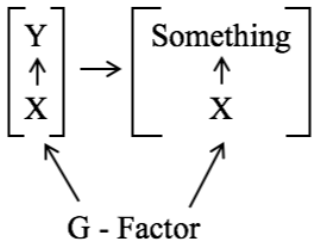
Now consider the existentially quantified fact [x is fully grounded in something]. The fact [x is fully grounded in something], like other existentially quantified facts, is fully grounded in each of its instances. The grounding fact [x is fully grounded in y] is an instance of the existentially quantified fact [x is fully grounded in something]. Therefore, [x is fully grounded in something] is itself fully grounded in [x is fully grounded in y].

The existentially quantified fact [x is fully grounded in something] is itself fully grounded in the grounding fact [x is fully grounded in y]. And the grounding fact [x is fully grounded in y] is fully grounded in the G-factor. Full grounding is transitive. So existentially quantified fact [x is fully grounded in something] is fully grounded in the G-factor. Therefore, the G-factor—whatever it turns out to be—fully grounds two, numerically distinct facts. The G-factor grounds the

grounding fact [x is grounded in y] and it grounds the existentially quantified fact [x is grounded in something].

This situation is illustrated in Figure 5 below:

Figure 5



As Figure 5 makes clear, the grounding fact [x grounds y] has another grounding fact as a groundmate, namely, the grounding fact [x grounds something]. Therefore, if the Grounding Grounding Thesis is true then, whichever account of what grounds the grounding facts is correct, some grounded entity has a groundmate. Premise 3 is true.

This second defense of Premise 3 relies on the claim that the existentially quantified fact [x is grounded in something] is grounded. So one might try to resist my second defense by claiming that [x is fully grounded in something] is fundamental, rather than grounded. But no fan of Purity should raise this sort of objection to my second defense of Premise 3.

To see this, assume, just for the sake of argument, that [x is fully grounded in something] is fundamental rather than grounded. It follows from this assumption that Purity is false. For Purity says that no fundamental fact contains a derivative entity as a constituent. And the existentially quantified fact [x is grounded in something] contains a derivative entity, entity x, as a constituent. But, we are assuming, [x is grounded in something] is fundamental. Therefore, Purity is false.

The conclusion of this chapter's main argument is that Purity is false. And the above objection to my second defense of Premise 3 of this chapter's main argument entails that Purity is false. So any friend of Purity who raised the above objection to my second defense of Premise 3 would achieve, at best, a Pyrrhic victory. So no friend of Purity should raise the above objection to my second defense of Premise 3.

III. Purity and Groundmates

Here is Premise 4 of my argument against Purity:

(4) If Purity is true then no grounded entity has a groundmate.

My defense of Premise 4 begins with three claims I already defended in Chapter One.

In Section II of Chapter One I argued that there is at least one ungrounded fact about every grounded entity that violates the Property Fixing Thesis. And in Section IV of Chapter One I also argued that every grounded entity with a groundmate violates Property Fixing Thesis. Therefore, so I concluded in Section V of Chapter One, there is at least one ungrounded fact about every grounded entity with a groundmate. Call this The Chapter One Claim:

The Chapter One Claim: there is at least one ungrounded fact about every grounded entity with a groundmate.

Now, in Chapter One I assumed that the standard analysis of the fundamental/derivative distinction is correct. According to that analysis, an entity is fundamental if and only if it is

ungrounded. Thus, given the standard analysis, The Chapter One Claim is equivalent to the following: there is a *fundamental* fact about every grounded entity with a groundmate.

Purity says that there are no fundamental facts about any derivative entity. According to the standard analysis, an entity is derivative if and only if it is grounded. Thus, given the standard analysis, Purity says that there are no fundamental facts about any *grounded* entity. And, as we just saw, there is a fundamental fact about every grounded entity with a groundmate. Therefore, I now conclude, if Purity is true then no grounded entity has a groundmate. So Premise 4 is true.

IV. Autonomy?

The Chapter One Claim says that there is an ungrounded fact about every grounded entity with a groundmate. Given the standard analysis, the Chapter One Claim is equivalent to the claim that there is a fundamental fact about every grounded entity with a groundmate. The above defense of Premise 4 relied on this equivalence.

However, in Section II of this chapter we saw that one of GGT's advocates, Shamik Dasgupta, rejects the standard analysis. According to Dasgupta's analysis, a fact is fundamental if and only if it is both ungrounded and non-autonomous, or "apt" for being grounded. Thus, given Dasgupta's analysis, the Chapter One Claim is not equivalent to the claim that there is a fundamental fact about every grounded entity with a groundmate. So, given Dasgupta's analysis, the above defense of Premise 4 is at best incomplete.

Consider the following claim, which did not appear anywhere in Chapter One:

> **Non-Autonomy** (NA): there is at least one ungrounded and *non-autonomous* fact about every grounded entity with a groundmate.

Given Dasgupta's analysis, NA *is* equivalent with the claim that there is a fundamental fact about every grounded entity with a groundmate. So if NA is true, then the above defense of Premise 4 will succeed even given Dasgupta's analysis of the fundamental/derivative distinction.

In Chapter Three I will defend a general account of which facts about grounded entities are ungrounded and which are grounded. According to that account, there is an ungrounded building fact—facts about which specific *building relation* a given entity bears to those entities from which it is "built" or "made up"—about every grounded entity. For example, according the that account, [{Socrates} has Socrates as its sole member] is an ungrounded fact about {Socrates}. Likewise, [redness has crimsonness, scarletness, etc. as its determinates] is an ungrounded fact about redness.

A full defense of the account must wait for Chapter Three. For now, though, I simply want to point out that these ungrounded facts about grounded entities do not fall into Dasgupta's category of autonomous facts.

Take [{Socrates} has Socrates as its sole member] as a representative example. Suppose one wanted to know what grounds or metaphysically explains [{Socrates} has Socrates as its sole member]. And consider the variety of potential answers one might contemplate when asked this question. Perhaps [{Socrates} has Socrates as its sole member] is grounded in the fact that {Socrates} has Socrates as a non-mereological part. Or perhaps it is grounded in a "law of metaphysics", stipulating that every individual has its very own singleton set and that every singleton set has its very own individual member. Or perhaps it is grounded in a fact about the *essence* of {Socrates}, such as the fact that it is essential to {Socrates} to have Socrates as its sole member.

I think that none of these answers is correct. For, so I shall argue in Chapter Three, building facts like [{Socrates} has Socrates as its sole member] are always ungrounded. Nevertheless, I don't think it is somehow illegitimate or deeply confused to contemplate any one of these answers. So neither is it illegitimate or deeply confused to at least *ask* what grounds or metaphysically explains [{Socrates} has Socrates as its sole member].

Recall that, for Dasgupta, asking what grounds or otherwise metaphysically explains the obtaining of an autonomous fact is akin to asking what causes 2+2=4. Both questions strike us as somehow confused or illegitimate. Someone who understood the nature of the relevant fact would not even think to *ask* such a question. But, as we have seen, asking what grounds [{Socrates} has Socrates as its sole member] is not confused or illegitimate at all. So [{Socrates} has Socrates as its sole member], despite being ungrounded, is not an autonomous fact.

The same goes, *mutatis mutandis*, for candidate ungrounded facts about other grounded entities with one or more groundmates. Facts about which determinable properties have which determinates, facts about which complex states of affairs have which simpler states of affairs as constituents, and facts about what composes what, are all perfectly *apt* to be grounded even if they are not in fact grounded in anything.

In Chapter One I argued that there is an ungrounded fact about every grounded entity with a groundmate. And—assuming a particular account of these ungrounded facts to be defended at length in Chapter Three—I have just argued that these ungrounded facts are also non-autonomous facts. So I conclude that there are ungrounded and non-autonomous facts about every grounded entity with a groundmate. That is, I conclude that NA is true.

Given Dasgupta's analysis, NA is equivalent to the claim that there is a *fundamental* fact about every grounded entity with a groundmate. On Dasgupta's analysis, as on the standard

analysis, a fact is derivative just in case it is grounded. Purity says that there are no fundamental facts about any derivative entity. So, given Dasgupta's analysis, Purity says that there are no fundamental facts about any grounded entity. Therefore, if Purity is true then no grounded entity has a groundmate.

So, regardless of whether the standard analysis or Dasgupta's analysis is correct, Premise 4 is true. I have already defended the other premises of my argument against Purity. Therefore, I conclude, Purity is false.

V. Grounding Ungrounded

In Section I of this chapter I argued that if Purity is true then GGT is also true. I have just argued that Purity is false. This section's main conclusion is that GGT is also false. My argument against GGT begins by noting that, if Purity is false, then GGT is completely unmotivated. Next I argue that, in light of a conclusion reached in Section V of Chapter One, we have strong reason to *reject* GGT rather than simply remain agnostic about its truth.

As I noted in Section I, GGT's actual defenders generally cite Purity as their main motivation for taking every grounding fact to be itself grounded.[75] So the falsity of Purity, which is this chapter's first conclusion, undermines the motivation that GGT's actual defenders have offered.

But there is a second, more substantive way to see that the falsity of Purity leaves GGT unmotivated. Suppose that Purity is false, that there is some fundamental fact containing a

[75] Although Bennett 2011b briefly mentions an argument from modal recombination as a second reason, in addition to Sider's purity principle, for taking the grounding facts to be grounded.

derivative or grounded entity as a constituent. For example, suppose that x grounds y. And suppose you know that the following is a fundamental fact about derivative entity y: [y is F].

Now consider a different fact about derivative entity y: [y is G]. Imagine you are asked, based only on what you know so far, whether [y is G] is itself a fundamental fact. Clearly it would be unmotivated of you to insist, without any further argument, that [y is G] is derivative rather than fundamental fact. After all, you know that at least one other fact about entity y, [y is F,] is a fundamental fact. In the absence of any further argument, you should simply withhold judgment.

More generally, once you learn that there is at least one fundamental fact containing derivative entity y as a constituent, you cannot simply assume every single fact about entity y is going to be derivative rather than fundamental. For any fact about derivative entity y, in the absence of further argument, you should simply withhold judgment about that fact's status as fundamental or derivative.

Now consider another fact containing derivative entity y as a constituent: [x grounds y]. Imagine you are asked whether *this* fact is fundamental or derivative. Just as before, it would be unmotivated of you to insist, without any further argument, that [x grounds y] is itself a derivative fact. After all, you know that there is at least one other fact about entity y, [y is F] that is fundamental. In the absence of a further argument, you should simply withhold judgment.

Of course, you might come across a good reason to think that some fact about derivative entity y is itself derivative rather than fundamental. For example, consider the conjunctive fact [y is F and x is G]. And suppose you have good reason to think that, in general, conjunctive facts are grounded in their conjuncts. This would give you reason to think that every conjunctive fact, including [y is F and x is G], is derivative. It is motivated for you to conclude that [y is F and x is

G], though, *only* insofar as you have some further reason for thinking that every conjunctive fact is derivative.

If Purity is false, then there are some fundamental facts containing derivative entities as constituents. Grounding facts, facts about what grounds what, contain derivative entities as constituents. So, if Purity is false, it would be unmotivated of us to insist that no grounding fact is fundamental. That is, it would be unmotivated to insist that each and every grounding fact is itself grounded. Thus, if Purity is false then accepting GGT is unmotivated.

At the very least, we should be agnostic about the truth of any unmotivated philosophical thesis. So, at the very least, we should be agnostic about the truth of GGT. However, we sometimes have good reason to reject an unmotivated philosophical thesis. And GGT is one such unmotivated thesis. Or so I shall argue below.

Let us begin by considering a different, but equally unmotivated, philosophical thesis—*Homuncular Dualism*. Homuncular Dualism (HD) is the conjunction of two theses. First, a person x is consciously thinking that p just in case there is some distinct, smaller person y inside x's head who is thinking that x is thinking that p. Second, every conscious mental fact—every fact of the form [x is in conscious mental state M]—is a fundamental fact.

I assume that you, like me, reject HD out of hand. You probably have many reasons for rejecting HD. For example, you probably know that it is empirically false that people have other, smaller people living inside their heads. Perhaps you also endorse some form of physicalism about the mental, and therefore have reason to reject HD's claim that every conscious mental fact is a fundamental fact. However, even if you were neither a physicalist nor empirically informed, you would still have sufficient reason to reject HD out of hand.

To see this, first note that the truth of HD immediately leads to an infinite regress. Suppose that person x is thinking that p. HD says that inside the head of every person x thinking that p there is a distinct homuncular person thinking that x is thinking that p. Thus, there is some homunculus y that is thinking that person x is thinking that p. Moreover, there is yet another homunculus z inside homunculus y's head, thinking that homunculus y is thinking that person x is thinking that p. And so on, *ad infinitum.*

Next note that HD's infinite regress of ever smaller homunculi is accompanied by another regress of infinitely many fundamental facts. First, there is the fundamental fact that person x is thinking that p. Second, there is the fundamental fact that homunculus y is thinking that x is thinking that p. Third, there is the fundamental fact that homunculus z is thinking that homunculus y is thinking that x is thinking that p. And so on, *ad infinitum*.

So HD's truth entails that there are infinitely many fundamental facts. Moreover, HD is completely unmotivated—you have no good reason to believe it. As a result, I think it would be epistemically irresponsible of you to merely remain agnostic about HD's truth. Instead, you have good reason to regard HD as false.

More generally, I think you should regard as false *any* completely unmotivated philosophical thesis whose truth implies the existence of infinitely many fundamental facts. That is, I endorse the following principle:

> **Principle**: for any philosophical thesis T, we should reject T if (1) we have no good reason to believe that T is true and (2) if T's truth would imply the existence of infinitely many new fundamental facts.

My argument against the Grounding Grounding Thesis, like my argument against HD, relies on the truth of Principle. Before getting to that argument, however, I want to note what Principle does *not* say.

Principle does not say that we should reject *any* philosophical thesis whose truth implies the existence of an infinite regress of facts. For example, consider the T-schema, according to which p if and only if it is true that p. It is well-known that the T-schema implies infinitely many facts. Suppose that p. Thus, assuming the T-schema, it is true that p. Thus, it is true that it is true that p. Thus, it is true that it is true that it is true that p. And so on, ad infinitum.

The truth of the T-schema leads to an infinite regress of facts. However, Principle does not instruct us to reject the T-schema. After all, the T-schema is not completely unmotivated. We have good reason to believe it. And Principle instructs us only to reject *unmotivated* theses whose truth would lead to an infinite regress of facts.[76]

As Karen Bennett has argued, GGT implies the existence of infinitely many, numerically distinct grounding facts.[77] To see this, consider the following grounding fact: [x grounds y]. If GGT is true, then [x grounds y] is itself grounded in something, z. Thus we have another grounding fact: [z grounds [x grounds y]]. And, if GGT is true, that latter grounding fact is also grounded in something, z*. Thus we have another grounding fact: [z* grounds [z grounds [x grounds y]]]. And so on, *ad infinitum*.

[76] Thus Principle is similar to Daniel Nolan account of the difference between vicious and benign infinite regresses in Nolan 2001. Commitment to any infinite regress, Nolan argues, entails infinitely many new quantitative ontological commitments. Thus every infinite regress is theoretically costly. A regress is vicious, he argues, when this cost is not worth paying. Likewise, Principle instructs us only to reject those unmotivated theses that lead to an infinite regress of fundamental facts. Principle does not require us to reject a well-motivated thesis whose truth implies such a regress of fundamental facts.

[77] See Bennett 2011b, pp. 30-31.

Note that the infinite regress of grounding facts follows regardless of which specific account of what grounds the grounding facts is correct. After all, our starting assumption in the last paragraph was that [x grounds y] is grounded in something, z. For all I said, z could be the entity at the "bottom" of the grounding fact, x. Or it could be the entity at the "top" of the grounding fact. Or it could be the bottom entity together with a general connective principle. Regardless of what z is, the infinite regress of grounding facts follows.

Every defender of GGT recognizes that GGT implies an infinite regress of grounding facts. Nevertheless, GGT's defenders are not generally bothered by this implication. For, as Bennett points out, each and every one of the infinitely many grounding facts in the regress is *grounded* rather than fundamental. And, she argues, while the postulation of infinitely many *fundamental* facts may be objectionable, the postulation of infinitely many new grounded facts is not objectionable.[78]

Contra Bennett, however, the conclusions of this chapter and of Chapter One show that the infinite regress of grounding facts is not harmless at all. To see this, first recall that in Section II of this chapter I argued that if GGT is true then some grounded entity has a groundmate. And recall that my defense of that claim began by considering some arbitrary grounding fact, [x grounds y]. I then supposed that, per GGT, every grounding fact is grounded. If every grounding fact is grounded then, so I argued, the grounding fact [x grounds y] has a groundmate. I concluded that if GGT is true then some grounded entity has a groundmate.

But I chose the grounding fact [x grounds y] arbitrarily. So I now conclude that if GGT is true then *every* grounding fact has a groundmate. Moreover, as I argued in Section V of Chapter One, there is a fundamental fact about every grounded entity with at least one groundmate.

[78] Bennett 2011a, pp. 32-35. And see Bennett 2017, pp. 196-8 for an updated discussion of her position.

Therefore, I now conclude, if GGT is true then there is a fundamental fact about every grounding fact.

In light of this, return to the infinite regress of grounding fact generated by GGT. It is true that each of these infinitely many grounding facts, per GGT, is itself grounded rather than fundamental. However, if GGT is true then there is a fundamental fact about every grounding fact. Thus, for each grounding fact in the infinite regress, there is a fundamental fact about that grounding fact. Since there are infinitely many grounding facts, there also are infinitely many fundamental facts accompanying them.

Therefore, if GGT is true then there are infinitely many fundamental facts, one for each grounding fact in the infinite regress of grounding facts. We have already seen that GGT is unmotivated. And Principle instructs us to reject any philosophical thesis that is both (1) unmotivated and (2) whose truth implies the existence of infinitely many new fundamental facts. Thus Principle instructs us to reject GGT. So I conclude that the Grounding Grounding Thesis is false—some grounding facts are fundamental.

VI. An Ungrounded Grounding Fact

So which grounding facts, exactly, are the fundamental ones? Perhaps they all are. Or perhaps some grounding facts are fundamental, and others are grounded. I will not try to adjudicate between these two positions here. Instead, I will close by pointing out one type of grounding fact that seems to be a particularly good candidate for being fundamental.[79]

Consider Peter van Inwagen's famous question about composition:

[79] Thanks to Jim Darcy for helpful discussion on the relationship between SCQ and the grounding of compositional facts.

The Special Composition Question (SCQ): for any things, the xs, what necessary and jointly sufficient conditions must the xs meet in order to compose a y?[80]

An answer to SCQ is any sentence stating conditions the meeting of which by any things whatsoever is both necessary and sufficient for their composing a further object. In other words, an SCQ is a sentence that states perfectly general conditions for composition's occurrence.

Let *criterialism* about composition be the view that SCQ has an answer. Unrestricted composition, according to which some xs compose a y if and only if the xs are two or more, is a form of criterialism.[81] On the other hand, let *anti-criterialism* be the view that SCQ has no answer. According to anti-criterialism, then, there are no perfectly general conditions for composition's occurrence.

Anti-criterialism simply says that there are no general necessary and jointly sufficient conditions for composition's occurrence. It does not explicitly say anything about whether composition's occurrence is always grounded or ungrounded. That is, anti-criterialism is officially neutral between *brutal composition*, according to which every composition fact is brute or fundamental, and *derivative composition*, according to which every composition fact is fully grounded in some non-mereological fact or facts.[82]

[80] See van Inwagen 1990.
[81] Defenders of unrestricted composition include Lewis 1986, Rea 1998, and Sider 2001. Some versions of restricted composition, the view that some xs compose a further object and others do not, are also forms of criterialism. For example, van Inwagen's version of restricted composition says that some xs compose a y if and only if the activities of the xs constitute a biological life.
[82] Thanks to Jim Darcy for pointing out, in conversation, that anti-criterialism and derivative composition are compatible.

Suppose that anti-criterialism and derivative composition are both true. Then, so I shall argue, the *grounding composition facts*—any fact of the form [[the xs compose a y] is fully grounded in [the xs are F]]—are fundamental facts. I shall defend the contrapositive of this claim: if some composition fact is grounded rather than fundamental then anti-criterialism is false.

Suppose that a composition grounding fact, [[the xs compose a y] is fully grounded in [the xs are F]], is itself fully grounded. What grounds that composition grounding fact? In Section II we saw that there are four accounts of what grounds the grounding facts. Section V's argument against GGT allows us to rule out the first account, Bottom-Up Particularism.

If Bottom-Up Particularism is true, then the composition grounding fact [[the xs compose a y] is fully grounded in [the xs are F]] is itself fully grounded in the "bottom" non-mereological fact, [the xs are F]. It would be arbitrary for [the xs are F] to fully ground the first-order grounding fact [[the xs compose a y] is fully grounded in [the xs are F]], but *not* to ground the second-order grounding fact [[[the xs compose a y] is fully grounded in [the xs are F]] is fully grounded in [the xs are F]]. So [the xs are F] fully grounds that second-order grounding fact as well. Likewise, it would be arbitrary for [the xs are F] to ground the first-order and second-order grounding facts but *not* the third-order grounding fact. So [the xs are F] fully grounds the third-order grounding fact to. And so on, *ad infinitum*.

Thus, if the composition grounding facts are grounded in the way Bottom-Up Particularism says, then there is a familiar infinite regress of grounding facts. Moreover, as we saw in Section V, there will be infinitely many fundamental facts accompanying this regress. Thus, for reasons familiar from Section V, I think we should reject the Bottom-Up Particularist approach to the composition grounding facts.

Instead, the composition grounding facts must be—per the three other main accounts of what grounds the grounding facts surveyed in Section II—partly grounded in a general "connective" principle.For example, perhaps fact [[the xs compose a y] is fully grounded in [the xs are F]] is partly grounded in a general law of metaphysics stating that, necessarily, for any xs, the xs compose a y if and only if and in virtue of the fact that the xs are F. Or perhaps it is partly grounded in a fact about what lies in the general essence of the composition relation such as the following: it lies in the essence of the composition relation to be such that, necessarily, the xs compose a y if and only if and in virtue of the fact that the xs are F.

Either way, though, the relevant principle states perfectly *general* necessary and sufficient conditions for composition's occurrence. In other words, that connective principle states an answer to SCQ. It follows that if the composition grounding facts are grounded then there is an answer to SCQ. That is, if the composition grounding facts are grounded then anti-criterialism is false. By contraposition, if anti-criterialism is true then the composition grounding facts are fundamental.

What might lead someone to endorse both anti-criterialism and derivative composition? According to *conservatism* about composite material objects, there are roughly all and only the composite material objects that we ordinarily take there to be.[83] So conservatism says there are, among other things, such objects as living organisms and their biological parts, artifacts like tables and chairs, as well as inanimate natural objects like mountains, clouds, and planets. On the other hand, conservatism denies that there are arbitrary mereological fusions like the object composed of my dog and the tree in your back yard.

Conservatives should be attracted to anti-criterialism about composition. For a conservative-friendly answer to SCQ would have to state a single perfectly general condition met

[83] Daniel Korman is perhaps conservatism's most prominent defender. See especially Korman 2016. Also see Markosian 1998 for a view that is consistent with conservatism but does not entail it.

by the cells composing your living body, and also met by all the parts of your car, and by the planets composing the Milky Way. Moreover, since conservatism denies that there are arbitrary mereological sums, that condition would *not* be met by any arbitrary scattered objects. And it is just hard to see how there could be such a general condition, even one that is yet unknown to us.[84]

Conservatives should also be attracted to derivative composition. For conservatives tend to trust their intuitions. And, intuitively, whenever composition occurs, surely it does so *because of* or *in virtue of* some facts about the putative composing objects. On the other hand, there is something counterintuitive about brutal composition's claim that composition's occurrence is never explained by or grounded in any facts about the putative composers.[85]

So conservatives should be attracted to both anti-criterialism and to derivative composition. Thus, conservatives should conclude that the composition grounding facts are fundamental. On this combination of views, there are always facts that ground composition's occurrence. However, these facts are so heterogeneous and disjunctive that they cannot be captured by any general principle. As a result, a composition fact's being grounded in any particular instance is always a fundamental or brute fact.

[84] There is also an inductive reason for conservatives to conclude that anti-criterialism is true. Metaphysicians have been searching for a conservative-friendly answer to SCQ for nearly thirty years now. So far, they have come up empty handed. One conclusion to draw from this, of course, is that conservatism about composition is false. But another conclusion to draw is that there is no completely general answer to SCQ. In other words, one lesson to draw from this is that anti-criterialism is true.

[85] Markosian addresses the counterintuitiveness objection in Section 5 of Markosian 1998.

Chapter 3

Grounding and Its Limits

In earlier chapters I argued that—contra the Siderean Purity principle—there are fundamental facts about each and every grounded entity. However, in those chapters I did not say much about precisely *which* facts about grounded entities are the fundamental ones.

This chapter's main goals are to defend a general account of which facts about grounded entities are fundamental, and to then draw out two of that account's implications. According to the account I shall defend, there is a fundamental "building" fact—a fact about the specific way in which that grounded entity is built from its grounds—about each and every grounded entity.

I shall then argue that my account has both a metaphysical implication and a methodological one. First, so I shall argue, grounded entities have a kind of ontological structure or complexity that fundamental entities lack. Second, the account I shall defend—together with conclusions reached earlier in the dissertation—provide a vindication of non-fundamental metaphysics. Metaphysics, I shall conclude, is neither exclusively about the fundamental nor exclusively about what grounds what.

I. Groundmate Individuators

In Chapters One and Two I did not say much about which facts about grounded entities are the fundamental facts. Some of the claims defended in those chapters do, however, imply an initial constraint on what the fundamental facts about grounded entities are like. This section's task is to

both articulate that initial constraint and to show how it follows from the results of Chapters One and Two.

Grounded entities x and y are *groundmates*, recall, just in case x and y are numerically distinct and x and y share their full grounds (see Chapter One, Section III). For example, both the set whose only members are Socrates and Plato, {SP}, and the mereological sum of Socrates and Plato, SP, are fully grounded in Socrates and Plato. Yet {SP} and SP are numerically distinct. Thus {SP} and SP are groundmates.

Next let us say that, where grounded entity x has property F, the fact that x is F is a *groundmate individuating* fact—or a GMI fact for short—about x just in case (1) entity x and entity y are groundmates, (2) entity x is F, and (2) entity y is not F. For example, the fact that {SP} is a set is a GMI fact about {SP}. For although SP is one of {SP}'s groundmates, {SP} is a set and SP is not a set.

Now note that, for any grounded entities x and y, if x and y are groundmates then there are qualitative differences between x and y. For example, there are qualitative differences between the groundmates {Socrates} and {{Socrates}}, between [p or q] and [p or q or r], between the statue and the lump of clay, and so on. More generally, x and y are groundmates only if x and y are numerically distinct. And any two entities that are numerically distinct also qualitatively differ from one another. Therefore, there are qualitative differences between any two entities that are one another's groundmates.

Equivalently, for any grounded entity x, if x has at least one groundmate then there is some GMI fact about x. In Section V of Chapter One, recall, I argued that every grounded entity has at least one groundmate. So I now conclude that there is at least one GMI fact about every grounded entity.

We have reached this conclusion using only the arguments of Chapter One, together with a couple of new definitions. But the arguments of Chapter One also imply that there is at least one *fundamental* or metaphysically unexplained GMI fact about every grounded entity. To begin to see this, recall the following thesis from Chapter One, Section II:

> **Property Fixing Thesis**: if some entity x has some qualitative properties F1…Fn and x is fully grounded in some entity y and y has qualitative properties G1…Gn then, necessarily, for any entity z, if z is fully grounded in y and y has G1…Gn then z has qualitative properties F1…Fn.

Let us say that, where x is a grounded entity and x is F, the fact that x is F *violates* the Property Fixing Thesis just in case entity x is fully grounded in entity z, which has properties G1…Gn and, possibly, there is some entity y such that y is fully grounded in z, which has properties G1…Gn, and yet entity y is not F.

Every GMI fact violates the Property Fixing Thesis. For example, the fact that {SP} is a set is a GMI fact, since although {SP} and SP are groundmates SP is not a set. And the fact that {SP} is a set violates the Property Fixing Thesis—although {SP} is a set and is fully grounded in Socrates and Plato, who have properties G1…Gn, SP is also fully grounded in Socrates and Plato, who have properties G1…Gn, and yet SP is not a set.

Moreover, it should also be clear, every fact that violates the Property Fixing Thesis is also a GMI fact. For the fact that x is F violates the Property Fixing Thesis only if x is fully grounded in z and, possibly, there is some y that is also fully grounded in z and yet y is F. Grounding is

necessitating (see the Introduction). So the fact that x is F violates the Property Fixing Thesis only if x is fully grounded in z and there is *actually* some y that is also fully grounded in z and yet y is not F. Equivalently, the fact that x is F violates the Property Fixing Thesis only if one or more of x's actual groundmates is not F.

Therefore, a fact violates the Property Fixing Thesis if and only if it is a GMI fact. In Section II of Chapter One I argued that any fact about a grounded entity x that violates the Property Fixing Thesis is either itself a fundamental fact about x or else is metaphysically explained in terms of some fundamental fact or facts about x. Therefore, I now conclude, every GMI fact about a grounded entity x is either itself fundamental or else is metaphysically explained in terms of some fundamental fact or facts about grounded entity x.

Now, if some GMI fact about some grounded entity x is metaphysically explained by some fact about x, then it can only be metaphysically explained by some other GMI fact about x. That is, no GMI facts are metaphysically explained by non-GMI facts. To see why, consider the fact that {SP} exists. That fact is not a GMI fact about {SP}, since SP is {SP}'s groundmate and is also such that it exists.

So suppose, for *reductio*, that the fact that {SP} is a set *is* metaphysically explained by the non-GMI fact that {SP} exists. SP is also such that it exists. And, as we saw in Section II of Chapter One, metaphysical explanation is *general* in the following sense: necessarily, for any x and y, if x's being F is fully metaphysically explained by x's being G then if y is G then y is also F. Therefore, SP is also a set.[86] But SP is not a set. Therefore, SP is both a set and not a set. So what

[86] This inference relies on a generality principle for metaphysical explanation, which we encountered in Chapter One, Section II. See footnote n. 13.

we assumed for *reducito* is false—the fact that {SP} is a set is not metaphysically explained by the fact that {SP} exists.

The above reasoning clearly generalizes—*no* GMI fact is metaphysically explained by a fact that is not a GMI fact.

To briefly recap: we have seen that every GMI fact about a grounded entity x is either a fundamental fact about x or else is metaphysically explained by some fundamental fact about x. We have also seen that only GMI facts can metaphysically explain other GMI facts. Thus, every GMI fact about x is either itself fundamental or is metaphysically explained by some fundamental GMI fact about x.

Above I argued that there is at least one GMI fact about every grounded entity. So I now conclude that there is at least one fundamental GMI fact about every grounded entity. Of course, this conclusion fits well with Chapter One and Chapter Two's conclusion that there are fundamental facts about every grounded entity. But this section's conclusion goes a little further than Chapters One and Two did. For, unlike in Chapters One and Two, we now have an initial constraint on what the fundamental facts about grounded entities are like—the fundamental facts about grounded entities must be groundmate individuating facts.

II. The Question

Our initial constraint does not, all by itself, give us a specification of which facts about grounded entities are the fundamental ones. After all, there are many GMI facts about every grounded entity. For example, the fact that {SP} is a set is a GMI fact. But the fact that {SP} has members is also

a GMI fact. For {SP}'s groundmate, SP, has no members. The fact that {SP} is abstract is also a GMI fact. So is the fact that {SP} has no shape. And so on.

In light of this, consider the following question:

The Question: for any grounded entity x, *which* fact is x's fundamental groundmate individuating fact?

The Question asks for a specification of which fundamental facts individuate grounded entities from their groundmates. This section's goal is to lay out three desiderata for an answer to The Question, and the next section's goal is to defend an answer that meets those desiderata.

First, we should look for GMI facts with facts that are *maximally* individuating. Let us say that, where x is F, the fact that x is F is maximally groundmate individuating—or is a maximally GMI fact—just in case *none* of x's groundmates is F. As a toy example, suppose that grounded entity {SP} has {{SP}} and SP as its only groundmates. And suppose that although {SP} is F, neither {{SP}} nor SP is F. Then the fact that {SP} is F is a maximally GMI fact about {SP}.

To see why we should be looking for maximally GMI facts, suppose that there were a fundamental GMI fact about a grounded entity that did not individuate it from *all* of its groundmates. For example, suppose that although the fact that {SP} is F individuates {SP} from SP, it does not individuate {SP} from {{SP}}. And furthermore suppose the fact that {SP} is F is a fundamental fact. Then—using the arguments of the last section—we could conclude that there

is a second, distinct fundamental GMI fact about {SP} that individuates it from {{SP}}. As a result, we would be stuck with *two* fundamental GMI facts about {SP} instead of just one.

So, other things being equal, an answer to The Question that identifies *maximally* GMI facts is an answer that postulates fewer fundamental facts than an answer that identifies minimally GMI facts. I think that, to the extent that we can, we should always avoid multiplying fundamental facts (see Chapter Two, Section V). So, other things being equal, we should be looking for an answer that identifies GMI facts that maximally individuate grounded entities from their groundmates.

The second desideratum is *generality*—other things being equal, we should prefer a general answer to The Question, one which is true of every grounded entity regardless of type, to a highly disjunctive or disunified answer. For example, other things being equal, an answer according to which the fundamental GMI facts about all grounded entities are modal fact, say, is to be preferred over an answer according to which the fundamental GMI facts about sets are modal facts, while the fundamental GMI facts about composite objects are mass facts, and the fundamental GMI facts about disjunctive properties are facts about logical operators.

The third and final desideratum of an answer to The Question is *explanatoriness*. The fewer derivative GMI facts a given GMI fact metaphysically explains, the less explanatory that GMI fact is. For example, the disjunctive fact that {SP} is either a set or an apple is less explanatory than the fact that {SP} is a set. After all, the disjunctive fact that {SP} is either a set or an apple is itself metaphysically explained by the fact that {SP} is a set. Since metaphysical explanation is transitive, the fact that {SP} is a set metaphysically explains everything the disjunctive fact that {SP} is either a set or an apple explains *and* at least one more fact, namely, that disjunctive fact itself.

III. Building Facts

Following Karen Bennett, let us say that a *building relation* is any broadly mereological relation by which one or more entities "make up" some other entity or entities.[87] Examples of building relations include composition, set-membership, material constitution, the functional realization relation, and the grounding relation itself.[88] Thus, a whole is composed of some parts, the property of being red is the determinable of which scarletness, burgundy, crimson, and so on are determinates, mental states are—perhaps—functionally realized by physical states, and sets are grounded in their individual members.

Karen Bennett has recently argued that the building relations form a relatively unified class of relations.[89] She offers three necessary and jointly sufficient conditions for some relation R to be a building relation. First, building relations are asymmetric—if entity x is built by entity y, then y does not build entity x. Second, building relations are necessitating—if entity x is built by entity y then, necessarily, if y exists then x exists. Third, building relations are "generative"—if entity x is built by y, then y's building x makes true claims of the form: "x exists/obtains in virtue of y" and "x exists/obtains because y exists/obtains."

I will follow Bennett in taking these three conditions to be necessary and sufficient for building. However, also following Bennett, I do not claim that these three conditions constitute anything like a reductive analysis or real definition of the property of being a building relation.

[87] The notion of building was first introduced by Karen Bennett in Bennett 2011a, and is the subject of her 2017 book *Making Things Up*.
[88] Bennett also argues that causation is also a building relation, although nothing I say here turns on whether she is correct about this. See Bennett 2017, Chapter 4.
[89] Bennett 2017, pp. 30-58.

Perhaps there is some such reductive analysis of the property of being a building relation out there. For now, though, I will be content to take the property of being a building relation as a primitive.

I am going to defend an answer to The Question that draws on Bennett's notion of building. In order to state that answer, however, I need to lay out a few more definitions—the notion of a building fact, the distinction between full and partial building, and the distinction between immediate and mediate building.

Where x and y are entities, and R is a building relation, let us say that a *building fact* is any fact of the following form: y stands in R to x. So, for example, if composition is a building relation then the fact that some particles, the ps, compose me is a building fact about me. If set-formation is a building relation, then the fact that Socrates is a member of {Socrates} is a building fact about {Socrates}. And so on for every other building relation.

Following Bennett, we can also distinguish between full building facts, on the one hand, and partial building facts, on the other.[90] For example, suppose {SP} has Socrates and Plato as its only members. Then the fact that {SP} has Socrates as a member is a partial building fact, while the fact that {SP} has Socrates and Plato as its members is a full building fact.

Finally, we can also distinguish between immediate and mediate building facts. For example, suppose that some particles, the ys, compose some things, the xs, which in turn compose the table. And suppose that composition is a transitive relation. Then it is both the case that the table is composed of the xs and it is the case that the table is composed of the ys. Yet the fact that the table is composed of the xs is an immediate building fact, while the fact that the table is composed of the ys is only a mediate building fact.

[90] Bennett 2017, p. 33.

Going forward, unless otherwise specified, when I use the phrase "building fact," I am referring only to those building facts that are both full and immediate. For example, suppose that all and only the xs compose the table and that there are no ys such that the xs compose the ys and the ys compose the table. Then the fact that the xs compose the table is both a full and immediate building fact about the table and hence, simply, a building fact.

I am going to introduce my answer to The Question by making a series of observations about grounded entities and building facts. My first observation is that there are at least two building facts about every single grounded entity. For every grounded entity, there is of course a "grounding fact" about that entity—the fact specifying what that entity's full grounds are. Since the grounding relation meets the three conditions for being a building relation—it is irreflexive, asymmetric, and generative—the grounding facts are building facts.

There is also a second building fact about every grounded entity, which appears to be distinct from the fact about what grounds that entity. These are the facts about which specific building relation, other than grounding, that grounded entities bear to the entity or entities from which they are built.[91] For example, the fact that {Socrates} has Socrates as its sole member is distinct from the fact that {Socrates} is fully grounded in Socrates. The fact that redness has scarletness as one of its determinates is distinct from the fact that scarlet is fully grounded in scarletness. And so on for each and every grounded entity.[92]

[91] Many of these building relations are thus what Wilson 2014 calls "small-g" grounding relations, as opposed to the big-G metaphysical Grounding relation that has been the main subject of this dissertation.
[92] Cameron 2016 has a helpful discussion of the relationship between building facts or small-g grounding facts, on the one hand, and big-G Grounding facts, on the other. He also offers an interesting reply to Wilson's claim that all the theoretical work big-G Grounding allegedly does can be performed by the small-g grounding facts alone.

My second observation is that no fact about what fully grounds a given grounded entity is itself a GMI fact about that grounded entity. For example, consider the fact that {Socrates} is fully grounded in Socrates. That fact does not individuate {Socrates} from any of its groundmates. For *what it is* for some distinct entity z to be one of {Socrates}'s groundmates just is for z to also be fully grounded in Socrates. Thus, each of {Socrates}'s groundmates is also fully grounded in Socrates. So the fact that {Socrates} is fully grounded in Socrates does not individuate {Socrates} from any of its groundmates.

My third observation is that the second sort of building fact, facts about building relations other than grounding, *are* GMI facts. For example, consider again the set of Socrates and Plato, {SP}. {SP} is fully grounded in Socrates and Plato. And here is a building fact about {SP}: the fact that {SP} has Socrates and Plato as its sole members. Now, the mereological sum SP is one of {SP}'s groundmates. Yet it is not the case that SP has Socrates and Plato as its sole members. Indeed, SP has no members at all. Thus, the fact that {SP} has Socrates and Plato as its sole members is a GMI fact about {SP}.

My fourth observation is that some building facts are *maximally* groundmate individuating, that is, they serve to individuate a grounded entity from all of its groundmates. Specifically, facts about full and immediate building are maximally GMI facts. I shall use the case of {Socrates} to argue for this claim, but the reasoning will generalize to every other grounded entity as well.

The fact that {Socrates} has Socrates as its sole member is both a building fact and a maximally GMI fact. To see this, suppose there is some other entity that shares its full grounds with {Socrates}, that is, an entity that is also fully grounded in Socrates. Call this "entity S." Entity S either has Socrates its sole member, or else it does not have Socrates as its sole member. Let us look at each option in turn.

First suppose that S *does* have Socrates as its sole member. Then entity S is a set. For something's having members is sufficient for its being a set. Of course, {Socrates} is also a set. And set-membership is *extensional*—for any sets S* and S**, S* is identical with S** if and only if S* and S** have exactly the same members. Therefore, since {Socrates} and S both have Socrates as their sole member, {Socrates} is identical with entity S. Since two entities must be numerically distinct in order to be groundmates, it follows that S is not {Socrates}'s groundmate.

On the other hand, suppose that S does not have Socrates as its sole member. Then S is numerically distinct from {Socrates}. After all, {Socrates} *does* have Socrates as its sole member, so {Socrates} and S have different properties. But we are supposing that entity S shares its full grounds with {Socrates}. So we can conclude that entity S is one of {Socrates}'s groundmates—a numerically distinct entity with which {Socrates} shares its full grounds. So S is both {Socrates}'s groundmate and does not have Socrates as its sole member. Therefore, the fact that {Socrates} has Socrates as its sole member individuates {Socrates} from its groundmate, S.

Thus, if S has Socrates as its sole member then S is not one of {Socrates}'s groundmates. On the other hand, if S does not have Socrates as its sole member, then S is one of {Socrates}'s groundmates and the fact that {Socrates} has Socrates as its sole member individuates {Socrates} from S. Therefore, either S is not one of {Socrates}'s groundmates or else S is one of {Socrates}'s groundmates and the fact that {Socrates} has Socrates as its sole member individuates {Socrates} from S. Equivalently, if S is one of {Socrates}'s groundmates then {Socrates}'s having Socrates as its sole member individuates {Socrates} from S. Since entity S was chosen arbitrarily, I conclude that {Socrates}'s having Socrates as its sole members individuates {Socrates} from *all* of its groundmates.

I have just argued that a particular building fact about {Socrates} is a *maximally* GMI fact. Moreover, for any set whatsoever, we could use the above reasoning to show that the fact about which members that set has is a maximally GMI fact about that set. So the building fact about any given set, the fact about which members that set has, are a maximally GMI fact about that set.

Moreover, the same reasoning can be repeated, *mutatis mutandis*, for other kinds of grounded entities. Here are two more examples, for the sake of completeness. A statue is fully grounded in a lump of clay. Yet the fact that the statue is *constituted* by that lump of clay is a GMI fact about the statue—none of the statue's groundmates is constituted by that lump of clay.[93]

The disjunctive fact [p or q] is fully grounded in the fact that p. Yet [p or q]'s having p, q, and disjunction as its only *constituents* is a GMI fact about [p or q]—none of [p or q]'s groundmates bears the constituency relation only once to p, once to q, and once to disjunction.

I have just made my fourth observation: certain building facts about grounded entities are also maximally GMI facts about those entities. My fifth observation is that those very same building facts can serve to metaphysically explain a wide array of other GMI facts. For example, it is plausible that the fact that {Socrates} bears the set-membership relation to Socrates either directly or indirectly metaphysically explains each of the following distinct GMI facts about {Socrates}: that {Socrates} is a set, that {Socrates} cannot exist without Socrates, that {Socrates}

[93] If the constitution relation is transitive, and if the itself statue constitutes a memorial, then the fact that the statue is constituted by the lump of clay is not a GMI fact about the statue. For the memorial is one of the statue's groundmates—it is also fully grounded in the lump of clay—and the memorial is also constituted by the lump of clay. In the case of transitive relations, then, the maximal GMI facts are the *immediate* or *non-mediated* building facts about the grounded entities. Thus the fact that the statue is immediately constituted by the lump does individutate the statue from the memorial. For the memorial is only mediately, and not immediately, constituted by the lump of clay. And, plausibly, the relation of immediate constitution *is* extensional—anything that is also immediately constituted by the lump of clay is identical with the statue.

is abstract, that {Socrates} has no mass, that {Socrates} either has members or is an apple, and so on.

More generally, for any type grounded entity, the immediate and full building facts about those grounded entities can explain a wide variety of other facts about them. The fact that some entity immediately bears the composition relation to some things directly or indirectly explains why it is a material object, why it has the weight and shape it does, why it has certain of its causal powers, and so on. The fact that some entity is immediately functionally realized by some neural state N explains why that entity is a mental state, why it has certain of its causal powers, and so on. The building facts, in other words, explain why grounded entities have the nature and properties they do.

The immediate and full building facts are both maximally groundmate individuating and explanatorily fruitful. Moreover, as we have already seen, every grounded entity is such that there is some immediate building fact about that entity. Thus, the immediate and full building facts meet all three of the desiderata from the last section—maximality, explanatoriness, and generality. In light of this, here is my answer to The Question:

> **Fundamental Building Facts**: for any grounded entity x, and where relation R is a building relation, the fact that entity y (or entities, the ys) immediately and fully bear R to x is a fundamental groundmate individuating fact about entity x.

IV. Two Objections

This section raises and responds to two objections to the Fundamental Building Facts answer. Both of these objections arise from one building relation in particular, the composition relation. According to the first objection, the Fundamental Building Facts answer leads to an objectionable overgeneration of fundamental composition facts. According to the second objection, the answer faces counterexamples based on the possibility of mereologically coincident objects.

Here is the first objection.[94] Consider a table. According to the Fundamental Building Fact answer, there is some fundamental building fact about the table, namely, some fundamental fact about what composes the table. Moreover, as I argued in the last section, the fundamental building fact about any given grounded entity is the *immediate* building fact about it. So the fundamental composition fact about the table is the fact about which things *immediately* compose it.

Presumably, the table's "bigger" parts are the things that immediately compose it. For, presumably, the table's smaller parts like the atomic simples, the ps, compose the table *mediately*, perhaps by first composing some larger molecules. And, presumably, even those larger molecules compose the table mediately, perhaps by first composing some visible objects like the screws, the pieces of wood, and the glue. And so on, until we reach the table's biggest parts, which compose the table immediately.

However, there appear to be many, equally good candidates for these biggest, immediately composing parts. There are the screws, the glue, and the pieces of wood, which are themselves composed of the molecules. But there is also the table's eastern half together with its western half. There is also the table's northern half and its southern half. And then there is "table-minus"—the

[94] I am grateful to Trenton Merricks for raising this objection.

object composed of all but one of the microphysical parts—together with the "complement" of table-minus—the single microphysical part that is not among table-minus' parts.

We can now state the objection. If the Fundamental Building Facts answer is true, then the immediate composition fact about the table is fundamental. But it appears that many, many different collections of things immediately compose the table. As a result, there are many, many fundamental building facts about the table rather than just one. This is an objectionable result. So we should reject the Fundamental Building Facts answer.

To begin to see my main reply to this objection, first note that, for some building relations, it is possible for some things, the ys, to *both* mediately and immediately build some built entity x.[95] Grounding works like this, for example. Suppose the fact that p obtains. The fact that p immediately fully grounds both of the following disjunctive facts: the fact that p or q, and the fact that p or q or r. But the fact that p or q also immediately fully grounds the fact that p or q or r. So, via the transitivity of grounding, the fact that p fully and *mediately* grounds the fact that p or q or r. Therefore, the fact that p fully immediately grounds the fact that p or q or r, and the fact that p fully mediately grounds the fact that p or q or r.

The composition relation works this way as well—some things can both mediately and immediately compose a further object. In the case of the table, the atomic simples, the ps,

[95] Briefly, here are two other possible responses. First, perhaps what the objection shows is not that there are multiple, fundamental composition facts about the table, but rather that it can be indeterminate or vague which immediate building fact is fundamental. On this response, it is true that there is some unique fundamental building fact about the table, but it is simply indeterminate which. Second, the objection relies on a relatively liberal approach to decomposition in order to generate the many candidate building facts. Specifically, the objection seems strongest if the "doctrine of arbitrary undetached parts" is true. On the other hand, the more restrictive view of composition and decomposition one endorses, the fewer arbitrary big parts—parts like table-minus and its complement, and the northern half of the table—one will be committed to. See van Inwagen 1981 for more on the doctrine of arbitrary undetached parts.

immediately compose the molecules, which in turn immediately compose some bigger things, which in turn immediately compose the table. So the ps mediately compose the table. Plausibly, however, the ps also *immediately* compose the table.

To see this, note that the ps would still compose the table even if—counterpossibly—the ps existed (and were arranged in the same way) but the molecules and bigger parts of the table did not exist. In that situation, the ps would immediately compose the table. Metaphorically, then, the ps have the "power" to compose the table immediately. It would be odd for the ps to possess this power in the actual world but fail to exercise it. So the ps actually immediately compose the table.

Next note that while there are many, equally good candidates for the table's "biggest" parts, it is not the case that there are many, equally good candidates for its *smallest* parts. After all, the ps are atomic simples. And there are no objects smaller than atomic simples. So there are no things, the qs, that "compete" with the ps for the status of the table's smallest parts.[96]

My response to the above objection, then, is that the table's smallest parts, and not its largest parts, are the things that fundamentally immediately compose the table. More generally, the fundamental composition facts about composite material objects are the facts about their smallest parts' immediately composing them.

[96] My response thus relies on there being some atomic simples that compose the table. So my response fails if there could be a "gunky" world, a world in which every material object has some proper parts. However, conclusions defended earlier in this dissertation give us independent reason to reject the possibility of infinitely divisible gunk. Material objects are fully grounded in their parts and how those parts are arranged. Thus, any world with infinitely divisible gunk is a world with an infinitely descending chain of evermore fundamental entities, each one grounded in the next. In Chapter One I argued that there is a fundamental fact about every grounded entity. Thus, in the gunky world there is a fundamental fact about each and every grounded entity in the infinitely descending grounding chain. So, in the gunky world, there would be infinitely many fundamental facts. But, per Chapter Two's Principle, I think we should deny even the possibility of such an unparsimonious world unless we have been good reason to believe it is possible. But we have not been given good reason to think that atomless gunk is possible. Therefore, infinitely divisible atomless gunk is not possible. See Sider 1993 on gunk.

Here is the second objection to the Fundamental Building Facts answer. Some philosophers think it is possible for two or more numerically distinct objects to mereologically coincide, or to be composed of exactly the same material parts at the exact same time. That is, some philosophers think that composition is non-extensional. According to the second objection, mereologically coincident but numerically distinct composite objects are counterexamples to the Fundamental Building Facts answer.

Suppose that the statue and the lump of clay are composed of exactly the same material parts, the xs. And suppose that composition is a building relation. Then the following fact is a building fact: the fact that the statue is composed of the xs. Now note that the lump of clay is one of the statue's groundmates—the lump, like the statue, is fully grounded in the xs and their arrangement (see Chapter One, Section III). However, the lump is *also* composed of the xs. As a result, the fact that the statue is composed of the xs is a building fact and yet does not individuate the statue from all of its groundmates—it is not a maximally GMI fact. Therefore, so the objection goes, the Fundamental Building Facts answer has not successfully identified facts that are maximally groundmate individuating.

I have two replies to this objection. My first reply is to agree with the objector about the truth of the following conditional: if the Fundamental Building Facts answer is true then mereologically coincident objects are impossible. However, the answer's inconsistency with mereological coincidence may be no mark against it. Instead, it may be a mark against mereologically coincident objects.

To see why I say this recall that, as we saw briefly in Chapter One, coincident objects face the difficult and persistent "grounding problem." The grounding problem asks for a metaphysical explanation of the various "sortalish" differences between the statue and the lump of clay. It

appears that there can be no such explanation, since the statue and the lump of clay share all their material parts and are situated in the same surrounding environment. Since many philosophers think that such brute or unexplained sortalish facts are impossible, they conclude that no two composite objects can mereologically coincide.

Everyone admits that the grounding problem is difficult. But why is it so difficult? Why is it so hard to explain the sortalish differences between coincident material objects? The Fundamental Building Facts answer can help answer that question, and thus can put even sharper teeth on the grounding problem.

If the Fundamental Building Facts answer is true, then the qualitative differences between any two groundmates must ultimately be explained by some difference in how those entities are built. However, every two or more objects that mereologically coincide *just are* two objects that are built up from the same things via the same building relation. That is, every two or more objects that mereologically coincide are two or more objects with no "building difference" between them. Thus, if the Fundamental Building Facts answer is true, it is no surprise that it is so hard to find a good metaphysical explanation of the statue and lump's qualitative differences.

Thus, if there can be coincident material objects then, as the objection notes, the composition facts are not groundmate individuating facts. However, I think a legitimate move in this context is to insist that the composition facts *are* groundmate individuating facts—i.e. insist that the Fundamental Building Facts answer is true—and thus conclude that mereological coincidence is impossible.

My second response is to note that, even if the *composition* facts are not maximally groundmate individuating, perhaps every composition fact is grounded in a more specific building relation that is maximally groundmate individuating.

For example, suppose that for every kind of object K there is a unique structural relation S, such that some xs bear S to one another and to the K they compose. And suppose that every single composition fact is grounded in the obtaining of some such structural relation (see Chapter Two, Section V for more on fundamental/grounded composition facts). Finally, suppose that each of these unique, kind-specific structural relations are distinct building relations.

Given all of the above, there will be a unique, maximally GMI building fact about the statue and a different maximally GMI building fact about the lump. The fact that the xs bear S to one another and to the statue individuates the statue from its groundmate, the lump. For the xs do not bear S to the lump, but only to the statue. The xs bear some other structural relation, S*, to one another and to the lump.[97]

V. The Structure of Grounded Entities

[97] Yet a third reply is to deny that the statue and the lump do, after all, share all their parts. For example, Katherin Koslicki argues that although coincident material objects share all their material parts, they always have different formal or structural parts. The statue is composed of the material parts, the xs, together with a form or structure, structure S. The lump, on the other hand, is composed of the xs together with a distinct form or structure, structure L. If Koslicki's view is correct, then the composition facts are groundmate individuating. For example, the fact that the statue is composed of the xs and structure S is a maximally ground-mate individuating fact about the statue. For none of the statue's groundmates, including the lump of clay, is composed of the xs *and* structure S. The same goes, *mutatis mutandis*, for the lump of clay. So if Koslicki's view is consistent both with composition being a building relation and with the truth of the Fundamental Building Facts answer. See Koslicki 2008, pp. 167-199.

In both Chapters One and Two I argued against the following principle:

> **Purity**: for any entity x, if x is a grounded entity then there are no fundamental facts about x.

My rejection of Purity puts me at odds with the orthodoxy about grounding. I think there are fundamental facts about grounded entities, while advocates of the orthodoxy deny that there are fundamental facts about grounded entities. In Chapter One I raised but did not answer an important question about the nature of this dispute between myself and the grounding orthodoxy.[98]

The concern is that advocates of the orthodoxy and I are engaged in a merely linguistic dispute without much interesting metaphysical import. If the orthodoxy is right, then the term "grounded" cannot apply to any entity involved in a fundamental fact. If I am right, then the term "grounded" can apply to an entity involved in a fundamental fact. According to the concern, there is no interesting *metaphysical* difference between a grounded entity involved in a fundamental fact, on the one hand, and a fundamental or ungrounded entity, on the other.

The Fundamental Building Facts account can help us to see more clearly what the dispute between myself and the orthodoxy amounts to, over and above a linguistic dispute about the application conditions for the term "grounding." Specifically, if the Fundamental Building Facts

[98] Thanks to Trenton Merricks and Kirra Hyde for both raising this question.

account is true then grounded entities have a kind of structural complexity that fundamental entities lack.

For any given entity x, there are two sorts of explanatory questions one might ask about x. First, one might want to know what metaphysically explains x's existence: "In virtue of what does x exist?" or simply "What grounds x?" Call these *existential explanation* questions. Second, one might want to know what metaphysically explains why x is the particular kind or sort of thing it is: "In virtue of what is x the kind of thing it is?" or "what makes x be what it is?" Call these *nature explanation* questions.

The orthodoxy says that, when it comes to a grounded entity like {Socrates}, both the existential explanation question and the nature explanation question can be completely answered solely with reference to {Socrates}'s full grounds and the properties of {Socrates}'s full grounds. Thus where Socrates is {Socrates}'s full grounds, the orthodoxy says that we need postulate no additional structure in the world over and above Socrates and his properties in order to explain both the existence and nature of {Socrates}.

I agree with the orthodoxy that {Socrates}'s full grounds, Socrates, is all we need to explain why {Socrates} *exists*. However, the Fundamental Building Facts account tells us that we need postulate something in addition to Socrates and Socrates' properties in order to explain why {Socrates} is the kind or sort of thing it is. Specifically, we must postulate a fundamental *building* fact, namely, the fact that Socrates bears the set-membership relation to {Socrates} and nothing else. Only this additional building fact will explain why {Socrates} has the kind properties, modal properties, and essential properties it does.

Grounded entities, on my view, can thus be thought of as *hylomorphic* compounds, structured entities that have some "matter" and a relational "form" as their basic or fundamental constituents.[99] Something (or somethings) M plays the role of matter in an entity x just in case M is that "from which" or "out of which" x exists. For example, a statue's various material parts play the role of its matter. Something F plays the role of a form in some entity x just in case F is numerically distinct from x and yet makes x *what it is*. For example, the uniquely statue-esque structural arrangement of the statue's material parts plays the role of the statue's form.

In the case of {Socrates}, for example, {Socrates}'s full grounds, Socrates, plays the role of {Socrates}'s matter. For Socrates is that "from which" Socrates exists, just as a statue's parts are that "from which" it exists. But neither Socrates nor his properties make {Socrates} be what it is. After all, if we only know that some entity x has Socrates as its full grounds and that Socrates has certain properties, we are still completely in the dark about what *kind* of thing x is.

In addition to {Socrates}'s matter or full grounds, there is also a fundamental building fact playing the role of {Socrates}'s form. The fact that Socrates bears the set-membership relation to {Socrates} and nothing else makes {Socrates} be the kind of thing it is, namely, a set. It is only with the addition of {Socrates}'s form, over and above its matter and the properties of its matter, that {Socrates}'s nature can be metaphysically explained.

There are fundamental, groundmate individuating building facts about every grounded entity. So I think every grounded entity has a hylomorphic structure like {Socrates}. Fundamental

[99] Mark Johnston 2007 also proposes a general hylomorphic account of non-material entities like sets and propositions although, unlike my view, his view has complex essence facts playing the role of forms. For hylomorphic accounts of material objects in particular, see Fine 2008, Fine 2015, as well as Stump 1995, Johnston 2006, Oderberg 2007, Koslicki 2008, Fine 2008, Rea 2011, Toner 2011, Marmodoro 2013, and Brower 2014.

entities, on the other hand, lack such a hylomorphic structure. Nothing makes a fundamental entity exist, since fundamental entities are ungrounded and metaphysically unexplained. And no fact or entity numerically distinct from any fundamental entity explains why it is the kind or sort of thing it is. So nothing plays the role of matter in a fundamental entity, and nothing plays the role of its form.

We can now see that there is an interesting metaphysical difference between grounded entities involved in fundamental facts, on the one hand, and fundamental entities, on the other. Grounded entities are hylomorphically structured out of form and matter. Fundamental entities, by comparison, lack such an ontological structure.

Advocates of the orthodoxy about grounding think that the existence and properties of a given grounded entity's full grounds can metaphysically explain both that entity's existence and its nature. On their view, grounded entities have no hylomorphic structure. For, on their view, a grounded entity's matter and the properties of its matter do all the required explanatory work.

The dispute between myself and advocates of the orthodoxy, then, can be characterized as a dispute about whether grounded entities have additional ontological structure over and above their matter or full grounds. Whether a given grounded entity possesses such additional structure is a metaphysical or ontological question, and not merely a linguistic one. I conclude that the disagreement between myself and advocates and the orthodoxy is a genuine, metaphysical dispute.

VI. Innocence and Permissivism Again

In Chapter One I argued that the Ontological Innocence Thesis (OIT), according to which every grounded entity is ontologically innocent relative to its full grounds, is false. The Fundamental Building Facts answer, and the hylomorphic picture of grounded entities that answer motivates, shows us more clearly *why* OIT is false.

Suppose you are committed to some grounded entity, {Socrates}. There is a fundamental building fact about {Socrates}, namely, the fact that {Socrates} has Socrates as its sole member. You are committed to {Socrates}. So you are also committed to the fundamental fact that {Socrates} has Socrates as its sole member.

It is completely uncontroversial, even among OIT's advocates, that commitment to a fundamental fact or entity is an additional and theoretically costly commitment over and above the commitments one already has. Thus, your commitment to the fundamental fact that {Socrates} has Socrates as its sole member is an additional and theoretically costly commitment over and above your prior commitment to Socrates. As a result, your commitment to the grounded entity {Socrates} is an additional and costly commitment over and above your prior commitments, including your commitment to {Socrates}'s full grounds, Socrates.

As a result, {Socrates} is *not*—on any plausible understanding of the phrase—"ontologically innocent" or an "ontological free lunch" relative to its full grounds Socrates. Instead, {Socrates} is a genuine addition to being over and above its full grounds. More generally, since there is a fundamental building fact about every grounded entity, *no* grounded entity is ontologically innocent relative to its full grounds.

This conclusion sits well with the hylomorphic account of grounded entities developed in the last section. No hylomorphist claims that hylomorphic compounds are ontologically innocent

relative to their matter alone. For hylomorphic compounds are have both matter and form as their basic constituents. And a form is a genuine additions to being over and above the matter in which it inheres. Thus, hylomorphic compounds are genuine additions to being over and above their matter as well.

The arguments of this chapter also make clear that permissivism about the grounded, according to which existence questions about grounded entities generally have obvious and positive answers, is deeply unattractive (see Chapter One, Section I for more on permissivism).

To see this, suppose you are already committed to Socrates. Now ask: is there such an entity as {Socrates}? Suppose that {Socrates}, if it exists, is fully grounded in Socrates, to which you are already committed. However, now suppose you realize that, if {Socrates} exists, it is a fundamental fact that {Socrates} has Socrates as its sole member.

Then you should conclude that a commitment to {Socrates} would be accompanied by an additional and theoretically costly ontological commitment, over and above your prior commitment to Socrates. You might, of course, weigh up the costs and benefits and decide that this additional commitment is worth its costs. But you also might decide that the additional commitment is not worth the cost. Either way, contra permissivism, it is not simply *obvious* to you, from the outset, that {Socrates} exists.

More generally, suppose you are already committed to some entity y, and you think that entity x is such that, if it exists, it is fully grounded in y. Then it can sometimes be an open question for you whether grounded entity x exists as well. So, contra permissivism, existence questions about the grounded sometimes do not have easy, positive answers. I conclude that permissivism is false.

VII. Non-Fundamental Metaphysics Vindicated

Theodore Sider writes:

> Metaphysics, at bottom, is about the fundamental structure of reality.[100]

Similarly, Jonathan Schaffer says:

> …[M]etaphysics as I understand it is about what grounds what. It is about the structure of the world. It is about what is fundamental, and what derives from it.[101]

So, according to Schaffer, metaphysics is both about the fundamental and what grounds what, but not about the grounded or non-fundamental entities themselves.

On the Schaffer-Sider view about the scope of metaphysics, two traditional areas of metaphysical inquiry are foreclosed. First, *existence* questions about the grounded—and perhaps existence questions more generally—are not genuine metaphysical questions. Second, questions about the *nature* of a given grounded entity, over and above questions about what grounds that entity, are not metaphysical questions either. Instead, the only genuine metaphysical questions are

[100] Sider 2011, p. 1.
[101] Schaffer 2009, p. 379.

either those about what fundamentally exists or those about how the fundamental gives ground to the existence and nature of everything else.

The Schaffer-Sider view is radical. But it should not be hard to see why some of grounding's advocates are attracted to it. For, as we have seen in Chapters One and Two, many of grounding's advocates endorse both the Purity principle and the Ontological Innocence Thesis. And, as I argued in Chapter One, the latter thesis motivates a permissive approach to existence questions about grounded entities.

Moreover, anyone who endorses Purity will likely find questions about the *nature* and properties of grounded entities to be wholly redundant and uninteresting. For, given Purity, the nature of every grounded entity is completely determined by the existence and nature of the fundamental. Thus, once you have done the hard work of figuring out which fundamental entities there are and what they are like, all the facts about the nature and properties of the grounded should fall right out of your account of fundamental reality.

So far in this dissertation I have offered arguments against OIT, permissivism about existence questions, and the Siderean Purity principle. So, to the extent that those theses are the main motivation for the Schaffer-Sider view about the scope of metaphysics, my arguments thus far also undermine the main motivation for the Schaffer-Sider view.[102]

I have also defended some more positive claims about grounding and grounded entities that support a more liberal view about the scope of metaphysics. For example, in the last section I argued that every grounded entity is an addition to being over and above its full grounds. Thus, every grounded entity is an addition to being over and above the fundamental. And, as we saw, it

[102] See Barnes 2014a, Merricks 2013, and recently Bennett 2017 for other dissenters.

follows from this that *existence* questions about grounded entities are no more obvious or trivial than questions about which fundamental entities there are.

As a result, traditional debates about the existence of tables and chairs, the existence of abundant properties and states of affairs, the existence of abstracta like sets and numbers, and even debates in the metaphysics of mind about whether there are qualia, are all debates over the existence of apparently *grounded* entities. Nevertheless, if I am right, it is not at all obvious at the outset whether or not any of these entities exist. So, if I am right, debates over the existence of these types of entities fall under the proper purview of metaphysics.

Second, as I argued in Sections I-IV above, questions about the *nature* of a grounded entity can be left completely unanswered even once questions about that entity's existence and fundamental grounds have been fully answered. In order to answer the former questions, so I argued, we must ask what specific building relation that grounded entity bears to the entity or entities from which it is built. As a result, questions about the nature and properties of grounded entities are not wholly redundant.

This result fits well with the actual practice of metaphysics. For example, suppose you and I agree that human persons exist. Furthermore suppose we agree that human persons are neither fundamental Cartesian souls nor fundamental "emergent" selves. Instead, we agree that human persons are non-fundamental composites—each human person is fully grounded in its material parts and how those parts are arranged.

Despite our areas of agreement, however, we might still disagree with one another about both about (1) what kinds of things human persons are and thus about (2) how human persons persist over time. Perhaps you are an animalist—you hold that human persons are organisms, and

that we have biological persistence conditions. And perhaps I am a Lockean—I hold that human persons are psychological beings, and that we have psychological persistence conditions. That is, perhaps we disagree about the classic question of personal identity over time, despite agreeing with one another about the existence facts and the grounding facts.

Contra Schaffer and Sider, then, metaphysicians *qua* metaphysicians can and should inquire about both the existence and nature of the non-fundamental. A few other metaphysicians have also opposed the Schaffer-Sider restrictive view about the scope of metaphysics. Jason Turner, for example, reports his frustration with the trend of framing existence questions as questions about metaphysical grounding:

> I do think that some authors in the literature really have thought that debates which seem to be about what exists have really been about what is grounded all along, and have illicitly shifted their view of the issues to follow suit. This is a bad thing; in fact, it strikes me as so obviously a bad thing that I don't really know how to argue further that we shouldn't do it. Whatever we think about grounding, we cannot be seduced into ignoring other important metaphysical issues.[103]

Elizabeth Barnes argues that it is a mistake to frame important questions in feminist and social metaphysics solely as questions about grounding:

> Schaffer-style grounding seems like too coarse of a tool to properly describe debates about realism in social ontology. For Schaffer, debates about realism can be re-described as debates about grounding: whether you are a realist about the xs depends on how/whether

[103] Turner 2016, p. 391.

> you think the xs are grounded. But in cases of social ontology, many parties —including both realists and anti-realists—seem to agree on questions of grounding.[104]

Ross Cameron agrees, adding that relations other than grounding—such as Bennett's building relations and Jessica Wilson's "small-g" grounding relations—have a role to play in specifying *how* some entities ground others:

> … I think it is an important point that defenders of big G Grounding ought to take on board, that simply saying 'X grounds y' and ending one's account is not satisfying. One must say something about how X grounds y; as Wilson would have it, which small g grounding relation is it that takes us from X to y?[105]

Turner, Barnes, and Cameron all seem to be after a more modest view about grounding's role in metaphysics. Chapters One through Three of this dissertation have, in effect, led us to such a modest position. Grounding has some genuine philosophical utility—indeed, I will put grounding to new work in Chapters Four and Five. However, the arguments of Chapters One, Two, and Three show that grounding has limits.

[104] Barnes 2017a, p. 2432. Also see Barnes 2014.
[105] Cameron 2016, p. 386.

Chapter 4

What is A Sorites Series?

Consider a Sorites series for baldness. In the first case, Peter has a full head of hair and is clearly not bald. In each subsequent case, Peter loses a single hair. In the very last case, Peter has no hairs at all. It is—at least arguably—implausible that there is a "sharp cut-off" with respect to baldness, a case in which Peter has precisely n hairs and is clearly not bald that is immediately followed by a case in which Peter has n-1 hairs and is clearly bald.[106] Instead, there must be a period in the series during which it is *vague* or *indeterminate* whether Peter is bald.

Now consider, in contrast, the structurally similar but non-Soritical trap door series.[107] In the first case, there is one pebble on a tightly shut trap door. In each subsequent case, an additional tiny pebble is placed on the trap door. There is nothing particularly implausible about the following claim: there is a case in the series in which there are precisely n pebbles piled on the closed door and yet, in the immediately subsequent case, the trap door is sprung wide open. That is, there is nothing particularly implausible about the claim that there is a sharp cut-off with respect to the opening of the trap door.

Finally, and again in contrast with the baldness Sorites, consider the non-Soritical centenarian series. A person is a *centenarian* just in case she is 100 years of age or older—either 100 years old, or 101 years old, or 102 years old, or 103 years old, etc. In the first case, Sam is one year old and clearly not a centenarian. In each subsequent case, Sam is a single year older. It is

[106] I say sharp cut-offs are "at least arguably" implausible because epistemicists about vagueness believe that there is a sharp cut-off somewhere in the baldness Sorites. However, even epistemicists recognize the *prima facie* implausibility of sharp cut-offs. After all, epistemicists go to great lengths to explain *why* it initially seems to us that there are no sharp cut-offs. See, for example, Williamson 2000 Chapter 8.

[107] This series was originally discussed by Trenton Merricks in Merricks 2001 pp. 124-130 and Merricks 2007.

perfectly plausible that although Sam is not a centenarian when she is 99 years old, she is a centenarian in the very next case and every case thereafter. That is, it is perfectly plausible that there is a sharp cut-off in the centenarian series with respect to whether Sam is a centenarian.

Why are sharp cut-offs—at least arguably—implausible in the baldness Sorites, but not in the trap door series or the centenarian series? In other words, why is the baldness Sorites a genuine, vagueness-inducing Sorites series while the structurally similar trap door series and centenarian series have nothing at all to do with vagueness? More generally, what is it for a series of cases S to be a Sorites series for F? Henceforth I shall refer to this latter question as *The Sorites Question*.

The Sorites Question has received relatively little attention. This is surprising since the Sorites series is central to the philosophical problem of vagueness. For one thing, if there can be a Sorites series for F—if F is 'Sorites-susceptible'—then it can be vague whether something is F. That is, Sorites-susceptibility is a sufficient condition for vagueness. For another, the phenomenon of vagueness is sometimes *defined* in terms of the Sorites series. What it is for F to be vague, on this view, just is for F to be Sorites-susceptible.[108] So an account of what it is for a series of cases to be Soritical will presumably deepen our understanding of vagueness itself.

In this paper I shall propose an answer to The Sorites Question. According to my answer, a Sorites series for F is a puzzle about the way in which F relates to its metaphysical grounds. After proposing my answer, I shall defend it from a rival answer originally put forward by Trenton Merricks, according to which a Sorites series for F is a puzzle about the way in which F relates to its reduction-base. Finally, I will argue that my answer has an interesting implication—my answer

[108] For example, Colyvan and Bueno 2012 define vagueness as Sorites-susceptibility. Along similar lines, Wright 1975 and Greenough 2003 characterize vagueness in terms of "tolerance"—the application of a vague predicate is tolerant of small changes but not large changes.

uncovers a new and attractive way to resist the Vagueness Argument against restricted composition.

I. Against an Easy Answer

Although few philosophers have explicitly asked or answered The Sorites Question, some do offer brief and informal characterizations of the Sorites series. For example, Galen reports that Stoics called the Sorites paradoxes "little-by-little" arguments—a series in which each subsequent case involves a little more or a little less of something such as one fewer hair, one more grain of sand, one more penny, etc.[109] Likewise, Cicero characterizes a Sorites series in terms of its "gradual progression:"

> Nor is it so just with a heap of corn, from which the name (sorites) is derived: there is no matter whatever concerning which, if questioned by gradual progression, we can tell how much must be added or subtracted before we can give a definite answer—rich or poor, famous or unknown, many or few, large or small, long or short, broad or narrow.[110]

And, more recently, Max Black says the following of the paradoxes of the heap and the bald man:

> …[The] paradox [is] associated with the emergence of qualities as a result of successive small alterations in respect of some other (quantative) characteristic, none of which, except the last, produce any change in quality.[111]

[109] See Galen, *On Medical Experience* 16.1-17.3, in Keefe 2000 pp.58-59.
[110] Cicero *Academica*, in Keefe 2000 pp. 59-60.
[111] Black 1937, p. 77.

Finally, Timothy Williamson characterizes the Soriticality of a series in terms of the "gradualness" of the cases:

> Consider the following argument, with premises above the line and conclusion below:
>
> 1 is few
> If 1 is few then 2 are few
> If 2 are few then 3 are few
> .
> .
> .
> If 9,999 are few then 10,000 are few
>
> ----------
> 10,0000 are few
>
> The argument appears to be valid; if its premises are true, its conclusion will be true too....The *gradualness* of the sorites series makes each of the conditional premises appear true.[112]

So, according to Williamson, it is because the argument has a gradual structure that we find it implausible to deny any of its conditional premises.

The above remarks by the Stoics, Galen, Black, and Williamson all suggest that a series' Soritical status has something to do with its possession of a little-by-little structure. Thus, suppose that whether something x is G is intuitively relevant to whether it is F. And suppose that G "admits of degrees", in such a way that one thing can be minutely more or minutely less G than another. Perhaps this is all we need to answer The Sorites Question—for a series S to be a Sorites series for

[112] Williamson 2000, pp. 22-23 emphasis added. Also see Raffman 1994, p. 42.

F is for the fact that something x is G to be intuitively relevant to whether x is F, for G to admit of degrees, and for the cases in G to have a little-by-little structure with respect to G.

Unfortunately, the little-by-little answer will not do. After all, the trap door series has a little-by-little structure—the number of pebbles is intuitively relevant to the opening of the trap door, and there is just one more pebble added in each case. And the disjunction series has a little-by-little structure—age in years is intuitively relevant to whether someone is a centenarian and in each case in the series Sam grows just one year older. Yet neither the trap door series nor the disjunction series is a genuine Sorites series.

So the possession of a little-by-little structure is, at most, a necessary condition for a series' being a Sorites series. An adequate answer to The Sorites Question should help us to see what distinguishes non-Soritical little-by-little series like the trap door series and the centenarian series from genuinely Soritical series like the baldness Sorites. In Section II, I shall argue that sharp cut-offs in the two non-Soritical little-by-little series are plausible for different reasons. Then, in Section III, we shall see how this sheds light on why sharp cut-offs in the baldness Sorites *are*—at least arguably—implausible.

II. Causation and Grounding

Each case in the non-Soritical trap door series involves a fact about how many pebbles have been piled on the trap door. Each case in the series also involves a fact about whether the trap door is tightly shut or sprung open. In the first case, for example, only one pebble has been placed on the door, and the door is tightly shut. And, somewhere in the series, there is a case in which there are

precisely n pebbles on the closed trap door is followed by a case in which the n+1st pebble is added and the door is sprung wide open.

It is no coincidence that every case in the series involves both a fact about pebble number and a fact about whether the door is open or closed. For, in each case, there is an *explanatory* relationship between the facts about how many pebbles there are and the facts about whether the door is open or closed. Thus, when the trap door springs open, it springs open because the appropriate number of pebbles has been added. Specifically, the addition of that relevant number of pebbles *causally* explains the opening of the trap door.

That causal explanation is at work in the trap door series sheds some light on why sharp cut-offs not—not even arguably—implausible. First note that, if C causally explains E then the occurrence of C is not—all by itself—the most complete or fullest possible explanation of why E occurs. For example, suppose that the baseball's striking a glass window causes the window to shatter. Why did the window shatter? A purely causal explanation of the window's shattering cites the cause alone: the window shattered because it was struck by the baseball. This causal explanation is perfectly adequate in most contexts but, at least in principle, there is an even more complete explanation available.

Why did the window shatter? Here is a second, more complete answer to that explanatory question: the window shattered because it was struck by the baseball *and* because the baseball had a mass of m, was traveling at velocity v, the window was made of 1mm thick glass, and because the relevant laws of physics L1…Ln jointly determine that something of that mass traveling at that velocity will cause glass of that thickness to shatter.

In light of this, consider what it would mean to postulate a sharp cut-off somewhere in the trap door series at, say, the addition of the nth pebble. Such a cut-off implies that the trap door opens when the nth pebble is added, but did not open when the n-1st pebble was added. Moreover, such a sharp cut-off implies a corresponding sharp cut-off in the relevant *causal* facts:

> **Causal Cut-Off**: the addition of precisely n pebbles to the trap door causes it to open, but the addition of precisely n-1 pebbles did not cause it to open.

Causal Cut-Off says that the addition of precisely n pebbles causes—and thus causally explains—the addition of the trap door. However, this does *not* imply that the addition of precisely n pebbles is the most complete possible explanation of why the trap door open.

Causal explanations are not generally complete. So even if precisely n pebbles causes the trap door to open, the addition of the nth pebble does not completely or fully explain why the trap door opens. For example, here is a fuller and more complete explanation: the trap door opened because precisely n pebbles had been added, *and* because each pebble had a mass of m, the trap door had a particular configuration c, and because the relevant laws of physics jointly determined a door of configuration c would spring open when and only when at least n pebbles of mass m had been added.

This more complete explanation makes it clear why the trap door opened when the nth pebble was added. Moreover, the details cited in that explanation make it clearer why the door did not open any sooner than it did. In particular, it is clear why the trap door did not open when the n-1st pebble was added. For the precise mass of each pebble, the configuration of the door, and the

laws of physics jointly determine that the trap door will not open when only n-1 pebbles have been added. As a result, it is perfectly plausible that Causal Cut-Off is true. And so it is perfectly plausible that there is a sharp cut-off in the trap door series.

Now consider our second non-Soritical series of cases, the centenarian series. As in the trap door series, it is perfectly plausible that there is a sharp cut-off somewhere in the centenarian series. But the plausibility of sharp cut-offs in the centenarian series have nothing to do with causation or causal explanation. Instead, the plausibility of sharp cut-offs has something to do with *grounding* or metaphysical explanation.

Someone is a centenarian just in case she is either 100 years old, or 101 years old, or 102 years old, or 103 years old, etc. Each case in the centenarian series involves a fact about whether or not Sam is a centenarian. And each case in the series involves a fact about how many years old Sam is. For example, in the first case, Sam is only one year old and is not a centenarian. And, in the 100^{th} case, Sam is 100 years old and is a centenarian.

It is no mere coincidence that every case in which Sam is a particular age is also a case in which Sam is either a centenarian or not a centenarian. For whether Sam is a centenarian is *explained by* how many years of age Sam is. Thus, when Sam is one year old, Sam is not a centenarian *because* she is only one year old. And when Sam is 100, Sam is a centenarian because she is 100.

Crucially, however, the explanatory relation at work in the centenarian series is not mere causation—Sam's precise age in years explains but does not cause her to be a centenarian or fail to be one. To see this, first note that the facts about how old Sam is *necessitates* the facts about whether Sam is a centenarian or not. That is, if Sam is n years old and is not a centenarian then,

necessarily, anyone who is n years old is not a centenarian. And if Sam is n years old and is a centenarian then, necessarily, anyone who is n years old is a centenarian. Yet causes do not necessitate their effects in this way.

Second, recall that causes are not, all by themselves, "maximally" explanatory of their effects—there are always fuller explanations available.[113] In contrast, the facts about how many years old Sam is *do* maximally explain whether or not Sam is a centenarian. Thus if you wanted to know why Sam is a centenarian, and if someone told you that Sam is 115 years old, that answer would be the fullest and most complete possible explanation you could hope for. Acknowledging that Sam is 115 years old but then going on to look for a more detailed explanation of why Sam is a centenarian would betray a confusion on your part. This confusion would be akin to the confusion displayed by someone acknowledged that Jones is an unmarried male, but then went looking for a more detailed explanation of why Jones is a bachelor.

Consider the following two facts:

Age: Sam is 115 years old.

Definition: for any person x, for x to be a centenarian is for x to be 100 years of age or older.

[113] Note that x can be maximally explanatory of y without x explaining everything about y. For example, suppose there is a fundamental fact about y. And suppose that x explains why y exists and has certain of its properties but that there is no other entity z that explains anything about y. Then entity x is maximally explanatory of y, in the sense that it explains y more completely than anything else, and yet it does not explain everything about y. I note this in order to show that the results of Chapters One through Three, where I argued that some facts about grounded entities are not explicable in terms of their grounds, are compatible with the claims being made here.

I said that Age alone provides a maximally complete explanation of why Sam is a centenarian. However, someone might suggest that Age together with Definition provides an even *more* complete explanation of why Sam is a centenarian. This suggestion is tempting, but it must be resisted.

To see why, consider the following three facts:

Age: Sam is 115 years old.

Definition: for any person x, for x to be a centenarian is for x to be 100 years of age or older.

Second Definition: for any person x, for x to be a centenarian is for x to be 100 years of age or older *and* for Definition to obtain.

Suppose that, as the initial suggestion says, Age together with Definition constitute a more complete explanation of Sam's being a centenarian than Age alone. Then surely Age together with Definition and Second Definition constitute an even *more* complete explanation of Sam's being a centenarian than Age and Definition alone.

Of course, if the addition of Second Definition renders the explanation more complete then so does the addition of:

Third Definition: for any person x, for x to be a centenarian is for x to be 100 years of age or older *and* for Definition to obtain *and* for Second Definition to obtain.

And so does the addition of:

Fourth Definition: for any person x, for x to be a centenarian is for x to be 100 years of age or older *and* for Definition to obtain *and* for Second Definition to obtain *and* for Third Definition to obtain.

Clearly, taking the initial suggestion seriously sends us off on an infinite regress of evermore complete explanations.

An explanation is *maximally* complete just in case no there are no other facts the addition of which could make the explanation more complete. If there is such an infinite regress of evermore complete explanations of the fact that Sam is a centenarian, then there is no explanation such that no other facts could be added to that explanation in order to make it more complete. So, if there is such an infinite regress, there is no maximally complete explanation of the fact that Sam is a centenarian.

However, surely there *is* a maximally complete explanation of the fact that Sam is a centenarian. And so I deny that there is an infinite regress of evermore complete explanations of that fact. The initial proposal that the addition of Definition makes our explanation more complete

is what led to this infinite regress. So I deny that the addition of Definition really does make our explanation any more complete than it already was.

This is not an *ad hoc* move, designed solely to block the ensuing infinite regress. Definition, after all, states *what it is* to be a centenarian. Age, on the other hand, is not a statement of what it is to be a centenarian. In general, I am suggesting, the facts that are constitutive of what it is to be F are not among the facts that explain *why* something is F.

We have just seen that Sam's age in years non-causally explains Sam's status as a centenarian. What is the non-causal explanation relation at work here? My proposal is that metaphysical grounding is the relation in question—in each case, the fact about precisely how hold Sam either grounds the fact that Sam is a centenarian, or does not ground the fact that Sam is a centenarian.

After all, grounding has the right features to play this role—it is both necessitating and maximally explanatory. Thus, if Socrates grounds {Socrates} then, necessarily, if Socrates exists then {Socrates} exists.[114] Moreover, if the fact that p grounds the fact that p or q, then the obtaining of p provides the fullest and most complete possible explanation of why p or q obtains.

Grounding's role in the centenarian series helps explain why it is not—not even arguably—implausible that there are sharp cut-offs somewhere in that series. A sharp cut-off in the centenarian series implies that when Sam is precisely 100 years old she is a centenarian, but that when she was precisely 99 years old she is not a centenarian. Moreover, such a sharp cut-off also

[114] On grounding and necessitation, see Audi 2012a and 2012b, Fine 2012, de Rossett 2010, Rosen 2010, Trogdon 2013, Skiles. And on grounding and explanation, see Fine 2012 Section I, Audi 2012, and Dasgupta 2014.

implies a corresponding cut-off in the "grounding facts" or facts about what grounds what. In particular, a sharp cut-off in the series implies that the following is true:

> **Grounding Cut-Off**: Sam's being 100 years old grounds her being a centenarian, but her being 99 years old does not ground her being a centenarian.

Consider the following grounding fact: Sam's being 100 years old grounds her being a centenarian. Why is it the case or in virtue of what, one might wonder, that Sam's being 100 years old grounds her being a centenarian? Note that this question is *not* asking for a more complete explanation of why Sam is a centenarian, over and above the fact that she is 100 years old. For Sam's being 100 years old is the fullest explanation of why Sam is a centenarian one could possibly hope for. Instead, The Sorites Question is asking why that entire *grounding fact*—the fact that Sam's being 100 years old grounds her being a centenarian—obtains.

Now, according to the orthodoxy about grounding, every grounding fact is explained in terms of some further, more fundamental facts. For, according to the orthodoxy, every grounding fact is itself *grounded* in some further, more fundamental facts. Thus, according to the orthodoxy, the fact that Sam's being 100 years old grounds her being a centenarian is itself grounded in—and hence explained in terms of—some further, more fundamental facts. Seeing *what* grounds that grounding fact will help us to see why Grounding Cut-Off is perfectly plausible.

In general, disjunctive facts are grounded in their true disjuncts. Moreover, facts about how disjunctive facts are grounded—facts of the form p grounds p or q—are themselves grounded in a general fact about disjunction. That general fact might look something like the following:

necessarily, every disjunctive fact is grounded in all and only its true disjuncts. Perhaps it is a "law of metaphysics" that disjunctive facts are grounded in all and only their true disjuncts. Or perhaps it is part of the "essence" of disjunction to be such that every disjunctive fact is grounded in all and only its true disjuncts.[115] For our purposes, the exact nature of this general fact about disjunction does not matter. All that matters is that grounding facts of the form p grounds p or q are grounded in some such general truth about disjunction.

The fact that Sam is a centenarian is a disjunctive fact—it is the fact that she is either 100, or 101, or 102, etc. Sam's being 100 years old is a true disjunct of the fact that Sam is a centenarian. Sam's being a centenarian is grounded is grounded in Sam's being 100 years old. What grounds that grounding fact? The following general truth about disjunction: disjunctive facts are grounded in all and only their true disjuncts. Thus that general truth about disjunction explains why that grounding fact obtains, and thus makes it clear why the first conjunct of Grounding Cut-Off is true.

That same general truth about disjunction makes it clear why the second conjunct of Grounding Cut-Off is true. The second conjunct of Grounding Cut-Off says that Sam's being 99 years old did not ground her being a centenarian. Sam's being 99 years old did not ground her being a centenarian because being 99 years old is not a true disjunct of being a centenarian, and because it is a general truth about disjunction that disjunctive facts are grounded in all and only their true disjuncts.

Here is the upshot. A sharp cut-off in the centenarian series implies a sharp cut-off with respect to facts about how Sam's being a centenarian is grounded. When we wonder why *this*

[115] For more on laws of metaphysics, see Schaffer 2017b, Wilsch 2014 and 2015, and Wasserman 2015. Wasserman 2015 is directly relevant to the discussion here, since he gives a treatment of vagueness and the Sorites puzzle in terms the laws of metaphysics. For more on grounding the grounding facts in general essence facts, see Dasgupta 2014, Fine 2012, and Rosen 2010.

precise number of years grounds her being a centenarian, when only one fewer did not, we have a good answer. For the facts that ground the grounding facts involving disjunction are "fine-grained" enough to ground a sharp cut-off in the grounding facts. As a result, such a cut-off is perfectly plausible, and so is the claim that there is a sharp cut-off somewhere in the centenarian series.

III. The Answer

Each case in the baldness Sorites involves a fact about how many hairs Peter has on his head. And each case involves a fact about whether or not Peter is bald. In the first case, for example, Peter has a full head of hair and is not bald. And, in the last case, Peter has no hair and is bald. Moreover, there is an *explanatory* relation between the hair number facts in each case and the baldness facts in each case. When Peter has no hair, he is bald *because* he has no hair. And when he has a full head of hair, he is not bald because he has a full head of hair.

However, the explanatory relation in the baldness Sorites is not causation. After all, the number of hairs he has *necessitates* whether he is bald—if he has no hair and is bald then, necessarily, anyone with no hair is also bald. Moreover, the number of hairs he has is *maximally* explanatory of whether he is bald. For example, Peter's having no hair at all is the fullest and most complete possible explanation of why he is bald. It would be confused to acknowledge that he has no hair, but to go looking for a more detailed explanation of in virtue of what he is bald.

Thus, I suggest that metaphysical grounding is also at work in the baldness Sorites. That is, the number of hair's Peter has in any particular case grounds whether he is bald. In light of this, let us momentarily make the—at least arguably implausible—assumption that there is a sharp cut-

off somewhere in the baldness Sorites. Once we see what follows from that assumption, we will be able to see why that assumption is—at least arguably—implausible.

Suppose there is a case in which Peter has precisely n+1 hairs and is not bald immediately followed by a case in which Peter has precisely n hairs and is bald. Such a sharp cut-off implies that the following claim is true:

> **Second Grounding Cut-Off**: Peter's having n hairs grounds his being bald, but his having n+1 hairs did not ground his being bald.

If the Second Grounding Cut-Off is true, then although Peter's having some precise number of hairs grounds his being not bald, his having only one fewer hair grounds his being bald.

First note that if Second Grounding Cut-Off is true, Peter's having n hairs *grounds*—but does not cause—Peter's being bald. And grounding explanations—unlike causal explanations—are maximally complete. Thus Peter's having n hairs is the fullest or most complete possible explanation of his being bald. Thus, unlike in the trap door series, there is are no additional details available to make the explanation more complete. So no appeal to additional explanatory factors can make it clear why n hairs grounds Peter's being bald, when one more hair did not.

Second, recall that, according to the orthodoxy, every grounding fact is itself grounded. Thus if Second Grounding Cut-Off is true then the fact that Peter's having n hairs grounds his being bald is itself grounded in some further, more fundamental facts. Plausibly, this grounding fact is itself grounded in some general truth about the way in which baldness facts are grounded in

hair number facts. For example, perhaps there is some general "metaphysical law" or some truth about what "lies in the essence" of baldness that grounds the facts about how baldness is grounded in hair number.

However, the general truth about the relationship between baldness and hair number facts is—at least arguably—not fine-grained enough to ground a sharp cut-off in the facts about how baldness is grounded. For example, there is no metaphysical law or essence fact of the following form: necessarily, for any x, if x is bald then x's being bald is grounded in x's having either precisely n hairs or fewer. Instead, the general fact about how baldness relates to hair number facts is likely vague and coarse-grained. For example, perhaps that general fact just says that someone's being bald is grounded in and only in their having relatively few hairs.

Here is another way to see the same point. Plausibly, there are no rock-bottom, fundamental facts about how baldness relates to hair number. Instead, whatever general truths there are about baldness and its relationship to hair number are ultimately explained by human language and thought. For example, perhaps the facts about how we apply and withhold the term 'bald' and its non-English equivalents ultimately ground the facts about what lies in the essence of baldness, which general laws govern the grounding of baldness facts, etc.

At least arguably, however, these linguistic facts are not fine-grained enough to ground perfectly precise and fine-grained general facts about how baldness relates to hair number facts. Instead, those general facts are going to be coarse-grained and vague. And, as a result, these general facts cannot ground sharp cut-offs in the particular grounding facts. For example, they cannot ground both the fact that Peter's having n hairs grounds his being bald, and yet his having n+1 hair does not ground his being bald.

We can now see why sharp cut-offs in the baldness Sorites are—at least arguably—implausible. Such a cut-off implies a corresponding sharp cut-off in the facts about Peter's being bald is grounded in the number of hairs he has. That cut-off would be acceptable, even plausible, if there were perfectly precise, fine-grained facts available to ground the grounding facts about baldness. However, the facts that ground the grounding facts about baldness are—at least arguably—not sufficiently fine-grained. And so it is—at least arguably—implausible that there is a sharp cut-off anywhere in the baldness Sorites.

What goes for the baldness Sorites also goes *mutatis mutandis* for other paradigmatic Sorites series. Whether or not some grains of sand constitute a heap is grounded in the number and arrangement of grains, whether or not someone is rich is grounded in how many cents that person has, and so on. Next, every fact about what grounds being a heap, being rich, being tall, etc., is itself grounded in some more fundamental facts. But—at least arguably—the ultimate grounds for each of these grounding facts is not fine-grained enough to ground that being a heap is grounded in there being no fewer than, say, precisely five grains of sand, and so on. As a result, it is—at least arguably—implausible to postulate a sharp cut-off in any of the relevant series. That is, each of these series is a genuine Sorites series.

We are now in a position to answer The Sorites Question. For a series of cases S to be a Sorites series for F is for all of the following to obtain. First, F is a grounded feature. That is, necessarily, if x is F, then the fact that x is F is grounded in some other fact, such as x's being G, x's being H, x's being I, and so on. Second, possibly, x's being F is grounded in x's being G, and G admits of minute differences of degree in such a way that there can be a little-by-little series with respect to G. Third, the grounding facts about F—the facts about what grounds something's being F on any particular occasion—are all grounded in further, more fundamental facts. Fourth

and finally, what grounds the grounding facts about F is—at least arguably—not fine-grained enough to ground that x's being some precise degree of G grounds x's being F, while x's being some minutely different degree of G does not ground x's being F.

If each of these four conditions is met, then a little-by-little series with respect to G will be a genuine, vagueness-inducing Sorites series for F. One virtue of my answer, which we have already seen, is that it accurately predicts that the baldness Sorites and its kin are genuine Sorites series and that the two non-Soritical series are not genuine Sorites series. Another virtue of my answer is that it bears theoretical fruit. For, as we shall see in Section V, my answer uncovers a new response to a much-discussed argument in the metaphysics of material objects. First, however, I shall argue that my answer is superior to its main rival.

IV. A Rival Answer

Trenton Merricks was the first to discuss causal little-by-little series like the trap door series. Moreover, Merricks suggests a way of distinguishing such causal series from genuine Sorites series like the baldness Sorites. In the passage below, he considers a series of cases in which a camel's back is gradually loaded down with straws, one at a time, until the addition of a single straw breaks the camel's back. Merricks offers the following suggestion about why a sharp cut-off in the camel's back series is perfectly plausible while a sharp cut-off in the baldness Sorites is not:

> I think that at least part of the explanation is that, when the crucial last straw is added, something occurs—the breaking of the camel's back—that is altogether different from the mere addition of that final straw. Again, there is no sense in which the camel's back's

> breaking is somehow constituted by (or is nothing over and above or is reduced to) the addition of that final straw…. On the other hand, in the [baldness Sorites] there is—in some sense—*nothing more* to a man's becoming bald than his coming to have the resultant number (and distribution, etc.) of hairs.[116]

Merricks' remarks here can easily be understood as an answer to The Sorites Question. On his proposal, a Sorites series is a puzzle about how F relates to some feature G to which F is reducible.[117] A sharp cut-off in a series of cases ordered by minute differences in G will be implausible, according to Merricks, since the existence of such a cut-off would imply that something's being F is reducible to its being some precise amount of G.

Let *The Grounding Answer* be the answer I proposed in the last section, according to which a Sorites series is a puzzle about the way a grounded feature relates to its grounds. And let *The Reduction Answer* be Merricks' proposal, according to which a Sorites series is a puzzle about the way a reducible feature relates to its reduction-base.

The Grounding Answer differs from The Reduction Answer in an important way. Many advocates of grounding do claim that all grounded entities are somehow "nothing over and above" or are otherwise ontologically innocent relative to their full grounds. Even among those who accept such claims, however, most agree that grounded entities are not all *reducible* to their grounds.[118]

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[116] Merricks 2007, p. 6.

[117] Merricks uses the notions of 'constitution', 'nothing over and above', and 'reduction' interchangeably. I have chosen to flesh out his proposal in terms of reduction, in part, since doing so makes the contrast between his proposal and mine a bit sharper. Moreover, since Merricks takes his proposal to have implications for the view that composite objects are identical with their parts and the view that composite objects are reducible to their parts, it is clear that his focus is on reductive notions of constitution and nothing-over-and-aboveness.

[118] For example, see deRosset 2010; Audi 2012a; Rosen 2010; and Fine 2012. The only exception here is Jenkins 2011, who argues that grounded entities are *identical* with their grounds. Gideon Rosen does accept what he calls the 'grounding-reduction' link, according to which all *reducible* facts are grounded in their

To see why, note that an entity can be both "multiply realizable" and grounded. For example, suppose the fact that I am sad is grounded in certain facts about the activities of my neurons, while the fact that HAL 9000 is sad is grounded in facts about his circuitry. In that case, something's being sad is not *reducible* to facts about neural activity, since something is sad and yet lacks neural activity altogether. Nevertheless, neural activity *grounds* sadness. So sadness is grounded in but not reducible to neural activity. More generally, a feature's being irreducible is compatible with its being grounded.

If The Reduction Answer is correct, however, then no irreducible feature is Sorites-susceptible. If The Grounding Answer is correct, on the other hand, then a feature's being irreducible does not automatically render it non-Sorites-susceptible. For The Grounding Answer requires that a feature be *grounded* and not that it be reducible. And, as we have just seen, a feature can be both irreducible and grounded.

That The Grounding Answer and The Reduction Answer have different implications helps us to see that they really are different answers to The Sorites Question. It also helps us to see why The Grounding Answer is preferable to The Reduction Answer. For some irreducible features are Sorites-susceptible. Indeed, one such feature—color—is the focus of a paradigmatic Sorites series.[119]

Consider the "patch Sorites". In the first case, the cloth patch is a bright and clear shade of crimson. In each subsequent case, the same cloth patch is dyed just an indiscernibly darker shade of crimson. In the final case, the patch is completely jet black. At the beginning of the series, the

reduction-bases. However, he is clear that not every grounded fact is reducible to its full grounds. See Rosen 2010.

[119] See Raffman 2012.

patch is clearly red. Yet, at the end of the series, the patch is clearly not red. At some point in between, there is a transition between the red cases and the not red cases. It is—at least arguably—implausible that there is a sharp cut-off somewhere in the series. So there must be a period during which it is vague whether the patch is red.

The patch Sorites is a genuine Sorites series for redness. However, the patch's being red is not reducible to its being some particular shade of crimson, or even its being some range of shades. After all, the patch would still be red if it were dyed scarlet, rather than crimson—there are many different ways for something to be red. So the patch Sorites does not involve a reducible feature and its reduction base. Yet The Reduction Answer says that every Sorites series involves a reducible feature and its reduction base. So The Reduction Answer is false.

The Grounding Answer, on the other hand, does not rule out the genuine Soriticality of the patch series. For, plausibly, the patch's being red is grounded in—despite not being reducible to—its being crimson, among various other possible shades of red. And since crimsonness is a matter of degree, it is possible to construct a little-by-little series. And so long as whatever grounds the facts about what grounds redness is not fine-grained enough to select a sharp cut-off point, the patch series is a genuine Sorites series.

V. The Composition Series

Restricted composition is the thesis that some things compose a further object, while some other things do not.[120] For example, an advocate of restricted composition might hold that some particles

[120] Advocates of restricted composition include Korman 2015, Markosian 1998, Merricks 2001 and 2005, and van Inwagen 1990.

arranged in the shape of a seated human organism compose something, while your head and the Eiffel Tower do not compose anything. Restricted composition is the mean between two opposed positions—unrestricted composition, according to which any things whatsoever compose something, and nihilism, according to which composition never occurs.[121]

Theodore Sider argues that if composition is restricted, then there can be a Sorites series for composition. First, suppose that composition is restricted, that some things compose while some other things do not. Then imagine a case in which some particles clearly compose something, say, your living body. Next, imagine a case in which those particles clearly do not compose anything, for example, a case in which they are spread out across the galaxy. Finally, imagine a continuous series of cases linking the first case and the last case. Sider explains how this continuous series is structured:

> …[E]ach case in the series is extremely similar to its immediately adjacent cases in all respects that might be relevant to whether composition occurs: qualitative homogeneity, spatial proximity, unity of action, comprehensiveness of causal relations, etc.[1]

Call this the *composition series*—a little-by-little series involving composition. If composition is restricted then, Sider claims, such a composition series is possible.

Sider also argues that such a composition series would be a genuine Sorites series for composition. For, he argues, it is implausible that there is a sharp cut-off in the composition series between the cases in which composition clearly occurs and the cases in which composition clearly does not occur:

[121] Advocates of unrestricted composition include Lewis 1986, Rea 1998, and Sider 2001. Advocates of nihilism include Unger 1979 and Sider 2010.

> What I object to is a sharp cut-off in a continuous series of cases of *composition* [i.e. a composition series]. To postulate such a sharp cut-off would be to admit that the realm of the macroscopic is in some sense 'autonomous' of the microscopic. By 'autonomous' I do not mean 'non-supervenient,' since accepting a sharp cut-off in a continuous series of cases of composition does not threaten supervenience. Rather I mean that there would seem to be something 'metaphysically arbitrary' about a sharp cut-off in a continuous series of cases of composition. Why is the cut-off here, rather than there? Granted, everyone must admit *some* metaphysically 'brute' facts, and it is a hard question why one brute fact seems more or less plausible than another. Nevertheless, *this* brute fact seems particularly hard to stomach.[122]

Sider says that sharp cut-off in the composition series would be "metaphysically arbitrary," since it would commit us to the existence of a "brute fact" that is particularly "hard to stomach." And it is clear from the surrounding context which brute fact Sider has in mind. He thinks a sharp cut-off in the composition series would commit us to a brute *composition* fact—at some point in the particles in the series compose something, but their composing something is a brute fact. Since brute composition facts are particularly hard to stomach, Sider concludes, there is no sharp cut-off in the composition series. That is, Sider concludes that the composition series is a genuine Sorites series for composition.

So Sider claims that if composition is restricted, then there can be a Sorites series for composition. This conditional claim is the first premise in a well-known argument against restricted composition, the so-called *Vagueness Argument*.[123] Here it is:

The Vagueness Argument

(1) If composition is restricted, then there can be a Sorites series for composition.

[122] Sider 2001, p. 124.
[123] Lewis 1986 pp. 212-213, Sider 2001 pp. 120-139, and van Inwagen 1990.

(2) If there can be a Sorites series for composition, then it can be vague whether composition occurs.

(3) If it can be vague whether composition occurs, then it can be vague how many objects there are.

(4) It cannot be vague how many objects there are.

(5) Therefore, composition is not restricted.

We have already seen the main defense of Premise 1—Sider's composition series defense. Premise 2 says that if there can be a Sorites series for composition, then it can be vague whether composition occurs. Premise 2 thus needs little defense. For, in general, the possibility of a genuine Sorites series for F is sufficient for F to be vague.

Premise 3 says that if it can be vague whether composition occurs then it can be vague how many objects there are. Consider the first case in Sider's composition series, where the particles clearly compose something. Suppose there are n particles. Let object O be the thing those n particles compose. And suppose that, in this first case, there are no other concrete objects besides the n particles and object O. So, in this first case, precisely n+1 things exist. At some point in the series, however, it is vague whether the particles compose something. So, during this period in the series, it is vague whether object O exists. So, during this period, it is vague whether there are just n things or whether there are n+1 things. That is, it is vague how many objects there are.

Premise 4 says that it cannot be vague how many objects there are. Again, Sider offers the most sustained defense of Premise 4. That defense begins with the so-called "linguistic" theory of vagueness, according to which all vagueness is ultimately due to human language and thought. For example, the vagueness infecting the fact that Peter is bald is linguistic because that vagueness is

ultimately due to facts about how we use the term 'bald' and its non-English equivalents. According to the linguistic theory of vagueness, all vagueness is relevantly like the vagueness infecting the fact that Peter is bald.[124]

Sider's defense assumes that the linguistic theory of vagueness is true. Given the linguistic theory, it can be vague how many objects there are only if some numerical sentence—some sentence of the form "there are n objects"—can be vague. However, numerical sentences can be expressed in perfectly precise logical vocabulary, using only the existential quantifier, variables, and numerical identity. So no numerical sentence can be vague. Thus, Sider concludes, it cannot be vague how many objects there are.[125]

Then it could be vague whether something, say object O, exists only if its being vague whether object O exists is ultimately due to vagueness in the sentence 'O exists.' But the sentence 'O exists' is not vague. After all, there is a translation of that sentence which makes use of only the precise vocabulary of first-order logic—the existential quantifier, a proper name, and identity. So if it is vague whether O exists then that vagueness is not ultimately due to vagueness in our language and thought. Therefore, it is not vague whether O exists. More generally, given the linguistic theory of vagueness, it can never be vague whether something exists.

Those are the main defenses of Premises 1-4 of the Vagueness Argument against restricted composition. I shall focus on Sider's defense of Premise 1. Sider claims that the composition series is a genuine Sorites series for composition. The Sorites Question asks what it is for a series of cases to be a Sorites series. And I have defended an answer to The Sorites Question—The Grounding Answer. So The Grounding Answer can help us determine whether the composition series really is a Sorites series for composition.

[124] Defenders of the linguistic theory include Fine 1975, Keefe 2000, and Lewis 1986.
[125] Sider 2001 pp. 126-130.

The Grounding Answer says that a series is a Sorites series for F *only if* F is a grounded rather than fundamental feature. Thus, the composition series is a Sorites series for composition only if composition is a grounded rather than fundamental feature. Now, some philosophers do deny that composition is grounded. For example, Ned Markosian defends the thesis of "brutal composition," according to which, for any xs, if the xs compose something then the fact that the xs compose something is a brute or fundamental fact.[126] Thus, if brutal composition is true, then the composition series is not a genuine Sorites series for composition and Sider's defense of Premise 1 fails.

Sider and Markosian both point out that Sider's defense of Premise 1 fails if brutal composition is true.[127] Thus Sider says that one could embrace sharp cut-offs in the composition series if one were prepared to also embrace "brute" composition facts. And Markosian makes a similar point, counting this as an advantage of the thesis of brutal composition. Sider and Markosian simply part ways on whether brute composition facts really are "particularly hard to stomach."

However, if The Grounding Answer is correct, even the falsity of brutal composition does not guarantee that the composition series is a genuine Sorites series. That is, even if the composition facts are all grounded, the composition series might not be a genuine, vagueness-inducing Sorites series.

To see this, begin by supposing that composition is grounded in the following sense: for any xs, if the xs compose something, then there is some non-mereological fact or facts that grounds the xs' composing something. And then suppose that composition is grounded in one or more of

[126] Markosian 1998.
[127] Markosian claims the availability of this response as an advantage for the thesis of brutal composition over rival versions of restricted composition. See Markosian 1998, pp. 237-240.

the non-mereological facts that order Sider's composition series, such as qualitative homogeneity, spatial proximity, unity of action, and comprehensiveness of causal relations.

The Grounding Answer says that a series S is a Sorites series for F only if the facts about how F is grounded—the "F grounding facts"—are themselves grounded rather than fundamental. So the composition series is a genuine Sorites series for composition only if the facts about how composition is grounded—the "composition grounding facts"—are themselves grounded rather than fundamental. And, conversely, if the composition grounding facts are fundamental, then the composition series is not a genuine Sorites series for composition.

To see this, consider what is implied by a sharp cut-off in the composition series. If the composition facts are grounded in non-mereological facts, then a sharp cut-off in the composition series would imply that the xs' standing in precisely n degrees of spatial proximity, having precisely such-and-such amount of causal unity, etc. grounds their composing something, while their standing in minutely less degrees of spatial proximity or having minutely less causal unity, etc., does not ground their composing something.

Thus a sharp cut-off in the composition series implies a corresponding sharp cut-off with respect to the facts about what grounds composition's occurrence. But *why* or in virtue of what, one might wonder, should this precise degree of spatial proximity, casual unity, or whatever, ground composition's occurrence? If the composition grounding facts are fundamental, then there is *nothing* in virtue of which these precise non-mereological facts rather than minutely different ones ground composition's occurrence. That's just how things are—these non-mereological facts ground composition, end of story.

Recall that, according to the orthodoxy about grounded, every grounding fact is grounded rather than fundamental. For most advocates of the orthodoxy endorse the following thesis:

The Grounding Grounding Thesis: for any x and any y, if x grounds y then the fact that x grounds y is itself grounded.

If the Grounding Grounding Thesis is true, then *every* grounding fact is grounded. So, if the Grounding Grounding Thesis is true, then the composition grounding facts are grounded rather than fundamental.

In Section V of Chapter 2 I argued that the Grounding Grounding Thesis is false. Thus I argued that at least some grounding facts are fundamental. Moreover, I went on to suggest that the composition grounding facts are good candidates for fundamental grounding facts. As I argued above, if the composition grounding facts are fundamental then the composition series is not a genuine Sorites series for composition. Therefore, I conclude, the composition series is not a genuine Sorites series for composition. So Sider's defense of Premise 1 fails.

I have just proposed a new strategy for resisting Sider's defense of Premise 1 of the Vagueness Argument, a strategy that flows from the conditions laid out in The Grounding Answer. It is worth noting that this new strategy has some advantages over the various extant reactions to the Vagueness Argument. The extant reactions to the argument fall into three broad categories.

First, some philosophers endorse each of the argument's premises and so reject restricted composition. Some of these philosophers then embrace the thesis of unrestricted composition. However, unrestricted composition has counterintuitive results—for example, it implies that there is an object that has your left foot and my nose as parts. Others turn to nihilism, according to which composition never occurs. Of course, nihilism has counterintuitive results as well—for example,

it implies that there is no human organism sitting in your chair right now, breathing through your nose, and reading this paper.

Second, some philosophers deny Premise 4, which says that it cannot be vague how many objects there are. These philosophers agree with Sider that if the linguistic theory of vagueness is true then it cannot be vague how many objects there are. They simply choose to reject the linguistic theory of vagueness. Some vagueness, these philosophers claim, is "ontic" or "metaphysical" vagueness, vagueness that is not entirely due to human language and thought. However, the ontic or metaphysical vagueness strikes many as objectionably obscure and mysterious. So this reaction to the Vagueness Argument has its own cost.[128]

Finally, some philosophers deny the argument's first premise. They hold that there can be no Sorites series for composition, even if composition is restricted. For example, Ned Markosian denies that there can be a Sorites series for composition because he thinks that the composition facts are brute or fundamental. Relatedly, Trenton Merricks holds that there can be no Sorites series for composition—even if composition is restricted—because he claims that composite objects possess fundamental causal powers, over and above the powers of their constituent parts.[129]

It would be nice if we were not forced to accept *either* counterintuitive results about which composite objects there are, or ontic vagueness, or fundamental composition facts. The response I have proposed in this section allows us to avoid all three of these costly options, if we want to. For my response is consistent with our intuitions about which composite objects there are, it is

[128] Cameron 2010, Barnes & Williams 2010, van Inwagen 1990.

[129] Merricks 2005. It is worth noting that The Grounding Answer says nothing at all about the fundamentality or irreducibility of the causal powers of composite objects. If The Grounding Answer is correct, then whether composition is Sorites-susceptible hangs entirely on whether the composition facts are grounded or fundamental. But there is no reason to think that a composite object's having irreducible or fundamental causal powers is incompatible with the composition facts themselves being grounded in some more fundamental facts.

consistent with the orthodoxy about the location of vagueness, and it does not postulate fundamental composition facts. It only requires us to accept that some facts about what grounds composition are fundamental.

Chapter 5

Grounding and Debunking

Debunking arguments appear in a variety of philosophical domains, including meta-ethics, the philosophy of mathematics, the philosophy of color, the philosophy of religion, and the metaphysics of material objects. A debunking argument targets our beliefs in the existence of a particular domain of facts—the F-facts—by alleging that the F-facts themselves do not figure in the complete causal explanation of those beliefs. According to the debunker, realizing that the F-facts do not figure in the complete causal explanation "defeats" or undermines whatever initial justification we had for holding those F-beliefs.

This chapter has two goals. Its first goal is to defend a new response to a well-known debunking argument in the metaphysics of material objects, a version of Trenton Merricks' Overdetermination Argument against inanimate composite objects. My response to this argument relies on the thesis of priority pluralism, according to which composite objects are metaphysically grounded in their parts and how those parts are arranged.

This chapter's second goal is more general. If I am right about *why* priority pluralists can avoid the threat of debunking in the domain of material object metaphysics then, so I shall argue, similar escape routes are available to advocates of grounding theses in other philosophical domains.

I. Overdetermination and Debunking

The debunking version of Merricks' Overdetermination Argument has three premises, validly leading to the conclusion that 'just seeing' (or, more generally, 'just perceiving') an ordinary object is not a good reason to believe that such an object exists: [130]

The Overdetermination Argument

(OD1) If there are tables, our table experiences are both fully causally explained by tables and fully causally explained by atoms arranged table-wise.

(OD2) If so, then tables merely overdetermine our table experiences.

(OD3) If so, then having a table experience is not a good reason to believe in tables.

(OD4) Therefore, if there are tables, having a table experience is not a good reason to believe in tables.

In defense of OD1, suppose there is a table here, holding up a cup. The table is causing the cup to be held up. But surely the atoms arranged table-wise, the table's atomic parts, are also jointly causing the cup to be held up. That is, the cup's being held up is fully causally explained by the atoms arranged table-wise, working in concert. More generally, if the table exists, *every* effect it causes is actually fully causally explained by the joint work of some atoms arranged table-wise. Our table experiences are among the putative causes of tables. Therefore, if there are tables, our

[130] Few discussions of The Overdetermination Argument interact with it as a debunking argument. However, Merricks makes clear in Merricks 2001, p. 74, Merricks 2003, and in his recent Merricks 2016 that this is indeed how The Overdetermination Argument should be understood. Korman 2016 contains the only sustained interaction with the Overdetermination Argument as a debunking argument.

table experiences are fully causally explained by tables and fully causally explained by the joint work of some atoms arranged table-wise.

In defense of OD2, first note that the table and the atoms arranged table-wise are numerically distinct entities. Plausibly, if two numerically distinct entities x and y fully causally explain the same effect E, then either entity x causes entity y to cause E or else entity y causes x to cause E or else entities x and y overdetermine E.[131] But the table does not cause the atoms to cause my table experiences, and the atoms do not cause the table to cause my table experiences. Therefore, if the atoms arranged table-wise and the table both independently fully cause my table experiences then those experiences are overdetermined by the table.

In defense of OD3, suppose that my table experience is causally overdetermined by the table and the atoms arranged table-wise. Then my table there is a complete and satisfying causal explanation of why I seem to see a table, which does not mention the existence of a table. That complete explanation simply cites the causal activities of some atoms arranged table-wise. And if there is such a complete explanation of my table experiences that does not mention tables, then having a table experience is surely not a good reason for me to believe that there is a table.

To see this, consider the following analogy. Suppose my visual experience as of a table is actually fully caused by the activities of a Cartesian demon, rather than by atoms arranged table-wise. Surely, in that case, my having a visual experience as of a table is not a good reason for me to believe that there is a table. In fact, in that case, my having a visual experience as of a table is not a good reason for me to believe that there is a table *even if* the table actually exists. Likewise, if my visual experience is actually fully causally explained by the joint work of some atoms

[131] See Merricks 2001, p. 58 for his definition of overdetermination.

arranged table-wise, then (even if the table exists) having that experience is not a good reason for me to believe that the table exists.

The conclusion of the Overdetermination Argument, OD4, is that, if there are tables then having a table experience is not a good reason to believe in tables. Of course, if there are no tables, then having a table experience is not a good reason to believe in tables. But either there are tables or there are no tables. It follows that, whether or not there are tables, having a table experience is not a good reason to believe in tables. And, Merricks adds, there are no other good reasons—perceptual, philosophical, or otherwise—for believing in tables. Therefore, there are no good reasons to believe in tables.

Before laying out my response to the Overdetermination Argument, I am going to show how it can be strengthened in order to bypass a popular objection. Doing so will allow us to focus on what is most important about the argument, namely, its debunking force.

II. The Overdetermination Argument without 'Overdetermination'

OD2 says that if our table experiences are fully causally explained by tables and our table experiences are fully causally explained by atoms arranged table-wise then tables merely *overdetermine* our table experiences. And Merricks' defense of OD2 proceeds by laying out some conditions for when two or more entities count as overdetermining some effect, and then arguing that the table and the atoms arranged table-wise meet those conditions.

As a result, much subsequent discussion of the Overdetermination Argument has focused almost exclusively on the truth of OD2. According to one common form of objection, two distinct

entities can overdetermine some effect only when those two entities are sufficiently metaphysically distinct from one another. However, the objection goes, composite objects and their parts are not distinct from one another in the right way and therefore cannot genuinely overdetermine any effect.[132]

For example, Amie Thomasson argues that if the existence of one entity analytically implies the existence of the other, then the two cannot genuinely overdetermine an effect. Moreover, she argues, the existence of atoms arranged table-wise analytically entails the existence of tables. Therefore, she concludes, when the table and its constituent atoms both cause an effect E, the table and its atoms are not thereby overdetermining E.[133]

Objections of this form do raise interesting questions about how best to distinguish genuine overdetermination from mere pseudo-overdetermination. However, Merricks can completely side-step this style of objection by reframing the Overdetermination Argument in a way that completely drops any mention of the term 'overdetermination.' Here is a version of the argument that does just that:

The Revised Argument

(RA1) If there are tables, our table experiences are fully causally explained by tables and our table experiences are fully causally explained by atoms arranged table-wise.

(RA2) If so, then having a table experience is not a good reason to believe in tables.

[132] For example, Sider 2003, Thomasson 2007, and Schaffer 2010a all defend versions of this objection.
[133] Thomasson 2007, Chapter 1.

(RA3) Therefore, if there are tables, having a table experience is not a good reason to believe in tables.

RA1 is the same as the first premise of the original Overdetermination Argument. As a result, it can be given the same style of defense—it appears that everything every inanimate composite object causes, including our perceptual experiences, can also be completely causally explained by the joint work of its atomic parts.

RA2 says that if our perceptual experiences as of tables are fully casually explained by the joint work of atoms arranged table-wise in addition to the causal work of tables, then having such an experience is not a good reason to believe in tables. The defense of RA2 mirrors the defense of the third premise of the original Overdetermination Argument—if our perceptual experiences are caused by something other than tables themselves then, as in the evil demon case, those experiences cannot be good reasons to believe in tables.

Note that RA2 is completely silent on the question of whether this constitutes a case of genuine overdetermination or rather some harmless, ersatz form of overdetermination. Indeed, the word 'overdetermination' appears nowhere in the Revised Argument. As a result, the Revised Argument, unlike the original Overdetermination Argument, is immune to objections based solely on distinguishing between genuine and harmless overdetermination.

In the rest of this paper, I shall argue that RA2 is false. The mere fact that our table experiences are completely explained by the causal activities of atoms arranged table-wise, so I shall argue, in no way renders those experiences bad reasons to believe in tables. The next section will be a warm up for my main argument, which I will present in Section IV.

III. A Lesson from Composition as Identity

Consider the following scenario. I have a visual experience as of Hesperus, in the morning sky. On the basis of having this experience, I form the belief that Hesperus is in the morning sky. But now consider the following fact: everything Hesperus causes is in fact fully causally explained by *Phosphorus*. As a result, my visual experience as of Hesperus is fully causally explained by the work of Phosphorus.

Pretty clearly, the fact that Phosphorus is fully causally responsible for my visual experience as of Hesperus does not render that experience a bad reason to believe that Hesperus is in the morning sky. For Hesperus is identical with Phosphorus. *What it is* for Hesperus to cause me to have a visual experience just is for Phosphorus to cause me to have that experience. Because of this, Phosphorus' fully causally explaining my visual experience does not in any way undermine my perceptual reasons for believing that Hesperus is in the morning sky.

According to RA2, if our perceptual experiences as of ordinary objects are fully explained by atoms arranged in certain ways, then those experiences are not good reasons to believe in ordinary composite objects. However, now consider the controversial thesis of 'composition as identity.' According to composition as identity, composite objects are literally identical with their parts. [134] So, for example, the table is literally identical with the atoms arranged table-wise. If composition as identity is true, then Premise 3 of the Revised Argument is false.

[134] See Baxter 1988 for the 'strong' version of composition as identity I have in mind here. Lewis 1991 defends a weaker version of that thesis, according to which composition is simply analogous to identity.

To see this, suppose that composition as identity is true. So suppose, among other things, that the table is identical with the atoms arranged table-wise. Now suppose that I have a visual experience as of a table. Finally suppose that the atoms arranged table-wise actually fully causally explain my visual experience as of the table. However, since the table is identical with the atoms arranged table-wise, *what it is* for the table to cause me to have a visual experience as of the table is for the atoms arranged table-wise to cause me to have that experience. So the fact that the atoms arranged table-wise cause me to have a visual experience as of a table could no more undermine my perceptual reasons for believing in the table than facts about Phosphorus' causal activities could undermine my perceptual reasons for believing that Hesperus is in the morning sky.

IV. Grounded Composites and Debunking

I hope you agree that the truth of composition as identity would undermine RA2. For although composition as identity is relatively unpopular, the thesis that composite objects are metaphysically grounded in their composing parts is relatively popular.[135] And I think advocates of the latter thesis can use a similar strategy as advocates of composition as identity to resist RA2.

Consider the following plausible claims about how a table, if it exists, is related to its atomic parts, the atoms arranged table-wise. First, the existence and features of the table supervene on the existence and features of the atoms arranged table-wise. Second, the existence of the table is non-causally explained by the existence the atoms arranged table-wise. Plausible claims like these lend support to the following view about the relationship between an object and its parts

[135] See Cameron 2014 for a helpful comparison of some of the similarities and differences between composition as identity and the view that composites are grounded in their parts.

attractive: composite objects like tables are *grounded in* their composing parts and the way those parts are arranged.[136]

If composite objects are grounded in their parts, then there is also a *generic essential-connection* between the existence of composite objects and the existence and arrangement of their composing parts. For example, if tables are fully grounded in atoms arranged table-wise, then it is essential to being a table that if a table exists then there are some atoms arranged table-wise. In other words, part of *what it is* to be a table is to be such that there are some things arranged table-wise.

Moreover, if composite objects are grounded in their parts, there is also a generic essential connection between certain properties of composite objects and the properties of their composing parts. For example, suppose that the table weighs 50lbs. Of course, the table's composing parts, the atoms arranged table-wise, also jointly weigh 50lbs. Plausibly, it is essential to the table's weighing 50lbs that there be some atoms arranged table-wise that jointly weigh 50lbs. In other words, part of *what it is* for the table to weigh 50lbs is for there to be some atoms arranged table-wise that weigh 50lbs.[137]

More generally, where a composite object O has property F and its composing parts jointly exemplify the very same property F, it is essential to O's being F that there be some appropriately

[136] In addition to being supported by these plausible claims about supervenience and explanation, this view has widespread acceptance. Proponents of grounding, for example, often list parts and wholes as paradigmatic relata of the grounding relation. See Correia and Schnieder's 2012, p. 1; Schaffer 2012a, p. 122; Trogdon and Bliss, 2014. Moreover, Ross Cameron has recently defended the view that composition relation just is a species of the grounding relation. See Cameron 2014.

[137] This is why, if you put the table weighing 50 pounds and its atomic parts collectively weighing 50 pounds together on a scale, the scale registers only 50 pounds. For although the table and the atoms arranged table-wise both token the property of weighing 50 pounds, part of *what it is* for the table to weigh 50 pounds is for the atoms to jointly weigh 50 pounds.

arranged atoms that jointly have property F. In other words, it is part of *what it is* for O to be F that there be some appropriately arranged things that are also F.

This principle has an important result for the causal properties of composite material objects. Suppose a baseball strikes a window, causing it to shatter. As Merricks argues, the baseball's composing parts, the atoms arranged baseball-wise, also cause the window to shatter. Given that composite objects are grounded in their composing parts, it follows that it is essential to the baseball's causing the window to shatter that there are some atoms arranged baseball-wise that also cause the window to shatter. That is, it follows that part of *what it is* for the baseball to cause the window to shatter is for there to be some atoms arranged baseball-wise that cause the window to shatter.

In earlier chapters of the dissertation, I argued that no grounded entity is ontologically innocent relative to or "nothing over and above" its full grounds (Chapter One). I also argued that there is at least one fundamental or ungrounded fact about every grounded entity (Chapter One, Section VI). It is worth mentioning that these two conclusions are perfectly compatible with the above theses about generic essential connections composites and their composing parts.

First, the claim that there is a generic essential connection between the table's existence and the existence of its composing parts is compatible with Chapter One's conclusion that the table's being an addition to being over and above those composing parts. For the essence of the table may not be *exhausted* by the fact that there are some atoms arranged table-wise. In other words, it might be only *part* of its essence that there are some atoms arranged table-wise.

Such a generic essential connection between the existence of the table and its composing parts is also compatible with Chapter One, Section VI's conclusion that there is a fundamental fact

about the table. For example, it is compatible with Chapter 3's claim that there is a fundamental building fact about the table, such as the fact that the table is composed of some atoms appropriately arranged. Indeed, this fundamental building fact may be an additional constituent in the table's essence, alongside the fact that there are atoms arranged table-wise.

Second, the generic essential connection between certain of the table's properties and certain properties of the table's composing parts is also compatible with the dissertation's earlier results. It is compatible with Chapter One's conclusion that the table's being an addition to being over and above those composing parts. For although the fact that the atoms arranged table-wise cause an effect E is a *part* of the essence of the fact that the table causes effect E, the former fact may nevertheless *exhaust* the latter's essence. So former fact may still be an addition to being over and above the latter.

Such a generic essential connection between the properties of the table and those of its composing parts is also compatible with Chapter One Section VI's conclusion that there is at least one fundamental fact about every grounded entity. As I argued in Chapter 3, there is still a fundamental building fact about the table's causing E, such as the fact that it is *realized* by the atoms arranged table-wise jointly causing E. Indeed, that fundamental building fact may be a part of the essence of causal facts about the table.

Note that essence facts—despite being expressible using the "what-it-is" locution—are not facts about metaphysical explanation. For example, the fact that it is essential to the table's causing E that the atoms arranged table-wise E is not identical with the fact that the table's causing E is fully metaphysically explained by the atoms arranged table-wise causing E.

The arguments of Chapters One through Three *are* incompatible with the claim that the table's causing E is metaphysically explained by the atoms arranged table-wise causing E. For the atoms arranged table-wise also fully ground a set, set S, containing them and only them. Yet set S, unlike the table, does not cause E. So although the table's causing E is not *explained* completely by the atoms arranged table-wise causing E, there is still an essential connection between the former and the latter.

We can now return to the Revised Argument. Suppose that the atoms arranged table-wise fully causally explain my having a visual experience as of a table. If composite material objects are fully grounded in their composing parts and how those parts are arranged, then this fact about the causal activities of the atoms does not render my visual experience a bad reason to believe that the table exists.

For it is essential to the table that, if it exists, then there are some atoms arranged table-wise here as well. In other words, part of *what it is* for there to be a table here is for there to be some atoms arranged table-wise here.

Moreover, for any effect E, it is essential to the table's causing E that there are some atoms arranged table-wise that cause E. Thus, is essential to the table's thus causing that experience that there be some atoms arranged table-wise causing that same experience. In other words, part of *what it is* for the table to cause me to have a visual experience as of the table is for some atoms arranged table-wise to cause me to have that experience.

More generally, if composite material objects are fully grounded in their composing parts, then part of *what it is* for any given object to cause certain visual experiences is for its composing parts to cause those experiences. Premise 3 of the Revised Argument says that if atoms arranged

in certain ways are causally responsible for our visual experiences as of composite objects then those experiences do not count as good reasons to believe in composite objects. If you were convinced by the last section's argument that composition as identity renders RA2 false, you should also think that composite objects' being grounded in their parts renders RA2 false.

If you aren't yet convinced, perhaps the following analogy will help. Suppose I have a visual experience as of a red ball, sitting before me. On the basis of this red ball experience, I then come to believe that there is a red ball. However, now consider the following fact: my red ball experience is fully causally explained by the ball's being a particular shade of red, namely, crimson. This fact, it should be relatively uncontroversial, does not render my visual experience a bad reason for me to believe that the ball is red. Why not?

Crimson is a determinate of the determinable property of redness. In general, determinable properties are grounded in or obtain in virtue of their determinates. So, for example, something is red in virtue of its being crimson, or scarlet, or magenta. Moreover, if an object's having a determinable property causes an effect, that effect is caused in virtue of the object's having a particular determinate of that property. So, for example, something's being red causes an effect E in virtue of its being crimson causing E.

In the above case, the ball's being red is grounded in or obtains in virtue of its being crimson. This entails, among other things, that part of *what it is* for the ball's being red to cause me to have a red ball experience is for the ball's being crimson to cause me to have that experience. That is why, plausibly, the fact that my red ball experience is fully causally explained by the ball's being crimson does not, all by itself, render that experience a bad reason for me to believe that the ball is red.

Recall that Premise 3 of the Revised Argument relied in part on the following line of thought. If my visual experience as of a table is fully causally explained by the work of an evil demon, then having that experience is not a good reason for me to believe that the table exists. But some atoms arranged table-wise are relevantly analogous to the evil demon. And so, if my visual experience as of a table is fully causally explained by the joint work of some atoms arranged table-wise, then that experience is not a good reason for me to believe that the table exists.

We are now in a position to see that the demon is not, after all, relevantly analogous to the atoms arranged table-wise. For the table, if it exists, is grounded in or exists in virtue of the atoms arranged table-wise. So part of *what it is* for the table to cause me to have a table experience is for those atoms to cause me to have that experience.

On the other hand, if the table exists, it is obviously not grounded in the evil demon. And, more generally, it is obviously not the case that—in any sense—part of *what it is* for the table to cause me to have a visual experience as of a table is for the demon to cause me to have that experience.

This difference explains why my table experience would be rendered a bad reason to believe in tables if it were caused by the activities of a demon, but would not be rendered a bad reason to believe in tables if it were caused by the activities of some atoms arranged table-wise.

V. Debunking Arguments in General

At the core of Merricks' Overdetermination Argument—both in its original and revised form—is the idea that a particular kind of concession always constitutes a defeater:

> **Explanation**: if S believes that her F-beliefs are fully causally explained by a set of facts numerically distinct from the F-facts, then S thereby has a defeater for her F-beliefs.[138]

If the arguments of this paper succeed, however, then Explanation is false.

To put the point in the language of defeaters and defeat, I have argued that we can concede that our table beliefs are fully causally explained by facts that are numerically distinct from the table facts, namely, facts solely about atoms arranged table-wise, without thereby gaining a defeater for our table beliefs. In particular, we can avoid getting a defeater for our table beliefs if we also hold that the table facts are metaphysically grounded in facts about atoms arranged table-wise.

Other debunking arguments, such as the evolutionary debunking arguments in metaethics, also rely on Explanation. For example, an evolutionary debunker might offer the following debunking explanation of our belief that we are obligated to behave altruistically: it was adaptively advantageous for our evolutionary ancestors to believe that they should behave altruistically, and so we are disposed to have pro-altruism beliefs when we encounter situations in which other people are in harm's way. Once we have accepted this explanation of our moral beliefs, we have thereby

[138] Versions of this principle are formulated by Korman forthcoming and Locke 2014.

accepted that our moral beliefs are fully explained by a non-moral facts. And so, via Explanation, we thereby have a defeater for our moral beliefs.

However, consider a metaethical thesis we can call 'priority naturalism,' according to which moral facts are fully metaphysically grounded in, but are neither identical with nor completely reducible to, certain natural facts.[139] It is of course a substantive and controversial question *which* natural facts fully ground the moral facts. But it is plausible that, however the priority naturalist answers this question, there will be significant overlap between the natural facts that fully ground the moral facts and the various natural facts that feature in the debunker's explanation of our moral beliefs.

For example, consider a version of priority naturalism on which the facts about the survival and flourishing of individual human beings and of human communities serve as the grounds of the moral facts.[140] These are precisely the sorts of facts that feature in the debunker's explanation of our moral beliefs. We believe we should behave altruistically toward others because it was adaptively advantageous for our evolutionary ancestors to hold and act on such beliefs when the survival or flourishing of the members of their communities were at risk.

Sure enough, by the lights of this priority naturalist, her moral beliefs are fully causally explained by non-moral facts. But since some of those non-moral facts are, by her lights, the very grounds of the moral facts, she does not receive a defeater for her moral beliefs. For, she can reason, she has not been given any reason to think that her moral beliefs are modally insensitive

[139] Gideon Rosen formulates what I'm calling priority naturalism in Rosen 2010 and Rosen forthcoming.
[140] Enoch 2010, Section 5.3 defends such a view.

to the moral facts. Neither has she been given any reason to think that it would be a massive coincidence if her moral beliefs were true.

So the Explanation principle underlying the debunking arguments is false. But perhaps a principle in the same neighborhood is true. For example, perhaps the following principle is true:

> **Explanation 2.0**: if S believes that her F-beliefs are fully causally explained by a set of facts that are both (1) numerically distinct from the F-facts and (2) are not such that, if there are F-facts, then they give ground to the F-facts, then S has a defeater for her F-beliefs.[141]

Suppose I come to believe that my table beliefs are fully causally explained by the activities of a Cartesian demon. Presumably, I neither believe that the table is identical with the demon nor do I believe that the table is grounded in facts about the demon. Thus, Explanation 2.0 correctly predicts that I thereby have a defeater for my table beliefs.

One interesting question, which I will not pursue further here, is whether any of the main views in the metaphysics of material objects or in meta-ethics are susceptible to a debunking argument based on Explanation 2.0. In meta-ethics, perhaps a view on which moral facts are both fundamental and epiphenomenal would qualify. And in material objects metaphysics, perhaps a view on which composite objects are both fundamental and causally redundant would qualify. But neither of these views is common. Perhaps Explanation 2.0 helps explain why.

[141] Versions of this principle are formulated by Korman forthcoming and Locke 2014.

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