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Grounding and explanation

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Grounding and Explanation

*A thesis submitted to King's College London for the degree of
Doctor of Philosophy*

Matthew J. Bodle

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Abstract

This thesis defends the notion of grounding—an explanatory connection of non-causal determination. I present four challenges to developing a systematic theory of grounding, and show that they can be met satisfactorily.

The first challenge is that grounding is unintelligible or uninformative—or at any rate, that its work can be done by more familiar notions. If so, the notion of grounding is not even *prima facie* justified. I argue that grounding is at least as informative as—and, in some respects, more informative than—the more familiar notions it is supposed to supplant. It is necessary because we can express with it certain explanatory relationships which are just inexpressible with weaker notions of determination. My defence of grounding is preferable to extant defences since it is less concessive, requiring fewer assumptions about the nature of grounding.

A key motivation for grounding is that it is an explanatory connection. The second challenge is that the sense in which grounding is a (distinctly) explanatory relation is unclear, wherefore the case for grounding is severely weakened. I motivate a theory of explanation and argue that it comports nicely with the sense in which grounding is explanatory. Moreover, I characterise a new explanatory notion I call *philosophical explanation* with grounding at its core. This notion illustrates the importance of grounding for philosophical methodology generally.

The third challenge is to the internal coherence of grounding theory. A dilemma apparently show that grounding connections can be neither grounded nor ungrounded. Several treatments of this problem already exist, but none is satisfactory. Some imply

implausible explanations. Others require new—dubious—posits. I present a new solution, which offers satisfying explanations but requires no dubious posits. It explains, moreover, why some grounding connections appear to admit of explanation but others do not.

The last challenge is to the usefulness of grounding. While it is an interesting meta-metaphysical posit, it offers little to the metaphysician working on first-order problems. I show how grounding can be fruitfully applied to breaking the deadlock in the debate about laws of nature.

*for Amy,
who always gets her way*

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CHAPTER 1

Introduction

The overarching aim of this thesis is to vindicate the notion of *grounding*.¹ By this I mean that the notion is useful, and that investigation into its nature is worthwhile. It has already become clichéd to say: the notion has caused something of a stir in metaphysics recently. Whether that is because the notion was initially championed by the likes of Kit Fine, or because philosophers sense something genuinely exciting afoot, is hard to say. I happen to think that grounding marks the most significant development in metaphysics since the rehabilitation of necessity. Naturally, as a philosophical notion becomes popular, others tend to push back. We are now seeing some serious criticism from naysayers, led by Jessica Wilson. But the research programme surrounding grounding has barely got off the ground, as it were. If grounding theory is to survive to adolescence, there are some foundational issues we need to address. The subsidiary aims of this thesis are to address those issues.

The purpose of this chapter is first, to get a preliminary handle on the notion of grounding, and second, to say how I plan to address those foundational issues in subsequent chapters.

¹Or ‘ground’. I will use the two terms interchangeably in this thesis. It is interesting to note, but holds no substantive interest, that ‘ground’ is overwhelmingly favoured by operator theorists, while ‘grounding’ is favoured by predicate theorists (see Chapter 3).

1.1 What is Grounding?

1.1.1 Explanation

Some facts hold in virtue of others. Or so philosophers often say. That Xanthippe is a widow holds in virtue of Socrates' having died (Kim 1974). My jumper is red in virtue of being maroon. An act is good in virtue of its bringing about a net gain in utility. The *in-virtue-of* locution is ubiquitous throughout philosophy, and yet is rarely given a second thought. As a systematic account of it, grounding theorists offer *grounding*—a connection of directed, explanatory, non-causal determination. (Cognate phrases—‘makes it the case that’, ‘determines’, ‘depends on’, ‘fixes’, ‘because’—are similarly thought to denote grounding.) Questions of what grounds what, it is further claimed, are central to metaphysics, and philosophy more broadly. Insofar as philosophy has an explanatory task, it is to seek the grounds of the phenomena which interest us.

Its close relationship with explanation is characteristic of grounding. Grounds explain what they ground. A philosopher might ask: why, or in virtue of what, does ‘Kripke’ refer to Kripke? And we might reply that ‘Kripke’ is shorthand for a definite description which uniquely denotes Kripke; that it does so by convention; or that our use of ‘Kripke’ is a part of a causal chain of references tracing back to an initial baptism of Kripke. These explanations are highly non-trivial, of course. Philosophers are not typically interested in trivial grounding claims. But if true, they are explanations nonetheless.

There are homely and obvious examples. That Socrates died *explains* why Xanthippe became a widow. My promising to φ explains why I am obliged to φ . My jumper's being maroon explains its being red. To be sure, in philosophy we might argue about how the determinate-determinable relation works, or what its nature is. Those are non-trivial issues. But it is trivial *that* my jumper is red because it is maroon.

Nor are such explanations confined to layman and philosopher. A physicist might ask in virtue of what the temperature of a gas is t , and it may be replied that this is

because its mean molecular kinetic energy is k . Or she might say that the curvature of spacetime explains gravitational phenomena. Or that graphene is highly conductive because of its flat hexagonal lattice structure.

The explanatoriness of grounding, moreover, is what makes it indispensable. In recent years, philosophers have attempted to capture a general notion of dependence in modal terms, such as supervenience (see Fine 2001; Schaffer 2009; Rosen 2010, cf. Wilson 2014). The dependence of the mental on the physical, for instance, was thought to be captured by a supervenience relation: M depends on P iff necessarily, there can be no change in M without a change in P . The trouble is, what we want to capture is that P *explains* M —but supervenience is not an explanatory relation. To see this, consider that supervenience can hold symmetrically. As Fine (1994) taught us, Socrates exists exactly when {Socrates} does, and thus each supervenes on the other. And yet, we are strongly inclined to say that Socrates explains, or accounts for, the existence of his singleton, and not the other way about. Explanation has a strict directionality which supervenience lacks, and thus requires a directed relation to back it up. But this isn't even the worst problem with supervenience. As Kim (1993) taught us, supervenience is not even of the right character in the first place to be explanatory.

Supervenience itself is not an explanatory relation. It is not a 'deep' metaphysical relation; rather, it is a 'surface' relation that reports a pattern of property covariation, suggesting the presence of an interesting dependency relation that might explain it. (p. 167)

That is, supervenience is a superficial relation. From the fact that one set of properties invariably accompanies another set of properties, it hardly follows that the latter explain the former in any interesting sense—any more than the fact that night always follows day entails that day explains night. Indeed, it is a relation which itself demands an explanation.

1.1.2 Primitivity

The main lesson of Fine (2001), as I understand it, is that we need to give up the obsession with replacing substantive notions of dependence with more hygienic, empiricist-friendly, or simply better-understood notions. For instance, logical, semantic, and modal characterisations of reduction repeatedly fail, and fail in trivial ways. This does not mean that we need to give up notions of dependence. If anything, it indicates that our handle on dependence is more nuanced and fine-grained than these notions allow for. As Fine (*ibid.*, p. 10) says, we need to restore ourselves to a state of ‘metaphysical innocence’ about these notions, in which they are ‘seen to concern the subject matter itself and not the means by which it might be represented or cognized’.

Noting similar failures to capture the idioms of dependence, Rosen (2010) makes an explicit plea for ideological tolerance. He says

We should grant immediately that there is no prospect of a reductive account or definition of the grounding idiom: we do not know how to say in more basic terms what it is for one fact to obtain in virtue of another. So if we take the notion on board, we will be accepting it as primitive, at least for now. . . . I begin with the working hypothesis that there is a single salient form of metaphysical dependence to which the idioms we have been invoking all refer. (pp. 113–114)

Rosen’s central point is that we should grant the notion of grounding—even though we may be unable to define it—and see what we can do with it. If it turns out to be useful, that is vindication enough. If not, we’re no worse off.

Most grounding theorists take on such a working hypothesis.² Part of the grounding theorist’s challenge is to show that ‘ground’ is meaningful. This can be done in several ways (see especially Chapter 2.3). We can specify its logical properties. We can trace its analytic connections with other terms. And we can ostend examples. We have already seen some examples. Let’s look at grounding’s formal properties.

²Though Correia and Skiles (forthcoming) are a notable exception. They define grounding in terms of a generalised notion of identity.

1.1.3 Formal Properties

For the purposes of this section, I'm going to assume that grounding is a relation between *worldly facts* (see Audi 2012b, cf. Rosen 2010).³ A worldly fact is an obtaining state of affairs. An *atomic* state of affairs is an individual entity together with one of its properties. If a is F , then a 's being F is a fact. (Sometimes this is denoted $[Fa]$, but it will usually not be necessary to avail ourselves of this notation.) We can view this as a 'chunk of the world', so to speak, or as something like an abstraction from a . The exact nature of facts will not be at issue in this thesis, but at the very least, the worldly conception of facts entails that facts are not sensitive to difference in sense. If $a = b$ and F denotes the same property as G , then $[Fa]$ and $[Gb]$ denote the same fact. More complex states of affairs, and thus more complex facts, may be built from the atomic states of affairs.

Now, the grounding relation is commonly (but by no means unanimously) thought to have the following properties:

1. **Irreflexivity.** Just as no fact explains itself, so no fact grounds itself.
2. **Asymmetry.** Just as circular explanations are prohibited, so are circles of ground.
3. **Transitivity.** Just as explanations chain, so do relations of ground.
4. **Factivity.** That A explains B entails that A and B are true. Likewise, that A grounds B entails that A and B obtain.
5. **Necessitation.** If A grounds B , then necessarily, if A then B .
6. **Non-Monotonicity.** If A explains B , it does not follow that A and A' explain B . We can't add arbitrary 'premises' to the explanans—they must all be *relevant*. For instance, that snow is white explains why 'snow is white' is true. But it is not the case that snow's being white and grass's being green explains why 'snow is

³The consequences of this assumption are minimal at this point. Those who take grounding to be an operator can encode its formal properties as inference rules in their logic. See Chapter 3.

white' is true. The colour of grass is irrelevant. Grounding is not invariant under the addition of arbitrary grounds.

7. **Hyper-intensionality** Grounding is more fine grained than purely modal notions, such as supervenience. An intensional context is one in which co-referring terms cannot be substituted *salva veritate*. Modal contexts are such contexts. It is necessary that $8 = 8$, but it is not necessary that the number of planets $= 8$. Belief reports induce hyper-intensional contexts. Lois believes that Clark is Clark, but she does not believe that Clark is Superman. Grounding is hyper-intensional in the sense that we can't substitute necessarily co-obtaining facts in grounding claims. That Socrates exists and that {Socrates} exists necessarily co-obtain. But the former grounds the latter, and not the other way about.

These formal properties make grounding particularly well-suited to defining and illuminating a host of related notions.

1.1.4 Structure, Fundamentality, and the Hierarchy

Grounding is sometimes described as 'something like metaphysical causation' (Schaffer 2012, p. 122). Just as causation drives the world forwards through time, so grounding drives the world 'up through levels' (Schaffer 2016b, p. 59). These levels are levels of *fundamentality*. The idea is that the 'low-level' facts—concerning the microphysical, fundamental particles and their properties—occupy the lower levels. Higher up we find the biological—organisms and their properties. (Even higher up we might find social facts.) And these sets of facts may be bridged by facts concerning the chemical—molecules and their properties. We can sum this up with the convenient simplification that biology depends on chemistry, and chemistry depends on physics, and.... The idea is that the higher-level facts are real—they really obtain. But they are fully fixed by the fundamental facts. This is similar to the working hypothesis of non-reductive physicalism: there are mental facts—they are distinct from physical facts. Nevertheless, each mental fact is fully explained by some constellation of microphysical facts.

Grounding thus induces *structure*. Specifically, as a transitive asymmetric (but not connected) relation, grounding induces a strict partial ordering on the domain of facts. A neat example of such an ordering is given by the proper subset relation:

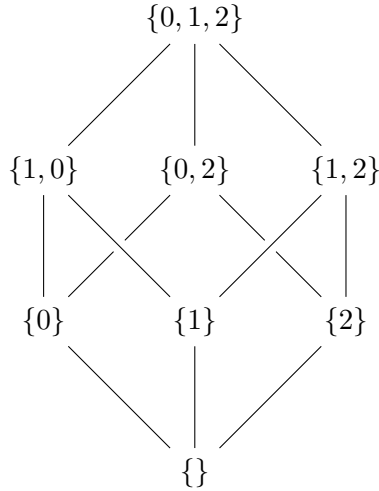


Figure 1.1: A partial ordering

Of course, a grounding structure won't be anything like as well-behaved as this, but the diagram gives a picture of the kind of structure to which grounding gives rise.

The structure induced by grounding is sometimes referred to as the *hierarchy*. Lower down the hierarchy we find the more fundamental facts, and higher up the less fundamental facts. I'm not overly fond of the hierarchical picture. It suggests that the facts are neatly stratified into levels according to their degree of fundamentality. That picture is too idealised. Some theorists (e.g. Cameron 2016; Rettler 2017) like to separate the notions of grounding and relative fundamentality. For instance, Rettler says that an electron in his hand is more fundamental than the Eiffel Tower, but plausibly, no grounding relation holds between them. Now, I'd certainly agree that there is a sense, intuitively, in which electrons are generally more fundamental than towers. But in general, when we separate relative fundamentality from grounding, the notion becomes slippery. Let us say that a pure notion of relative fundamentality induces a weak total order on reality—that is, for any two things x, y : either x is more fundamental than y ; y is more

fundamental than x ; or x, y are equally fundamental. Now consider the window and the table. Which is more fundamental? Who knows. It's not even clear there should be a determinate answer. The best we can do is to say that x is more fundamental than y iff x grounds y (see Schaffer 2009).⁴

Finally, note that the least members of the ordering occupy a privileged position. Nothing grounds them. They are the most fundamental facts in the hierarchy. They are the *absolutely fundamental* facts. That is, x is (absolutely) fundamental iff nothing grounds x . We will defend this understanding of fundamentality in the next chapter.

So there you have it. Grounding is a relation of non-causal determination between facts (or fact-like entities). Grounding is explanatory; grounds explain what they ground. The notion is more useful than supervenience for characterising dependence. It is primitive—we can't define it—but it is useful. And the formal properties of grounding make it well-suited to explicating structure and fundamentality. We will now consider some obstacles to formulating a systematic theory of grounding.

1.2 Foundational Issues

The first issue is how to tackle outright skepticism about the grounding theorist's posit. While others have addressed skeptical worries (Raven 2012, 2017; Schaffer 2016a; Cameron 2016; Berker 2015), my defence of ground is less concessive, and consequently leaves a broader space of possible grounding theories. If I could sum up the skeptic's position, it is that grounding is unexplanatory because it is uninformative. My rejoinder is that the skeptic has mischaracterised the grounding theorist's position. In the course of dispelling the mischaracterisations I show how grounding claims can be informative, and consequently, how grounding gets to be explanatory.

The second issue is the relationship between grounding and explanation. Grounding theorists generally agree that a characteristic feature of grounding is that it is explana-

⁴Note that I could have replaced this definition with the weaker definition that grounding is *sufficient* for relative fundamentality. This would have allowed for the possibility of relative fundamentality between grounding-disconnected facts, without tying the notion to a dubious definition. This would have created a problem for my next definition, however.

tory. But the exact nature of the relationship is rarely spelled out (though Audi 2012b; Schaffer 2016b are exceptions). I relate this problem to the question of how we ought to represent grounding claims—with an operator or a relational predicate? As it turns out, the problems are intimately related. How we choose to represent grounding claims has consequences for the plausibility of certain positions on the relationship between grounding and explanation. I will argue that grounding is irreducibly relational, and so best represented by a relational predicate. While other grounding theorists hold this position, my argument for it is unique. I argue that an operational grounding claim is true, if at all, because it has a relation of ground as a truthmaker. I then use this position to motivate a view on which explanation is an epistemic notion, distinct from the metaphysical dependence relations which ground it. Finally, I characterise a notion I call *philosophical explanation*—explanation by philosophical theory—and show how it relates to metaphysical explanation. The nature of this relationship illustrates the centrality of grounding not just to metaphysics, but to philosophy more broadly. Indeed, on this view the rest of philosophy turns out to be a kind of applied metaphysics.

The third issue is the problem of iterated or meta-grounding: what grounds the grounding facts? There are compelling reasons to doubt that grounding facts are grounded, and compelling reasons to doubt that they are ungrounded. But if neither option is plausible, then the posit of grounding must be misguided. The problem is well known to grounding theorists (Bennett 2011; deRosset 2013; Dasgupta 2015; Litland, forthcoming), but I don't think any treatment is adequate. Bennett and deRosset's accounts imply implausible explanations. Litland's account pushes the problem into his logic, and Dasgupta relies on an extra—controversial—posit. After dismissing some *prima facie* routes to dismissing the problem, and arguing that it is a problem facing all accounts of dependence, I present my own solution. The solution is most similar to Dasgupta's, but it does not rely on any extra posit. I take grounding facts to be grounded in the essence of grounding itself. This has some surprising and welcome consequences, given the primitivity of grounding. On this account, there is, in principle, a ground for every grounding fact, but because the essence of grounding remains partially

unknown to us, we can't always find the required ground—as would be expected, given primitivity.

Now, all this work would be largely beside the point if grounding were not a *useful* notion. But most work on grounding has hitherto focused on theoretical questions about the notion itself. Applications are thin on the ground. It is a fair criticism of the grounding literature that it does not illuminate how we can actually use the notion. The fourth issue, then, is whether, and how, grounding may be deployed in philosophical theorising. The fifth chapter aims to rectify this. I show how the notion of grounding can be used to break the deadlock in the debate between Humeans and non-Humeans about laws. Specifically, I argue that the anti-Humean's central complaint is best articulated as a complaint of grounding gaps—that a Humean ontology is unable to ground what Humeans claim it grounds. If the Humean attempts to close the grounding gap, another one springs up elsewhere. Even if this articulation fails to convince any Humeans, at the very least it sets up the non-Humean's misgivings in a way which is clearly non-question-begging, opening the way for constructive debate.

CHAPTER 2

Grounding Skepticism

2.1 Introduction

One can challenge the notion of grounding in at least two ways. On the one hand, one might challenge the very intelligibility of the notion. Skeptics of this type include Thomas Hofweber (2009) and Chris Daly (2012). Hofweber accepts that there are contexts in which the use of ‘ground’ is reasonably well clear, but denies that in such cases the notion is necessary; its work can be done by better understood notions, such as logical entailment, conceptual priority, or counterfactual dependence. In contexts where its use is unclear, the notion of ground becomes ‘esoteric’. Hofweber’s attack overlaps somewhat with Daly’s, but whereas Hofweber considers the notion ‘esoteric’, Daly thinks it is outright unintelligible. With any primitive term, unless it is clearly deployed in everyday thought, it is difficult to establish definitively that it is intelligible. But here, I think, it is easy enough to shift the dialectical burden. For the grounding theorist has met all mutually agreed criteria for furnishing her primitive with content. Absent a principled reason as to why ground should be considered unintelligible, any attack on its intelligibility just betrays a prejudice against it (which comes across very clearly in Daly’s attack). Thus, my response is not to attempt to convey the content of ‘ground’ (many such attempts already exist), but rather to show that Hofweber and Daly have

given no good reason to think the notion unintelligible.

On the other hand, though one may think questions of metaphysical dependence are intelligible and important, one may yet doubt that ground, conceived as a *generic* notion of dependence, is in any way useful. Skeptics of this type include Kathrin Koslicki (2015) and Jessica Wilson (2014). Koslicki argues that, by obscuring salient and important differences between different types of metaphysical dependence, a generic notion of ground confuses questions of dependence. Wilson holds a similar view, but her argument aims to show that a generic notion of ground is uninformative, leaving open important questions which must be answered in order to get a handle on the nature of the dependence at issue. The upshot of the argument is that ground is not such an admirably explanatory notion—one of its key motivations.

My response to Koslicki is rather swift. I argue that the notion of ground, as a *relation* of dependence, does not obscure putative differences between various forms of dependence, since these differences ought to be attributed to differences in the nature of the *relata*. Wilson’s attack presents the strongest challenge to the grounding theorist to date. As such, the bulk of the chapter will be devoted to rebutting her arguments. Getting bogged down in the details of these arguments will take some time, and may obscure the overall picture. So, to summarise: I argue that grounding claims are appropriately informative, and they allow for follow-up questions which illuminate the nature of the dependence at issue. The logical interaction of specific relations of metaphysical dependence provides reason to think a common relation is at work. Bare grounding claims taken out of context may indeed be unexplanatory, but when embedded within a larger theory, their explanatory role becomes clear. Moreover, it is doubtful that Wilson’s specific relations are able to convey what a grounding claim conveys, particularly regarding the directedness of dependence. Lastly, I compare the grounding framework with Wilson’s primitive fundamentality framework, and argue that the grounding framework is both more expressive, and better characterises fundamentality.

2.2 Grounding is Esoteric

Hofweber (2009) attacks what he takes to be an illegitimate way of doing metaphysics—*esoteric* metaphysics—which he takes grounding to exemplify:

Esoteric metaphysics holds that the questions metaphysics aims to answer involve distinctly metaphysical terms. It is properly called ‘esoteric’, since one needs to understand distinctly metaphysical terms in order for one to understand what the questions are that metaphysics tries to answer. You have to be an insider to get in the door. (ibid. p.267)

The most common way to be an esoteric metaphysician in practice is... [to] rely on a notion of metaphysical priority: some notion that claims that certain facts or things are metaphysically more basic than other facts or things. (ibid. p.268)

This is to be contrasted with *egalitarian* metaphysics:

One conception [of metaphysics] holds that the questions in the domain of metaphysics are expressed in ordinary, everyday terms, accessible to all. We shall call metaphysics so understood *egalitarian metaphysics*. One does not need to understand special metaphysical terms to understand the questions that we are trying to ask in egalitarian metaphysics. The questions are accessible to all, even though not everyone cares equally about finding an answer to them. (ibid. p. 266, emphasis original)

Hofweber is not explicit on what precisely he thinks is wrong with esoteric metaphysics, but we can surmise from the rhetoric¹ what he has in mind. Esoteric metaphysics is the paradigm of ivory tower philosophy, concerned with irrelevant questions and problems philosophers themselves have invented. It is exclusive because only the initiated may participate. And it is arrogant because it considers itself independent from the rest of inquiry.

Hofweber targets his attacks on special primitive metaphysical terminology. Defined terminology, so long as it bottoms out in terms accessible to all, I take it, is fine.²

¹‘Esoteric metaphysics appeals to those, I conjecture, who deep down hold that philosophy is the queen of the sciences after all, since it investigates what the world is REALLY like.’ (p.273). The capitals are supposed to indicate that ‘really’ is being used in a non-standard, special metaphysical sense.

²I base this claim on Hofweber’s contention that, despite appearances, mathematics is a paradigm of an egalitarian discipline, since its terms are explicitly defined by prior terms, going back to terms which are accessible to all.

Moreover, it is only metaphysics which concerns itself with *questions* couched in distinctly metaphysical terminology that is deemed esoteric. Metaphysical *theories* which ‘implicitly define’ special terminology are fine, so long as those theories attempt to answer egalitarian questions. Hofweber offers no reasons for this claim, but it seems the idea goes something like this: introducing special metaphysical terms in an attempt to answer a metaphysical question is akin to introducing theoretical entities in science to attempt to explain some phenomenon. A metaphysical theory which makes use of special metaphysical terminology is fine, it seems, so long as it is justified by an inference to the best explanation.

Now, Hofweber concedes that proponents of grounding, despite taking the notion as primitive (usually), attempt to elucidate it by way of example. But, he claims, grounding theorists pull a ‘bait-and-switch’ here, pointing to an example of some ordinary kind of priority, and claiming it exhibits a grounding connection. Fine (2001)’s contention that a true disjunction is grounded in its true disjunct(s) is really an example of logical priority—in the sense of asymmetric entailment. Other putative grounding connections are similarly dismissed. Where no suitable ‘ordinary’ notion of priority seems to be at work, the example is dismissed as not requiring us to recognise any priority at all, since the same facts hold in any case.

2.2.1 Response to Hofweber

There are two prongs to Hofweber’s attack. The first is that there is no need for ground, since our stock of ordinary notions of priority is sufficient to understand questions of dependence. The second is that ground is esoteric. Even if there were a need for some finer-grained notion of priority, it is not clear this would be ground. Michael Raven (2012) notes that much of the recent work on grounding can be seen as attempting to clarify the notion. Thus, answering the first attack provides vindication for the attempt to clarify the notion of ground, and the clarification of ground can be seen as a response to the second attack. But I think we can do better than this. We can show that Hofweber has given no good reason to dismiss ground out of hand, since his esoteric/egalitarian

distinction rules out many important and perfectly intelligible questions.

The need for grounding

Grounding is usually introduced via intuitive examples of dependence which are apparently not captured by better understood notions. Hofweber's contention is that: either the example exhibits some ordinary kind of priority, or there is no need to recognise any kind of priority in the example. The second horn of this dilemma can be dismissed off the bat as clearly question begging. If there is strong intuitive evidence that some form of dependence is at work, then summary dismissal of the example merely indicates a prejudice against ground (cf. Audi 2012a). Thus, we will restrict ourselves to the examples where Hofweber considers some 'ordinary' form of priority to be at work.

Example 1. A true disjunction $p \vee q$ is grounded in its true disjunct p . This, claims Hofweber, is merely an example of *logical priority*, in the sense of asymmetric entailment. Now, as Raven (2012) points out, non-asymmetric relations cannot serve as grounding relations. Grounding has a strict directionality. In the case of non-asymmetric relations, directionality has to be enforced by something else. Thus, either this example involves a tacit appeal to ground, or else Hofweber must accept that there is no real dependency here. Audi (2012a) joins Hofweber in dismissing the example, but for different reasons. On his conception of grounding, the relata are facts, and there is no such thing as a disjunctive fact, nor can facts stand in entailment relations. But it is easy to recast the example in non-factual terms, and, dialectically, it would be better to respond without adverting to a particular conception of grounding.

Thus, consider the following example: a conjunction $p \wedge q$ is grounded in its conjuncts p, q . Here we have a case of symmetric entailment: the conjunction entails the conjuncts and the conjuncts entail the conjunction. Yet, we are strongly inclined to say that the conjunction is true because its conjuncts are, and not the other way about. It does not help to appeal to the truth definition, for the truth definition is expressed as a biconditional: $p \wedge q = \text{T}$ iff $p = \text{T}$ and $q = \text{T}$.³ It is true that in the logic classroom we

³If one thinks it is relevant that the grounded is singular while the grounds are plural, change the

compute a formula's truth definition 'top-down', by computing the possible truth values of its constituents, but we could in principle (though with more difficulty) do it 'bottom up'. Nothing in the truth definition prevents it. Thus, no kind of logical dependence (syntactic or semantic) adequately captures the kind of dependency we have in mind.

Example 2. Consider any set of mutually definable physical quantities, such as mass, volume, and density. Hofweber says:

Any two of them determine the third, but intuitively one pair, mass and volume, is more basic than density. And this seems right, but this is priority in a conceptual sense, not a metaphysical one. Our concept of density is derivative on our concepts of mass and volume. (pp. 269–70)

Here is what Raven (p. 690) has to say about conceptual priority:

[Ground does not] assimilate to conceptual priority. What is conceptually prior needn't be metaphysically prior. For example, whether the set-theoretic facts ground the arithmetic facts is orthogonal to whether our set-theoretic concepts are, in some relevant sense, prior to our arithmetic concepts.

That seems true. However, the issue is whether there is any kind of metaphysical priority here at all, not whether it should be assimilated to conceptual priority. Hofweber's point is that conceptual priority may give the appearance of a more substantive kind of priority, even where there is none.

There are several things to say about this. First, I quote Hofweber in full here to illustrate the baldness of the claim. It may, after all, turn out that the priority here is merely conceptual priority, but that is far from obvious and Hofweber gives zero argument; it is merely proclaimed. Second, even if there is a relevant sense of conceptual priority, it is doesn't seem to be any more egalitarian than the notion of ground. Third, in a footnote Hofweber mentions that Newton might have regarded volume and density as more basic than mass. 'If that is right then conceptual priority and *physical priority*, according to Newton, come apart' (ibid. footnote 6, my emphasis). What does Hofweber mean here by 'physical priority'? It is not causal priority. The mass and volume of a gas do not *cause* it to have the density it has. It's true that if we alter, say, example. p symmetrically entails $\neg\neg p$, but the latter is grounded in the former.

the volume of the gas, the density will change too. But whatever causes the change in volume also thereby directly causes the change in density. The change in volume is not some intermediary effect between the change in volume and the change in density. Thus, this ‘physical priority’ is a more constitutive kind of determination. Many grounding theorists would call it a grounding relation—the kind of grounding relation which is discovered *a posteriori* (other examples might include categorical/dispositional features or physical/mental states). Such cases are important, because they undermine Hofweber’s attempts to reclassify putative grounding cases as cases of conceptual priority. Pretty much any putative case of grounding, if it is determined *a priori*, is vulnerable to this kind of charge. (If we know *a priori* that *A* grounds *B*, how can we assure ourselves that it is not merely that the concepts in *A* entail, or are otherwise prior to, the concepts in *B*?)

Moreover, such cases undermine another claim Hofweber makes: that grounding relations are ‘immune from the facts’. Aside from the trivial point that grounding facts are supposed to be among the facts, this is an example of a grounding fact which is constrained by *a posteriori* knowable facts.⁴ Now, it may be that all three of our quantities are equally fundamental (in which case, no grounding relations hold), or it may be the case that they mutually ground each other (in which case, we have to revise our views on grounding’s formal properties). But perhaps, just maybe, two of the quantities are more fundamental than the third (in which case, grounding behaves as expected). What has not been established, *pace* Hofweber, is that the example exhibits mere conceptual priority.

Example 3. ‘Its being the case that the couple Jack and Jill is married consists in nothing more than its being the case that Jack is married to Jill.’ (Fine 2001, p. 15, as quoted by Hofweber *ibid.*, p. 270).

Hofweber claims not to follow this example, since it is a conceptual truth that

⁴As Audi (2012a) notes, as is the case in most of philosophy, grounding facts are to be determined by a mixture of both *a priori* and *a posteriori* considerations. (Moreover, Hofweber himself dismisses epistemological concerns regarding metaphysics as ‘not as serious as they have sometimes (historically) been taken to be’, p. 260).

- (1) A and B are a married couple iff A and B are married to each other.

No doubt that is true. But, as Audi (2012a, p. 113) points out, Hofweber has misunderstood the example. The example should be understood as the existence of a certain complex (a couple) being grounded in a relation between its constituents. One may doubt that couples exist, as Audi does. Or one may hold that the fact that A -and- B are married is just the fact A is married to B . But if we take seriously the idea that couples exist, we are surely not going to hold that their existence is just brute. Couples owe their existence to something. It is natural to think that the relation of marriage between Jack and Jill has something to do with the existence of Jack-and-Jill as a married couple. Such a view is not esoteric. Couples certainly feature in folk ontology. (Indeed, it may be trivial that couples exist on Hofweber's view.) But it is not trivial *how* couples exist, if they do.

Questions egalitarian and questions esoteric

There are a number of strategies for responding to Hofweber's second charge—that grounding represents metaphysics at its worst: esoteric metaphysics. First, we could argue that grounding is a folk concept after all, and thus egalitarian. Second, we could undermine the distinction between folk and philosopher's concepts, and thus the distinction between esoteric and egalitarian metaphysics. Third, we could argue that, despite being esoteric in Hofweber's sense, there are legitimate uses of 'ground'. Audi (2012a) is skeptical about the distinction between folk and philosopher's concepts. But officially, he takes the first kind of approach, showing how grounding features in folk discussions, particularly regarding questions of morality (cruelness grounding wrongness), and by tying ground to the folk concept of explanation. However, I think ethical examples are all-too-easily dismissed as exhibiting some kind of conceptual priority (thick and thin moral concepts). And while explanation is certainly a folk notion, Audi's preferred theory of it is not, and the theory practically implies that there is a grounding relation.⁵ I

⁵Audi subscribes to *explanatory realism* (Kim 1994; Ruben 1990), the view that explanations are made correct by the determination relations which 'underwrite' them—causation in the case of causal

am sympathetic to Audi's view of explanation, but it is dialectically unwise to hang our response on a view so highly theoretical. I also doubt there is an important distinction to be drawn between the folk and the philosopher, but I'm not sure how to go about persuasively dismissing the distinction. Thus, I will argue that there are intelligible and important questions to be asked in metaphysics, despite being 'esoteric' in Hofweber's sense.

Consider Hofweber's criteria regarding the esoteric/egalitarian distinction:

- (2) A question is esoteric if it involves undefined, distinctly metaphysical, terms.
- (3) An answer to a metaphysical question which implicitly defines a metaphysical term is egalitarian, so long as it is an answer to an egalitarian question.

Now, there is a question here about what amounts to 'implicit definition'. A term might be implicitly defined by a theory if the theory (logically) implies a definition of the term. Or it could be that a term derives its content from its place in the context of the theory. The cases are importantly different. In the former we have a term which is, in principle, explicitly definable. In the second, we have a term which is irreducibly primitive, but which nonetheless has discernible content. For example, the set-membership relation seems to be implicitly defined by set theory in this sense.⁶ A term explicitly definable in egalitarian terms is clearly egalitarian, so we can assume Hofweber has in mind the latter sense of 'implicit definition'. But in that case, it seems that by Hofweber's lights, there is a perfectly egalitarian way of introducing the term 'grounds'. Witness:

- (4) There appear to be forms of dependence not captured by notions modal, semantic, or otherwise more familiar to the philosopher.
- (5) How should we understand such forms of dependence?
- (6) We should posit a hyperintensional form of dependence, which we will call *ground*.

explanation, grounding in the case of metaphysical explanation.

⁶There is an interesting question as to whether this notion of set-membership corresponds to our 'ordinary' notion of set-membership. In naïve set theory, a set can be a member of itself, but in modern axiomatic set theory, it cannot. The notions thus come apart. Do they come apart enough for us to call them different concepts? However the answer to that goes, it's clear that 'is a member of' is perfectly intelligible within axiomatic set theory.

Hofweber takes issue with (4). We saw in the last section why his reasons for this were unfounded. (5), I take it, is a perfectly egalitarian question. Dependence is a perfectly folk concept. Of course, the philosopher often wishes to go further and discern exactly what kind of dependence is at issue. But the folk have no problem understanding talk about dependence without adverting to its specific species. (6) here is supposed to be a placeholder for a theory of ground, which is an answer to the egalitarian question posed by (5). Given (4), that is a perfectly natural question to ask. But why, having introduced the term in an egalitarian fashion, is it not legitimate to ask further questions involving it? Hofweber considers a similar strategy concerning the term ‘natural’. He says:

[O]ne might hold that first there is the question which counterfactuals are true, and the answer to that question introduces the term ‘natural’. Then there is the next question: which things are natural in this sense? But the followup question is then derivative on the theory of counterfactuals. This seems to give counterfactuals too big of a role in metaphysics, and doesn’t seem to be a proper way to start the project of ontology. (p. 272)

Granted, it would probably be unwise to hang the whole of metaphysics on the theory of counterfactuals. But it is not clear that the question is ‘derivative on the theory of counterfactuals’. The theory of counterfactuals has merely given us a handle on the notion of naturalness; it has provided us with an implicit definition of ‘natural’. It could easily be viewed as a ladder which we kick away. On the other hand, if it were found that the same notion of naturalness could be fruitfully applied to other egalitarian, or ‘first-order’, metaphysical questions, that would indirectly confirm the theory of counterfactuals. Or suppose we have a second theory of counterfactuals, which implicitly defines the term ‘joint-carving’. It is then natural to ask: which theory is better? Theory comparison is a necessary part of metaphysics, as with any academic pursuit. But it is unclear whether we can ask such questions without becoming esoteric. To assess a theory holistically involves assessing (perhaps indirectly) any of its primitive terms. If each theory performs equally well as regards other theoretical virtues, the question has to turn on which notion gives us a better handle on counterfactuals: naturalness or

joint-carving? By Hofweber's lights, these should be esoteric questions. Not only are they clearly not esoteric, good methodology demands that we ask them. As Daly (2012, p. 97) remarks, it is good methodology to limit our stock of primitives. Wouldn't it then be good methodology to put our limited stock of primitives to as much work as possible? That is precisely what the grounding theorist is doing. She starts with the observation that questions of dependence are not only rife, but central, to many first-order questions of metaphysics. The second observation is that dependence can't be captured by our current stock of uncontroversial primitives. She then makes a single posit in an attempt to answer these diverse questions of dependence.

All of that said, I think there is something right in Hofweber's criticism, which we might understand as a kind of methodological rule: when asking questions about or involving metaphysical terms, this must ultimately be in the service of some first-order metaphysical question. This seems uncontroversial, but we could probably all do with reminding ourselves of it from time to time. It can be too easy to get caught up in the finer nuances of theory; we shouldn't lose sight of the bigger picture.

2.3 Grounding is Unintelligible

Daly (2012) claims not to understand grounding talk, but it is unclear what the dialectical force of this criticism is supposed to be. For lack of a general theory of significance—a theory of which terms are meaningful and which are not—he rejects grounding on the basis of his 'philosophical conscience' (cf. Goodman 1955). That is, I gather, that he rejects grounding simply because it does not make sense *to him*. Daly recognises that a parallel move is available to the grounding theorist, but says the best that can come of such an exchange is a stalemate. I'm not sure such a result would worry too many grounding theorists. Dialectically, the criticism cannot force the grounding theorist to reassess her overall position. Thus, she is free to continue her work on elucidating the notion. And such work may help the skeptic to understand grounding talk after all.

Daly outlines three ways to furnish content on a primitive term. First, we can specify

its logical properties; second, we can trace its analytic connections with other terms, and third, we can give examples.⁷

Daly is quite right that specifying a term's logical properties *constrains*, but does not *determine*, its content. That is easily conceded. No one claims that logical properties alone determine a term's content. They do, however, allow us to distinguish terms which might otherwise be confused. For instance, anecdotally, it seems that some philosophers consider grounding the latest incarnation of the 'truthmaking fad'. But truthmaking and grounding plausibly have different logical properties. Grounding is irreflexive, but truthmaking is probably not.⁸

Regarding grounding's connection with other terms, Daly makes some rather dubious claims. He considers Schaffer (2009)'s definition of 'fundamental' in terms of grounding:

$$x \text{ is fundamental} =_{df} \text{ nothing grounds } x$$

and writes:

Since the above definition defines 'fundamental' in terms of 'grounding', any understanding we have of 'fundamental' has to be given to us through understanding 'grounding'. What we wanted, however, was to gain an understanding of 'grounding'. (p. 92)

But that's just false. We have some antecedent understanding of 'fundamental', and we use that understanding when assessing whether the proffered definition is adequate. Such practice is quite common throughout philosophy. We seek to define terms which we already understand reasonably well, and (as is usually the case) use that understanding to construct counterexamples to the definition. Though definition is not symmetric, definiendum and definiens are, in many contexts, substitutable. Thus, if we have a handle on how to use the one, we have some handle on how to use the other. Of course,

⁷Kit Fine (pers. comm.) thinks that pictures and models can also furnish a term with content, and often aid understanding better than these other methods. If true, that's just more grist to our mill. But I wonder if providing a model is not just a way of specifying a term's logical properties. The problem, well worn in philosophy of science, is whether 'syntactic' and 'semantic' descriptions of a theory amount to the same thing. An interesting problem, but outside our purview.

⁸Take the proposition, (there is a proposition). See Rodriguez-Pereyra (2015) and Tahko (2013) for discussion.

‘grounds’ is only part of the definiens. Thus the definition does not determine its content. But that was not what was being claimed. All that was claimed is that we may gain further understanding of a notion by tracing its analytic connections with other notions.

Lastly, Daly claims that the best card the grounding theorist has to play is to give examples, but that this is ‘indecisive’. Daly concedes that some terms can only be learned by ostending exemplars and foils, but denies that ‘grounding’ is such a term:

Some terms can be learned (and perhaps can only be learned) by means of ostending exemplars and foils. Be that as it may, the sceptic denies that ‘grounding’ can be learnt in such a way. As noted, the sceptic is familiar with the (alleged) examples of grounding and he can follow a ‘divide and conquer’ strategy. Either he finds that he does not understand the claims being made, and so the examples offered are as baffling as the general claim that some facts ground others. Or he finds that the examples are best construed as examples of relations of supervenience or identity, relations that are supposedly distinct from the relation of grounding.

This charge similarly lacks any dialectical force. We have already seen how Hofweber’s attempts at assimilating ground to other notions have failed. In the absence of any principled reason as to why some primitive terms (such as modal terms) are meaningful, and others are not, such a charge is just question-begging. The onus here is not on the grounding theorist to say more as to why ‘ground’ is meaningful. There are three agreed strategies for furnishing a primitive term with meaning. The grounding theorist has implemented them, and thinks she understands ‘grounding’ (and has persuaded others they understand it too). Schaffer (2016b) sets out to elucidate ‘grounding’ in precisely these three ways. He writes:

The reader who thinks that more is needed should take this as an invitation to say what more is needed generally, for a concept to be communicated at all. (p. 51)

And if the skeptic thinks the dialectical burden is on grounding theorist, she should similarly say why that is so.

2.4 Grounding is too Coarse-Grained

We now turn to a different kind of challenge to grounding. Wilson (2014) and Koslicki (2015) take no issue with the intelligibility of ‘ground’ or its cognates. They appear to think that it is meaningful at least in a minimal sense in that it has a relatively clear denotation. And they think that there are distinctive kinds of metaphysical dependence which are not adequately captured by modal or semantic notions. However, they think the denotation of ‘ground’ is heterogeneous, grouping together several—importantly different—kinds of dependence relation under a single rubric. Among such relations (which she calls ‘small-g’ grounding relations) Wilson includes ‘type identity, token-but-not-type identity, functional realization, the classical mereological part-whole relation, the causal composition relation, the set membership relation, the proper subset relation, and the determinable-determinate relation.’⁹ Here Koslicki differs. She does not consider these relations themselves to be dependence relations, but thinks that they ‘*induce* different varieties of metaphysical dependence in different circumstances and in different respects’ (2015, footnote 2, my emphasis). Though Wilson and Koslicki arrive at the same conclusion—that grounding is too coarse-grained to do any useful work—they arrive at the conclusion via quite different arguments. Wilson’s argument focuses on the supposed informational paucity of grounding claims, whereas Koslicki’s argument focuses on the supposed pertinent differences between the kinds of examples the grounding theorist considers to exhibit grounding connections. I will thus consider their positions separately, starting with Koslicki.

2.4.1 The Heterogeneity of Grounding

Koslicki (2015) distinguishes three ways in which putative cases of ground might present us with a unified phenomenon. What she calls the ‘Unity Hypothesis’ admits of three

⁹Grounding theorists are likely to take issue with this list. Certainly no grounding theorist would countenance type- or token-identity as grounding relations. Why does Wilson think of these as ‘small-g’ grounding relations? It appears that she thinks they play the same kind of explanatory methodological role the (‘big-G’) Grounding relation is supposed to play. That token mental states are identical with token brain states would explain how the mental depends on the physical.

interpretations of varying strength:

(7) **THE SINGLE RELATION INTERPRETATION:**

There is a single relation of grounding at work in the putative examples.

(8) **THE SINGLE GENUS INTERPRETATION:**

There is a generic relation of grounding with several species.

(9) **THE MERE RESEMBLANCE INTERPRETATION:**

There are distinct relations of metaphysical dependence which exhibit some objective similarities.

Koslicki then argues, by pointing to some salient differences between cases, that the grounding theorist can at best support only the ‘mere resemblance’ interpretation.¹⁰ And she says, ‘by treating a collection of phenomena which is in fact heterogeneous as though it were homogeneous, we have, if anything, taken a dialectical step backward’ (p. 307).

In what way, then, are the alleged grounding relations supposed to differ? Rosen (2010) offers the following example: the fact that something is a square is grounded in the fact that it is an equilateral rectangle. This is supposed to be an instance of a species (square) being (partially) grounded in its genus (rectangle). Here the grounding relation is directed from the less specific to the more specific. Compare: the fact that something is red is grounded in its being maroon. Here the grounding relation goes from the more specific (a determinate colour property) to the less specific (a determinable colour property). But in general it seems as though ground should travel from the more to the less fundamental. Which is more fundamental, the more specific or the less specific?

There are a number of ways we can respond to this. We could concede the point. Not much hangs on whether a species is grounded in its genus. The only consequence of that is that the direction of grounding runs opposite to what we thought it was. We could

¹⁰Koslicki starts out by arguing that appeals to grounding’s formal structure do nothing to distinguish it from it from other well-founded strict partial orderings (such as the substring relation). But as I pointed out when discussing Daly’s articulation of this point, no grounding theorist thinks that appeals to formal structure alone are enough to convey the content of ‘grounds’. We also need the examples.

deny that any grounding relation is in the offing. For instance, Audi (2012b) thinks that a species just *is* a genus + differentia. That is, he considers the relation between square and equilateral rectangle just to be identity. Or we could simply challenge the assumption that grounding must run from the specific to the general. No one has explicitly advocated anything like this kind of principle.¹¹ What reason is there to believe it? It might be natural to think of the general as somehow ‘built up from’ the specific—in the way that a generalisation, ‘all *F*s are *G*’, is built up from its instances ‘*Fa* and *Ga*’, ‘*Fb* and *Gb*’, ... But suppose that the connection is lawlike. Then it might be natural to think that the instance is grounded in the generalisation (cf. Rosen 2010). There are two take-aways here. First, the case is controversial. Even if Koslicki’s point has force against a particular conception of grounding, it has no force against grounding generally. And second, we shouldn’t suppose that every interesting feature of a particular grounding case should generalise (and thus it is doubtful that the point has force against any grounding view.)

The second case Koslicki considers concerns overdetermination. The fact $p \vee q$ has three possible grounds: p , q and both p and q . In the latter case, the ground *overdetermines* what it grounds. Such a situation is in general permissible in logical cases. But compare again the determinate/determinable relation. The fact that something is red cannot be overdetermined. A jumper cannot be both maroon and scarlet. So we have a systematic difference between logical grounding and the determinate/determinable relation.

The third case involves truthmaking (though again we should note that such cases are controversial among grounding theorists). In such a case we have a worldly item (a fact or state of affairs) making true a representational item (some kind of truthbearing entity). Other cases of grounding strictly relate worldly items. That is a systematic difference between truthmaking and all other grounding relations.

The appropriate response to these cases, I think, is contained within a passage from Audi (2012b, p. 689), which Koslicki herself quotes:

¹¹Raven (2017, p. 634) makes a similar point.

Even the view that there is only a generic similarity, that there is a different species of noncausal determination at work in each case, strikes me as under-motivated. What differentiates the species? If it is only that one concerns normative properties, another determinables, still another dispositions, this does not yet give us a reason to think that *how the determination works* differs in each case, simply because it relates different kinds of fact. (Emphasis original)

It seems to me that the differences in these cases, which Koslicki attributes to the nature of the kind of determination at work, can just as easily (and perhaps more naturally) be attributed to the nature of the relata. Determinable colour properties just aren't the kind of thing which can be multiply realised. Hence it is that the determinate/determinable relation doesn't admit of overdetermination. The point applies even more clearly to the truthmaking case, in which the worry is that one of the relata of the truthmaking relation is different in kind to the relata of other grounding relations. 'So what?', one wants to reply.

The last case Koslicki considers case involves natural/moral properties. The fact that some act is wrong is grounded in its being a lie. But the wrongness of a lie is *defeasible*—it is defeated, for example, if the lie is to save someone's life. Thus, wrongmaking features do not with any kind of necessity determine wrongness. The determinate/determinable relation, on the other hand, does carry such modal force. It is metaphysically necessary that, if something is maroon, then it is red—another systematic difference.

Here, it could easily be argued that being a lie is never a full ground on its own for wrongness.¹² Such cases present the classic problem for the deontologist. Why is that some acts seem right or permissible, despite their possessing wrongmaking features? Either we say that being a lie is insufficient, on its own, for wrongness, or if we are staunch Kantians, we might bite the bullet and insist that *all* lies are wrong. Either way, the counterexample to necessitation is unconvincing.

Koslicki takes her arguments to seriously undermine both the single relation and the single genus interpretations of the Unity Hypothesis. Even if we grant that the differences in the cases should be attributed to the kinds of determination at work,

¹²Audi recognises the potential problem here and makes essentially the same response, arguing that being a lie is at best a ground for *prima facie* wrongness.

Koslicki has said nothing to undermine the general features ground is usually assumed to have (such as asymmetry, transitivity, non-monotonicity, hyper-intensionality). If her arguments are successful, at best they undermine the single relation interpretation. That the different species exhibit systematic differences does not preclude their being of a common genus. Indeed, if the species did not exhibit differences, there would be no reason to consider them different species.

2.5 Grounding is Uninformative

Probably the most influential (and sophisticated) critique of grounding to date is due to Jessica Wilson. In an influential paper (Wilson 2014)¹³ she challenges the aptness of a single, generic notion of ground to capture what is meant by ‘in virtue of’ and similar phrases. For Wilson, this generic notion of dependence is uninformative, and therefore, unexplanatory. What we need (and already have) is a stock of specific ‘small-g’ grounding relations—the parthood relation; the determinate/determinable relation; the subset relation; the causal composition relation; the set-membership relation; and type/token identity. Genuine illumination requires that we advert to these specific relations, and having done so, there is no work left for a generic notion of (big-G) Grounding—this can be done by the small-g relations together with the right methodological assumptions.

In the remainder of the chapter I wish to engage Wilson’s criticisms head-on. My aim is to defend grounding theory as a research programme, rather than any particular conception of ground. Sometimes criticism requires that we revise a notion so as to avoid it, but ultimately, I don’t think Wilson’s arguments really tell against any serious contender for a theory of ground. I will thus consider the arguments as Wilson presents them; I will not translate them into my preferred ideology. This will entail entertaining some assumptions many grounding theorists (including the author) reject—that ground can relate entities of arbitrary category, for instance. But not much of substance hangs on this—the examples can be recast in terms of facts.¹⁴

¹³Unless otherwise indicated, all references are to this paper.

¹⁴This chapter was largely finished shortly before the publication of Mike Raven’s (2017), which

2.6 The Underdetermination Argument

Wilson's main argument is meant to show just how uninformative or 'underdetermined', and hence, unilluminating, grounding claims are. By 'underdetermination' Wilson means that the holding of a grounding relation leaves open several crucial questions regarding the metaphysical status of the grounded—questions which '*must be answered* to gain even basic illumination' about the metaphysical dependence at issue (p. 545, emphasis original). Consider the bare grounding claim that the mental is grounded in the physical. This leaves open several basic questions regarding the status of the mental:

- The ontological question** Are mental states real?¹⁵
- The reduction question** Are mental states reducible to physical states?
- The emergence question** Are mental states *over and above* their physical grounds?
- The efficacy question** Are mental states causally efficacious?

Wilson says (p. 549)

Now, suppose someone claims that the mental is Grounded in the physical. Am I in position to know whether I should agree with them? Not at all ... [T]he bare assertion of Grounding is compatible with both reductive and non-reductive versions of physicalism—indeed, perhaps even with anti-realist eliminativism about the mental... Absent further information about the specific grounding relation(s) supposed to be at issue, I am stuck: I am not in a position to assess, much less endorse, the claim that the mental is Grounded in—is metaphysically dependent on, nothing over and above—the physical.

These charges could not be levelled at a general notion of causation, claims Wilson, for even a bare causal claim—'fire causes smoke'—puts us in a position to infer a great deal about the effect: smoke is real; smoke is distinct from fire; smoke is not reducible to fire; and smoke is efficacious.

makes a number of similar points regarding Wilson's critique of grounding.

¹⁵Wilson appears to be using 'real' in the sense of 'existent'. I have never been convinced myself of the need to distinguish the two notions (*pace* Fine 2001). I will thus follow Wilson's usage.

It is important to note that Wilson's target is a synthesis of the views of Fine (2001), Schaffer (2009), and Rosen (2010). These views differ in important respects, however. Indeed, the authors don't even agree on the proper relation of the grounding relation, and each view bears on these questions differently. Wilson does not clarify what this synthesis might look like, or whether any particular author would endorse it, and her charges don't have much traction against any of these particular views. Although these authors are not unanimous on any of the basic questions, taking each view separately, one finds that many of these questions are indeed answered. (Hence, Schaffer (2016a) replies that bare grounding claims and bare causal claims are informationally comparable.) In response, a grounding theorist can just clarify how her conception of ground would bear on these questions, or else deny that ground should bear on them. (Fine, for instance, thinks that questions of reality are to be settled on considerations of ground.)

Wilson is not just attacking a straw man, however. She considers what she calls the 'general presumption gambit'. We can employ, for instance, a general presumption in favour of the grounded's being real. But in that case, it is the general presumption, not the grounding relation, which is doing the 'heavy lifting'. A similar strategy can be employed to bolster supervenience: to ensure a strict direction of dependence we can couple a supervenience claim with a claim of conceptual entailment—though similarly, it is the claim of conceptual entailment, not of supervenience, which is doing the heavy lifting.

Furthermore, suppose we employ general presumptions regarding *each* of our four questions. Then, argues Wilson, ground will be *too* fine-grained to be of general use. Sometimes we want the grounded to be real, efficacious or what have you. Sometimes not. Take the following pair of grounding claims:

- (10) That the jumper is red is grounded in its being maroon.
- (11) That S is in pain is grounded in S's being in physical state *p*.

One may want to assent to both of these grounding claims, but deny the existence of determinable colour properties (one may think that 'red' fails to pick out a real

property but rather has a disjunctive, vague, or ‘scattered’ reference), while accepting the existence of mental properties. But part of the appeal of ground was its supposed wide applicability to diverse metaphysical problems. The advantage of positing multiple different, more fine-grained, relations of dependence is that one obtains *different* answers to these questions. Once these relations are admitted, what further need is there for a general notion of ground? If metaphysics must always proceed by reference to the more specific metaphysical relations, it is doing no metaphysical work. If it is conceptual unification we are after, a distinct metaphysical posit is not what is required.

The above remarks in mind, I prefer to think of Wilson’s challenge as a dilemma: either a general notion of ground is too coarse-grained to be of any use, or it is too fine-grained to be of general use. It is here that Wilson lands her crucial blow:

That grounding is so useless undermines another motivation for such a posit, according to which this relation is admirably explanatory... [but] from the bare fact that some goings-on are Grounded in some others, it hardly follows that the latter metaphysically explain the former in any interesting sense; nor does a bare Grounding claim itself constitute an explanation in either a metaphysical or epistemic sense. (p. 553)

Though she addresses it only cursorily, this is, I think, Wilson’s crucial point. Bare grounding claims are not as ‘admirably explanatory’ as grounding theorists hold them to be. Only the specific dependence relations can explain, because they tell us how the determination really works. And it is only by knowing how the determination really works that we can answer her four questions.

2.7 Underdetermination Undermined

My response to Wilson proceeds on several levels. First, I argue that grounding does not admit of as much ‘underdetermination’ as she supposes. Some of Wilson’s questions are indeed answered (depending on what we mean), while others are appropriately left open. Wilson thinks such questions must be answered and that the grounding theorist is unable to answer them. But this caricatures the grounding theorist’s position. The

grounding theorist can answer such questions in a number of ways: she can invoke other notions (such as translatability and identity); she can invoke background or methodological assumptions; or she can merely pose her questions of ground more pertinently. What's more, though Wilson contends that these questions are answered by the small-g relations, I argue this is doubtful. When invoking the determinate/determinable relation or the proper subset relation, we still have to invoke background assumptions in order to establish the efficacy of the mental. Thus, with regards to her four questions, a relation of ground is at least as informative as many small-g relations. Second, regarding *how the determination works*, there are two ways to follow up such questions, as Schaffer (2016a) notes. First, we can point to the species of grounding relation at play. And second, we can specify the rule which maps ground to grounded. I am skeptical that the small-g relations are able to act themselves as grounding relations. At best, I think, like Koslicki (2015), that the small-g relations *induce*, underwrite, or ground, dependence relations (and may just be indicative of dependence relations). That such 'induced' dependence exhibits unity is evidenced by its logical behaviour (cf. Koslicki *ibid.*). Finally, I offer a third way in which we can show how the determination works: by embedding a grounding claim within a larger background theory—which also shows how grounding claims play their explanatory role.

2.7.1 Bare grounding claims leave some questions open

There are two ways in which bare grounding claims are uninformative. The first pertains to how many questions regarding the metaphysical status of the grounded are left unanswered. The second pertains to *how the grounding connection works*. Let's first take Wilson's four questions. Is the grounded real? Does the grounded reduce to its ground? Is the grounded over and above its ground? Is the grounded efficacious? As they stand, some of these questions are in need of clarification. Ground bears differently on the reduction and emergence questions, depending on how they are precisified, and it leaves open the efficacy question. But if any question is left open, I will say why it is appropriately left open.

The ontological question, I think, is a bit of a red herring. First, the reality of the grounded follows directly from ground's being a factive notion. But second, suppose we wish to take a deflationary position on determinable colour properties. The deflationist will not give a story about how redness depends on maroonness. Rather, she will give a story which 'explains away' the appearance of redness (perhaps invoking similarity or naturalness). On such a view, there is no determinate/determinable relation—at least not understood as relating colour properties—for there are no colour properties (at least on one side) to be related. At best, the relation will relate colour predicates (and perhaps make intelligible how we can speak truthfully about red things, though no such property exists). So my response to Wilson here is: ground does entail reality, but to deny the existence of a dependent entity is to deny the existence of (a token of) the dependence relation. And the grounding theorist can accommodate such a view—by talking about existence (and similarity, or what have you).

Suppose heat is grounded in mean molecular kinetic energy (MMK). Is this to say that heat just *is* MMK (in some reductive sense of 'just is')? Or could there be facts about heat further to facts about MMK, despite being grounded in them? It seems that depends on what you think deserves the name 'reduction'. A popular view of reduction is that it indicates identity (Audi 2012a). There is broad agreement among grounding theorists that ground is irreflexive. From this it follows that reduction is not a kind of ground. However, one may legitimately ask whether reduction must be understood in this way. Perhaps some instances of what we consider reduction will turn out to be ground, others identity. It is ironic that Wilson helps herself to the term 'reduction', given that there is little consistency in how it is applied in the literature. In philosophy of science it is used in at least the following three ways: as indicating translatability between theories; as indicating a supervenience relation; and as indicating a relation between two ways of representing the same phenomenon. Does all this show that reduction is after all a useless concept? No. It merely suggests that we should be clearer about what we mean, and perhaps regiment the notion accordingly. Once we have a clearer idea of what we mean by 'reduction', it may turn out that ground entails it (trivially, if it

just is ground), is compatible with it (if it indicates translatability or supervenience), or is incompatible with it (if it indicates identity). There is nothing here on which the grounding theorist must remain silent.

Are mental states over and above the physical—by which Wilson means, does the grounded *emerge* from its ground? There are two senses of emergence—weak and strong. A phenomenon is weakly emergent if it is in some way surprising, though in principle, perfectly explainable by its physical base. To offer a causal analogy: a chaotic system is perfectly deterministic, but may give outputs which are surprising given the inputs (just because of the system’s sheer complexity). But given a maximally specific description of the system at a prior time (and significant computing power) we could explain the state of the system at a later date. Ground is clearly compatible with this ‘surprising’ emergence. Strong emergence, on the other hand, is more metaphysically robust. A phenomenon is strongly emergent if we can’t even explain it in principle in terms of its physical base. If *A* strongly emerges from *B*, then part of what it is to be *A* isn’t contained in what is to be *B* (in some relevant sense). It may be that such emergence is compatible with partial grounding, if a strongly emergent phenomenon is partly explained by its physical base. Or such emergence might be incompatible with grounding, if one is suspicious, as I am, of the notion of an in-principle in-completable explanation. Now, Wilson thinks that a general notion of dependence is inadequate if it is unable to capture strong emergence. But I don’t see why this should be so. Ground is held, above all things, to indicate an explanatory determination between its relata, whereas strongly emergent phenomena are in-principle unexplainable (or not fully explainable). It is therefore unsurprising (and I’d say, desirable) that ground isn’t able to capture this very different kind of dependence. I say that ground appropriately leaves open questions of weak emergence, because this relation seems more of an epistemic kind than a metaphysical one.

Are mental states efficacious? The sense of ‘efficacious’ here is reasonably clear, and I think the question is appropriately left open by a grounding claim. For we want grounding claims to cover the abstract realm as well (and indeed, ground may have important work to do in distinguishing explanatory from unexplanatory proofs in mathematics).

Does this mean the grounding theorist is unable to answer the question of whether the mental is efficacious? Of course not. Wilson writes as though the grounding theorist holds that questions of ground are the be-all-end-all of metaphysics. No one claims that. What is claimed is that questions of ground are central to metaphysics, not that they comprise it. The grounding theorist has at her disposal many other tools to answer this question. Moreover, as Berker (2015) notes, whether the mental is efficacious does not itself appear to be a question about dependence:

Perhaps it is true that, when it comes to the mental, the [four] questions Wilson is asking are more interesting than the question of what, if anything, the mental depends on. But that doesn't show that one hasn't answered the question of dependence until one has answered these other questions, and it also doesn't show that in all areas of philosophy questions of dependence are uninteresting. (p. 39)

That said, I think it may be possible to answer the question in terms of ground—it is just that the question of whether the mental is grounded in the physical is the wrong question (since it is too broad). The question is rather: is the efficacy of the mental grounded in the efficacy of the physical, and if so, how? Moreover, the grounding theorist can advance her own *tu quoque* here, for merely adverting to the small-g relations is not sufficient to answer this question. The determinate/determinable relation does not entail the efficacy of determinables. Abstract geometric shapes (squares and rectangles) can stand in the determinate/determinable relation, yet they are not efficacious. Take Yablo's (1992) view:

What if mental phenomena are determinables of physical phenomena in something like the traditional sense...? Then since a determinate cannot preempt its own determinable, mental events and properties lose nothing in causal relevance to their physical bases... (p. 250)

Here Yablo does not build into his proposal the causal efficacy of the mental. Rather, he proposes a story on which the causal efficacy of the mental does not compete with causal efficacy of the physical. The causal efficacy of the mental follows from the background assumption that mental properties do indeed have causal powers. Likewise for various characterisations of realisation.¹⁶

¹⁶For a recent characterisation of realisation, take Gillett (2003):

The upshot of all this is that, even if grounding claims are relatively uninformative, it is doubtful that the small-g relations are able to pick up the slack. Answering these questions is rather messy and often involves making methodological assumptions. But Wilson is just wrong if she thinks that the grounding theorist can't appeal to such assumptions in the course of her inquiries. For ground is just one tool, among many, at her disposal. The positive case for ground proceeds not by showing that ground can do all the work that other notions can do, but by showing that there is work only ground can do.

2.7.2 Bare grounding claims leave open how the grounding connection works

Schaffer (2016a) offers an analogy with bare causal claims. Take a claim such as 'smoking causes cancer'. This claim leaves open exactly how the causal connection works. There are at least two further 'how' questions we can ask. The first is which 'small-c' causal relation is at work (waking, baking, making). Second, which specific rule maps the input to output (for example, which function maps number of cigarettes smoked per day to the appropriate risk of cancer?). Now, although such a bare causal claim leaves these questions unanswered, it is nevertheless informative. It rules out smoking and cancer being effects of a common cause. Likewise, the claim that the mental is grounded in the physical rules out certain forms of dualism. Despite its non-specificity, one can assess a bare causal claim—through sophisticated statistical methods (exactly how the link between smoking and cancer was established). Likewise, one can, *pace* Wilson, assess bare grounding claims. However the exact story goes, we can be quite sure that the

Property/relation instance(s) F_i - F_n , realize an instance of a property G , in an individual s , if and only if s has powers that are individuated by an instance of G *in virtue of* the powers contributed by F_i - F_n , to s or s 's constituent(s), but not vice versa. (p. 594, my emphasis)

Here, causal efficacy is built right into the definition of realisation. However, there is at work another dependency relation, indicated by 'in virtue of'.

On Wilson's preferred treatment of realisation, subset realisation, a mental property M is realised (roughly speaking) by a physical property P iff only M 's causal powers are a proper subset of P 's causal powers. It is clearly not the subset relation doing the 'heavy lifting' here, but the presupposition that mental properties exist and have causal powers.

fragility of glass has something to do with its molecular structure. I'm certain, as a matter of conceptual entailment, that my jumper is red in virtue its being maroon.

There is, however, an important insight in Wilson's critique. Schaffer draws from it the following lesson (2016a):

Wilson's first lesson. An account of grounding must give one more than just the bare ideology of 'this grounds that,' and in particular must allow one to make sense of follow-up inquiry into how exactly the grounding connection works.

As with bare causal claims, Schaffer thinks there are two ways of pursuing such inquiry. First, we can point to the species of grounding relation at work (the specific small-g relation), and second, we can point to the rule which maps input to output. To illustrate: suppose we say that sets are grounded in their members. We can follow this up by saying that it is the set-membership relation which serves as the grounding relation, and it is the extensionality axiom which maps input to output.

Schaffer thus holds that the small-g relations are species of a common grounding genus. There are at least two advantages to the posit of a unifying relation, he claims. First, it allows us to wrap up the specific relations in an appropriate formalism¹⁷ which outfits them unified rules. This allows us to uncover generalisations we might otherwise miss. Second, a generic notion allows us to enumerate its species. Schaffer doesn't really clarify what he means by this, but I take it the advantage is that we can only recognise some specific relation as a (small-g) grounding relation if we also have the generic notion. Schaffer thinks that, in general, if we can provide an appropriate formalism for some notion, this provides defeasible evidence of unity, since (I assume) the presence of a single relation provides the best explanation for the satisfaction of unified principles. Wilson argues that the small-g relations should not be regarded as unified by the presence a common generic relation, since, even if they exhibit the commonalities Schaffer and others assume them to have, this does not show that a distinctive *metaphysical* posit unites

¹⁷Schaffer's preferred formalism is that of structural equation models (see especially Schaffer 2016b). The formalism effectively outfits the notion with a contrastive structure: this rather than that grounds this* rather than that*. I take issue with Schaffer's contrastive approach to ground, primarily because I just don't see how a supposedly worldly relation could be contrastive (cf. Schaffer 2012). But the point applies to any rigorous formalism, including Fine's Pure Logic of Ground (Fine 2012a, 2012b).

them, rather than their being merely *conceptually* unified. Moreover, it is doubtful that the relations exhibit even formal unity, since some small-g relations (set-membership, for instance) are not even transitive.

2.7.3 The Transitivity and Asymmetry Arguments for Unity

Recall that Koslicki (2015), whose critique of grounding is similar to Wilson's, proposes an importantly different positive alternative: the small-g relations are not themselves dependence relations, but *induce* dependence relations. This position makes better sense of how sets depend on their members. For clearly $\{\text{Socrates}\}$ depends on Socrates and $\{\{\text{Socrates}\}\}$ depends on $\{\text{Socrates}\}$. But we are also strongly inclined to think that $\{\{\text{Socrates}\}\}$ depends on Socrates. However, since set-membership is not transitive, Wilson must either posit some other (small-g) dependence relation between these sets, or else deny that there is any dependence between them. Neither option seems plausible, however.¹⁸ On the other hand, if we say that the set-membership relation induces dependence between a set and its members, there's nothing to prevent us from saying that $\{\{\text{Socrates}\}\}$ depends on Socrates, since the induced dependence may be transitive, even though the dependence-inducing relation is not.

Whereas Koslicki thinks that induced dependence relations are distinct, their logical interaction provides reason to think that there is only one. Berker (2015) offers two kinds of argument for the unity of the small-g relations—one from transitivity, and one from asymmetry. We have already given an argument from transitivity—in which the (non-transitive) set membership relation induces a kind of transitive dependence. We will now consider mixed cases. The transitivity argument proceeds by taking two grounding claims involving distinct (small-g) grounding relations: A grounds* B and B grounds** C , and considering whether A grounds C in some 'non-rigged-up' sense.

(12) Socrates' physical brain states causally compose Socrates' neural states.

¹⁸The transitive closure of the set-membership relation does not seem a good candidate, for the relations *being a direct member* and *being a member of member* seem importantly different, especially from a set-theoretic perspective.

- (13) Socrates' neural states subset-realise Socrates' desire to seek truth.

Given these two claims, we are strongly inclined to hold that Socrates' desire to seek truth is dependent on his physical brain states. But Socrates' desire to seek truth bears no (obvious) small-g relation to his physical brain states. For Wilson to accommodate this dependence claim, she's going to have to posit some kind of rigged-up 'meshing' between causal composition and subset realisation.

Perhaps this example is unconvincing, but in fairness to Berker, he was picking from Wilson's somewhat restrictive list of approved grounding relations. If we go off-list, we can come up with more convincing examples. For instance, certain semantic and pragmatic factors ground the fact that I have promised to φ . My promising to φ grounds a moral obligation to φ . So my obligation to φ is grounded in certain semantic and pragmatic factors. Here we have 'semantic grounding' meshing with 'moral grounding'. As Berker notes, we don't even need a general transitivity principle for this argument to work. Even if there are only instances in which transitivity plausibly holds, we will still be forced to posit some kind of rigged-up meshing of small-g relations. This makes the grounding theorist's position particularly strong. She does not need to argue for a universal claim, only an existential one: there's *at least one* case of 'mixed transitivity'. Wilson, on the other hand, needs to establish a universal claim: there are *no* cases of mixed transitivity.¹⁹

On the other hand, the asymmetry argument requires that the following schema hold with full generality:

- (14) If A grounds* B , then there is no grounding** relation, such that B grounds** A .

Certainly, we can find instances of this schema (and I know of no counterexamples). But the argument goes: if the small-g relations are indeed distinct, then we shouldn't expect any such principle to hold. There would be no explanation of why the relations

¹⁹In her (forthcoming) Wilson notes that Schaffer's (2012) counterexamples to the transitivity of grounding all involve distinct small-g relations. Thus, even if these were genuine counterexamples (I will argue in the next chapter that they are not), they would not count against the transitivity argument.

would ‘get out of each other’s way’ in this kind of fashion. Yet, we observe time and again (though this doesn’t establish the general principle) that when A grounds* B , no other grounding relation holds in the other direction. The best explanation, concludes Berker, for the logical behaviour of the supposedly distinct grounding relations is that they are all species (or instances) of a single generic relation which is transitive and asymmetric.²⁰

Response to the transitivity and asymmetry arguments

Considerations from the logical interaction of the grounding relations, I think, constitute the strongest argument in favour of unity. I now want to consider two arguments which Wilson might offer in response, and show why they are found wanting.

Argument from conceptual unity. First, Wilson might argue that the fact the small-g relations seem to obey a mixed transitivity principle stems from their being conceptually, rather than metaphysically, unified. She might argue, for instance, that when A grounds* B and B grounds** C , there is no metaphysical reason to suppose that a further grounding relation holds between A and C . Rather, it is our explanatory practices which make it seem so. When B is explained in terms of A and C in terms of B , it appears as though C is explained in terms of A . But there is no direct explanatory link between A and C —it is rather parasitic on the mediate explanation of C in terms of B . By coming to understand C in terms of B , and B in terms of A , it appears (*to us*) as though we have come to understand C in terms of A .

There are two responses to such a move, however. First, even granting that there may be only an appearance of transitivity, this response has no force against the asymmetry argument. For, presumably, the analagous argument goes: when A grounds* B , it may equally be the case that B grounds** A , but because of our explanatory practices (we don’t like circular explanations), we routinely miss cases of symmetric explanation. Such a response suggests that we are systematically blind to grounding relations which crop

²⁰Wilson would probably find this argument question-begging, since she thinks we should leave open the possibility for symmetric dependence. I find her arguments unconvincing. See Section 2.8 below.

up where one already holds in the other direction, which seems implausible. Granting the cogency of the response to apparent transitivity, we are still unable to say why the various grounding relations would ‘get out of each other’s way’, as asymmetry demands. Second, the move requires us to make a controversial assumption about explanation—that it is generally not transitive. For, suppose that ‘ A grounds* B ’ and ‘ B grounds** C ’ do not entail that A grounds C . In the absence of a further grounding relation, independent from these, there is no appropriate determination relation to underwrite the correctness of an explanation of C in terms of A . Thus, not only do we have to accept that our explanatory practices give the appearance of grounding transitivity, we also have to accept that those practices are wrong.

Argument from overgeneralisation. The second argument is a kind of reductio. For a similar kind of transitivity argument seems to show that grounding and causation are unified—an apparently unwelcome result. Consider the following example from Lange (2013):²¹

- (15) The expansion of a balloon is caused by the fact that its internal pressure is greater than the external atmospheric pressure.
- (16) That the internal pressure is greater than the external pressure is grounded in the forces exerted by the gas molecules on the balloon’s interior.

From this it seems to follow that the forces exerted by the molecules on the balloon’s interior determine the expansion of the balloon. Should we then conclude that grounding and causation are species of the same kind of relation? I say that we should. We already have a generic term for such a relation—*determination*. Moreover, it seems plausible that causation and grounding stand in a general asymmetry principle. (This follows immediately if determination is transitive and irreflexive.)

If one finds such a position too unpalatable, there is a way of understanding the example without invoking a generic determination relation. All that is required is that

²¹Lange uses the example only to show that metaphysical and causal (or, as he says, scientific) explanation stand in a transitivity principle.

we replace ‘the balloon expands’ with its microphysical description—to replace the fact that balloon expands with its ground. Then facts about the forces exerted by the gases cause the microphysical facts about the balloon, which in turn ground the fact that it expands. Diagrammatically (where A denotes the microphysical facts about the gas, B the facts about the pressure of the gas, C the expansion of the balloon, and D microphysical facts about the balloon):

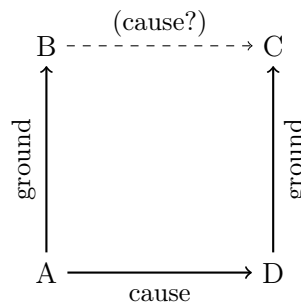


Figure 2.1: Grounding and causation without determination

This contrasts with how ‘upwards causation’ (or what we are calling determination) is usually understood in the literature (though grounding relations are usually glossed as ‘supervenience’ relations).

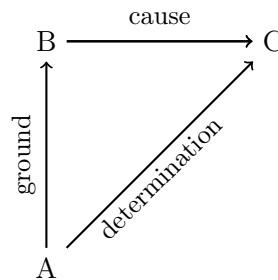


Figure 2.2: Determination or ‘upwards causation’

Although I do not think we are forced to such a conclusion, my preferred view is that causation and ground exhibit unity. While I think the relations are unified, I nevertheless

think they can be teased apart—though this is a difficult topic we will postpone until the next chapter. Thus, I don't think that the argument from transitivity overgeneralises.

2.7.4 Are grounding claims explanatory?

Earlier I speculated that the crucial upshot of Wilson's argument is that bare grounding claims are unexplanatory. If true, that would seem to remove one of the key motivations for the posit of ground. But I think Wilson's charge attributes to the grounding theorist something they do not hold. Grounding theorists do not claim that assertions of the holding of a grounding relation are explanatory. Compare: General Relativity explains the perihelion of Mercury. That is true, but it is not in itself an explanation. It is entirely unilluminating. It does not tell us why, exactly, the orbit of Mercury has the particular shape that it does. Rather, it asserts that an explanation exists—of the perihelion of Mercury in terms of General Relativity. But that is a rather involved story. Similarly, the claim that a certain mental property is grounded in some set of physical properties isn't itself an explanation—that is also likely to be a long and involved story. The claim merely asserts the existence of such an explanation. The grounding theorist's claim here is not that grounding *claims* are explanatory, but that *grounds explain what they ground*.

The explanatory connection may sometimes be somewhat opaque. Presumably, a physicalist would maintain that there is an explanation of some mental property in terms of some set of microphysical properties. Be that as it may, it seems likely that the mental facts and the microphysical facts will occupy opposite ends of a long grounding chain. We shouldn't expect a description of the microphysical facts to transparently explain how some mental property arises—they must be mediated by the grounds between. When a grounding theorist attempts to convey the content of her posit, she typically gives uncontroversial examples of (near) immediate ground. In such examples, the explanatory connection is usually (fairly) transparent. For instance, that a ball's sphericity grounds (explains) its disposition to roll. By contrast, the interesting grounding claims made by philosophers are rarely uncontroversial and are rarely immediate. As such, it is not surprising that an unadorned grounding claim would be explanatorily opaque. But

then, philosophers do not make extravagant, unembellished grounding claims—they are accompanied by theory. And grounding claims operate against the background theory. To illustrate, suppose a Humean about laws claims:

- (17) Laws of nature are grounded in the Humean mosaic.

If Humeanism about laws is correct, (17) is true, but it can hardly be considered an explanation in itself. What the Humean theory of laws does is first, give an account of what laws are, and second (drawing on the account of what laws are), show *how exactly* the laws of nature are grounded. To simplify the story somewhat, let's assume we're dealing with a naive regularity theory of laws: laws are just true generalisations (perhaps with some extra feature). Then, since a generalisation is grounded in its instances, so too is a law grounded in the particular features of the mosaic which instantiate it. This story is explanatory insofar as it tells us what is responsible for making the laws what they are, and showing us *how* it makes them what they are. (I will give a fuller account of how this works in the next chapter.)

Wilson seems to have conflated the two following enterprises: (1) giving a general account of ground, saying how it figures in philosophical theorising, and describing the general rules for its application, and (2) actually seeking the grounds for various phenomena. Only the latter actually provides explanations within first-order metaphysics. But to explain some phenomenon isn't merely to assert a grounding claim—even if that claim happens to be true. It is to show how that phenomenon is grounded in its ground, and that often involves invoking background theory. No grounding theorist expects a theory of consciousness to fall out of a theory of ground. It would just not be appropriate for a theory of ground to generate first-order metaphysical explanations.

2.8 Wilson's Alternative: The Primitive Fundamental

I hope by now to have shown that Wilson's criticisms of ground are unconvincing. But she also gives a positive proposal—one she claims is better than the grounding picture.

If we can show that Wilson’s framework is inferior (including by several of her own measures), then we will have indirectly defended the grounding programme.

Kit Fine and Benj Hellie offer the following response to Wilson: even if talk about metaphysical dependence must advert to more specific dependence relations, these relations are not enough on their own to establish a relationship of ground unless we invoke further assumptions—assumptions which make a crucial appeal to ground. My hand is a proper part of my body. But from this nothing follows as to whether my hand is dependent on my body or vice versa.

Wilson concedes that the small-g relations are unable to fix the direction of priority without invoking further assumptions, but denies that these assumptions must involve an appeal to ground. Instead, following ‘standard metaphysical methodology’, one first assumes a fundamental base and then sees what follows from this. ‘Fundamental’, however, cannot be understood as the grounding theorist understands it—as the *ungrounded*—for this would involve a tacit appeal to ground. Instead, the fundamental must be taken as primitive. As Wilson says, “[w]hich entities are in the fundamental base is primitive; this primitive specification then fixes the direction of priority” (p.561). Moreover, Wilson contends, this is the most appropriate way to characterise the fundamental:

...the characterization of the fundamental as the un-Grounded is metaphysically suspect...the fundamental should not be metaphysically characterized in negative terms—or indeed, in any other terms. The fundamental is, well, fundamental: entities in a fundamental base play a role analogous to axioms in a theory—they are basic...the fundamental should not be metaphysically defined in any other terms, whether these be positive or negative. (p. 560)

When considering how the non-fundamental stands to fundamental, it is easy enough to see how this primitive characterisation of the fundamental should work. Assuming that atoms are fundamental (for argument’s sake), H₂O molecules are clearly dependent on two H atoms and an O atom. But how are we supposed to determine the direction of priority between non-fundamental entities? Wilson responds that her view does not encode facts about relative fundamentality between non-fundamenta—but, that this is a “feature, not a bug” (Wilson 2016). For instance, both hands and bodies are non-

fundamental entities. However, *qua* mereological sums, bodies depend on hands, and *qua* functional objects, hands depend on bodies.

2.8.1 Absolute Fundamentality and Priority

Schaffer (2016a) thinks that Wilson's framework suffers a number of shortcomings when compared to the relative fundamentality framework—chief among which is that Wilson is unable to make sense of relative fundamentality. The proponent of relative fundamentality has a ready definition of absolute fundamentality (as the ungrounded), but there is no obvious definition in the other direction. This makes problems for Wilson in two ways. First, she cannot make sense of dependencies between non-fundamenta (though, as stated above, Wilson replies that this is a feature, not a bug).²² And second, she cannot make sense of structure in worlds with infinite descending chains of dependence (in which grounding is non-well-founded). Consider a world in which matter is gunky, rather than particulate. In such a world there are infinite descending chains of parthood, with no level serving as the fundamental base. On a relative fundamentality framework we can easily make sense of this, but on an absolute fundamentality framework we cannot—there is no absolutely fundamental level.

Wilson (2016) replies that she can make sense of such a world in two ways. For instance, if the chains of dependence converge on a limit, such as point-sized chunks of matter (in the same kind of way that the series $1, 1/2, 1/4, \dots$ converges on 0), we can take that limit as the fundamental base. Second, in keeping with a standard metaphysical methodology, if there is a level beyond which the deeper structure is irrelevant, we can simply select that level as fundamental. Moreover, claims Wilson, it is the relative fundamentality framework which is impoverished compared to hers. On her framework

²²Though Wilson considers this a feature, we might wonder whether the small-g relations deserve to be called 'dependence' relations when there is no clear direction of priority. When considering my hand and my body, it seems all we can say is that my hand is a part of my body or that my hand's functional properties are a subset of my body's functional properties. Nothing about dependence follows.

Furthermore, it's questionable whether this particular feature is desirable. With regard to the specific example, the appropriate response (as Kit Fine has suggested to me) may simply be to deny that bodies *qua* functional objects are identical to bodies *qua* mereological sums—in the same way that a statue is distinct from the clay which composes it.

she is able to make sense, for instance, of cases in which the fundamental entities are self- or mutually grounding, as per a Malebranchean or Leibnizian view. Wilson considers these important philosophical doctrines which shouldn't be ruled out of court.

I will grant Wilson these methods for establishing a fundamental base.²³ I want to take issue with her contention that her framework is more expressive than the grounding theorist's.

Relative Fundamentality for Absolutists?

Suppose the fundamental entities are self-grounding. Then on Wilson's view, one or other of the small-g grounding relations holds between a fundamental thing and itself. Even granting there's a suitable relation capable of holding reflexively, how is it supposed to work as a grounding relation? On Wilson's view, for a small-g relation to work as a grounding relation one of its relata has to be clearly more fundamental than the other. But in the case of a self-grounding relation, both relata (being the same thing) are equally fundamental. Similarly for mutually-grounding fundamenta. Thus, it's not clear how Wilson can make sense of these cases.

In a later paper, Wilson (forthcoming) clarifies her position. Small-g relations don't encode a direction of priority—that makes them apt to hold symmetrically. (Whether we want to *call* such relations 'grounding relations' isn't really a substantive dispute.) And although the small-g relations don't *encode* relations of priority, we can nevertheless settle questions of priority—if appropriate—on her framework. We just need the following:

- The holding of a small-g relation.
- A specification of which things are fundamental.
- A 'fairly specific' account of how the fundamenta stand to the non-fundamenta.
- Accounts of the natures of the non-fundamenta.

²³Actually I think that these responses betray Wilson's equivocation on 'fundamental'. See Section 2.8.2.

And again, Wilson claims that this is just ‘standard methodology’. Consider again hands and bodies. The operative assumptions we need here regard the nature of the non-fundamenta. If hands and bodies are functionally defined, then bodies are prior to hands, since hands inherit their function from bodies. If they are mere mereological sums, then priority tracks the parthood relation.

All is not as it appears, however. Wilson has glossed over some crucial steps as to how we derive priority relations. Even the case of the fundamental to the non-fundamental is not so straightforward. Let’s examine the cases in more detail.

Case 1. Fundamental to non-fundamental. Assume that mereological atoms are fundamental. Given that the whole is a fusion of the atoms, does it follow that atoms are prior to the whole? Yes, according to Wilson, that is how such questions of priority are generally decided. But consider: it is possible that two things x, y are each fundamental, and yet x grounds y . Hence, given that x is fundamental, and x grounds y , it does not follow that x is prior to y . Perhaps the problem is that some crucial information is elided: wholes are non-fundamental. Clearly now, atoms are prior to wholes. But small-g relations don’t encode priority! We need a principle connecting priority to (non-)fundamentality. Perhaps this would do:

(18) If x is fundamental, and y is non-fundamental, then x is prior y .

But this generates too many priority relations. Suppose the as compose A and the bs compose B . We don’t want to say that the as are prior to B . (We might want to say: the as are relatively more fundamental than B .) What we need is all three facts:

(19) If x is fundamental, y is non-fundamental, and x (small-g) grounds y , then x is prior to y .

This involves one more assumption than Wilson says we need, but so far, so good.

Case 2. Non-fundamental to non-fundamental. Which is prior: my hand or my body? Suppose we have the other requisite assumptions: the physical is fundamental; hands and bodies are fusions of the physical; and bodies are fusions of their parts.

How do we extract the conclusion that hands are prior to bodies? We have a priority principle connecting fundamentality, non-fundamentality, and the small-g relations, but no principle connecting two non-fundamental things and a small-g relation. There are two ways I can see to extract the desired conclusion. The first—not an option—is if parthood is inherently directed. The second is that the standing of the *fundamental* and the non-fundamental in a small-g relation encodes that relation with a direction of priority. Effectively, the fundamental-to-non-fundamental small-g relation ‘switches on’ the accompanying priority relation, such that parts are prior to wholes. The effect of this, however, is that parthood gets associated *generally* with a certain direction of priority—something Wilson explicitly wanted to avoid. Either way, I do not see how to resist the conclusion that small-g relations must be encoded—directly or indirectly—with a direction of priority.

Symmetric grounding

The grounding theorist can express facts Wilson can’t: priority relations. But Wilson also claims that she can express facts the grounding theorist cannot: relations of symmetric grounding. I do not advocate giving up asymmetry,²⁴ but since we are debating the relative expressiveness of our frameworks, it is worth noting that doing so allows us to (consistently) express symmetric grounding relations. And, moreover, we can still define absolute fundamentality:

(20) **ABSOLUTE FUNDAMENTALITY** (with self- or mutually grounding fundamenta):

x is fundamental $=_{df}$ there is no y such that y grounds x and x doesn’t ground y .

And we have the choice whether to keep a version of asymmetry restricted to the non-fundamental:

²⁴The assumption of asymmetry is not universally held by those sympathetic to grounding. Carrie Jenkins (2011), for instance, argues that it is bad methodology to *assume* that grounding is irreflexive. She grants that it sounds bad to assert ‘ x grounds x ’, but denies that this entails anything substantive about irreflexivity. The way I see it, if it sounds bad to say ‘ x grounds x ’, that is defeasible evidence that we have trouble understanding it. And our having trouble understanding it is defeasible evidence that it doesn’t make sense. Thus, the burden of proof is with the denier of irreflexivity.

(21) **RESTRICTED ASYMMETRY:**

If x grounds y and y grounds x , then x, y are fundamental.

Such a principle allows us to derive a contradiction whenever x or y is clearly non-fundamental. One may think the obvious downside to this view is that grounding can't be viewed *in general* as one of relative fundamentality. Thus, the question arises as to whether the grounding theorist can account for priority. This is easily answered. We just need to adopt a weak notion of relative fundamentality ($\leq_f$), rather than a strict notion ($<_f$). We then take grounding to be encoded with this weak notion. Given that A grounds B , it follows that $A \leq_f B$. If we want to establish that $A <_f B$, we just need to further establish that B doesn't also ground A . Thus, the methods for determining relative fundamentality are just those for determining grounding.²⁵

2.8.2 Slogans

We now consider Wilson's conceptual rationale for taking the fundamental as primitive. Recall: she thinks it is inappropriate to characterise the fundamental *in any other* terms (let alone the negative, relational), because the 'fundamental is, well, fundamental'. There are two problems with this. First, as Berker (2015, footnote 67) notes, Wilson seems to have conflated two things: the *characterisation* of the fundamental, and *what entities we take to be fundamental*. Or, more perspicuously:

(22) 'Fundamental' is a primitive term.

(23) That x is fundamental is primitive.

²⁵The last point here is somewhat of a cheap shot, so I relegate it to a footnote. Wilson's criticism that the grounding framework rules out Leibnizian or Malebranchian views is an explicit appeal to ecumenicalism—that general philosophical frameworks should not rule out, as a matter of stipulation, substantive philosophical positions. I'm not sure I share Wilson's commitment to ecumenicalism. Any framework (having content) is going to rule out some views—and we can appeal to our framework when deciding between views. If we encounter a particularly appealing first-order theory which is inconsistent with our framework, then that may be reason to revise it, but Wilson has not provided one. Even granting that Malebranchian and Leibnizian views are inconsistent with grounding (though I don't think they must be), Wilson's framework arguably rules out positions which are more plausible than these. On her view there can be no relations of dependence or relative fundamentality between non-fundamenta. If a choice must be made between a framework which accommodates current popular views and a framework which accommodates views of historical interest (but which few take seriously these days), I don't think that will concern too many grounding theorists.

Here, ‘primitive’ doesn’t even seem to be employed with a consistent sense. In (22) it applies to an undefined term. In (23) it is used to designate a fact or claim which is assumed at the outset of inquiry. The upshot of the distinction is this: we can still assume, as a starting point of inquiry, which entities or facts are fundamental, *and* we can say what it is to be fundamental. Whether or not Wilson is correct that standard metaphysical methodology is to assume some level as fundamental, and then see how the rest of the facts hang together, this strategy is open to (and often employed by) the proponent of relative fundamentality. Questions of relative fundamentality are hard, and often one must consider such questions holistically. This is essentially the kind of strategy employed by Schaffer (2010a) when considering whether wholes or parts are prior. Thus, Wilson’s appeal to ‘standard metaphysical methodology’ doesn’t motivate her taking ‘fundamental’ as a primitive term. Furthermore, the grounding theorist can accommodate the driving intuition behind her slogan ‘the fundamental is fundamental’—that the starting point of inquiry is to assume some set of phenomena as fundamental.

What of Wilson’s contention that it is inappropriate to characterise the fundamental in any other terms, let alone non-basic, relational, negative terms? I submit that fundamentality is an inherently relational notion. First (for whatever it’s worth), there is the linguistic evidence: the fundament is literally the *the ground of something*, and in many languages the terms are the same (Italian: *il fondo* vs *fondamentale*). Second, and more to the point, the characterisation of something as fundamental when it fails to be the ground of anything is gratuitous. In a world with a flat structure, in which nothing grounds anything else, the notion of (absolute) fundamentality is redundant—it doesn’t add anything to our conception of such a world. Indeed, what is interesting about such a world is that no relation of relative fundamentality holds between any two things.

We can turn this thought into a modal argument. Suppose that quarks are among the absolutely fundamental things. Further suppose there is a nearby world in which quarks are built from hyperquarks. (And that everything about quarks can be accounted for in terms of hyperquarks.) In such world we are inclined to say that it is the hyperquarks, and not the quarks, which are fundamental. Since Wilson takes fundamentality to be a

primitive, non-relational, matter, she has no principled reason for preferring to take the hyperquarks, rather than the quarks, as fundamental. Of course, Wilson is fully entitled to primitively specify that it is the hyperquarks which are fundamental in such a world, and refuse to say anymore on the matter. But that is not very satisfying. Not only do we want to take hyperquarks as fundamental, we can *why*. Can Wilson rule out this world as impossible? Could she say that quarks are essentially or necessarily fundamental? Sure. But she should say why we should regard them as such. And I cannot see any plausible reason other than that quarks are essentially unstructured. And that is to characterise fundamentality in structural (hence, relational) terms. Thus, either quarks might have been structured, and thus non-fundamental. Or they are essentially structureless. Either way, fundamentality is intimately bound up with the notion of structure.

To top this all off we can give what I think is a satisfying positive characterisation of the fundamental. On this characterisation ungroundedness turns out to be a materially adequate definition of the fundamental, but it doesn't really capture what is special about the fundamental. It is this. The world is a vast hierarchy of facts. What is special about the fundamental facts is that they occupy a unique and privileged position in this hierarchy. It is not that there is *nothing below* the fundamental, but that the fundamental is (collectively) that in virtue of which *everything else* may be explained.

CHAPTER 3

Metaphysical Explanation

3.1 Introduction

There is an underappreciated controversy—the *formulation* controversy—among grounding theorists: how should we represent grounding claims? The *operator* theorist thinks that grounding claims should be expressed using a connective or operator. There is perhaps no natural language analogue for such an operator—but ‘because’ comes pretty close. ‘*A* grounds *B*’ is to be read as something like ‘*B* because *A*’, with ‘because’ read in a metaphysical, rather than causal, sense. The *predicate* theorist thinks that grounding is a relation, and so naturally represented with a relational predicate. On this view, ‘*A* grounds *B*’ is to be taken at face value, with ‘grounds’ serving as the required relational predicate. It is, of course, a further controversial matter, which we will come to below, what kinds of entity *A* and *B* should be taken to denote. Often, operator theorists speak informally of a ‘grounding relation’, or of one fact’s grounding another. It will be helpful to reserve a term which is neutral between the operator and predicate views. I will reserve ‘grounding connection’ or simply ‘connection’ for such purposes.

The formulation controversy is often noted, but quickly passed over, with words to the effect: ‘nothing in my argument depends on any particular formulation of grounding claims’. In most cases this is true. But there are interesting and important cases in

which it's not. The first half of this chapter aims to do two things. First, it aims to show why the dispute matters more than is often supposed (answer: it has *immediate* consequences for how we theorise with and about grounding). And second, it defends the predicate view. My concern is not to show that it is illegitimate to represent grounding claims with an operator. (And thus my argument in no way undermines work on the logic of ground which takes it to be an operator.) It is rather to show that grounding is—*most basically*—relational. Operational grounding claims are fine, so long as it is recognised that the operator is defined in terms of the relation, and not the other way about.

The formulation controversy is entangled with another controversy about grounding: how does it relate to explanation? It is generally agreed that grounding is intimately related to explanation, but there is no consensus on the precise nature of that relationship (and like the formulation controversy, it's hard to detect in the literature a sense that it really matters). But there are two broad views we can discern. In Raven (2015)'s memorable terminology, we can be *separatists* or *unionists*. The unionist thinks that a relationship of ground just *is* an explanation. If *A* grounds *B*, then *A* explains *B* because, well, that's just what it is for *A* to ground *B*. The separatist, on the other hand, thinks that while grounding and explanation are intimately related, they are distinct. The relationship is rather that grounding *backs*, *underwrites*, or grounds(!) metaphysical explanation in the same way that causation backs causal explanation. Now, I don't think the settling of either dispute would settle the other. But one can see how the operator view sits more naturally with unionism (if explanations are canonically expressed with 'because', then so are grounding claims), while the predicate view sits more naturally with separatism (if ground stands to explanation as causation does, and causation is a relation, then it's natural to think of ground as a relation)—and indeed this is borne out in the dividing lines among grounding theorists.

After arguing for the predicate view, then, the second half of this chapter is devoted to defending separatism. Along the way we settle some outstanding issues regarding the relationship between grounding and causation. But most importantly, we moti-

vate a theory of *philosophical explanation*—explanation by philosophical theory—with grounding at its heart.

3.2 The Logical Form of Grounding Claims

3.2.1 Operational Grounding Claims

Let us begin by formulating the operator and predicate views a little more precisely. Take an informal grounding claim: ‘the truth of A and the truth of B together ground the truth of $A \wedge B$ ’. How should we render this officially? According to the operator theorist, we should define a grounding operator:

$$\Gamma < \phi$$

where Γ is an unordered list¹ of sentences representing the grounds, ϕ is a sentence representing what is grounded, and $<$ says that the $\gamma_i \in \Gamma$ ground ϕ . Here is the official rendering of our grounding claim:

$$A, B < A \wedge B$$

Γ is taken to be unordered because the order in which the grounds are listed does not affect the truth of a grounding claim. The following is also an official rendering of our grounding claim:

$$B, A < A \wedge B$$

Informally, we can read ‘ $A, B < A \wedge B$ ’ as ‘ $A \wedge B$ because A, B ’ or ‘ $A \wedge B$ is true because A is true and B is true’.

¹Why not a set? The pedantic reason is that we can’t flank a sentential operator with set names and get a well-formed formula. The substantive reason is that it is not a *set* of grounds which enter into a grounding connection but the grounds themselves.

3.2.2 Predicational Grounding Claims

The predicate theorist has no need for a grounding operator. For her, grounding is a relation, so it will be denoted by a relational predicate. Let R denote the grounding relation (which we take to be variably polyadic to the left). Then

$$aRb$$

is taken to mean ‘ a grounds b ’. We are neutral here as to what kinds of things a and b are. Most predicate theorists consider R ’s relata to be *facts*. If ϕ is a sentence, we will take $[\phi]$ to denote the fact that ϕ . For the predicate theorist, the official rendering of our grounding claim is then:

$$[A], [B]R[A \wedge B]$$

Since this is rather ugly, we will unofficially take $a, b, c \dots$ to stand for arbitrary facts. ‘ $abRc$ ’ is easier on the eye. If one thinks, as Schaffer (2009, 2016b) does, that grounding can relate objects of arbitrary category (including facts, properties, and individual entities), then $a, b, c \dots$ will range over arbitrary objects of arbitrary category. This is fine, so long as we’re dealing with a *pure* logic of ground. But an impure logic of ground will have to distinguish categories.²

3.3 Motivating the Operator View

There are three principle motivations for the operator view. The first appeals to an analogy with explanation. The second is pragmatic—the operator approach is useful for building logics of ground. The third, most substantive, motivation is that operational grounding claims are ontologically neutral. Let’s dispense quickly with the first two, and focus on the third.

²See Fine (2012a). Whereas the pure logic of ground deals with the structure of the grounding relation, the impure logic also deals with the internal structure of the relata. Thus transitivity may be seen as a principle of the pure logic of ground. But the principle that a conjunction is grounded in its conjuncts belongs to the impure logic of ground.

Grounding is an explanatory notion. We can explain why a given fact obtains by appealing to its grounds. We can explain why a certain object has a disposition to roll by citing its sphericity. We might say: the ball has a disposition to roll *because* it is spherical. The canonical representation of an explanation, it seems, makes use of the operator ‘because’. A grounding operator is just taken to indicate a restricted sense—the metaphysical sense—of ‘because’.

There are two problems with this approach. First, it straightforwardly begs the question against the separatist. Even if a grounding *claim* is an explanation, and so canonically represented with ‘because’, it does not follow that a grounding *connection* itself is an explanation. Ground may stand to explanation as causation does—it is the relation which gives explanation its required metaphysical backing. Second, even if grounding *is* a kind of explanation, it is not clear that explanation is basically operational, rather than relational. Sure, we can represent explanations with ‘because’, but we can also represent them with a relational predicate: ‘*A explains B*’. This motivation is inconclusive.

The second motivation is not, as far as I know, explicitly mentioned in the literature, but it is worth exploring. The operational approach is overwhelmingly favoured by formally-minded grounding theorists who like to build logics of ground (see Fine 2012b; Correia 2010; Schnieder 2011; Litland, forthcoming). The reason, we might surmise, is pragmatic. Grounding logicians take ground to be an operator in large part because it is easier to build a logic around an operator. The structural properties of ground can be captured with introduction and elimination rules. And the choice carries no ontological significance since operational grounding talk is in principle translatable with relational grounding talk (Litland (forthcoming) makes this point explicitly). How might the translation go? Replace the inference rules with axioms in a first-order theory—axioms governing the non-logical grounding predicate *R*. Take the cut rule. Its role can be played by an axiom expressing the generalised transitivity of *R*. Or take Fine’s non-circularity rule ‘ $A < A \vdash \perp$ ’. Its role can be played by an irreflexivity axiom: $\forall x \neg(xRx)$.³

³The relative merits of such systems may be unclear. It is at least generally acknowledged that

But that intertranslation is possible does not dissolve the dispute. We want to know if ground is most basically operational or most basically relational. Pragmatic concerns about building logics are silent on this issue. We can define a grounding operator in terms of a grounding predicate and vice versa, but so what? Defined terms are interesting only insofar as what defines them is interesting.

This brings us on to the third motivation. When pressed, the operator theorist has a fallback defence—operational talk is ontologically non-committal. *Prima facie*, an operational claim is ontologically neutral in two respects. First, it frees us of commitment to any kind of special entities, such as facts, which stand in a grounding relation. Correia (2010), for example, writes that his

preference goes to [the operational] approach for reasons of ontological neutrality: it should be possible to make claims of grounding and fail to believe in facts. (p. 254)

Second, the operator view frees us of commitment to a grounding *relation*. Just as a conjunction need not commit us to some kind of worldly conjunction operation (its truth value directly depends on the truth values of its conjuncts, taken individually), so too we can talk about ground and grounded without invoking some kind of ‘spooky’ grounding relation. In any case, we can talk about ground and grounded without having to attend to the details of what kind of relation, if any, ground might be. In this vein, Raven (2015) writes:

Perhaps the main benefit of the operator approach is that it postpones controversies immediately arising for the relational approach. The latter strongly suggests that ground is a relation, and so prompts us to engage with the controversies over what this relation is and what its relata are. (p. 324)

The neutrality motivation has two interpretations of unequal strength. The stronger claim is that a grounding ideology incurs *no* ontological cost. The weaker claim is that a grounding ideology may incur an ontological cost, but it is open as to what that cost

axiom systems are cumbersome to *use*, but sometimes it is easier to prove adequacy results *about* them. And the relative difficulties are going to depend, to a great extent, on how exactly you set up your semantics and deductive apparatus.

is—it may not commit us to facts, but it commits us to some entities or other. I will argue, first, that if we think that a grounding ideology incurs an ontological cost, it is ill-advised to postpone questions as to what that cost is. And second, I will argue that it is implausible we can adopt a grounding ideology without incurring a cost in ontology.

3.3.1 Against Postponement

Relation Neutrality

In many cases we can make grounding claims without attending to the details of what, exactly, the grounding connection is, or what its ‘relata’ are. We can say, for example:

(24) The fact that the ball is red is grounded in the fact that it is maroon.

Or we can say:

(25) The ball is red because it is maroon.

But the underlying grounding claim depends on the particularities of neither formulation. This is not true in every case. Suppose we take ground to relate *facts*. How do we distinguish facts? The dominant view is that a fact is an obtaining state of affairs—a property or relation together with some object(s) which instantiate(s) it. A fact is a ‘chunk of the world’, so to speak. If a is F , then there is the fact of a ’s being F . We might think of this fact as a kind of abstraction from a —but the important point is that facts, like events, are things in the world. The key upshot of this is that the identity of a fact depends in no way on how we might represent it. If F and G denote the same (worldly) property, and a and b denote the same object, then a ’s being F and b ’s being G are the same fact. Call this the *worldly* view of facts. If, additionally, we want to distinguish facts by the way they are represented, then we get a *conceptual* view of facts.

Disputes about how we ought to understand facts have already given rise to disagreements about the kinds of grounding claims we ought to accept and the relationship between grounding and other notions. For instance, Rosen (2010) takes a conceptual

view of facts (this is how Audi (2012b) reads him anyway). This allows him to distinguish facts by their senses as well as their worldly constituents. He can distinguish, for instance, the fact that something is square from the fact that it is an equilateral rectangle. The upshot is his Grounding-Reduction Link: if the fact that q reduces to the fact that p , then p grounds q . If reduction indicates identity, then this presents a problem, as grounding is irreflexive. Irreflexivity can be maintained, however, if we can distinguish conceptual facts from their worldly counterparts.⁴

The distinction between worldly and conceptual facts may be thought irrelevant to the operator/predicate dispute. After all, we can distinguish propositions by their senses. And we can stipulate whether grounding is to be sensitive to differences in sense. If we suppose that facts, being worldly kinds of things, do not have senses, and we wish to uphold the Grounding-Reduction Link, then we can take grounding to be operational. There are many positions to carve out in logical space. But the point is that, whichever position we wish to carve out for ourselves, our views on the relata, grounding connection, and grounding's relationship with other terms will have to cohere. This is highlighted by the case of reduction.

Further disagreements about grounding claims are generated if we think, like Schaffer (2009, 2016b), that grounding can relate entities of arbitrary category. Schaffer thinks that objects can ground and be grounded. For instance, an object—Socrates—grounds the fact that Socrates exists. A complex object—a married couple—is grounded in the fact that Ann is married to Bill. Socrates grounds {Socrates}. The operator theorist won't just deny such grounding claims—she won't even be able to express them. Sentential operators can't take singular terms as arguments. Fact-talk and proposition-talk is plausibly intertranslatable. But object-talk and proposition-talk cannot be.

We might see fit to dismiss Schaffer's view out of hand. After all, ground is supposed to be explanatory. How can it relate objects? Objects just don't seem like the kinds

⁴As I say, this is Audi's reading of Rosen. As I read Rosen, he simply denies, contra Audi, that reduction must be understood as identity. It is not that *being square* and *being an equilateral rectangle* are different representations of the same property, but that they denote different properties.

of things that can explain or be explained (except in some extended sense).⁵ If this is right, then Schaffer's view further obscures the relationship between ground and explanation. Grounding explanations are a kind of explanation *why*. Given a grounding claim like 'the fact that Socrates exists grounds the fact that {Socrates} exists', the correlate explanation is obvious: '{Socrates} exists because Socrates does'. But we cannot ask 'why {Socrates}?''. We might say: that Socrates grounds {Socrates} backs the explanation '{Socrates} exists because Socrates exists'. But two worries. First, the question of how exactly the grounding claim relates to the explanation remains. In the former explanation, the explanans *is* the ground, the explanandum *is* the grounded. Here they are different. So what must be the relevant connection between ground/grounded and explanans/explanandum? Second, why would two grounding relations back the same explanation? To be sure, this does not look like a usual case of overdetermination, as when two logically independent facts both fully ground some other fact.⁶ Rather, it looks as though one of these grounding claims is properly redundant.⁷

There may be more to be said for Schaffer's view, however. It would permit, for instance, the assimilation of some nearby notions to ground, allowing for greater ideological parsimony. Take ontological dependence. It seems that {Socrates} ontologically depends on Socrates. With a liberal view on what can ground and be grounded, we can assimilate this talk: Socrates grounds {Socrates}. This would be attractive to someone who thought that the kind of dependence involved in ontological dependence looks very much like that involved in grounding.

It might be thought we could easily define ontological dependence in terms of fact-grounding: x ontologically depends on y iff the existence of y grounds the existence of x . There is a potential snag, however. If facts are made up of particulars and their

⁵Carrie Jenkins (2008, p.64) gives the following example: Mr Smith's broken steering wheel is the explanation of the car crash. But it seems clear that what is doing the explanatory work is *the fact that* the steering wheel was broken. In fairness, Jenkins only observes that our linguistic practices suggest that explanations can be of any category.

⁶As when $p \vee q$ is grounded by both p and q , though each on its own is a full ground.

⁷Perhaps it could be replied that an object a is a limiting case of a fact—the fact that a exists. But this is implausible, since it entails that every object is *identical* to a fact. Socrates and the fact that Socrates exists are very different kinds of things.

properties, but there is no existence property, then there are no existential facts. On the other hand, existential truths are unobjectionable. And it seems as though existences can clearly be explained—Socrates’ existence clearly accounts for the existence of {Socrates}. If one is resistant to the idea that objects can ground or explain, but wants to maintain that existences can ground and explain, one should opt for the operator approach.

Relation Neutrality

Why be neutral about a grounding *relation*? Perhaps, being properly metaphysical, it is a ‘spooky’ kind of relation. Operator theorists who stress that grounding is nothing more than explanatory notion might be read as attempting to allay such concerns. Dasgupta (2014, p. 558) writes: ‘[a]s I use the term, [ground] is a purely explanatory notion: to say that some facts ground another is just to say that the former explain the latter, in a particular sense of “explain”.’ The thought is: we have a pretty good handle on explanation, and we are antecedently committed to it. If grounding just is (a kind of) explanation, then we have no need to be skeptical about it (*prima facie*, at least).

Though one feels the pull of the spookiness charge, it is quite hard to say what it amounts to. I surmise two possible candidates. First, it might be meant with the kind of sense in which Mackie (1977) uses ‘queer’—that grounding is a relation quite unlike any other relation. It is a determination relation between ‘non-distinct’ relata (cf. Schaffer (2009)) which gives rise to special type of objective explanation. Though causation shares similar features (apart from non-distinctness of its relata), it is not spooky because it is a folk notion, and is perhaps even perceptible (Anscombe 1971). The second—related—interpretation is that grounding represents Hofweber (2009)’s esoteric metaphysics. One has to be antecedently committed to grounding in order to make sense of grounding talk. Because no reductive account is forthcoming, the uninitiated might find it hard to see what is meant by ‘grounding’, find the notion slippery, and consequently become skeptical it has any definite sense.

Whatever the merits of such skeptical worries, it is hard to see why they should concern operator theorists less than predicate theorists. The ‘spookiness’ or otherwise

of a grounding connection is not to be attributed to its being relational. Indeed, it might be thought a world exhibiting operational structure without correlate relational structure is even spookier. And one is unlikely to find operational grounding talk intelligible but balk at relational grounding talk. In any case, the alleged ‘spookiness’ of grounding ought only to worry those antagonistic to metaphysics generally. Such an attitude is unlikely to be well met by adopting the operator view. Even if grounding claims are explanations, those explanations are meant to be properly metaphysical. Moreover, operational neutrality only postpones the inevitable question. Isn’t explanation a kind of relation? That we may postpone controversies about what kind of relation grounding is (and what its relata are) is not a good reason to believe that relata and relation do not exist, and thus does not motivate taking ground to be basically operational.

3.4 Grounding and Ontological Commitment

3.4.1 Logical Form and Ontological Commitment

We now consider how an operator theorist might renounce any ontological commitments. The operator theorist I have in mind thinks that there are true grounding claims, and yet denies their truth commits her to any new kinds of entity—neither to relata nor relation. Why should we be inclined to accept this? The reason is Quinean in spirit (notwithstanding that grounding theorists self-consciously aim to build a post-Quinean metaphysik). We need be committed only to the values of bound individual variables. And the logical form of operational grounding claims contains no individual variables, let alone bound ones.

But we might resist this idea. There seem to be valid inferences which quantify into sentence position of grounding claims. Consider:

$$(26) \quad A < (A \vee B)$$

‘A grounds (A or B)’

$$(27) \quad B < (A \vee B)$$

‘ B grounds (A or B)’

(28) So, $\exists p[(A < p) \wedge (B < p)]$

There is something both A and B ground.

At the very least, then, we should think that operational grounding claims commit us to propositions. Perhaps such entities are less suspect than facts, but they are certainly not uncontroversial. If this is true, then the motivation for the operator view is weakened.

But, alas, things are not so straightforward. There are good reasons for treating sentential variables (or predicate variables) differently to individual variables (see Textor 2005). A grounding claim no more commits us to propositions than does the claim that the Earth is flat. The reason that existential generalisations on individual constants carry ontological commitments is that the unquantified sentence already presupposes such a commitment. Consider:

(29) Socrates is wise.

(30) So, $\exists x(x \text{ is wise})$.

The reason this inference is even valid is because (29) is *logically stronger* than (30)—that is, it contains more information. Analogously, if ‘ $A < B$ ’ does not already commit us to propositions, neither will ‘ $\exists p(A < p)$ ’.⁸

But suppose the Quinean is right. Then, while the predicate theorist might be committed to facts (as the values of the singular terms flanking our predicate), she will not be committed to a grounding *relation* (since predicates are ontologically non-committal). That the predicate view should be committed to relata but not relation, I think, highlights the shortcomings of reading ontological commitments off logical forms. We are verging on the incoherent.

⁸So how are we to understand quantified sentence variables? The usual strategy is to take such quantifications to be *substitutional*. As Wolfgang Künne (2003, p. 356) puts it, ‘if one construes the quantifiers *substitutionally*, quantification into positions of any grammatical category is permitted’ (emphasis original). Such quantifiers are not associated with a domain of objects, but rather with a class of suitable substituends. Thus, ‘ $\exists p(A < p)$ ’ is true iff we can find a suitable expression to substitute for p and the result be true. ‘ $A \vee B$ ’ is such an expression.

Perhaps a better way to determine ontological commitments is via *truthmaking*: what is required of the world in order for a grounding claim to be true?

3.4.2 Truthmaking and Ontological Commitment

In order for a sentence to be true the world must be a certain way. It is natural to conclude that a sentence commits us to whatever the world must be like in order for that sentence to be true. This proposal captures a similar sentiment to Quine's, but is more general. Quine's criterion commits us to the values of the individual variables which must exist for a sentence to be true. The truthmaker criterion of ontological commitment does not impose such strictures. If there must be properties for p to be true, then p commits us to properties. *However* the world must be for p to be true is what p commits us to.

This kind of proposal certainly packs intuitive force, and has eminent advocates (see Armstrong 2004; Heil 2003; Cameron 2008a). I'd certainly like to advocate something like it. But deriving ontological commitments from truthmaker commitments doesn't sit well with grounding theory—or at least, not the kind of grounding theory I'd like to advocate. Let me explain.

A plausible principle governing grounding and truthmaking is this:

- (31) If t is a truthmaker for p , and $p < q$, then t is a truthmaker for q .

This is plausible since a truthmaker is sufficient for the truth of what it makes true, and a ground is sufficient for the truth of what it grounds. This is why Schaffer (2008) thinks that truthmaking is useful for determining *fundamentality* commitments, but not ontological commitments. If we need be committed only to those entities which must exist in order for some claim to be true, we need only be committed to its most fundamental truthmaker—that is, the lower bound of its grounding chain. That is bad in two respects.

First, it removes what (for me at least) is one of the most attractive features of grounding theory—that it allows for an abundant, yet methodologically acceptable, on-

tology. We can countenance all the higher-level facts—about numbers, universities, human beings, or what have you—provided they are grounded on a sparse fundamental basis (Schaffer 2009). On the truthmaker account of ontological commitment, though we may speak truthfully about such things, they don't *really* exist. As I see it, that's a major loss.

Second, the truthmaker approach favours the operator view. If only the fundamental facts or states of affairs exist, and p grounds q , then either the fact that q does not exist, in which case, there's nothing to be related. Or else the fact that q just is the fact that p , and by irreflexivity, the fact that p cannot ground the fact that q . To restore irreflexivity, ground must be taken to be a connection between representations of the facts (and so distinguished by sense), not the facts themselves.

Even if one is inclined to accept that only the fundamental really exists (or is really real), I would not advocate the truthmaker approach to ontological commitment. For the truth of a grounding claim would then depend not on the world, but on our representation of it. For if p and q both represent the same state of affairs, then the only thing that could make a difference to whether p grounds q or vice versa would be a difference in the representations themselves. This flouts one of the main lessons of Fine (2001):

[W]e need to restore ourselves to a state of innocence in which the metaphysical claims are seen to be about the subject-matter in question... and not the means by which it might be represented or cognized. (pp. 7–10)

Can we retain some lesson from the truthmaker account of ontological commitment, while still retaining the spirit of grounding theory? The lesson I'd like to retain is this: the ontological commitments of a given claim are just what the world must contain for the claim to be true. This can be achieved easily enough. Let t be the ultimate (most fundamental) truthmaker for p . We define a battery of related notions.

First, truthmaking is closed under full grounding.

(32) If t fully grounds t' , then t' is also a truthmaker for p .

We can think of t' as an intermediary truthmaker. This allows for mediate and immediate

notions of truthmaking—analagous to mediate and immediate ground.

- (33) t is an *immediate truthmaker* for p just when t is a truthmaker for p and there is no truthmaker t' for p such that t grounds t' .

We can also define the notion of an *ultimate truthmaker*:

- (34) t is an *ultimate truthmaker* for p just when t is a truthmaker for p , and there is no full ground for t which is also a truthmaker for p .

Now, I say that a truth is committed to *all* of its truthmakers. But one problem remains. We must include among the truthmakers the *partial* truthmakers. For t may be the ultimate truthmaker for p , and yet fail to be fundamental. But if we are committed to a truthmaker, we should also be committed to *its* grounds. Thus, let us say that

- (35) t is a *partial truthmaker* for p just when t partially grounds t' and t' is a truthmaker for p .

If there are conjunctive facts, then the fact that p will be a partial truthmaker for ' $p \wedge q$ '.

We could go further, and define the notion of an ultimate partial truthmaker (which would just be a fundamental, or ungrounded, fact). But these notions will suffice. I say that a truth is committed to both its truthmakers and partial truthmakers.⁹ This comports nicely with the idea that a truth commits to whatever must obtain to make it true. A truth certainly commits us to its ultimate truthmaker, and an ultimate truthmaker commits us to whatever it grounds.

3.5 Truthmakers for Operational Grounding Claims

Here is the view I wish to defend:

⁹It may be objected that a truth has many possible truthmakers. They need not all obtain for the truth to be true. So why must a truth commit us to *all* of its truthmakers? I don't really see a problem here. Take the truth 'there are cats'. This has many possible truthmakers: Felix, Tibbles, Garfield... The truth doesn't commit us to any particular a cat. It commits us to *some cat or other* (or 'the arbitrary cat'). If a truth has many possible truthmakers, it seems natural to say that it is committed to *one or other* of them.

- (36) The immediate truthmaker for an operational grounding claim is a grounding fact $[a_i R b]$, where a_i is (are) the ground(s), b is the grounded, and R is the grounding relation.

Thus, if it is true that B because A , then this is because the grounding relation holds between a , the fact that A , and b , the fact that B .

My strategy will be to argue that, in general, a non-truth-functional claim is true just in case some (possibly monadic) relation makes it true. This is because truth depends on the way the world is. But operators are linguistic, rather than worldly, items, though the worldly counterpart of an operator is a relation. While *truth-functional* operators may safely be regarded as ontologically neutral, they are disanalogous to non-truth-functional operators. The disanalogy arises because truth-functional operators are eliminable—nothing more is required of the world than that their arguments have certain truth-values. Non-truth-functional operators require more of the world. Since, when construed as an operator, grounding is non-truth-functional, it follows that an operational grounding claim must be made true by the holding of a relation.

3.5.1 Non-Truth-Functionality

The usual truth-functional operators are familiar: $\neg, \wedge, \vee, \rightarrow$. Such operators take an ordered pair of truth values (or a single truth value, in the case of negation) and return another truth value. Consequently, the truth of ' $\phi \wedge \psi$ ', say, depends only on the truth values contributed by ϕ and ψ . We do not require of the world that there be some kind of non-linguistic conjunction operator for a conjunction to be true. All that is required is that each conjunct be true. (See Schnieder 2008 for an account of truth-functionality defined explicitly in terms of dependence.)

We cannot appeal to the ontological neutrality of the truth-functional connectives in defending the ontological neutrality of grounding, for the grounding operator is non-truth-functional. If you are not convinced, suppose A and B are true. Then (37) is true, while (38) is false.

$$(37) \quad A, B < A \wedge B$$

$$(38) \quad A \wedge B < A$$

Since A and B are true, these claims would be materially equivalent, if truth-functional.

A non-truth-functional operator may be a function of truth values plus ‘something else’, or it may merely be a function of something else. For instance, ‘because’ statements seem to presuppose that both antecedent and consequent are true (Schnieder 2011, p. 451). To say that John got cancer because he smoked when he doesn’t smoke or have cancer is at best highly infelicitous. But even it is true that John both smoked and got cancer, it does not immediately follow that John got cancer because he smoked. John’s cancer could have been due to a genetic predisposition or exposure to asbestos. So in addition to truth, we must have the right connection between antecedent and consequent. With the causal sense of ‘because’, this is causation. The event described in the antecedent must be a cause of the event described in the consequent. The truth conditions of a causal *because*-sentence are then something like:

$$(39) \quad \text{‘} B \text{ because } A \text{’ iff } A \text{ and } B \text{ are true, and the } A\text{-event caused the } B\text{-event (plus some extra pragmatic stuff).}$$

Since causation cannot relate non-obtaining events, the truthmaker for a causal *because*-sentence then is just an obtaining causal relation.

On the other hand, an operator such as strict implication does not depend on the truth values of its constituents (at least not their actual truth values). ‘ A strictly implies B ’ is true iff if A is true, B must be true, whether or not A is actually the case. Since, the truth-values of A and B do not determine the truth of a strict implication, its truthmaker must be something else. In a simple case, it will just be the entailment relation: ‘ A strictly implies $A \vee B$ ’ is true because ‘ A ’ entails ‘ $A \vee B$ ’. In other cases it will be the necessitation relation: A necessitates ‘Socrates is self-identical’, because there is no world in which the former is true, and the latter false.

The problem with appealing to the ontological neutrality of truth-functional operators is that it is implausible that it carries over to non-truth functional connectives.

The truth value of a truth-functional claim is determined by the truth values of its constituent sentences. The truth value of a non-truth-functional claim is not. Thus, a truth-functional claim commits us to nothing over and above certain truths. To account for the truth of a non-truth-functional claim, we must appeal to something else.

We might think of the distinction as (imperfectly) analagous to the distinction between internal and external relations. An internal relation, like *being taller than*, is one whose holding depends only on the intrinsic properties of its relata. If Bill is 5'10 and Jim is 5'8, then those properties alone fix that Bill is taller than Jim. Nothing 'external' to Bill, Jim, and their intrinsic properties, is required. An external relation, on the other hand, requires something in addition to its relata's intrinsic properties—something properly located 'outside' them. For instance, London's being south of Sheffield is not something we can surmise from knowing all the intrinsic properties of London and Sheffield. We need to know how things are with London with respect to Sheffield. The point is: it seems we can straightforwardly deflate the need to recognise internal relations—they can be reduced to monadic properties. Likewise, we can deflate the need to recognise worldly conjunction operations—we just need to talk about truth values. But we cannot so easily dispense with external relations or the relations to which non-truth-functional operators must answer.

Simply put, my argument is an inference to the best explanation. Non-truth-functional operational claims require more of the world than that their constituents have certain truth values. The best candidates for the 'more that is required' are relations. Construed as an operator, grounding is non-truth-functional. Therefore, the best candidate truthmaker for a grounding claim is a relation.

3.5.2 Objections

Perhaps it will be countered: okay, of course there are many operational claims whose truthmakers are relations, but surely not all operators require relations. The '□' operator seems to be an example. I reply that the exact wording of my thesis was that the truthmakers for non-truth-functional operators were '*possibly monadic*' relations, i.e.

properties—the intention being to cover unary operators as well. And it seems evident to me that the $\Box$ operator at least requires a monadic property. Among other things, debates about metaphysical modality are debates about what makes modal claims *true*, or whether modality can be reduced to something else. The modal realist considers ‘ $\Box p$ ’ to be true just when p is true in all (relevantly similar) concrete, non-actual, worlds. The truthmaker for ‘ $\Box p$ ’ may be then regarded in a number of ways: as a relation between p and the worlds; a property of all the worlds, or a property of p . In any case, the truthmaker is a property of *something*. The dispositionalist thinks that modal claims are made true by categorical, dispositional, properties. The primitivist thinks modal claims are made true by irreducible properties the actual world has—ways the world might have been.

The second objection to consider stems from what Bennett (2011) calls the ‘superinternality’ of grounding: that a grounding relation holds in virtue of the intrinsic nature of just one of its relata—the ground. If grounding is superinternal, then the truthmaker for a grounding claim is just the fact doing the grounding. No relation is required. And in such cases we can assign truth conditions to operational grounding claims without making reference to a relation. I reply that what we have here is a case of *mediate* truthmaking. ‘ A ’ is a mediate truthmaker for ‘ $A < B$ ’, but the immediate truthmaker is the grounding relation between the fact that A and the fact that B . The objection makes the same mistake as the simple truthmaking account of ontological commitment. That is, it would commit us only to ultimate truthmakers, thereby wiping out the paradise afforded by grounding theory.

The last objection to consider is that we have no reason to consider grounding as a relation between *facts*, as opposed to a relation between propositions. Necessity claims might be reduced to properties of, or relations between, propositions, but we have not shown that necessity requires a property of a *fact*. It is true that I have not shown that grounding ought to be considered a relation between facts as opposed to propositions. My general claim about non-truth-functional operational claims is only that their truthmakers are facts involving relations (properties). I take no stand on the nature of

the relata here. My aim was only to show that grounding is a relation between some things or other. If we are satisfied that grounding is indeed a relation, now is the appropriate time to investigate the nature of its relata. But more substantively, it is not clear that the distinction will have much ontological significance, if the truthmakers for propositions are facts.

3.6 Unionism vs Separatism

Grounding theorists hold (as far as I can tell, unanimously) that grounding is an explanatory relation—indeed, the tightest explanatory relation: ‘if there is a gap between the grounds and what is grounded, then it is not an explanatory gap’ (Fine 2012a, p. 39). Despite this, the literature on the precise nature of grounding’s relationship with explanation is relatively impoverished. In what sense, exactly, is grounding an *explanatory relation*? Does grounding *underwrite*, as the separatist holds, a certain kind of explanation (like causation underwrites causal explanations), or is grounding itself, as the unionist holds, a kind of explanation? While several authors have taken a stand on this issue,¹⁰ others (including Fine) have been less than entirely perspicuous. Matters are muddled by the operator/predicate dispute—the operator view lends itself more naturally to unionism. But having settled that debate in favour of the predicate view, it doesn’t immediately follow that separatism is true—it may be that a grounding relation just is an explanation relation. Nevertheless, I will argue that the relations do indeed come apart.

A couple of sociological observations worth noting: first, despite more than half a century of literature on explanation from philosophy of science, grounding theorists offer virtually no engagement with it.¹¹ Now, clearly grounding theorists are aware of this literature. The best explanation for their not engaging with it is that they don’t think it is relevant. This suggests that they regard metaphysical explanation as fundamen-

¹⁰See Schaffer (2016b) and Audi (2012b) for explicitly separatist views, Raven (2015) for an explicitly unionist view.

¹¹Though Wilsch (2016) and Schnieder (2010, 2011) are notable exceptions.

tally different to causal explanation—different enough, at least, that the philosophy of science literature sheds little light on metaphysical explanation. That there has been little discussion of metaphysical explanation, as distinct from grounding, is explained if unionism is in fact the dominant view. For unionists, in discussing grounding, would regard themselves as thereby elucidating metaphysical explanation. (Then again, perhaps I’m being overly charitable.) These observations are significant for my central theses:

(40) Separatism is true.

(41) Metaphysical explanation and causal/scientific explanation are species of a single genus of explanation.

These theses will be refined below. (In fact, two senses of (41)—both true—will be distinguished.)

Hopefully the discussion will be fruitful regardless of its eventual fate. For if metaphysical explanation and causal/scientific explanation really are fundamentally different beasts, presumably we’d like to know in what their difference consists. It would therefore be helpful to know why these arguments fail.

3.7 Seven Decades of Scientific Explanation (with a lot of gaps)

A couple of clarifications are in order. First, by ‘explanation’ we will mean an explanation *why*. There are other senses of explanation. One can explain the rules of chess, for example. But to explain the rules of chess is not to explain why the rules of chess are the way they are. Rather, it is to give some (contextually adequate) information about the rules of chess. The question ‘why are the rules of chess the way they are?’ could be interpreted causally (who came up with them?), or as a request for the *reasons* its inventors chose those particular rules (a request for a *teleological* explanation).

Second, we often speak of this or that theory explaining some phenomenon. For instance, we often say of General Relativity that it explains the perihelion of Mercury.

But no mention of Mercury appears in any axiomatisation of General Relativity, so what do we mean when we say such things? We will consider this question more fully later, but for now we need only note it is not the sense of explanation we are primarily concerned with. For one thing, the notion does not appear to be factive. We often say things such as ‘Newtonian Mechanics explains the motions of slow-moving bodies’, even though we know Newtonian Mechanics to be false. Perhaps we mean that NM *would* explain such motions, *were* it true. But in the case of singular explanation—of explaining one particular fact by another (or collection of facts)—this non-factive sense of explanation does not appear to be available. The following conversation, for example, would be highly irregular:

- (42) A: Why did John get cancer?
- (43) B: Because he smoked.
- (44) A: John’s never smoked a day in his life!
- (45) B: Still, it would explain why he got cancer.
- (46) A: *Stares incredulously.*

Third, we will remain neutral as to whether the relata of the explanation relation are facts, propositions, or representations thereof. (We do not claim to remain neutral on *whether* explanations have relata!) Some writers on explanation take it to relate truthbearers or representations. If event (or fact) *c* causes event (or fact) *e*, then it is *C*, the description of *c*, which explains *E*, the description of *e*. There are interesting questions regarding the relata of explanation—but they are orthogonal to our primary concerns.

To sum up, the notion of explanation that concerns us is singular explanation *why*, of explaining one fact by some other(s). The notion is (or at least appears to be) factive. And the explanatory relation holds between fact-like entities. Though we will sometimes speak of a subject *S* explaining the fact that *p*, we will take this to mean that *S* is *communicating an explanation* of *p*.

3.7.1 The Deductive Nomological Model

Probably the most influential early account of scientific explanation was Hempel's ill-fated *deductive-nomological model* of explanation (Hempel and Oppenheim 1948). On this account an explanation is a deductive argument, where the conclusion is the explanandum and the premises—one of which must be a law of nature—are the explanans. To explain the fact that a metal rod expands when heated is to derive it from some law concerning metal (all metals expand when heated) and some initial condition (this metal rod was heated).

The worst problem with the DN model, and a problem which afflicted many other models, is that it can't account for the strict order of explanation. This is illustrated by the infamous flagpole problem: suppose a flagpole of height h casts a shadow at noon of length l . Why is the length of the shadow l ? Using the position of the sun and some elementary trigonometry, we can derive l from h . Notice, however, that we can also use l and the other conditions to derive h . But the length of the shadow does not explain the height of the pole!

3.7.2 Causal Theories of Explanation

Fast-forward two or three decades. The causal theory of explanation is in fashion. The most basic version of this is Lewis's (1986a): to explain an event is to give some information about its causal history. To explain an event could be as simple then as citing its (salient) cause: the car crashed because the tyre blew. A more sophisticated version of the causal theory (Salmon 1984) holds that explaining involves not only citing causes (the *aetiological* aspect of explanation), but describing how the relevant causal processes work (the *constitutive* aspect of explanation).

All versions of the causal theory easily circumvent the flagpole problem—indeed they explain why explanations are generally asymmetric. Intuitively, the problem is that the flagpole causes the shadow, but the shadow does not cause the flagpole. Since causation is asymmetric and is necessary for explanation, explanations cannot be symmetric.

The main problem for the causal theory of explanation is that there are perfectly good explanations which do not appear to involve causation—even in science. Walter’s possessing certain antibodies explains his being immune to flu. But Walter’s possessing those antibodies does not *cause* his being immune to flu—they are in some way *constitutive* of his immunity. The sphericity of a ball explains its disposition to roll, but does not cause it. The volume and molecular kinetic energy of a gas explain its pressure.

3.7.3 Explanatory Realism

In the nineties a new theory of explanation emerged. It was a direct reaction against the extant explanation literature in philosophy of science. Ironically, it caught on more among metaphysicians. That theory was *explanatory realism*. Proponents of explanatory realism (Kim 1994; Ruben 1990) were at pains to stress that explanation is an epistemic notion. (Kim especially lamented that, despite the seemingly platitudinal status of this claim, much of the 20th century philosophy of science literature on explanation failed to fully appreciate it.) But being epistemic does not devoid a notion of objectivity. Knowledge is an epistemic notion, but it requires truth, and derives objectivity therefrom. An explanation is a piece of information which advances understanding. And understanding appears to be a kind of knowledge. If one understands why John got cancer, one knows something about how the fact that John got cancer relates to other facts. Or perhaps understanding is just knowledge organised in a certain way (cf. Kim 1988). Either way, it is clear that understanding is an epistemic notion.

The first tenet of explanatory realism (the ‘realist’ part) is that explanations have some kind of objective, mind-independent, truth- or correctness-conditions (and not merely pragmatic felicity conditions). This contrasts with van Fraassen’s (1980) pragmatic theory of explanation, according to which an explanation may be perfectly ‘good’, despite being false. That is *not* to say that explanations don’t have any subjective, interest-relative, or context-dependent adequacy conditions—merely that such conditions will not be sufficient on their own for an explanation. One can hold that an explanation must meet both objective and subjective conditions in order to count as an

explanation in a given context.

This brings us onto the second tenet of explanatory realism: *explanations track determination relations*. Unpacking a little: *A* explains *B* only if *A* plays a role in determining *B*. Or as Ruben (1990) puts it, determination relations give explanation its required ‘metaphysical backing’. Let’s take a causal example:

(47) John got cancer because he smoked.

If John didn’t smoke, then this is not an explanation of his getting cancer. The problem is not that it is false, but that it involves a kind of presupposition failure. In order even be eligible to explain, the explanans must be true. We also get presupposition failure if John didn’t have cancer. Only facts (or true propositions) can be explained. If John smoked, but his cancer was caused by exposure to asbestos, then, again, this is not an explanation of his getting cancer. This does not constitute a case of presupposition failure—the presupposition holds. Rather, it is merely a case of a false (or incorrect) explanation. But if John did in fact smoke, and his smoking played a (causal) role in his contracting cancer, then this is an explanation of why John got cancer. Perhaps it is not a full, or the best, explanation, but it is an explanation nonetheless.

It is widely accepted that causation is distinct from explanation. But we should be careful not to conflate them. This can be difficult when it looks like we have a one-one correspondence between causal relations and causal explanations. If all it takes to explain an event is to cite its causes, then we have such a correspondence. But that is not all it takes to explain. Lipton (2004) noted that the Big Bang was a cause of everything, but explains very little. Causation is necessary, but not sufficient, for explanation. Or as explanatory realists like to say, causation *backs* or *underwrites* explanation. This idea is intuitive enough, but we can be more explicit. Kim (1988, p. 149) put it this way: ‘[causation] is an objective relation among events that, as we may say, “grounds” the explanans relation.’ All I’d do with this is remove the scare quotes.¹² Since a causal

¹²While many philosophers used the grounding idiom prior to Fine (2001), Kim’s use of it is interesting for two reasons. First, it was clear that he was using it consciously, as indicated by his frequent use of scare quotes. Second, Kim was one of the first contemporary philosophers to recognise a non-causal

relation is insufficient for an explanation, we can further refine this:

- (48) The fact that *A* causally explains *B* is partially grounded in the fact that *A* caused *B*.

This clears up what is meant by ‘underwriting’. But what constitutes a full ground for a causal explanation? That requires a thesis all its own. But in addition to the relevant causal relation, it will have to include, at the very least, pragmatic and interest relative factors.

3.7.4 The Realist Account of Metaphysical Explanation

Now, if this were the whole story, then explanatory realism would be no different from the causal theory of explanation. Kim’s innovation was to recognise other explanatory (non-causal) determination relations. This is one of Kim’s earliest examples (1974):

- (49) Xanthippe became a widow because Socrates died.

This explanation is not plausibly interpreted causally. This is trivial if one is inclined to think that causation must be diachronic. Xanthippe became a widow at the *exact* moment Socrates died, not immediately after. The relationship also seems too intimate to be causal. Hume reminds us that there is no logical connection between cause and effect. But a husband’s death necessitates his wife’s widowhood. The relationship is not intimate enough to be identity, however. We’re inclined to think that Xanthippe’s becoming a widow depends on Socrates’ dying and not conversely. And if events have locations, then Socrates’ death occurred in the prison, while Xanthippe’s becoming a widow occurred wherever she was. Perhaps some events can be spatiotemporally scattered, in which case Xanthippe’s becoming a widow happened in part where Xanthippe was, and in part where Socrates was, but still, identity would not follow. Socrates’ death happened *wholly* where Socrates was, and in no part where Xanthippe was. We have,

dependence relation (see Kim 1974)—in addition to being one of the most forceful early detractors from supervenience (Kim 1993).

nevertheless, what appears to be a perfectly good explanation. The causal theory of explanation cannot account for this. If, however, we recognise other forms of explanatory determination relations, and it can be shown that this example exhibits one, then it is easily accounted for.

Explanatory realism really is a nice theory. It explains why some DN arguments are explanatory but not others (some DN arguments track determination relations, others don't). It subsumes the causal theory of explanation, which works very well in its restricted domain. On top of this, it offers an account of understanding: as determination relations structure the world, so explanations structure knowledge—understanding is just structured knowledge (or perhaps knowledge of structure). And since the effect of this structuring is cumulative (accumulating more explanations imposes more structure on one's knowledge), we can explain why subsumption and unification give rise to understanding (they impose a lot of structure at once, cf. Friedman 1974; Kitcher 1989). No wonder it has seduced several grounding theorists—most prominently Jonathan Schaffer and Paul Audi. Unfortunately, it is a theory adopted without much argument as to whether it is a suitable theory of *metaphysical* explanation. We will now attempt to reconstruct such arguments.

3.8 Metaphysical Explanation is Epistemic

Kit Fine (personal communication) has put to me that the sense in which he took grounding to be explanatory was not an epistemic one, of making something intelligible, but an ontic one, of *accounting for* something. Explanations may have epistemic byproducts, such as understanding (perhaps even necessarily!), but Fine is skeptical that it is of the *essence* of an explanation to yield such epistemic goods. I am going to argue that there is at least *one* sense in which metaphysical explanation is an epistemic notion. I will argue that if there is an ontic sense of metaphysical explanation, it cannot be usefully distinguished from grounding. Similarly, if there is an ontic sense of causal explanation, it is just causation.

3.8.1 Metaphysics or Epistemology?

My jumper's being maroon *grounds* its being red. Given this, there is a sense in which my jumper's maroonness *accounts for* its redness. I also *understand why* my jumper is red. I know that it is maroon, and I know that anything maroon is thereby red. It is *prima facie* very plausible that there is an epistemic sense of explanation. For there are cases of causation and grounding in which explanation is clearly lacking. Thus, these metaphysical relations are insufficient for explanation. Given the lack of understanding which accompanies them, it is natural to conclude that what is missing is something epistemic.

Unexplanatory Causes

There are at least three ways in which a cause may be unexplanatory. First, we may have a full cause whose relevance is unapparent because it is too distal with respect to the explanandum event. Second, we may know the full immediate cause, but be unfamiliar with the mechanism by which it brings about the explanandum. And third, the relevance of a *partial* cause may be elusive unless the *full* cause is known.

The Big Bang is an example of a full cause which explains very little. I'm writing this dissertation because the Big Bang occurred. The Big Bang is a (many-times!) mediate cause of my writing this dissertation.¹³ But it obviously doesn't *explain* my writing this dissertation. The structure of this case is of a full or sufficient cause which stands at the end of a very long causal chain—the vast majority of whose intermediary events are unknown. Now, in order to understand an event we do not need to understand why *all* of its causes occurred. But for an explanans event to be explanatory, we ought, at the very least, be able to trace its causal efficacy to the explanandum event. As it stands, it is hard to see what explanatory *relevance* the Big Bang has for my writing

¹³The claim is unobvious and unintuitive, but ultimately, I think, unobjectionable. Consider: the correlate counterfactual is certainly true—if there had been no Big Bang there would have been no essay; there is seemingly a very high degree of influence (see Lewis 2000) between the Big Bang and my writing this essay—the tiniest change in the Big Bang may well have resulted in my not existing, let alone writing this essay.

this dissertation.

A quite different case is illustrated by Salmon's (2004, pp. 183–4) anecdote of the friendly physicist, the balloon, and the accelerating airplane. As Salmon recounts it, the friendly physicist

was sitting on a jet airplane awaiting takeoff. Directly across the aisle was a young boy holding a helium-filled balloon by a string. In an effort to pique the child's curiosity, the friendly physicist asked him what he thought the balloon would do when the plane accelerated for takeoff. After a moment's thought the boy said that it would move toward the back of the plane. The friendly physicist replied that *he* thought it would move toward the front of the cabin. Several adults in the vicinity became interested in the conversation, and they insisted that the friendly physicist was wrong. A flight attendant offered to wager a miniature bottle of Scotch that he was mistaken—a bet he was quite willing to accept. Soon thereafter the plane accelerated, the balloon moved forward, and the friendly physicist enjoyed a free drink.

The acceleration of the airplane did indeed cause the balloon to drift toward the front of the cabin. But if any of those bystanders had asked why the balloon drifted forward, and it had been replied that the plane accelerated, their curiosity would not have been satisfied. If indeed citing the cause did amount to an explanation, that is not because it improved anyone's epistemic situation.

A better 'explanation' cites Einstein's equivalence principle—that an acceleration is equivalent to a gravitational field. Since balloons travel upward in the Earth's gravitational field, so they travel toward the front of a plane if a 'gravitational field' is placed at the back of the cabin. Perhaps this 'explanation' does something to alleviate our sense of puzzlement vis-à-vis balloons and accelerations. But it is at least open as to whether it counts as an explanation proper. For one thing, it doesn't tell us why a balloon travels away from the Earth's gravitational field. If we knew that, and we also knew of the equivalence between accelerations and gravitational fields, then perhaps we'd understand why balloons move toward the front of accelerating planes.

But why ask why balloons rise in gravitational fields? This is something we *expect*. Indeed it is, but that may just be because we are accustomed to it. Given that things generally *fall* in gravitational fields, there is still puzzlement to be relieved (cf.

Salmon *ibid.*). But we know what the cause of the balloon's moving forward is—it's the acceleration of the plane! What more is needed to achieve explanation?

The second explanation for why the balloon moves forward is that the collision of the rear cabin wall with the air molecules in front creates a pressure gradient along the length of the cabin. Why is *this* an explanatory story? Perhaps the problem was that we just couldn't see in what *way* the acceleration of the plane could bring about the balloon's moving forward. This might suggest that what was missing was not knowledge of *causes*, but knowledge of *mechanism*. We knew *that* the acceleration brought about the forward motion; we wanted to know *how* it did so. As Salmon (1984, p. 297) would have put it, we had an *etiological* explanation of the event, but what we wanted was a *constitutive* explanation.

There is something to this distinction. (Perhaps causal mechanisms ground causal relations, and that is how constitutive explanations are explanatory in the first place.) The distinction can't, however, always capture what is lacking in our epistemic state. Why did the glass shatter? The etiological explanation merely reports that it was dropped. The constitutive explanation describes the mechanism by which the dropping resulted in the shattering—gravity, the fragility of the glass, the hardness of the floor, and whatnot. But, ordinarily, people do not understand such mechanisms. To be sure, they know *that* things fall when dropped, but who can really claim to understand *how* gravity works? Yet, when we find shattered glass, we're content with the explanation that a glass was dropped.

The third kind of case involves partial causes. Now, there are times when we are happy to accept partial causes as explanatory. For example, in seeking to understand a case of heart disease, smoking will usually satisfy as an explanation—even though the full cause may very well include the patient's poor diet and lack of exercise. But say that Jack's living in Scotland is cited as the cause of his developing rickets. Citing this cause does not suffice for explanation. But add that rickets is often brought about by a vitamin D deficiency; that Scotland, being relatively far from the equator gets little sunlight; and that Jack had a genetic disorder affecting his ability to synthesise vitamin

D from sunlight, then we begin to see how Jack's living in Scotland can be explanatory—as part of a larger explanatory story. The difference between the two cases is that in the former, but not the latter, we can see how the partial cause might fit into a fuller explanatory story. Since, in the latter case, we might be unfamiliar with any of the mechanisms by which living in Scotland contributes to developing rickets, the relevance of the cited cause eludes us.

Unexplanatory Grounds

Just as there are unexplanatory causes, so there are unexplanatory grounds. The cases are (imperfectly) analagous.

As to the first kind of case, though every event shares the same ultimate cause, we do not ordinarily think every fact shares the same ultimate ground. If, like priority monists, however, we thought that parts were dependent on wholes, we might think every fact has an explanatory story in terms of the entire universe (see Schaffer 2010a). Be that as it may, there is certainly no *transparent* explanatory story between the existence of the universe and my being conscious.

But priority monists are few; we need another example. It is easy to imagine abstract cases of this kind. Just imagine a long grounding chain:

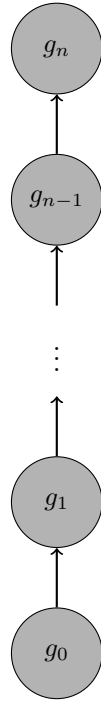


Figure 3.1: A ‘non-branching’ grounding structure

Suppose that each node represents a full ground for the next link in the grounding chain. A case of unexplanatory grounding arises when the relevance of g_0 is obscured with respect to g_n —even though the explanatory links may be *stepwise* transparent. If you like, you can view it as a Sorites problem: g_0 is clearly relevant to g_1 , insignificantly less so to g_2 , and so on. By the time we get to g_{n-1} any relevance is completely lost.

Now, the problem with finding concrete examples of this kind is that few grounding chains have this simple ‘non-branching’ structure. (Causal examples of this kind are ubiquitous—let each node represent the falling of a domino.) The most common structure for a single grounding relation is many-one. As such we get chains like:

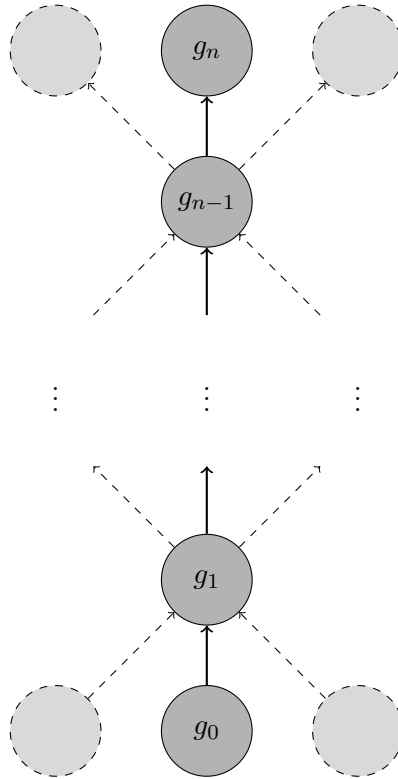


Figure 3.2: A branching grounding structure

We can certainly find cases like this in which g_0 is unexplanatory with respect to g_n . But such cases are not very revealing of this type of unexplanatory ground, for g_0 is only a *partial* ground of g_n . The case is thus more analogous to the case of a partial ground or cause whose relevance is obscured when taken in isolation. Unfortunately, I am unable to find a convincing concrete case.¹⁴ But the abstract case should illustrate at least the conceptual possibility of *full*, unexplanatory distal grounds.

To illustrate the second kind of case, take Fine's beloved example once more. Someone unfamiliar with set theory might be at a loss as to how the existence of Socrates explains the existence of $\{\text{Socrates}\}$. What is it about elements which guarantees the existence of their singletons? If asked why singleton Socrates exists, it will not do to

¹⁴To be clear, there are obvious examples of grounding chains with such a structure (truthmaking and the determinate/determinable relation are the obvious ones), but the relevance of lower bounds in such chains is plausibly transparently relevant to the upper bounds.

reply, ‘because Socrates exists’. It is the connection between them which is sought. A felicitous reply will cite the pairing axiom (or some primitive ‘set-builder’ operation).

As to the third case, in which the relevance of a partial ground is obscured with respect to explanandum, such cases are ubiquitous. Assume there is a table here because some molecules are arranged in a certain way. Then the fact that a certain molecule is in a certain location partially grounds the fact that there is a table here—but it certainly does not explain it.

There is a further kind of example of unexplanatory ground, which (though I’m less sure of it) is interesting since it doesn’t seem to have a causal correlate. It is one in which there just seems to be no epistemic context in which a certain full ground could be explanatory. Though the determinate/determinable relation is often ushered as a paradigm example of a grounding relation, one might think it is an odd choice for a discussion about explanation. There is apparently no situation in which the answer ‘because it is maroon’ is a felicitous answer to ‘why is your jumper red?’.¹⁵ Indeed, the answer just sounds facetious. The reason (I think) is that when we ask why something is red, we can’t plausibly be interpreted as asking after the grounds of redness. Everyone knows in what redness consists—it consists in something’s being a determinate shade of red. Since everybody knows this, and everybody knows everybody knows this, such an answer can only constitute a flagrant flouting of Gricean maxims. What’s more, that something is red by virtue of being a determinate shade of red seems such a basic conceptual truth, that is questionable whether *anybody* might earnestly enquire into the grounds of something’s redness. So the reason such grounding claims fail to be explanatory is not because the grounding relations they track are inherently unexplanatory, but because they can’t improve anybody’s epistemic situation (at least actually.) On the other hand, there are plenty of felicitous responses if the answer is interpreted causally (‘I fell into a vat of red dye’) or teleologically (‘because I want to affirm my status as a

¹⁵Because of this example I used to doubt that the determinate/determinable relation was a genuine grounding relation. I thought: grounding is an explanatory relation, so there must be *some* context in which any grounding relation is explanatory.

Labour supporter’)—such answers are non-trivial.¹⁶

Ontic Explanation?

We have what appear, on the face of it, to be (at least) three cases in which a fact is grounded but unexplained by its ground. Thus, grounding and explanation clearly come apart. But the unionist has a reply. She can maintain that there are two senses of explanation—an epistemic sense and an ontic sense. In these cases, it is explanation in the epistemic sense which is lacking. We still have ontic explanation. The universe *accounts for* my being conscious, even if it doesn’t render it intelligible. Socrates *accounts for* the existence of {Socrates}, even if we don’t know by what mechanism. And the existence of a certain molecule partially *accounts for* this table, even if it doesn’t partially explain it. Epistemic explanations are highly context-dependent and must meet an array of pragmatic conditions. But ontic explanation—accounting for—is robustly metaphysical, and holds even when such conditions are not met. A grounding relation is identical with an explanation in this ontic sense.

Suppose the unionist is right. Then nothing more is required of the world for an ontic explanation to hold than for a grounding relation to hold. But unless we can give an independent account of ontic explanation, such a view is either vacuous or trivial (and at any rate, uninteresting). It is vacuous if the claim adds nothing to our theory of grounding. That is, since a theory of grounding just is, *ipso facto*, a theory of explanation, we need say nothing more on the matter. It is trivial if the sense in which grounding is explanatory is just built into the notion itself—that grounding is a kind of accounting for, and accounting for is a kind of grounding. But it seems neither trivial nor vacuous that grounding is explanatory, and it would be desirable to know what is distinctively *explanatory* about it! That said, I am happy to grant that there is such a notion of explanation (for it is merely grounding by another name). I just maintain

¹⁶Note, in contrast, that such ‘facetious’ explanations do not appear to arise in the case of causation. Shadows are always caused by some object’s blocking the light. But we can answer the question ‘why is there a shadow?’ without sounding facetious. I’m not exactly sure why this is so. Perhaps it is because there is no essential conceptual connection between explanans and explanandum—even though they are constantly conjoined.

that it holds no interest over and above the interest of grounding.

Is there another sense of ontic explanation, one on which it is neither merely grounding, nor a matter of epistemology? There is, though it is not strictly a unionist view. It is the view on which there is a robustly metaphysical kind of explanation which is grounded by a grounding relation. That is, that A grounds B grounds the fact that A ontically explains B . It then makes sense to ask, ‘what is it, over and above the grounding relation, that is required of the world in order for an ontic explanation to hold?’.¹⁷ But now the problem is that it is far from clear what this might be. p grounds $p \vee q$. What more is required *of the world* (since we’re talking about a robustly metaphysical relation) for p to explain $p \vee q$? One possibility is that p *determines* $p \vee q$. In this sense, grounding (like causation) is a determinate of the determinable determination.¹⁸ Thus being a determination relation is something over and above being a grounding relation.

But it is not clear that this ‘something more’ gets at what it is to be ontically explanatory. To be sure, on the theory of explanation we’re dealing with, it is the determination relation (or its species/determinates) which ground (epistemic) explanations. Perhaps it grounds them by virtue of being ontically explanatory—but we are still in the dark as to what this ontic explanatoriness *is*!

My principal complaint about unionism is that the view leaves entirely unilluminated the (interesting) sense of ontic explanation its proponents apparently have in mind, and I have trouble reconstructing what such a form of explanation might take. That is hardly a knockdown argument. Unionists can take it as an invitation to do better. But I think there *is* an interesting epistemic sense of explanation to be elucidated, and compelling reasons to think that such explanations are associated with grounding. Hence, I am inclined to believe that grounding an explanation come apart. Their relationship is

¹⁷N.B. I am *not* claiming that the grounding relation is *insufficient* for the explanation. The fact that p fully grounds (and so is sufficient for) the *truth* of p . But p ’s being true *consists in* more than the fact that p —in the sense that the truth of p is not *reducible* to the fact that p . We want to be able to distinguish correspondence theories of truth from, disquotational or identity theories of truth which, although they would agree on ‘ $Tp \leftrightarrow p$ ’, make very different claims on the metaphysics of the case. Regarding the present case, there is ‘more to’ an ontic explanation than a grounding relation, even though the latter is sufficient for the former.

¹⁸Try saying that quickly!

rather that grounding grounds explanation.

3.8.2 The Unity of Explanation

The previous section argued that grounding and explanation come apart. This section will argue that there is *one* kind of explanation *why*—or that grounding explanation and causal explanation are flavours of the same kind of explanation. The argument for this is quite straightforward. It is the only view which can accommodate so-called ‘hybrid’ explanations—explanations which cite both both grounds and causes. Recall that we already considered a hybrid explanation in the previous chapter. The possibility of such explanations was apparently a consequence of the transitivity argument for the unity of grounding. In Lange (2013)’s example we had a grounding explanation chaining with a causal explanation (A grounds B , which causes C). Here, we’ll consider a converse example (A causes B , which grounds C) due to Schaffer (2016b, p. 89). The mean molecular kinetic energy (MMK) of a gas at t_0 (A) causally explains its MMK at t_1 (B). And the gas’s MMK at t_1 metaphysically explains its heat at t_1 (C):

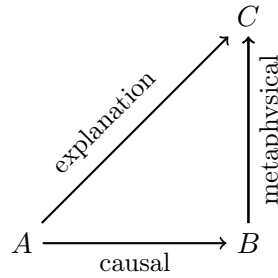


Figure 3.3: Hybrid explanation

We already know that metaphysical explanation chains, and that causal explanation chains. Now, given that causal explanation chains with metaphysical explanation—and, as we argued in the previous chapter, conversely—it follows that explanation chains *generally*. The best explanation for this is that we have a single relation of explanation, regardless of whether it is backed by causation or grounding or what have you.

I said I would distinguish two senses in which explanation is univocal. The above

argument establishes that the *epistemic* sense of explanation is univocal. I will now argue that ontic explanation—accounting for—is univocal. Recall that on our working theory of explanation *A* explains *C* only if *A* plays a role in *determining C*. We also know that *A* causally (metaphysically) explains *C* only if *A* causes (grounds) *C*. It follows that if *A* causally explains *B* and *B* metaphysically explains *C*, then *A determines C*. Since I don't see any useful notion of ontic explanation over and above the notions of causation and grounding, it is natural to conclude that a generalised notion of ontic explanation is just determination. This is just another inference to the best explanation. Given that causal and metaphysical explanations chain, the best explanation for this is that the relations which underwrite them chain. And the best explanation of their ability to chain is that they are but species of the same generic relation. Moreover, as I pointed out in the previous chapter, it looks as though causation and grounding stand in a general asymmetry principle. If *A* causes *B* and *B* grounds *A* (or vice versa), it looks as though *A* is causing itself (albeit with some movement between levels).

3.9 More on Logical Form: Contrastivity

3.9.1 Contrastive Explanation

Cases of unexplanatory grounding and causation show that these notions should not be conflated with metaphysical/causal explanation. But the unionist has a route of response which we should put to rest.

Since van Fraassen (1980), explanation has been widely thought to be *contrastive*. A contrast is a statement or proposition of the form '*p rather than q*'. Contrastivists about explanation hold that there is no such thing as an explanation of *q simpliciter*. Explanations cite *difference makers*. We must cite what makes the difference between *q* and something else. That is, we must explain why *q* rather than *q'*. To use a well-worn example: paresis is the result of latent untreated syphilis. Supposing that Smith, but not Jones, had syphilis, we can explain why Smith, but not Jones, developed paresis: because Smith, *rather than* Jones, had latent untreated Syphilis. But suppose Jones

too had untreated syphilis. Then the explanation will not do—we have not cited the relevant difference between Smith and Jones.

The idea that explanation is contrastive is supposed to capture the fact that it is interest relative. Hanson (as cited in van Fraassen 1980, p. 125) put the point thus:

There are as many causes of x as there are explanations. Consider the cause of death as might have been set out by the physician as ‘multiple haemorrhage’, by the barrister as ‘negligence on the part of the driver’, by a carriage builder as a defect in the brakeblock construction, by the civic planner as ‘the presence of tall shrubbery at that turning.’

If, as Hanson claims, ‘there as many causes of x as there are explanations’ (and analogously for grounding) then the unionist can respond that our putative examples of unexplanatory grounding are no such thing—we just haven’t identified the relevant contrasts. Of course, if unionism and contrastivism about explanation are both right, then that entails that grounding is contrastive. But that may not be too heavy a price to pay for the unionist—for even separatists have argued that grounding is contrastive.

3.9.2 Grounding is not Contrastive (and neither is Causation)

Jonathan Schaffer is a big fan of contrastivity—not just regarding grounding. Schaffer advocates contrastive treatments of causation (Schaffer 2005a), knowledge (Schaffer 2005b), explanation, *and* grounding (Schaffer 2012). His reasoning is remarkably Lewisian in style: he presents some problem cases for the target notion, and then shows how a contrastive treatment of the notion dispels all the problems. Now, other things being equal, a theory which solves more problem cases is preferable. But, of course, other things are rarely equal. The inequality in the present case is this: contrastive accounts of causation and grounding have *no* independent plausibility. That is because, as Schaffer rightly emphasises, these are *worldly* relations, and it is hard to see how a worldly relation could be contrastive.

Schaffer (2012) has three arguments that grounding is contrastive. First, explanation is contrastive, so viewing grounding as contrastive makes it more amenable to underwriting explanation. Second, it sustains the analogy with causation, which Schaffer also

takes to be contrastive. And third, it easily resolves some apparent counterexamples to the transitivity of grounding. We will dispense with each of these, beginning with the counterexamples.

Counterexamples to Transitivity

The Dented Sphere. Imagine a sphere σ with a dent in it. σ 's precise shape (call it S) is a determinate of the determinable, more-or-less-spherical (call this M). Now, the fact that σ has a dent (partially) grounds the fact that it has shape S, and having shape S grounds the fact that it is M. But having a dent cannot ground having shape M. σ is more-or-less-spherical *despite* the dent, not because of it. That is, the dent is irrelevant to whether or not σ has shape M.

The Third Member. Let A be a set with exactly three members, one of which is c . Then c partially grounds A 's having three members, and A 's having (exactly) three members grounds the fact that A is finite. But c cannot ground A 's being finite, since c may be a member of an infinite set (just take $\omega \cup \{c\}$). A is finite *despite* having c as a member, not because of it.

The Cat's Meow. Suppose Cadmus the cat is meowing. This is (partially) grounded in facts that make this cat Cadmus. Given the essentiality of origin, the meeting of sperm S and ovum O ground the fact that this cat is Cadmus. Moreover, that Cadmus is meowing grounds the fact that something is meowing. Hence, the meeting of S and O grounds the fact that something is meowing. But this is implausible, since the meeting of S and O has nothing to do with whether something is meowing.

How is the contrastive analysis supposed to resolve the examples? First, we recast grounding claims with a contrastive structure. ' A grounds B ' is taken to be elliptical for

$$(50) \quad (A \text{ rather than } A^*) \text{ grounds } (B \text{ rather than } B^*).$$

(The parentheses indicate that the contrasts are to be taken as single units, albeit with internal structure). Transitivity is then taken to be a principle governing contrasts.

That is:

(51) **(DIFFERENTIAL) TRANSITIVITY**¹⁹

If (contrast₁ grounds contrast₂) and (contrast₂ grounds contrast₃), then (contrast₁ grounds contrast₃).

The idea is that the counterexamples exhibit illicit shifts in the middle contrast.

(52) (*A* rather than *A**) grounds (***B* rather than *B****).

(53) (***B* rather than *B*****) grounds (*C* rather than *C**.)

A case exhibiting this structure, then, fails to satisfy the conditions for (differential) transitivity, and so fails to count as a counterexample. Consider again the dented sphere (the other cases are solved analogously, as the reader can verify). The sphere's having a dent grounds its being shape *S*. This must be understood as elliptical for something like:

(54) (*σ*'s having a dent rather than not) grounds (*σ*'s being *S* rather than *S** (perfectly spherical)).

The claim that being of shape *S* grounds being of shape *M* (more-or-less spherical) must now be analysed along the same lines. Now we get

(55) (*σ*'s being of shape *S* rather than shape *S**) grounds (its being of shape *M* rather than *M** (more or less cubic, say)).

But this is false. The dent makes no difference to whether or not *σ* is of shape *M*. It would have been more-or-less-spherical either way. A true grounding claim—riding on a relevant difference—would be something like

(56) (*σ*'s being shape *S* rather than shape *S*** (perfectly cubic)) grounds (its being *M* rather than *M**).

¹⁹Schaffer defines a new property on quaternary relations (which he calls 'differential transitivity') which is formally equivalent to the principle laid down here. I think it is more perspicuous presented this way.

But now we have an illicit shift in the middle contrast. This case is no counterexample.

This is an elegant solution to a nonexistent problem. For these are not genuine counterexamples to transitivity, as I will shortly argue. In each case, I will offer reasons to think that the grounding claim Schaffer denies is, after all, acceptable. First, note that each example concerns partial, rather than full, grounding. Each example turns, moreover, on the apparent irrelevance of a lower bound in a grounding chain to an upper bound in the grounding chain. The moral of story I will tell is that relevance is a highly context sensitive matter. The relevance of a partial ground often only becomes apparent in the context of a full ground, as we argued above. The relevance of the position of a certain molecule is obscured with respect to the existence of a table—unless we know the positions of the other relevant molecules.

Mackie (1974) provides a notion which will be of use to us here: the insufficient but necessary part of an unnecessary but sufficient (INUS) condition.²⁰ This is a useful way of thinking about grounds for assessing claims of relevance (I do *not* claim this is what grounds *are*). There are different ways of being grounded. $p \vee q$ can be grounded in p or it can be grounded in q . Now consider $(p \wedge p') \vee (q \wedge q')$. Here p does not constitute a full ground. But it is a *part* of a full ground—indeed a necessary part. But p is not a necessary partial ground for $(p \wedge p') \vee (q \wedge q')$ because there is another full ground— $q \wedge q'$ —of which it is not a part. I propose thinking of Schaffer's counterexample this way. The apparently irrelevant (partial) grounds only seem irrelevant because there are other full grounds in which they do not feature. But, as it happens, they do *actually* feature in the full grounds. In this sense they are relevant.²¹

The Dented Sphere Solved. It is true that σ would have been more-or-less spherical had it not had a dent. But in this scenario, σ is not of precise shape S, but some other precise shape S* (perfectly spherical). That is a sufficient ground for σ 's being M, but it is not the only possible sufficient ground. Being shape S is a sufficient ground. And

²⁰This was Mackie's ill-fated attempt at analysing causation.

²¹Similar remarks are made by Litland (2013) in his discussion of Schaffer's examples. He stresses that grounds are *ways* for facts to obtain. Here 'way' is not intended to have any metaphysically inflated sense. The idea is merely that for each fact there are a number of possible states of affairs that would ground it, if they obtained. For a different approach see Raven (2013).

a necessary part of what it is to be *S* is to have a dent.

The Third Member Solved. The solution here is slightly more interesting (it is similar to Litland (2013)'s and quite different from Raven (2013)'s). First, it might be objected that sets have their members essentially, so Schaffer's reasoning stops dead in its tracks. But we can easily circumvent this problem by letting *A* be a more coarse-grained collection, like an orchestra. The identity of an orchestra is not wholly dependent on its members. You would still be seeing the London Philharmonic if a second violin fell ill and couldn't make the gig. And it is conceivable that the London Philharmonic might have precisely the same members as the London Symphony Orchestra. The orchestra you see is the one whose name is on the ticket.

What grounds the fact that the LPO has *n* members? I consider the problem to be analogous to the problem of finding suitable grounds for universal claims, $\forall x\phi$. Let $a_1, \dots, a_n$ be all the things there are, and assume all instantiate ϕ . Then it is true that $\forall x\phi$. But $\phi(a_1), \dots, \phi(a_n)$ do not necessitate $\forall x\phi$,²² for there might have been an $n + 1$ th thing which is not ϕ . Fine (2012)'s solution to this, borrowed from truthmaker theory (see Armstrong 2004, ch. 6), is to invoke a 'totality' clause. $\phi(a_1), \dots, \phi(a_n)$ can witness $\forall x\phi$ —so long as we know we have enumerated every member of the domain. We just need to add clause that states that everything there is among $a_1, \dots, a_n$. Now, it is clear that a collection's cardinality depends on its members. But only all of them can determine its *exact* cardinality. At best, $a_1, \dots, a_n \in A$ is a full ground only for '*A* has at least *n* members. (It may be a partial ground for '*A* has exactly *n* members'.) Just as with universal claims, we must add the further claim that that's all the members there are. Assuming *n* is finite, does *A* have finitely members despite having a_1 as a member? After all, we could drop a_1 or replace it. No. a_1 's being in *A* is a necessary part of a sufficient ground for having finitely many members.

The Cat's Meow Solved. This example is perhaps the easiest to solve. (I'm slightly puzzled as to why Schaffer even entertained it. But we will go through the reasoning

²²Though see Skiles (2015) and Litland (2015) for arguments that grounds needn't necessitate what they ground.

explicitly for the sake of completeness.) Let's grant that part of what grounds the fact that Cadmus is meowing are facts which make Cadmus Cadmus, i.e. the fact that S and O met.²³ If it were Tibbles, and not Cadmus, that was meowing, facts that make Tibbles Tibbles (the meeting of S* and O*) would have to ground this. That is, whatever cat is meowing, facts about the identity of that cat are necessary to ground that it is meowing. Now, the fact that something is meowing is certainly not fundamental; it must be grounded. Nor could it be prior to the fact that Cadmus is meowing. For then it would presumably also be prior to the fact that Tibbles is meowing. And by necessitation, every cat would be meowing. But it is implausible that this fact could be grounded in anything other than the fact that some cat or other is meowing. Thus, given that it is actually Cadmus meowing, and that the meeting of S and O is necessary to ground this, the meeting of S and O must, as a matter of fact, ground that something is meowing.

Worldly Relations are not Contrastive

I agree with Schaffer (2016b) that the similarities between grounding and causation should be taken seriously. But I see no strong reason to accept that causation is contrastive, and so the causal analogy does not motivate the contrastivity of grounding. Schaffer (2005a) lays down several arguments for the contrastivity of causation. Or rather, he presents several problem cases which are easily resolved by a contrastive analysis. But there are two problems here. First, Schaffer does not address the possibility that we routinely conflate causation qua *production* (see Hall (2004)) with causal explanation, and it is perhaps this conflation which gives rise to putative counterexamples. Second, it is just implausible that contrastivity could be a feature of the *world*, rather than our representations of it. I will argue for this latter claim directly. I will then provide a natural account of how a non-contrastive dependence relation may underwrite

²³One might think that identity facts lack grounds. After all, what is more basic than the fact that something is self-identical? Criteria of identity should be interpreted as materially adequate conditions, not grounding claims. On the other hand, perhaps the ground of a non-fundamental existence is also the ground of its self-identity. See Fine (2016) for discussion of these issues.

a contrastive explanation.

If there are worldly contrastive relations, then their relata—that is, contrastive facts or events—must be worldly too. It might be fairly objected that a contrastive fact ‘ p rather than q ’ is made up in part of a negative fact. It is equivalent to: ‘ p and not q ’. But it is unclear how a negative fact is to stand in a worldly relation.²⁴ I’m at least open to the idea that there could be negative facts, so I will not press the point. There are other troubles afoot. Causal relations proliferate implausibly and we have a looming reference class problem.

Suppose that Smith’s having syphilis caused his later developing paresis. On the assumption that causation is contrastive this is elliptical for

- (57) (Smith rather than Jones had syphilis) caused (Smith rather than Jones developed paresis)

What makes (57) true is that Jones is a relevant member of Smith’s contrast class, and that the relevant difference between them is that Smith, but not Jones, had syphilis. Suppose in addition that Schmidt was syphilis free. Now we have

- (58) (Smith rather than Schmidt had syphilis) caused (Smith rather than Schmidt developed paresis)

On the assumption that causation is contrastive, we have here two distinct causal relations (in fact, one for each member of Smith’s contrast class). But this is implausible. There is just one causal relation—Smith’s syphilis causing his paresis!

An obvious fix is to say that the relevant contrast is the entire class of people who do not have syphilis (call this $\neg S$), which we can pick out—pragmatically—by one of its members. Whatever the merits of this proposal (there aren’t many), we now have the conclusion that this causal relation is highly modally fragile—and not in the usual way. Turn to a world where Schmidt does not exist. But now $\neg S$ no longer exists. So we have

²⁴The problem is similar to that of finding truthmakers for negative truths. It apparently requires that there be negative facts, but such facts have obscure natures. This is the problem of non-being in a modern guise.

a different causal relation. In this world $\neg S'$ is the relevant contrast class. But this is implausible! Whether or not Schmidt exists does not make a blind bit of difference to whether Smith got paresis because he had syphilis.

The Structure of Underwriting

Schaffer thinks grounding is more amenable to underwriting explanation if, like explanation, it is contrastive. That is simply false. Straight dyadic dependence relations can equally well underwrite explanation. Recall that a contrastive treatment of explanation was supposed to capture its interest-relativity. Contrasts fulfil a pragmatic role, not a metaphysical one. They zero in on the part of the causal nexus that interests us. The upshot is that the *truth* of causal statements does not shift with context, but their *relevance* does.

To illustrate, suppose we are asked why Smith got paresis. It is true that syphilis was a cause of his paresis and, given what else we know about the context, perfectly relevant. But we are pushed further: ‘But Jones had syphilis too, and he didn’t develop paresis’. It is still perfectly *true* in this context that Smith’s syphilis caused his paresis—we know that causal statements don’t imply exceptionless generalisations (Anscombe 1971)—but it fails to *explain* why Smith rather than Jones got paresis, because it doesn’t identify the relevant causal difference between Smith and Jones’s cases. Note, I am not claiming that the following is true in this context:

(59) Smith rather than Jones got paresis because Smith rather than Jones had syphilis.

This claim is not equivalent to the claim that Smith’s syphilis caused his paresis. (59) presupposes that Jones did not have syphilis. The claim is not just about Smith, it’s about Jones. That Smith had syphilis is unexplanatory because it still leaves us in a state of puzzlement regarding Jones. Moreover (59) has different truth conditions to the claim that syphilis caused Smith’s paresis. Minimally, we expect it to be true only if

(60) Smith’s having syphilis caused his paresis and it is not the case that Jones’s having syphilis caused his paresis.

A contrastive causal claim, then, is at least the affirmation of one causal claim, and the denial of another.

Now further suppose that Jones’s syphilis was *treated*—which prevented his developing paresis. That is, treatment is the relevant difference between Smith and Jones. Now we have the following contrast:

- (61) Smith rather than Jones got paresis because Smith rather than Jones had untreated syphilis.

Which, I claim, is true only if

- (62) Smith’s having untreated syphilis caused his paresis, and it is not the case that Smith’s having untreated syphilis caused his paresis.

Schematically, this suggests the following structure for underwriting (we write A/A' for ‘ A rather than A' ’):

- (63) A/A' explains B/B' only if A determines B and not- $(A'$ determines $B')$

Careful readers will notice this gives only a necessary condition for explanation. By no means is it meant to capture every pragmatically relevant factor to explanation. What it does show is that there is no *prima facie* reason to believe that contrastive explanations need be underwritten by determination relations which are themselves contrastive.²⁵

3.10 Philosophical Explanation

Much has been made of importance of grounding for *metaphysical* explanation. Less has been made of its importance for *philosophical* explanation. That is probably because grounding is studied almost exclusively by metaphysicians. But Fine (2012a, p. 38) did write that “Ground...stands to philosophy as cause stands to science.” That thought strikes me as natural and I propose to run with it.

²⁵Shortly before submission I became aware of Krämer and Roski’s (2017), which explores these topics in much more depth than I am able to here.

As I understand it, philosophical explanation is to be distinguished from metaphysical explanation (though they have an interesting relationship). The difference is not that metaphysical explanation is explanation in the metaphysical domain, while philosophical explanation applies more broadly. If the kinds of explanations typically sought by philosophers must be underwritten by grounding relations, and that is sufficient to make an explanation metaphysical, then it is trivial that all philosophical explanation is metaphysical explanation. There is not much interest in pursuing such a claim.

The notion I'm interested in capturing is more the intellectual or epistemic goal of philosophy itself. What kind of intellectual exercise are we engaged in, and how do we go about it? Those are ambitious questions, and I shall not attempt to tackle them fully. However, it seems that the philosophical *theory* is central. After all, most 'positive' work done in philosophy involves theory building. (The 'negative' mostly comprises offering counterexamples to those theories.) At the highest level, philosophy rarely proceeds by considering knockdown arguments for or against a certain position. For such arguments are rarely to be had. Rather, it proceeds by theory comparison, of comparing theoretical virtues—particularly explanatory virtues. The theory which offers the best (overall) explanation of the target domain is to be preferred. (For all our extolling of the deductive argument, it appears we may rely disproportionately on inference to the best explanation.)

But this is not *singular explanation*—the kind we've been considering thus far in this chapter. This is *theoretical explanation*, which we set aside in Section 3.6. There we noted that there is a sense in which theories explain which is quite distinct from the sense in which a fact explains. Newtonian Mechanics explains the motions of slow-moving bodies. This seems perfectly intelligible, and indeed, true, even though singular explanation appears to be factive in both positions. My proposal is that *philosophical* explanation is to be understood in a similar fashion. Philosophical explanation is explanation by philosophical theory. The causal theory of reference explains why 'Kripke' refers to Kripke (rather than to Nixon)—even if it is false. Consequentialism explains why we should switch tracks (even if it is false). The Best Systems Account of Laws explains

why the second law of thermodynamics is a law of nature, but ‘all gold spheres are less than a kilometer in diameter’ isn’t (even though, as I will argue in Chapter 5, the BSA is false).

If the philosophical theory is indeed so central, then the pressing question is ‘what is a philosophical theory?’—another ambitious question, and one to which I suspect there is no definitive answer.²⁶ However, there does seem to be a prevalent class of theories aimed at *real definition*, at providing definitions of *things*, rather than of words or concepts. The justified true belief theory gives a (false)²⁷ real definition of knowledge. Divine command theory offers a real definition of moral rightness. I do not claim that *every* philosophical theory aims at real definition—only that a large and important class of them does. My account is meant only to cover such theories. (That task is ambitious enough.)

On Gideon Rosen (2015)’s account of real definition, a property *F* is defined by a property Φ iff it lies in the nature or *essence* of *F* to be grounded by Φ . Similarly, On a naïve essentialist view, Φ defines *F* iff it lies in the essence of *F* things to be Φ . I needn’t take a stand on the correct account of real definition. All I require is that philosophical theories feature essence claims (essentially!). The correct account of real definition won’t change any substantive detail of my proposal. So I am just going to assume (for simplicity) that statements of real definition are essence claims. Regarding

²⁶Just look at the literature on scientific theories. The first ‘received view’ was that theories were sets of sentences (the syntactic view). Then the view that theories were sets of models (the semantic view) became dominant. And recently attention has turned back towards the syntactic view (see Halvorson 2012, 2013 for discussion).

²⁷In contrast to definitions of words, real definitions cannot be stipulated, which makes them apt to be false. We cannot stipulate the real definition of knowledge. Aside from anything else, this would trivialise philosophical theorising. To be sure, we could stipulate ‘knowledge’ to denote justified true belief. And this would be ‘false’ in the sense that such a definition does not conform to common usage. But strictly speaking, we could redefine ‘knowledge’ as justified true belief and truly describe justified true belief as knowledge.

Now the really interesting cases arise. In instances of explication we typically replace a pretheoretic notion with a regimented, or theory-laden, alternative—perhaps because it is thought that there is no real definition to be had of the pretheoretic notion, or because we regard the theoretical notion as more useful. For instance, we might think the pretheoretic notion of free will is something like the libertarian notion of free will, but that, lamentably, it is implausible that we could possess such free will. Nevertheless, we might think the compatibilist notion of free will is close enough, and that it is useful to think of ourselves as free in this sense. Is this a stipulative real definition of free will? Or a redefining of ‘free will’ and offering a real definition of its new denotation?

philosophical theories then (or at least an important class of them), my claim is that they are simply essence claims (or collections thereof). For example:

(64) **JTB THEORY OF KNOWLEDGE**

Knowledge is essentially justified true belief.

Following Fine (1995) we can regiment this a little further. We write:

$$(65) \quad \Box_{\text{knowledge}} S \text{ knows that } p \iff S \text{ has a justified true belief that } p.$$

for ‘it lies in the essence of knowledge that S knows that p whenever S has a justified true belief that p ’. This claim just *is* the JTB theory of knowledge. There is no more, or less, to the JTB theory.

Now let us return to the question of philosophical explanation. How does our account of philosophical theories feature there? I will avail myself of one final piece of ideology: the *explanatory inference* (Litland, forthcoming). An explanatory inference is a move in an impure logic of ground. The basic inferences correspond to relations of full, immediate, ground. Examples include:

(66) **Conjunction Introduction**

$$\frac{\phi, \psi}{\phi \wedge \psi}$$

(67) **Disjunction Introduction**

$$\frac{\phi}{\phi \vee \psi}$$

(68) **Determinable Introduction(?)**

$$\frac{Fa}{Ga}$$

where F is a determinate of determinable G .

(Officially, we are predicationists about grounding, but there is nothing to bar us from representing explanatory inferences in this way so long as—officially—we take them to be underwritten by grounding *relations*.)

To cover the mediate cases we can generalise the notion of an explanatory inference. The generalised notion of the explanatory inference is the explanatory *argument*—an argument composed of explanatory inferences, which we define inductively as follows:

(69) **EXPLANATORY ARGUMENTS**

- Explanatory inferences are explanatory arguments.
- If $\phi_0, \dots, \phi_n \vdash \psi_0$
and $\psi_0, \dots, \psi_m \vdash \xi$
are explanatory arguments, then so is
 $\phi_0, \dots, \phi_n, \psi_0, \dots, \psi_m \vdash \xi$.²⁸

We can now define philosophical explanation. Let T be a philosophical theory and e some explanandum of the target theory. Then

(70) **PHILOSOPHICAL EXPLANATION**

T philosophically explains e iff there is an explanatory argument from T to e .

For a straightforward example again consider the Humean theory of laws. In its simplest form this theory consists of one essence claim:

(71) **(NAÏVE) HUMEAN THEORY OF LAWS**

$\Box_{\text{law}} \lambda$ is a law $\iff \lambda$ is a true generalisation.

As an essence claim, this tells us what it takes for a proposition to *be* a law. It must be a true generalisation. Now consider an arbitrary generalisation L . Our stock of explanatory inference rules—basically, generic statements of full, immediate ground—point the way to the explanantia of L 's being a law. Regardless of its plausibility, the Humean implicitly relies on this grounding principle (as when she says things like ‘everything there is—including laws—depend only on local matters of particular fact.’).

(72) Generalisations are grounded in their instances.²⁹

²⁸This definition is a somewhat simplified version of Litland (forthcoming)’s.

²⁹As we saw in the previous section, this introduces a problem for those who hold that grounds necessitate what they ground.

We can either encode this principle as an inference rule:

(73) **GENERALISATION GROUNDING**

$$\frac{Fa_1 \wedge Ga_1, \dots, Fa_n \wedge Ga_n}{\forall x(Fx \rightarrow Gx)}$$

provided $a_1, \dots, a_n$ are all the F s there are

Or we can just state a generic grounding principle as a premise. However we choose to represent it exactly, we are now in a position to represent Humean reasoning explicitly.

- (i) $\Box_{\text{law}}$ ‘all F s are G ’ is a law $\iff$ ‘all F s are G ’ is a true generalisation. (Humean Theory of Laws)
- (ii) Generalisations are grounded in their instances. (Generic Grounding Claim)
- (iii) $Fa_1 \wedge Ga_1, \dots, Fa_n \wedge Ga_n$ (and that’s all the F s there are). (Assumption)
- (iv) All F s are G . (from (ii) and (iii))
- (v) ‘All F s are G ’ is a law. (from (i) and (iv))

The Humean theory of laws (laws are true generalisations), together with a grounding principle (generalisations are grounded in their instances) explains why a given proposition is a law (because its instances hold). Moreover, by displaying the explanatory reasoning explicitly, and citing those grounding rules upon which we have relied, we have shown *how* the Humean Theory of Laws accounts for the lawhood of those propositions which are laws.

There are some interesting features of this account. First, it recognises a distinct role for philosophical explanation, but makes essential use of grounding/metaphysical explanation. The explanatory power of theories derives in large part on grounding principles. It is because the explanandum is derivable *via* grounding principles that a theory is able to explain. This suggests a criterion of explanatory adequacy on philosophical theories:

(74) **EXPLANATORY ADEQUACY**

A theory T is explanatorily adequate with respect to some domain D (of facts or explananda) just in case each $d \in D$ is derivable from T *using only explanatory inferences*.

In the case of lawhood, at the very least, our D will be a (possibly exhaustive) set of explananda of the form ‘ p is (not) a law’. We want our theory not only to correctly ‘predict’ which propositions are laws, but also to explain why those propositions are laws. It is a common complaint of the philosophical theory that, although it makes the correct predictions about its target phenomena, it fails to illuminate (in an explanatory sense) why those phenomena hold. For instance, the Best Systems Account of laws correctly ‘predicts’, by and large, which propositions count as laws. But as I will argue in Chapter 5, it does not plausibly *explain* why those propositions are laws. Indeed, that is the chief anti-Humean complaint.

Second, out of this falls nicely a vindication of our preference for explanatory virtues in the course of theory comparison. We often appeal to the theory which we feel ‘best explains’ the target phenomena—although everyone agrees it extraordinarily difficult to say why explanatory virtues should be a guide to truth. On this account they are trivially a guide to truth. We are in the business of seeking grounds (which by their nature are explanatory). Thus, if it seems that a theory does not explain, that is defeasible evidence that there is no grounding chain between our target phenomenon and its hypothesised essence.

Third (and most tentatively), if all grounding principles are metaphysical principles (however metaphysics is to be demarcated), and all parts of philosophy rely on grounding principles in order to explain, then all philosophy is (at least partly) a kind of applied metaphysics. This affords metaphysics a privileged place within philosophy, since it is primarily the job of the metaphysician (presumably) to discover what the grounding principles are. I suspect that many metaphysicians have felt this way all along. And many non-metaphysicians recognise metaphysics at least as *a* central component of phi-

losophy. But for those who are generally suspicious of metaphysics, it will be unwelcome news to them that they implicitly rely on it. I merely note this interesting consequence of my account, and withhold judgment on it.

3.10.1 Objections

I pause now to consider some objections to my account. Recall that a key difference between philosophical and metaphysical explanation is that latter is factive whereas the former is not. But since philosophical explanation is parasitic on metaphysical explanation, it would appear that there couldn't be non-factive philosophical explanation. Let T be a theory (i.e. an essence claim) and e some explanandum. Factivity will fail if either of T or e is false/doesn't obtain, but the interesting case is where T is false. This is, in fact, true of the case we've been considering. Laws, whatever they are, are not (merely) true generalisations. Note, however, that although the theory itself is false, the grounding claim on which the philosophical explanation relies is not. Generalisations *are* (partly) grounded in their instances (cf. Rosen 2010). Thus, e is derivable from T by explanatory inferences. And hence, the factivity of grounding is compatible with the non-factivity of philosophical explanation.

But now consider a case in which our grounding principle is false. Assume for the sake of argument that generalisations are not grounded by their instances. (Here, we don't strictly have a failure of factivity since the putative ground and grounded may be true although the grounding claim is not.) Nevertheless, we have the appearance of explanatoriness. The Humean theory appears to explain why some propositions are laws. But I am happy to say just that—we have the *appearance* of explanation. The appearance of explanatoriness arises because the grounding principle on which the account relies is *prima facie* plausible, though ultimately false. If you like, call the theory *quasi-explanatory*.

Second, some may worry that the account suffers from a drawback similar to that of Hempel's deductive-nomological account of explanation—it reduces explanation to a set of argument patterns, not really distilling what is essential to explanation. Kim (1994,

p. 52) laments that after

[philosophers of explanation] get past the initial paragraphs about the importance of explanation and understanding, they quickly launch into highly technical constructions heavily laden with terms like ‘law’, ‘derivation’, ‘causality’, ‘probability’, ‘simplicity’, and their forbidding technical kins, and we never see a serious discussion of just what these concepts have to do with understanding something of making something intelligible.

We’re in danger of making the same mistakes all over again, it seems.

This worry is easy to allay. First, the representation of explanations as argument patterns is strictly optional. All that is required is that we can link the theory (the essence claim) via a grounding relation to the explanandum. Explanatory inference rules are merely supposed to *encode* relationships of ground. The use of explanatory arguments is convenient, though, because grounds necessitate what they ground, and are thus truth-preserving. Second, the account illuminates explanation by showing *how*—via the inference rules (generic grounding principles)—a fact is grounded. Since the inference rules encode *immediate ground*, each step of the argument is transparent. So although it may be opaque how some phenomenon is mediately (and interestingly) grounded, explanatory arguments provide understanding by being *stepwise* transparent.³⁰

Here is where one might resist the analysis. How do we know what the general grounding principles are? (As Litland notes, a logic of ground should appropriately remain silent here.) And how do they explain if they are brutally stipulated, while revealing nothing about the nature of the explanatory connection? A fair complaint, but I fear it gets things the wrong way round. It is because, when considering the paradigm examples of ground, we recognise an explanatory asymmetry, that we conclude to some connection capable of underwriting such an explanation.³¹ I have a pretty strong intuition that the truth of a conjunction $A \wedge B$ is explained by the truth of its conjuncts—and not the

³⁰Note the connection here with Wilson’s charge, discussed in the previous chapter, against grounding’s alleged explanatoriness.

³¹Indeed, this is how Audi (2012b)’s positive argument for grounding proceeds. Paraphrased a little more neutrally, the arguments goes: there are non-causal explanations; so there must be a non-causal explanatory connection (call it ground). Of course, the proper conclusion of the argument is that there is *at least* one non-causal explanatory connection, but Audi considers challenges to unity to be undermotivated.

other way round. No small-*g* relation, for instance, accounts for this asymmetry. It is not entailment—a conjunction symmetrically entails its conjuncts. Truth definitions don't help—they're couched as biconditionals. Perhaps it is truthmaking. Maybe. But note that we can also ask why truthmaking should be an explanatory connection. Why does the fact that *a* is *F* account for the truth of '*Fa*'? Either we posit, brutally, that truthmaking is an explanatory relation. Or else we posit some more basic explanatory relation to underwrite it. We can similarly ask why a determinate property should account for the holding of a determinable. Why does *a*'s being scarlet account for its being red? Again, either we posit, brutally, that the determinate/determinable relation is explanatory, or else we posit a general explanatory connection which can take determinates and determinables as relata. We do not posit a distinctive explanatory connection and then use it to explain. We recognise distinctive explanations and conclude to some connection which might account for them.

Lastly, there are a couple of technical worries with the account we should preempt. First, it is not strictly true, in most cases, that we can derive our explanandum from just an essence claim—we must use extra assumptions, as we did above. In addition to the claim that laws are essentially generalisations, we needed to assume the instances of a given generalisation in order to explain why it is a law. We could discharge this assumption. For instance, if we use conditional proof, we can derive from just the essence claim that '*if* $Fa_1 \wedge Ga_1, \dots, Fa_n \wedge Ga_n$ ', then ' $\forall x(Fx \rightarrow Gx)$ ' is a law. This would require us to add conditional proof to our stock of explanatory inference rules. There are surely some plausible instances of this. What could be a better explanation of why ' $p \rightarrow q$ ' holds than a derivation of *q* from *p*? But I can't confidently claim this holds generally.³² The main worry with this, however, is that it was not a conditional claim we wanted to explain. We wanted to explain why *L* is a law, not why *L* would be a law if its instances were true.

We may, after all, have to amend our account to allow our assumptions to include 'background' conditions. It is Humean theory of laws *plus* certain background conditions

³²Though it certainly *sounds* plausible that if *T, p* explain *q*, then *T* explains $p \rightarrow q$.

which explain why L is a law. Intuitively, there appears to be nothing wrong with this—*given* certain features of L , we can explain why L is a law. Perhaps the worry is that now we must restrict ourselves, in some non-ad-hoc fashion, to a permissible set of background assumptions—those which are explanatorily relevant. This worry turns out to be unfounded, however, since our restriction to explanatory inference rules ensures that all background assumptions are explanatorily relevant. If there is an explanatory argument from Γ to p , then the permissible set of assumptions is the (not necessarily unique) smallest $\Gamma_0 \subset \Gamma$ such that there is an explanatory argument from Γ_0 .

The second technical worry is that the last step of the argument ((iv) to (v)) apparently does not involve an explanatory inference. The inference is underwritten by an essence claim (a kind of equivalence) rather than a grounding relation. Thus, our ‘explanatory argument’ relies on more than just explanatory inferences. There are a number of moves we could make here. We could adopt Rosen (2015)’s account of real definition, according to which (in this case) it lies in the nature of lawhood that laws are grounded in true generalisations. This entails directly that the last step is explanatory after all. The second move we could make is to take essence claims to express a *generalised identity* (in the sense of Correia and Skiles, forthcoming). Then, for L to be a law just is for L to be a true generalisation. Thus, the grounds of L ’s being a true generalisation just are the grounds for its being a law. This eliminates the last step from the argument. The final, most interesting (and controversial) move, is to take essence claims to be a kind of explanation à la Fine (2015). There Fine distinguishes two senses of metaphysical explanation: explanations *why*, and explanations *what*. Explanations *why* are just grounding explanations. Explanations *what* are essence explanations. We can explain *what* singleton Socrates is by saying that it is the set whose sole member is Socrates. For Fine, explanations *what* correspond to constitutively necessary conditions (it is constitutively necessary of Socrates that he is the sole member of singleton Socrates), while explanations *why* correspond to constitutively sufficient conditions. The existence of Socrates is constitutive of the existence of singleton Socrates. Given this, one might well think, according to Fine, that

if the existence of singleton Socrates is to be explained in terms of the existence of Socrates, then this explanatory link must itself somehow arise from the identity of singleton Socrates; it should somehow be part of the nature of singleton Socrates that its existence is to be determined in this way from the existence of Socrates. (ibid. p. 297)

This bears some similarities to the present proposal. Our account of laws (true generalisations) points towards their grounds (their instances). But if the proposal is to extend our explanatory logic to include principles of essence as inference rules, then the question arises as to how exactly explanation what stands to explanation why. In order to respond satisfactorily to the present concern, it is imperative at the very least that they chain: if p explains why q , and q explains what it is to be the case that r , is there a useful sense in which p explains q ?

Each of these moves require further motivation, and I am still unclear on which move I prefer. I mention them only to show that the worry about explanatory inference, though legitimate, is by no means a knockdown objection.

3.11 Distinguishing Grounding from Causation

Plenty has been written on the close analogy between grounding and causation. So much so, that it's almost a more pressing question what sets them apart, rather than what unifies them. For, presumably, we do not want to conclude that grounding *is* causation.³³ Absent reductive accounts of causation and grounding, it could be difficult to give a precise account of the difference. Who cares? We're doing fine without a reductive account of grounding, thank you. And we are very well able to distinguish cases of grounding from cases of causation; what's the value of a distinguishing criterion? First, of the differences that have been proposed, most are superficial, and subject to counterexamples. This opens grounding theorists to the challenge that we don't really have a secure grasp on the notion after all. Second, in the previous chapter, we argued

³³Though Alastair Wilson (2017) thinks grounding is a *kind* of causation. Interestingly, Bolzano thought that causation was to be defined in terms of grounding. For Bolzano, event c causes event e , if the proposition (Bolzano thought ground related propositions) that c occurs grounds the proposition that e occurs (see Schnieder 2014 for discussion).

the logical behaviour of the small-g relations (they chain and obey a non-circularity constraint) suggests that they are unified. But the very same behaviour then suggests that causation and grounding are unified. Lest this be seen as a *reductio* of grounding unity, we need a defeating criterion of grounding-causation unity. The structure of the argument for grounding-unity is then: the logical behaviour of the small-g relations provides defeasible evidence of unity. This evidence is undefeated. Therefore, we have reason to believe the small-g relations are unified. We can then defeat the analogous move to grounding-causation unity by providing a defeater—in this case, a principled (non-ad-hoc) distinguishing criterion.

So what *is* the difference between grounding and causation. Several differences have been noted in the literature, most of them off-the-cuff remarks, and few serious attempts to capture any deep differences. So let's survey these, in order of plausibility.

3.11.1 Grounding is Well-Founded?

Schaffer (2009, p. 376) remarks that although grounding is similar to both causation and proper parthood in formal structure, 'it differs from both in requiring minimal elements'. He later justifies this claim in his Schaffer (2010a, p. 62), where he argues that if there were no ultimate ground, '[b]eing would be infinitely deferred, never achieved.' (This, in turn, is meant to motivate Schaffer's priority monism. If the fundamental is necessarily fundamental, and gunky worlds are possible, then we must look 'upwards' for a stable foundation.) Causation, on the other hand, needn't be well-founded, since, as Cameron (2008b, p. 8) notes, it is plausible that the universe could be infinitely old, and even if it is not, there is no minimum duration for an event. (Think Zeno's paradoxes.)

There are two problems with this distinction. First, (non-)well-foundedness is hardly characterising of either notion. Suppose there must be a first cause. Does this substantially change our notion of causation? It does not seem to me that it does. A billiard ball strikes another. It makes no difference to the intrinsic nature of this relation whether it stands an open causal chain, or a closed one. Similarly with grounding. Second, the arguments for the well-foundness of grounding are unconvincing. Why must there

be something fundamental? In worlds with infinitely descending grounding chains, it seems most natural to say that *nothing* is absolutely fundamental. And if there can be infinitely *descending* chains, why can't chains of dependence continue endlessly in every direction (in which case we can't look upwards for the fundamental, either)? Moreover, Raven (2016) shows how we can define a reasonable notion of fundamentality, even when there are no terminating grounding chains.³⁴

3.11.2 Grounding is Synchronic?

Schaffer (2012, p. 122) offers an alternative gloss on the grounding-causation distinction.

He says:

Grounding is something like metaphysical causation. Roughly speaking, just as causation links the world across time, grounding links the world across levels.

One way of reading this is that whereas causation is a diachronic relation (causes temporally precede their effects), grounding is a synchronic relation—grounds precede what they ground not temporally but ontologically (or in the fundamentality order or whatever). This assumption is natural given the paradigmatic cases. The paradigm examples of causation (rock throwings, bottle smashings) are indeed diachronic. The paradigm examples of grounding (marooness, redness) indeed synchronic.³⁵

Sara Bernstein (2016) presses this point of disanalogy in her argument against grounding-causation unity (or elucidating grounding by analogy with causation). She claims it reveals three deep differences between grounding and causation. First, because

questions about the metaphysical relationship between causation and time are more complex and rich than those involving ground and time. It is a substantive metaphysical question whether causes always precede their effects. But it is not a substantive question whether grounders are metaphysically prior to what they ground: they must be. (p.24)

³⁴Albeit with some degree of repeating structure. Roughly, he defines something as fundamental if it recurs in every ground below it in the grounding chain.

³⁵I'm not sure Schaffer would endorse this reading. Nor is it necessary. Grounding relations may drive the world across levels by acting 'diagonally'—forwards across time and upwards through levels.

This point simply equivocates on ‘precede’, however. It is indeed a substantive question whether causes always precede their effects—*temporally*. But it is trivial that causes *causally* precede their effects. The substantive question is whether causal priority entails temporal priority. Conversely, it is trivial that grounds are *metaphysically* prior to what they ground. But is substantive whether grounds must be simultaneous with what they ground. It is substantive whether there are any cases of diachronic grounding. Certainly, the relationship between grounding and time is far less *explored* than the relationship between causation and time, but it may be equally rich. (Or the relationship between causation and time may turn out to be less important than previously thought.)

Second, grounding-causation unionists

face a problem of distinguishing between simultaneous causation and grounding. For one would not want to hold that cases of simultaneous causation just are cases of grounding. (p. 24)

Bernstein’s examples are dubious, but illustrate the point well enough. According to Newton’s law of universal gravitation, a shortening of the distance between two bodies will result (simultaneously) in an increase in their gravitational attraction. Intuitively, this is not case of grounding. Likewise, when an iron ball depresses a cushion, we seem to have simultaneous cause and effect. Certainly, it is no case of grounding.

Bernstein’s claim is that if grounding is or is *like* causation, then we’ll have trouble distinguishing cases of grounding from cases of synchronic causation. This isn’t so much a deep difference between causation and grounding as the result of an absence of one. It is a restatement of the present concern. Given the deep similarities between causation and grounding, what are the telling differences? Bernstein’s solution is to deny the antecedent by reductio. For clearly, we can distinguish causation and grounding.

Third,

the diachronicity of causation allows for hasteners and delayers, modifiers that hasten or delay an event’s occurrence.

whereas there is no analagous phenomenon in the case of grounding. Disregarding

concerns about whether hasteners and delayers are possible,³⁶ this may well be a genuine difference between causation and grounding. But it does not seem to me to be a telling one. The possibility or otherwise of hastening and delaying will be decided by our theory of events—whether they be fragile or robust. It will not hang, directly, on our theory of causation.³⁷

In any case, counterexamples to the synchronicity of grounding are abundant. Nor do the counterexamples concern pathological cases. They are quite run-of-the-mill. It's thus hard to see how synchronicity should be regarded as providing even a rough-and-ready demarcating criterion (the paradigm examples notwithstanding). The following list details some non-pathological (though not uncontroversial) grounding relations which are non-synchronic.

- (75) (Causal Theory of Reference) That 'Kripke' (now) refers to Kripke is grounded in Kripke's past initial baptism.
- (76) (Social institutions) That Bill is presently married to Sue is grounded in the fact that a marriage ceremony took place.
- (77) (Moral Obligations) That I am now obliged to comment on my colleague's paper is grounded in the fact that I promised to last week.
- (78) (Truthmaking) The truth of 'there will be a sea battle tomorrow' is grounded in tomorrow's sea battle.

³⁶The doctor delays death by administering treatment. But does the patient die the same death they would have died without the treatment? That will turn on the how modally fragile we take events to be.

³⁷Overall, I find Bernstein's argument unconvincing. Her overarching aim is to undermine the intelligibility of grounding. But the argument seems to be self-defeating.

1. Grounding theorists attempt to elucidate grounding by analogy with causation.
2. But the analogy can only elucidate grounding if the similarities run deep.
3. The similarities are superficial; the differences run deeper.
4. Therefore, grounding theorists cannot elucidate grounding by appeal to causation.

The trouble is that if we are to uncover points of *deep* disanalogy, we had better have a somewhat secure grasp on the target notions. If we did not, how would we recognise the dissimilarities? Bernstein herself says that the purported analogy ignores the 'intricacies that *genuinely characterize* each notion' (2016, p. 35, my emphasis).

- (79) (Humean Laws) That all ravens are black is grounded in the blackness of every past, present, and future raven.
- (80) (Mathematical Truths) That there is a Gödel sentence is grounded in the diagonal lemma.
- (81) (Lewisian Modal Realism). The fact that I might have been rich (rather than a philosopher) is grounded in the existence of a world much like this one, containing an individual much like me who decided to go into banking.

If this list is anything to go by, then there really isn't a straightforward relationship between grounding and time. The first three examples exhibit diachronic (past-to-future) grounding relations. The fourth example exhibits a 'backward' diachronic (future-to-past) grounding relation. The fifth exhibits relationships moving along all dimensions of time. And the last two seem to be 'atemporal': mathematical facts transcend time; and modal realist modals are grounded in facts which are stipulated to be spatiotemporally disconnected (they transcend time *and* space).

3.11.3 Ground and Grounded are not 'Wholly Distinct'?

Audi (2012b, p. 687) offers this remark about the grounding/causation distinction:

[The relation between ground and grounded] seems too intimate to be a causal relation; the facts are not *wholly distinct* in the way causation apparently requires its relata to be. (My emphasis)

Distinctness in this sense is not non-identity; ground and grounded are taken to be non-identical. Rather, the sense is similar to that of 'non-separateness'. To take a physical example, a statue is distinct from the clay which composes it. It is not, however, 'separate' from the clay. I certainly do not mean that a ground *composes* what it grounds—merely that the sense in which a ground is not separate or not wholly distinct from its ground is similar to the sense in which a statue is not separate from its matter. The distinction seems to hold up in the usual examples. I flick a switch, the light comes on; cause and effect seem wholly distinct. My jumper's maroonness and

its redness however are not entirely distinct. Both facts concern the same thing—my jumper. And redness and maroonness do not appear to be wholly distinct properties.

This distinction seems to capture something genuinely characteristic of grounding—that its relata are particularly intimately related. I take this to be the most plausible distinction offered in the literature. But, alas, it is subject to counterexamples. Counterexamples to synchronicity double up as counterexamples to non-distinctness; facts which obtain at different times cannot be non-distinct. For a synchronic counterexample, take truthmaking. A truth (or the fact that a truth is true) is something quite distinct from its truthmaker. The fact that snow is white is a fact concerning snow and its colour property. The fact that ‘snow is white’ is true is a fact concerning a truthbearer and one of its semantic properties. These facts are quite distinct.

3.11.4 An Informal Distinction

Although non-distinctness proved an inadequate distinguishing criterion, it came closest to characterising the intuitive distinction between causation and grounding. So perhaps something in the vicinity is available? Non-distinctness captured the particularly ‘tight’ relationship between ground and grounded. Something like this is offered as characteristic of grounding by Fine (2012a, p. 38–9). Suppose a particle is accelerating. If we ask in virtue of what the particle is accelerating, it may be answered that it is being acted upon by a net positive force. But in that case there is a sense that a stricter account can be given of that in virtue of which the particle is accelerating: that it is increasing its velocity over time. In this case, says Fine, ‘there is—and could be—no stricter account of that in virtue of which the explanandum holds’ (p. 39). Though we may have an account of the explanandum’s *full and immediate* cause, we may not possess the fullest and strictest account of the explanandum. There is a further *why*-question to be asked.

It is the strictness of grounding *in-virtue-of* claims, I propose, which sets them apart from causal *in-virtue-of* claims. This strictness also captures what was captured by the non-distinctness criterion—the particularly tight connection between ground and grounded. The distinction is informal, to be sure. A lot rides on how we are to un-

derstand ‘tightness’, of which I know no revealing analysis. And the distinction is non-reductive. It won’t help us distinguish a causal relation from a grounding relation—unless we have already have a fair idea what kind of relation we’re dealing with. But, should we suspect that there is no stricter account of some phenomenon, that is a reason to suspect we are dealing with a relationship of ground. What the distinction won’t do is tell us when there is no stricter account to be had of a given phenomenon. A reductive distinction between causation and grounding, one that is genuinely characterising, would presumably have to be grounded in reductive accounts of both causation and grounding. The demand for such a distinction is unreasonable, given that most theorists agree grounding is primitive.

Recall, moreover, that the need for a distinction was motivated by our desire to block the extension of the argument for grounding unity to grounding-causation unity. Our criterion blocks the inference to grounding-causation *identity*, while still allowing for a good deal of similarity. That is to be welcomed.

3.12 Introduction

If A grounds B , then it is a fact that A grounds B . Call such facts *grounding facts*. Since grounding facts are facts, we can ask if they too are grounded. Suppose they are. Now we have introduced yet further grounding facts. We can ask if they are grounded. Regress. Thus, suppose that grounding facts are fundamental (that is, ungrounded). It seems eminently plausible that the constituents of a fundamental fact must also be fundamental. Thus, B is fundamental. But B is not fundamental—it is grounded by A . Contradiction.

This dilemma—are grounding facts grounded or not?—is the problem of *meta-* or *iterated* grounding. The trouble is that neither horn seems at all plausible. And if neither horn is plausible, the posit of grounding must be misguided. This conclusion must be resisted. Recent treatments of the problem have made clear why. For Bennett (2011), the dilemma threatens *flatworldism*, the view that the world has absolutely no structure—everything is on a par, ontologically speaking. Electrons and universities alike. For deRosset (2013), the dilemma threatens *The Collapse*—that absolutely everything is fundamental. And for Dasgupta (2015), the dilemma precludes the formulation of physicalism—for grounding is unable to take us beyond the basic physical facts.

Unfortunately, no current treatment of the problem is adequate. In this chapter I present my own solution. In the next section I formulate the problem more explicitly. In sections 4.3 and 4.4 I show why some apparently obvious fixes will not work. We will then examine some extant solutions to the dilemma and show why they are found wanting. Particular attention will be given to Dasgupta (2015)’s solution, since it is the most similar to mine. This will then motivate my own solution. In a nutshell, my view is this: grounding—the very relation—is fundamental, and grounding facts are grounded in its essence. The key advantages of this approach are that it does without any extra posits (unlike Dasgupta’s approach), and it does justice to our intuitions regarding the relationship between primitivity and fundamentality, which these other accounts fail to address.

3.13 Sider's Challenge

There are two reasons to doubt that grounding facts are fundamental. The first is due to a principle defended by Ted Sider (2011, chs. 7-8):

(82) **PURITY PRINCIPLE (PP)**

A fundamental fact has only fundamental constituents.

This is not the exact principle Sider defends—he casts it in explicitly representational terms. This formulation cuts to the metaphysical chase, and thus sidesteps criticisms that it is largely beside the point (see Wilson, forthcoming). Why believe the principle? Because there's a sense in which the fundamental must exist 'before' (metaphysically speaking) the derivative comes into being. But a fact cannot exist 'before' its constituents do. Now, PP directly implies that grounding facts cannot be fundamental, since the right hand side of a grounding fact is grounded—by definition. Thus, if we accept PP we are going to have take the first horn of the dilemma.³⁸

The second reason to deny that grounding facts are fundamental is noted by Schaffer (as cited in Bennett 2011). It is that

(83) **MODAL FREEDOM (MF)**

Any combination or 'permutation' of the fundamental is possible.

This needs unpacking a little. Say that *some* entities x_i are modally free just in case we can change the intrinsic nature of any x_n —either its existence or its intrinsic properties—without changing the *intrinsic* nature of any other x_m . (In more homely terms, we can 'wiggle' x_n without wiggling x_m .)³⁹ Why believe MF? Because if an entity is not modally free, it would appear that it is dependent on something else. For instance, truth is not modally free—it covaries with truthmakers. Grounding facts are not modally free in this sense—they covary with grounds. Maroonness never grounds blueness (as per Cameron

³⁸It would be a fair strategy to tackle the dilemma by attacking the principles which generate it. PP is, after all, a highly theoretical philosophical principle. It is hardly beyond dispute. Though I'm surprised the strategy remains unexplored, I will not explore it here, since I think the principle is true.

³⁹This is my unpacking of the gloss that 'any combination of the fundamental is possible'. cf. Schaffer (2003, 2010b) and Wang (2016).

2016)—it always grounds redness. Indeed, it *must* ground redness. Necessarily, if x is maroon, then it is a fact that x 's being maroon grounds its being red.⁴⁰

MF is less plausible than PP. It faces a well-known problem—the ‘problem of free mass’ (Schaffer 2003). There appear to be necessarily co-instantiated properties which are nonetheless fundamental. *Having mass* and *being shaped* both seem fundamental. Yet, anything with mass is shaped. Though neither quantity can exist without the other it does not seem as though either grounds the other. And since both appear fundamental, it does not seem like they share a common ground. Nevertheless, each quantity necessitates the other. Although it may be doubted that MF is generally true, however, I will argue later on that there is a reasonable sense in which grounding conforms to it. Though the principle may not be generally true, it may well be mostly true. That A necessitates B is defeasible evidence that B depends on A .

What about the other horn of the dilemma? Why should we resist the regress? The problem is not that we would have an infinitely descending grounding chain (see Rabin and Rabern 2016)—there is nothing obviously objectionable about that (cf. Cameron 2008b). It is that, to even get off the ground, we need infinitely many grounding facts. The problem arises even if we assume there are terminating grounding chains. Let f_1 be a fundamental fact and suppose it grounds f_2 . We have

$$f_1 \text{ grounds } f_2$$

But the question is now: what accounts for this grounding relation? What makes it the case that f_1 grounds f_2 ? We need to introduce another fact, f_0 , the purpose of which is just to ensure that f_1 grounds f_2 .

$$f_0 \text{ grounds } [f_1 \text{ grounds } f_2]$$

And something must account for the holding of this grounding relation. By assumption,

⁴⁰This is an instance of a principle Litland (2015) calls *internality*. Litland argues against the principle, but it is consistent with his view that instances (indeed, most instances) of it are true.

our first-order grounding chain terminates— f_1 is fundamental. We have generated an infinitely descending chain orthogonal to our first-order chain:

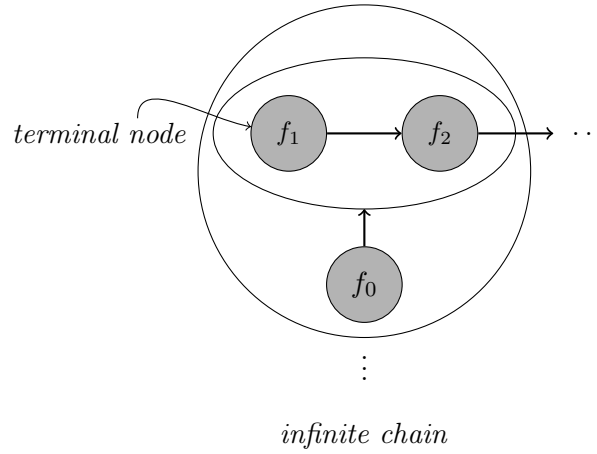


Figure 3.4: The meta-grounding regress

If the fact introduced at each stage must be novel, then this regress is clearly vicious. Our best bet then is to find a plausible ‘benign’ regress—a mere infinite series. And in fact, this is the strategy everyone adopts—myself included. But before we consider implementations of this strategy, let us assure ourselves that the problem is not easily dismissed out of hand.

3.14 No Cheap Fixes

3.14.1 Purity is false

Here’s the dilemma: either grounding facts are grounded, and regress looms, or they are fundamental, and so is everything else. A quick response is to deny PP. It’s a nice-sounding slogan, but that is not a reason to suppose it is true. Moreover, there seem to be counterexamples to both its sufficiency and its necessity. Here is a counterexample

to its sufficiency: suppose f, f' are fundamental facts. It is plausible that conjunction is a fundamental operation. So $f \wedge f'$ contains only fundamental items, yet it is grounded in f, f' . As regards necessity, consider that the distance between things seems to be a fundamental relation. Yet this relation can hold between non-fundamental objects. There doesn't seem to be anything further to say (groundingwise) as to why the distance between two objects is what it is.⁴¹

Further, it may be responded, as does Wilson (forthcoming), that metaphysical and mathematical facts are typically seen as outside the purview of physicalism. Physicalism requires only that 'broadly scientific' phenomena be accounted for by the physical. A physicalism of the type Dasgupta characterises—*every* fact is physical or grounded in the physical—is too strong to be taken seriously. If we discard PP and relax our view of physicalism, it appears we have a simple way out of the dilemma. The grounding facts are fundamental, despite having non-fundamental constituents, and this does not conflict with physicalism, since the grounding facts are properly metaphysical.

But that response is hardly satisfying. Suppose, to use Dasgupta's favourite example, there is a conference occurring (call this fact C). Now C is grounded in a slew of fairly high-level facts—involving the participants, their actions, and perhaps their mental lives (call these facts c_i). Now, it is a fact that the c_i ground C . There is surely *something* wrong with the thought that this fact is fundamental. It does not sit well with the hierarchical picture of reality. At some high level, we have a conference come into being. Yet this conference must already be present in the foundation of the hierarchy, as part of the fundamental fact which ensures that the conference is grounded! It verges on the incoherent to claim that a fact can exist before its constituents do.

I am not so much concerned with preserving Dasgupta's conception of physicalism. I imagine that a physicalist would be motivated to defend the strongest physicalist doctrine she can. But regardless of what actual physicalists think, I agree with Wilson

⁴¹Mark Textor has put to me that perhaps causation is a fundamental relation, yet it can relate non-fundamental events. I have some sympathy for this view. However, Kroedel and Schulz (2016) offer a view on which causal relations between higher-level events can be understood as grounded in the causal relations between their grounds: if C, E ground C', E' respectively, and C causes E , then $[C$ causes $E]$ grounds $[C'$ causes $E']$.

that Dasgupta's interpretation is overly strict, and consequently less plausible.

3.14.2 Primitivity vs. Fundamentality (again)

Another easy response is to deny that the question 'what grounds grounding?' can, or should, be given an answer. After all, grounding is a primitive notion. But to ask in virtue of what a grounding relation holds seems to presuppose otherwise. If we could say in virtue of what *A* grounds *B*, we would be able to say, in more basic terms, what it is for *A* to ground *B*, so a grounding ideology would be eliminable—something we have explicitly eschewed.

I admit to feeling the pull of this worry, but we must tread carefully. One way of viewing it is as conflating primitivity with fundamentality. We criticised others for this conflation in Chapter 2. Recall that on one interpretation 'the fundamental is fundamental' is true—it is trivially true when the first instance of 'fundamental' picks out the *extension* of 'fundamental'. That is, it is true that the fundamental things are fundamental. But when it picks out its *intension*—*what it is to be fundamental*—it is false. What it is to be fundamental is to be ungrounded. Are we making a similar mistake here? It is true that

(84) 'Grounding' is fundamental.

At least when 'fundamental' is interpreted as 'primitive'. (Otherwise I'm unsure what it could mean.) But what is at issue is whether

(85) Grounding is fundamental.

That is, whether grounding is *ungrounded*. To make things more complicated, there are numerous ways of interpreting this too. On the one hand, it could be asking whether all the individual grounding *facts*—that *A* grounds *B*, that *A'* grounds *B'*, and so on—are fundamental. On the other, it could be asking whether the grounding *relation* (or its existence) is fundamental. Let's leave aside this latter question for now, and focus on the former.

On the face of it, the complaint trades on this conflation:

(86) The grounding facts are fundamental.

(87) What it is for a grounding fact to obtain is fundamental.

(86) is at issue. (87) is what the primitivity of grounding amounts to. But suppose (86) is false; grounding facts are grounded. Is that compatible with (87)? Let g be a grounding fact. Since (86) is false, g itself has a ground. But can't we answer the question 'what is it for g to obtain?' by citing its ground? That turns on what it takes for a term (or notion) to be nonprimitive. The orthodox answer is that it is to have an analysis. According to Horvath (forthcoming), the textbook account of analysis is that analyses are strict biconditionals:

(88) Necessarily, *analysandum* $\iff$ *analysans*.

The claim that a grounding fact (A grounds B) is analysed by its ground g , then, amounts to the claim that

(89) Necessarily, A grounds $B \iff g$.

In cases where more than one (full) ground is possible, this condition is unsatisfied, since a grounded fact would not necessitate its ground. Thus, ' x is maroon' does not analyse ' x is red'. This is a desirable result. There is more to redness than maroonness. So we have a large class of facts which are not analysed by their grounds.

It is more plausible, however, that a fact is analysed by the disjunction of all its possible grounds. Indeed, a popular (and natural) view of determinables is that they are 'nothing more' than disjunctions of their determinates.⁴² It is entirely possible that a grounding fact has only one possible ground—in which case the biconditional is plausibly true. And if this is anything like the correct account of analysis, it follows that grounding facts are analysed by their grounds, in contradiction to primitivity.

⁴²Note that this doesn't affect the common assumption that determinables are grounded in their determinates—it just entails that this is a special case of grounding a disjunction in its disjuncts.

The textbook view of analysis is not plausible, however (see Horvath, forthcoming). Among the least of its problems, it doesn't even ensure a strict direction between analysans and analysandum, so a ground could be analysed by what it grounds. But Horvath's own, more sophisticated, view of analysis (or what he calls 'concept analysis') might still cause problems. On his view, an analysis is a strict biconditional in which the *concepts expressed in the analysans* ground the *concepts expressed in the analysandum*. Thus, for example, the JTB analysis of knowledge would be successful iff

(90) Necessarily, S knows that $p \iff$ S has a justified true belief that p . And

(91) S's knowing that p is grounded in: p 's being true, S's believing that p , and S's belief in p being justified.

On this view, (89) provides a successful analysis of a grounding fact only if the concepts in g ground the concept of grounding. For sake of argument, assume that they do. Not only does it now look like grounding is nonprimitive, but it must still bootstrap itself in to being. Structurally, we have something similar to the inductive vindication of induction. Past experience, by induction, vindicates induction. Similarly, g , by grounding, analyses grounding. The analysis is not circular in the same way that an ordinary circular argument is circular (the conclusion is among the premises). Rather, it is circular in the way that a *rule-circular* argument is circular—the conclusion is among the *rules of inference*.⁴³ To avoid another regress, we must proliferate and iterate different kinds of grounding relation.

Luckily, we so far have no reason to suppose that the concepts in g ground the concept of grounding. To that end we must look at some plausible candidates for 'meta-grounding' facts. What makes it the case, for instance, that promises ground obligations? Why does my promising to φ ground my obligation to φ ? It is hard to say. An apparently reasonable answer—and perhaps this counts in favour of primitivism—is 'that's just what promises do!'. There's nothing more to be said about it. It is brute. A different, but hardly more informative answer, is 'it is the nature of a promise that it creates

⁴³I learnt the distinction from Psillos (1999, ch. 4). He attributes it to Braithwaite (1953).

an obligation'. Without saying more about what that nature is—and that may not have a straightforward answer—this doesn't tell us much. Nevertheless, it too seems a perfectly reasonable answer in the context. What both of these answers have in common, however, is that neither suggests that a meta-grounding fact contains an analysis of grounding. It has something to do with promising, not with grounding, that promises ground obligations. There is no indication that the concepts in the meta-grounding fact ground the concept of grounding.

So how is it possible to say what grounds grounding facts, yet not have an analysis of grounding? Some imagery may help. Imagine grounding is a black box.

$$\text{ground} \Rightarrow \boxed{\text{GROUNDING}} \Rightarrow \text{grounded}$$

Since grounding is primitive, we can't say in more basic terms what happens inside the black box. However, we can describe the input to the box—the ground. We can describe the input, but not the *mechanism*. We can say what is *responsible* for the obtaining of a grounding relation, but we cannot say *what it is* for a grounding fact to obtain. This is so even when the output of a grounding relation is another grounding relation. We can iterate the grounds all while never being able to peer inside the black box:

$$\text{ground} \Rightarrow \boxed{\text{GROUNDING}} \Rightarrow \boxed{\text{ground} \Rightarrow \boxed{\text{GROUNDING}} \Rightarrow \text{grounded}}$$

Perhaps this precludes a *general* account of meta-grounding? For surely the clue to what makes grounding facts hold—generally—is to be found in the nature of grounding itself. But it seems we can only point to the grounds of particular grounding facts. Maybe. This does not preclude our giving a *schema* however. What we need is a general account of things of the right shape (grounds) to plug into the black box. The upshot of all this is that the primitivity of grounding does not warrant so ready a dismissal of our dilemma.

3.15 *Tu Quoque*

The conclusion we are trying to avoid is that the dilemma reveals an inherent tension in the notion of grounding, so we should give it up. That response is unacceptable. It should be noted (contra what others have claimed) that other conceptions of dependence face the same dilemma. If one thinks the dilemma shows an incoherence with grounding, one should think it shows an incoherence with dependence generally. But one does not give up the notion of truth in the face of the semantic paradoxes. It is just accepted that they present difficult problems to be solved. Likewise, the present dilemma needn't show there is something inherently wrong with the notion of dependence, just that there is an obstacle to be overcome. Just as thin notions of truth, such as disquotationalism, are unable to avoid the paradoxes, so thin notions of dependence are unable to avoid the dilemma. Establishing this is the aim of this section.

Jessica Wilson (2014, forthcoming) thinks that 'bothersome' questions, such as 'what grounds grounding?', do not arise for her small-g conception of metaphysical dependence. They are 'spandrel' questions, she says, generated by the overly abstract nature of grounding. No one has ever asked in virtue of what the determinate/determinable relation holds, or the subset relation, or set-membership.⁴⁴ We have an antecedent understanding of these notions. And discussions of how the mental depends on the physical, for instance, take for granted that these relations suffice for metaphysical dependence. There is a perfectly adequate formulation of physicalism in terms of the small-g relations: that all *broadly scientific* phenomena are nothing over and above (in some or other small-g fashion) the physical.

This is unconvincing. As we argued in Chapter 2, questions of dependence are not

⁴⁴Wilson's first example is of identity. I'm not convinced myself that it is entirely unreasonable to ask in virtue of what an identity holds, but I can see why that might be doubted. Everything just *is* self-identical. What more can be said? On the other hand, suppose we're dealing with a nonfundamental entity *a*—an entity whose existence is grounded. Then surely it is not a fundamental fact that *a* is self-identical. We might say that in order for an entity to be self-identical it must exist. So *a*'s existing grounds its being self-identical. Or we might say the two facts are actually one and the same. Perhaps neither is a genuine fact, since they involve non-properties. But these interesting issues are moot, since we deny that identity is a grounding relation—small-g or otherwise.

settled by the small-g relations. For one thing, most are not inherently directional. Nominalists and realists about properties agree that a red ball is a member of the set of red things, but they disagree about the direction of dependence.⁴⁵ Most pertinently, it is not clear that determinates can account for the ‘reality’ of their determinables. Thus, the mental, for instance, cannot be ‘small-g generated’ from the physical. This is not so much a problem for the reductive physicalist (which Wilson is not),⁴⁶ but it creates problems for the non-reductive physicalist. For she will be left, unless she countenances further dependence relations, without the resources to show how the reality of the fundamental accounts for the reality of the nonfundamental.

Further, it is perfectly reasonable to ask why a small-g relation holds. We can ask, for instance, why *A* is a subset of *B*, and it may be replied that all of *A*’s members are members of *B*. I concede that there is less pressure to pose such questions than there is to ask why a grounding relation holds. But this seems to me to be because of an epistemic gap, not a metaphysical one. It is obvious *when* the determinate-determinable relation holds. It is not always so obvious *when* a grounding relation holds. But it is equally obscure *why*, metaphysically speaking, either should hold. The temptation to ask why a grounding relation holds apparently stems from the need to justify it. To see this, consider the statement: *red* is a determinable of determinate *maroon*. The question why this is so comes across as flippant—if it is interpreted as request for a reason as to why this particular instance of the relation holds. ‘What do you mean? It just is.’ seems the most appropriate response. If interpreted, however, as a request for information on how the relation works generally, it is a perfectly reasonable (though difficult) question. Now, supposing it makes sense to ask why a small-g relation holds we can generate the regress—the only difference being that at each stage of the regress there are several different small-g relations which might be invoked.

Wilson’s most promising avenue, I would have thought, would be to appeal to prim-

⁴⁵It is a familiar complaint of nominalist, empiricist, anti-realist, or otherwise ‘metaphysically light’ approaches to philosophical problems that they get the direction of dependence or explanation wrong.

⁴⁶It is most natural to interpret the reductive physicalist as looking for *identities*, not dependence, between ‘lower’ and ‘higher’ level phenomena.

itive fundamentality. Since, for her, it is primitive what things are fundamental, she could appeal to primitively fundamental grounding relations with nonfundamental constituents. Aside from being grossly *ad hoc*, however, we have already argued relative fundamentality is superior to absolute fundamentality, so I will not consider this proposal further.

3.16 The Grounds Ground Grounding?

Bennett (2011) and deRosset (2013) independently argue that if A grounds B , then this fact itself is grounded in A . I'll focus on Bennett's exposition here. Grounding, according to Bennett, is what she calls a *superinternal* relation. *Internal* relations are already familiar. An internal relation is one which holds in virtue of the intrinsic nature of its relata. Comparative quantities provide the well-known examples. If Adam is five foot 10 and Bob is five foot eight, then it is already settled that Adam is taller than Bob. There is nothing more to the obtaining of the *taller-than* relation than that its relata possess the intrinsic natures that they do. They are no addition of being, an 'ontological free lunch'. *Superinternal* relations are similar—except they hold in virtue of the nature of just one side of the relation. If aRb holds in virtue of the intrinsic nature of a (or b) alone, then R is a superinternal relation.⁴⁷

The thought is that superinternality is what makes grounding *generative*—and this makes it particularly well-suited to characterising physicalism. The physicalist does *not* claim that the physical grounds the mental because of the intrinsic nature of both the physical and the mental. The physicalist's claim is that the physical alone can account for all else. So it is the physical alone which generates the mental and ensures that it has the intrinsic nature that it does.

⁴⁷Bennett adds the condition that in superinternal relations a also guarantees that b exists and has the intrinsic nature that it does. But I think we should allow for the possibility of 'trivially superinternal' relations. For instance, a superinternal relation R can be defined on any monadic property P : xRy iff Px .

This proposal has interesting consequences for our regress. Suppose

$$A \text{ grounds } B$$

This itself will be grounded in A :

$$A \text{ grounds } [A \text{ grounds } B]$$

Which is also grounded in A , and so on. So we have an infinite series, but, claims Bennett, not a vicious regress. Her claim is that it is similar to the truth regress, which is often supposed to be non-vicious. The series

$$\begin{array}{c} Tp \\ TTp \\ TTTp \\ \vdots \end{array}$$

is unproblematic because each stage is ultimately grounded in p . Indeed, although the series is infinite, there is a *finite* chain of dependence between each stage and its ultimate ground.⁴⁸ A regress is vicious (cf. Bliss 2013) when an ultimate ground is infinitely deferred. Thus, for instance, if we reversed the direction of dependence in the truth regress— p because Tp —the resulting regress would be vicious. For we would never reach the ultimate ground of p .

If anything, Bennett's regress is even less problematic. For though she generates infinitely many grounding facts, she does not generate ever longer chains of dependence. Whereas each stage of the truth regress—barring ' Tp '—is *mediately* grounded in p , each stage of Bennett's regress is *immediately* grounded in the ground of the first-order grounding relation. Compare the following structures:

⁴⁸In the same way that although the *set* of natural numbers is infinite, each natural number is finite.

$$p < Tp < TTP < TTP < \dots$$

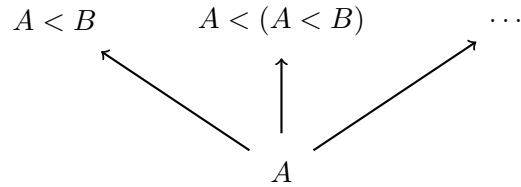


Figure 3.5: The truth regress vs. Bennett's regress

Bennett's proposal, then, offers an elegant solution to the dilemma. Grounding facts are grounded, and immediately so. Grounds for grounding facts are not infinitely deferred. We have an explosion of grounding facts, to be sure, but this is no more problematic than the explosion of truth-facts generated by a single proposition. And we have a story of how grounding takes us beyond the fundamental: the fundamental itself ensures that this is so. If fundamental fact f_0 grounds f_1 , then that is because of f_0 itself. Unfortunately, the account is dead wrong.

3.16.1 The grounds don't ground grounding

Bennett's proposal, elegant though it is, misses something rather basic, as Dasgupta (2015) points out. Grounds are supposed to explain what they ground. It might sound plausible in the abstract that A explains why A grounds B , but many concrete instances of this schema just don't offer satisfying explanations. Consider the standard example of a disjunction's being grounded in its true disjunct. On Bennett's account, it is true that

- (92) That snow is white or grass is blue is grounded in the fact that snow is white, and is so-grounded *because* snow is white.

But that a true disjunction is grounded in its true disjunct(s) has nothing to do with the content of those disjuncts—in this instance, nothing to do with the whiteness of snow. It has everything to do with the nature of disjunction. It is because of how disjunction works that a disjunction is grounded in its true disjunct(s). This point can be made clearer if we consider that Bennett’s proposal entails that grounding facts which intuitively have very different explanations get the same explanation. p not only grounds $p \vee q$, it also grounds $\neg\neg p$ —which has nothing to do with the content of p , and everything to do with the nature of negation.

It might be replied, drawing on what was argued in the previous chapter, that meta-grounding claims are instances of unexplanatory grounding relations. *A does* ground that *A* grounds *B*—it just doesn’t explain it. On its own, however, this response is inadequate. In other cases of unexplanatory grounding we usually have a fair idea of why they are unexplanatory. Bennett’s meta-grounding relations don’t fit any such cases described in the previous chapter. We have no reason to suppose that such grounding relations would be unexplanatory. Moreover, we *do* have plausible candidate explanations of these grounding facts, as outlined above, and we have no reason to suppose that these explanations are not indicative of grounding relations.

A more ambitious response would be to argue that Bennett’s grounding claims, contra appearances, are indeed explanatory. This stance is taken by Louis deRosset (2013). He distinguishes an *explanans* from what he calls an *explanatory story*—similar to what we have termed an explanatory argument. An explanatory story comprises the explanans and the explanandum, but it may also contain *ancillary material*—information which, given the explanans, helps make the explanandum intelligible. Let our explanandum be

$$p \text{ grounds } p \vee q$$

deRosset’s claim is that p is the explanans of this grounding fact, and an appeal to the nature of disjunction, its truth table, or similar, is part of the ancillary material of the argument. I find this response somewhat opaque, I admit. My best guess is

that it trades on something similar to the Bolzano-Carroll regress.⁴⁹ p entails $p \vee q$ by disjunction introduction. But it is not the case that p and disjunction introduction entail $p \vee q$ (for we would need to introduce a new rule to ensure that this entailment holds). Nevertheless, we may refer to disjunction to make intelligible why p entails $p \vee q$, though it does not itself feature in the entailment.

But here is what I don't understand. It is very clear to me that disjunction doesn't feature (at least not directly) in the explanans of $p \vee q$. The explanans is just p . That alone accounts for the truth of $p \vee q$. But the question 'why $p \vee q$?' is very different to 'why does p ground $p \vee q$?'. The former seeks a ground for a disjunctive fact, the latter for a grounding fact. A causal example brings this out more clearly. If I ask why the glass broke, a satisfactory answer is that it fell. But if I ask why the glass broke, given that it fell, the answer 'because it fell' is clearly infelicitous. It is not answering the right question. The question is why the breaking and the falling stand in such a causal relationship—and repeating a statement of the cause just restates a presupposition of the question. Far from being 'ancillary', the mechanism by which the fall caused the breaking is directly in question.

Consider again the Bolzano-Carroll regress. If we are inclined to think that the deductive inference rules are in need of justification, it won't be the premises that justify them, but 'meta-rules'. The regress for modus ponens (MP), as Carroll (1895) taught us, will look like this:

(93) (MP) If p and $p \rightarrow q$, then q . Why? because

(94) (Meta-MP) If $p, p \rightarrow q$ and MP, then q . Why? because...

Although this is a regress, each stage felicitously answers the question posed at the previous stage, and does so not citing a premise but a further rule, ensuring that the previous rule does indeed connect the premises to the conclusion. Meta-grounding questions are analagous. Why does p ground $p \vee q$? We're looking for information about the

⁴⁹Bolzano asked (2014), some 57 years prior to Carroll, whether the rule of inference, in addition to the premises, should be considered a ground for the conclusion. He concluded 'no', on pain of regress.

connection between ground and grounded. Merely restating the ground does not help.

3.17 Grounding is Zero-Grounded?

A view which resembles that of Bennett and deRosset, but which fares rather better, is Litland (forthcoming)’s Zero Grounding Account (ZGA). The view hangs on three ideas: zero-grounding, non-factive grounding, and the explanatory argument. The explanatory argument is already familiar. A notion of grounding is factive just in case ‘*A grounds B*’ entails that *A* and *B* are the case. Otherwise it is non-factive. An intuitive gloss is given by the subjunctive: *A* non-factively grounds *B* just in case *A would ground B, were it the case*. We will continue to take ‘*A grounds B*’ to mean ‘*A factively grounds B*’, unless stated otherwise.

The notion of ‘zero-grounding’ is a little murkier. Fine (2012a, pp. 47–8) distinguishes an ungrounded fact from a zero-grounded fact. Ungrounded facts are simply *not grounded*—among such facts we include the fundamental facts. Zero-grounded facts, by contrast, *are* grounded, but not by anything. On Fine’s analogy, a set is generated from its members via the ‘set-builder’ operation. *a, b, c...* generate $\{a, b, c \dots\}$. Given no elements, the set-builder returns the empty set, the set built from no elements, or the ‘zero-generated’ set. Some grounding theorists have found Fine’s notion of zero-grounding to be obscure and unuseful. Dasgupta, for instance, complains that zero-grounded facts have the same (admittedly empty) ground (2015, 590). Litland’s innovation assuages such worries somewhat. Recall that for Litland *A grounds B* just in case there is an explanatory argument from *A* to *B*. *B* is zero-grounded when there is an explanatory argument from the empty set to *B*. Thus, the distinction between being ungrounded and zero-grounded is just a special case of the familiar and unobjectionable distinction between being underivable and being derivable from the empty set of premises.

With the terminology in place we can now state the Zero Grounding Account:

(95) **ZGA**

A grounding fact ‘ A grounds B ’ is grounded in A plus the fact that A *non-factively* grounds B .

This resembles the BDA insofar as grounding facts are partially grounded in their grounds. But, assuming that the non-factive grounding fact is given, it actually sounds felicitous and plausible. Of course, the problem now is to say what grounds the non-factive grounding fact, and this is what Litland does.

As the reader might have anticipated, Litland’s idea is that non-factive grounding facts are zero-grounded. How do we deal with the regress? We say that zero-grounding facts are themselves zero-grounded. (Since if p is provable, it is provable that p is provable.) Litland develops a logic of ground on which non-factive grounding claims may be derived from the empty set. In addition, he develops a graph-theoretic semantics which allows grounding facts to be grounded in different ways even though they share the same (perhaps empty) ground, offsetting Dasgupta’s concerns. For example, p grounds both $p \vee q$ and $\neg\neg p$. A graph theoretic semantics allows us to trace different *paths* from p to $p \vee q$ and $\neg\neg p$. Fine (2012a, 2012b)’s truthmaker semantics is not fine-grained enough to allow for this.

The obvious question is: why believe that grounding facts are zero-grounded? Litland offers two reasons. First, the mere fact that it offers a solution to the dilemma is reason enough to believe it. Second, once we understand what zero-grounding is, we thereby understand that grounding statements are zero-grounded—in the same way that once we understand what conjunction is we understand that a (true) conjunction is grounded in its conjuncts.

I still have some misgivings about zero-grounding,⁵⁰ but even granting the notion, a

⁵⁰Here are two. First, I can see how zero-grounding might work if grounding is inherently operational, but since I have argued at length that grounding is relational, the existence of zero-grounding appears to entail that there are grounding relations with a missing relatum. Of course, if the ZGA really does promise the most satisfying account of meta-grounding, this might just count against the relational view.

The second worry is related to Dasgupta’s complaint about the Bennett-deRosset account. Does zero-grounding underwrite explanations, and if so, what is that nature of such explanations? If such explanations exist, then it appears that they lack explanantia. There are explanations without explainers. But zero-grounding claims *do* appear to have explanantia. The explanans for why true disjuncts ground disjunctions would appear to be (some aspect of) the nature of disjunction. I see no reason to think we

serious problem remains—serious enough to undermine the ZGA.

3.17.1 The Tortoise’s Revenge

Suppose we want to derive that p non-factively grounds $p \vee q$. First, we assume p (for later discharge). An explanatory rule of inference tells us that we can now infer $p \vee q$. Since this argument contained only explanatory inferences, we can conclude that p (factively) grounds $p \vee q$. And finally we can discharge the assumption that p . We know that p would ground $p \vee q$, were it true. So we conclude that p non-factively grounds $p \vee q$. As we have already pointed out, explanatory inference rules basically encode generic principles of immediate ground. It is not surprising that we can show, given no assumptions, that p grounds $p \vee q$. It is an explanatory rule that ϕ entails $\phi \vee \psi$! We have staved off regress while incurring something like rule circularity. We have shown that $p, p \rightarrow q$ entail q by conditional proof.

Of course, there are more interesting cases. We could show, for instance, that ‘ p grounds $(p \vee q) \wedge (p \vee r)$ ’ is zero-grounded. This grounding relationship is not immediate and is not directly encoded by our logic. Litland’s logic characterises the conditions under which explanatory inferences chain to form explanatory arguments—or how relationships of immediate grounding ground relationships of mediate grounding. But this is analagous to proving derived rules in a sequent calculus; without the primitive rules, they are unprovable. Likewise, without the explanatory inference rules, the interesting grounding statements are unprovable.

One way of responding to the Tortoise is to stamp one’s foot: ‘ p and $p \rightarrow q$ just do entail q . That’s all there is to say on the matter.’ We might understand this thus: modus ponens is fundamental. It is not in need of justification. And it would be misguided to seek justification for it. An analagous move does not appear to be open to Litland, however. The claim that explanatory inference rules are fundamental seems dangerously close to the claim that grounding principles are fundamental, whence Sider’s worry resurfaces. There might, however, be a different sense in which grounding principles are

should regard the nature of disjunction as mere ‘ancillary material’, as per deRosset’s response.

‘fundamental’ or ‘basic’, or at any rate, not grounded. Such a sense is key to Dasgupta’s solution to the dilemma, to which we now turn.

3.18 Grounding is not apt to be grounded

In addition to the fundamental and the grounded (the ‘substantive’ facts), Dasgupta (2015) thinks there is a third category of fact: the ‘not apt to be grounded’, or *autonomous*, as he officially terms it.⁵¹ The idea is this. The world forms a structure (the familiar hierarchical picture). The bottom of the structure, the foundation, contains the fundamental facts. Although such facts are ungrounded, they might have been grounded—had the world contained deeper structure. Despite being ungrounded, then, they are apt to be grounded. Above we find the derivative (grounded) facts. Since these facts are grounded, they are clearly apt to be grounded. How do the autonomous facts fit into this structure? They are the ‘scaffolding’ around the structure. As Dasgupta puts it, the correct answer to what grounds an autonomous fact is not ‘nothing’. It is that the question does not make sense.

This kind of tripartite division finds analogues elsewhere. Dasgupta gives the following. In a formal system, such as set theory, we have the ‘fundamental’ propositions, the axioms. Such propositions are not derivable, but they might have been derivable, had we chosen different axioms. Then there are the ‘grounded’ propositions, the theorems. These are derived from the axioms. A fortiori, they are derivable. But there is another class of proposition, the definition. We can use definitions to help us derive theorems. But definitions themselves just aren’t the kind of proposition that can be derived. The correct response to a request for a proof of the definition of ‘subset’ is ‘woah, back up. We need to get clear on the role of a definition.’ The sense in which an autonomous fact is not apt to be grounded is supposed to be similar to the sense in which a definition is not apt to be proved.

Now, Dasgupta’s idea is not that grounding facts are autonomous. He thinks they are

⁵¹Dasgupta gives a more thorough exposition of the notion in his (2016).

grounded, but grounded in facts which are themselves autonomous; they are grounded in *essentialist* facts. Suppose that

- (96) S's being conscious is grounded in S's physical brain state P .

Dasgupta holds that this is grounded in S's being conscious and a (general)⁵² essential connection between consciousness and brain states:

- (97) It is essential to being conscious that if someone's brain is in physical state P , then it is conscious.

Some of Dasgupta's remarks indicate that he thinks, in general, it is the essence of the *grounded* which grounds grounding facts. That is, that if A grounds B , this is grounded in A and

- (98) It is essential to B that if A , then B .

But this generates implausible explanations. Interestingly, the counterexamples mirror those to Bennett's account. For instance, a promise to φ grounds an obligation to φ . But it is not at all plausible that S's obligation to φ is grounded in S's promising to φ *because* S is obliged to φ . Rather, it is just in the nature of promising that it creates an obligation. Promises create obligations because *that's just what promises do!*⁵³ Luckily, there is an easy fix. We can take it to lie in *both* the nature of A and B that if A , then B . It would appear that this generates specious explanations—explanations violating non-monotonicity, for instance. It has everything to with the nature of disjunction, and nothing do with the nature of a particular disjunct that p grounds $p \vee q$. I think that bullet can be safely bitten. It is the connection between *this* disjunction and *this* disjunct that is at issue. As such, the nature of the particular disjunct is indeed relevant.

⁵²This qualification is necessary to account for general patterns among grounding facts. Generally, if a type A fact grounds a type B fact, then facts of type A invariably ground facts of type B . If grounding facts were grounded in individual essences, it would be a massive cosmic coincidence as to why the same kinds of brain states ground the same kinds of conscious states.

⁵³This example is due to Kevin Mulligan (pers. comm.).

So far, so good. But why believe that essences are autonomous?⁵⁴ Dasgupta gives two reasons. First, the question of why an essence claim holds strikes us as odd in the same that a request for proof of a definition strikes as odd. Suppose

- (99) It is essential to {Socrates} that it is the unique set whose sole member is Socrates.

But we want to respond the question why this is essential to Socrates with something like ‘what do you mean? That’s just what {Socrates} is!’

Second, there is a sense in which merely fundamental facts are *arbitrary*. The fact that an electron is where it is appears to be such a fact. Why is it here rather than there? There’s no (ground-theoretic) reason why an electron is where it is. Essentialist facts are not arbitrary in this way. As Dasgupta says (p. 580), ‘[t]here is nothing arbitrary about the fact that {Socrates} is by definition the unique singleton containing Socrates: this is, after all, just what {Socrates} is!’

3.18.1 Autonomy?

I have no knock-down objections against Dasgupta’s view. However, I find his arguments for it unpersuasive, stemming from three qualms with the notion of autonomy. First, the analogy with definitions in formal systems, such as set theory, is misleading. I see clearly that definitions are not the kind of proposition that can be proved.⁵⁵ But I can also see *why* definitions are unprovable: they are stipulated. Stipulations are not the kind of thing you can, or need to, prove. But you can’t just stipulate anything you like. There are restrictions. Definitions are allowed because they don’t incur an ontological cost. Set theory has only one non-logical predicate—‘is a member of’. All useful set-theoretic

⁵⁴Dasgupta remarks (p. 580) that this claim is not important to most of his argument. What is important is that there is a distinction to be recognised between ungrounded and autonomous facts. I take it the idea is that we require some autonomous facts or other to ground grounding facts, and since essentialist facts are plausibly autonomous, they can serve to illustrate the view. Fine, but Dasgupta doesn’t offer any other candidates that could play the role, and since I cannot think of any, I will take the claim to be essential(!) to the view.

⁵⁵Actually, I think there *is* a sense in which definitions can be proved, but only trivially, by entailing themselves. There is no interesting sense in which they are derivable.

notions are definable using set-membership and the apparatus of first-order logic. Here is the definition of subset:

$$A \subseteq B \iff_{df} \forall x(x \in A \rightarrow x \in B)$$

But since ‘subset’ is introduced in this way, it is eliminable. We could say everything we wanted to say with it using only the notion of set-membership (plus quantification). If we like, we can just view it as a useful shorthand. It constitutes, as the logicians say, a *conservative* extension of the basic set-theoretic language. Autonomous facts are dissimilar in this regard. Both essentialist facts and grounding facts are substantive, not stipulated. They incur an ontological cost. We can say things with them that we couldn’t say without them. If grounding facts are indeed autonomous it is not because they are relevantly similar to definitions.

An analogy which seems more apt to me is that general grounding principles are like *inference rules* in a formal system. We have the premises (grounds) which, given the inference rules (grounding principles), entail (ground) the conclusion (grounded). The idea is that both entailment and grounding are the kinds of relations which produce an output, given some input. The primitive inference rules, at least, cannot be proven. They are fundamental. But that does not mean it’s misguided to ask whether they can be proven. Derived rules, for instance, *can* be proven. And had we chosen a different set of primitive inference rules, we might have been able to prove some of those rules. But this analogy pushes us back towards our dilemma. Either we insist that the inference rules (grounding facts) are fundamental, and we face the Siderian collapse. Or else we accept that inference rules (grounding facts) must be proven (grounded), and we’re at the mercy of the Tortoise.

Second, I don’t think Dasgupta has done enough to establish that essentialist facts are autonomous, rather than being obviously fundamental. Dasgupta’s argument hangs on our finding certain questions ‘odd’. We are supposed to find the question odd why {Socrates} has the essence that it has. From this oddness we are supposed to conclude

that the question has a false presupposition, or doesn't make sense in some way. But this oddness would be equally well explained if essentialist facts were fundamental, and obviously so. For asking why an essentialist fact holds would be infelicitous in much the same way that the question 'why is your jumper red?' is infelicitous, as we argued in the previous chapter. The reason it strikes us as odd is that a Gricean maxim has been obviously violated.

My last qualm with autonomy is that it constitutes a radical (non-conservative) extension of our ideology. So far we have recognised two (relevant) kinds of fact: the fundamental and the grounded. These our united, however, by the their both being a part of the grounding order. The only difference is that one kind of fact occupies a unique place in the grounding order. The working hypothesis of the grounding theorist, as I understand her, is that the whole of reality—*all* the facts—can be understood as a large grounding order. Without a direct reason to suppose that there are facts which fall outside the order, this strikes me as too radical a departure.

Luckily, I think we can do without autonomy.

3.19 Fundamental Errors

I'm going to take quite a different approach to those outlined above. My view is that grounding facts are grounded in ungrounded facts *about* grounding (more specifically, its essence), but that this does not entail flatworldism, a collapse, or the falsity of physicalism. To start, I am going to reexamine the reasoning which generated the dilemma in the first place. Recall that, on the one hand, it is supposed that grounding must be non-fundamental because of Purity and Modal Freedom. Now, I am not going to argue that either of these principles is false. Instead I'm going to offer an understanding of grounding which both respects versions of these principles, and avoids the Siderian dilemma. And I'm going to do it without requiring any radical departures from orthodoxy.

An instance of maroonness, as we've already noted, always grounds an instance of redness; it never grounds an instance of blueness. Strictly speaking, however, all this

indicates is that grounding relations are *necessitated* by their grounds. And as we are constantly reminded, necessitation doesn't imply dependence (as witness independent yet necessarily coextensive properties, like mass and shape). This suggests that although maroonness necessarily grounds redness, we can locate the *source* of this necessity elsewhere. To foreshadow: this opens up the possibility of understanding grounding—the relation itself—as the source of this necessity. This offers a reasonable sense in which grounding conforms to MF.

As I say, I'm not going to challenge Purity. However, it should be noted that it does its work against a tacit assumption. This assumption is rarely made explicit, though Sider (2011) is an exception. He calls the assumption:

(100) **COMPLETENESS**

Everything is either fundamental or holds in virtue of the fundamental.

This, of course, is what Dasgupta denies. Autonomous facts are neither fundamental, nor do they hold in virtue of the fundamental. Sider's reasoning is that we should be able to tell the entire story of the world using only fundamental notions. The fundamental story of the world should not mention things like *cityhood*. After all, all God had to do was create the fundamental and the rest took care of itself. This is what I take issue with. I think it is simply false that all God had to do was create the fundamental—on Sider's interpretation, at least.

There is a simple argument that we can't tell the entire story of the world using only fundamental notions. Consider two philosophers, one an antirealist about properties, the other a realist. These philosophers agree on the fundamental story of the world. They agree perfectly on which facts are fundamental. Nevertheless, they have a substantive disagreement. The antirealist thinks that there is no place for properties in the resulting 'book of the world'. The realist agrees that (facts about) properties do not feature in the fundamental story of the world, but nevertheless thinks, since they are grounded in the fundamental, they feature in the *overall* book of the world. Thus, it is possible for two books to differ on the world, even though their fundamental stories are the same.

Put another away, if the fundamental story of the world were the *whole* story, then these kinds of disagreement would not be possible. Yet, it is clearly possible for philosophers to agree on the fundamental and have substantive (and reasonable) disagreements about the derivative.

What gives? The trouble is that if grounding is non-fundamental, then Completeness entails that grounding must somehow bootstrap itself into being. This spells trouble if we continue to think of grounding in *connective* terms—as *connecting* the fundamental to the less fundamental. For then grounding must always comprise the non-fundamental. But we needn't think of grounding this way. We can take grounding to be fundamental without taking grounding *facts* (that is, connective facts) to be fundamental. Establishing this is the task of the next section.

3.20 Fundamental Grounding

My position is that the very method of deriving the higher-level facts—the grounding relation itself—is fundamental. In fact it would be helpful not to think of it as (merely) a relation at all. It is better to think of it as a function. (We want to avoid any tendency to presuppose that ground and grounded must exist 'before' the grounding relation can kick in.) This function takes an input and returns an output. The point is, the fundamental facts on their own cannot generate the derivative facts—they need a mechanism by which to achieve it. That mechanism is the grounding 'function'. Some analogies may help.

Taking some inspiration from Dasgupta's scaffolding analogy, let's imagine that the world is a building. As the world is built from facts, so this building is built from bricks. But it takes more than bricks to build a building. A pile of bricks does not arrange itself 'buildingwise'. If we viewed grounding in connective terms, it would be the cement holding the bricks together. This is *not* what I propose. Grounding is more like a builder. A builder is required to take the bricks and form them into a building. Moreover, it's not as though we have builders merely by having bricks. The builders too must be there

from the very beginning—else our pile of bricks will remain a pile of bricks. Similarly, the grounding relation (function) must be there from the very beginning. Without it, we just have a pile of facts.

For a more instructive analogy, consider the natural numbers. Suppose we have a structure (in the model-theoretic sense) just consisting of one number and the less-than relation: $(0, <)$. $<$ is like relative fundamentality. Once we have some numbers, we can order them with $<$, but the relation cannot generate new numbers. And 0 on its own is not apt to generate its successor. Thus, $(0, <)$ gives rise to no interesting structural relations. Likewise, fundamental facts, on their own, are not apt to generate what they ground. Fundamental facts, without grounding, do not give rise to structural relations. Grounding *is* the structuring relation. If, instead, we had $(0, 1, 2, <)$, we would at least have interesting structural facts: ‘ $0 < 1$ ’, ‘ $1 < 2$ ’, ‘ $0 < 2$ ’. But this requires that the numbers are pre-given. And in that sense they are all ‘fundamental’. We still don’t have the means of generating all the numbers. That, of course, requires the successor function.⁵⁶ Provided $<$ is encoded with appropriate rules,⁵⁷ we can generate all the numbers, and the structural facts about them, with the structure $(0, s, <)$.

What’s the point of this analogy? It’s that $<$ can only be used to articulate relations given antecedently given numbers. In this way, it is like Sider’s non-fundamental connecting truths. Since these truths contain non-fundamental constituents, those constituents must be given ‘before’ the connecting truth can hold. The successor function, understood in a generative sense, requires only that 0 is given. Given 0, the successor function gives us 1. Given 1, it gives us 2. Grounding, I claim, is more akin to the successor function. It requires only that the fundamental exist. Given the fundamental, we get what the fundamental immediately grounds. And given the what the fundamental immediately grounds... You get the picture. On this understanding, grounding is fundamental but the constituents of grounding facts needn’t be.

But, given Purity, doesn’t this entail that grounding facts are grounded? The ques-

⁵⁶Think of the successor function as *generative* rather than as a mere mapping.

⁵⁷This recursive rule will do: $x < s(x)$ and $x < s(y) \rightarrow x < ss(y)$.

tion remains, then, what grounds them. The clue lies in the fact that the grounding relation is fundamental. For that opens up the possibility of cutting off the regress. However, the grounding *relation* is not a fact, and so is not a candidate for being a ground. That's a small obstacle. It is fundamental that the grounding relation exists and has the nature that it has. It is fundamental that the grounding relation behaves the way it does.

Thus suppose that A grounds B . If we further suppose that it is part of the essence of grounding that A grounds B , then, since we have already assumed that that essence is fundamental, it follows that B is fundamental. Collapse. However, think again of the successor function. It lies in the nature of the successor function (which is taken as fundamental) that it takes 0 and returns 1. But that is not because the successor function is encoded with infinitely many connecting rules regarding numbers and their successors. It is encoded with one general rule: give me n and I'll give you $n + 1$. Similarly, we can take the grounding relation to be encoded with general rules—such as: give me a type- A fact and I'll give you a type- B fact.

The natural suggestion at this point would be to take this grounding principle to be fundamental, and to say that it grounds the particular grounding fact (perhaps along with the ground). But now that pesky Tortoise shows up again. After all, isn't it perfectly legitimate to ask: what grounds the fact that the grounding principle grounds the grounding fact? To which we want to roll our eyes and reply that no, it isn't perfectly legitimate to ask this question—it's just fundamental that grounding facts just are so-grounded. And again, Purity forces us to reconsider our response. To avoid iterating this whole process, we must deny that grounding facts are fundamental.

But consider the question: why does the rule 'that (type- A facts ground type- B facts)' ground that (A grounds B)? To which the only sensible reply seems to be 'what do you mean? *That's just how grounding works*'. If we are to take this response seriously (and I propose that we do), we cannot interpret it as 'it is of the essence of grounding that grounding facts are so grounded'. For then we wind up saying, again, that grounding facts are fundamental (since the essence of grounding is fundamental). Thus, I propose

that

(101) **GROUNDING ESSENTIALISM**

A grounding fact is grounded in (some fact(s) about) the essence of ground.

To illustrate, suppose type-*A* facts (hereafter, α) ground type-*B* facts (hereafter, β). What grounds this? Some collection of facts $\mathcal{E}$ about the essence of ground:

(102) That α grounds β is grounded in $\mathcal{E}$.

To avoid collapse we must find a ground for this fact too. Here my account resembles those of Bennett, deRosset, and Litland. I claim that this too is grounded in $\mathcal{E}$:

(103) (That α grounds β is grounded in $\mathcal{E}$) is grounded in $\mathcal{E}$.

Like the Bennett-deRosset account, this generates an infinite series, but not a regress:

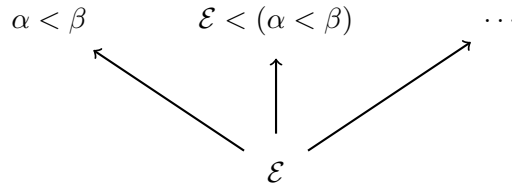


Figure 3.6: The Grounding Essentialist ‘regress’

Though we have a proliferation of grounding facts, we do not have a proliferation of grounds, for each grounding fact is grounded in the nature of grounding itself. Note that this does not entail that all grounding facts get the same ground. That would indeed be a drawback. The claim is that each grounding fact is grounded in *some* collection $\mathcal{E}$ of facts about the essence of ground. Different grounding facts may be grounded in different $\mathcal{E}$ s.

Given the previous chapter’s account of philosophical explanation, this has some interesting consequences. Recall that, for an important class of philosophical theories—those aimed at real definition—the aim is to give an account of the essence of the target

phenomenon, and then to show how the instances of the phenomenon are grounded in that essence. Most grounding theorists agree that it is not possible to give an account of the essence, or a real definition, of grounding. Thus, my account has the consequence that, although a grounding fact has a ground in the essence of grounding itself, we may not be able to determine all the relevant essential facts providing the ground. But that is not to say that we will never be in possession of the relevant facts. We do know (or at least think we know) some facts about the essence of ground. For instance, that α grounds β and β grounds γ ground that α grounds γ . And we know why this is so. It is because grounding is essentially transitive.

Yet sometimes we have good reason to suspect that a grounding relation holds without being able to say exactly why it holds. A philosopher who doubts that determinable properties are mere disjunctions of determinates may still reasonably believe that determinables are grounded in their determinates. (Calling the relation the determinate-determinable relation does not illuminate how it works—the label just denotes a class of grounding relations united by their relata.) If pressed as to why the relation holds, it would be perfectly reasonable, it seems, for this philosopher to reply that *that's just how grounding works*. And the best way to cash this out, I reiterate, is that it lies in the nature of ground to behave in such a way. The reply is not very informative, to be sure. But the request for such information, given our admitted imperfect knowledge of grounding, is not always appropriate. Thus, I regard it as a virtue of Grounding Essentialism that it sometimes provides an informative account of the grounds of grounding facts, but cannot do so in all cases.

3.20.1 Modal Freedom Revisited

Grounding Essentialism, finally, puts us in a position to explain why grounding facts are not modally free, even though grounding is fundamental. We can both preserve the claim that grounding is fundamental and square this with grounding's apparent lack of modal freedom. The trick is in where we locate the source grounding's modal properties.

Consider an electron e . Electrons seem like good candidates for being fundamental

entities. For our purposes, we will assume that the fact that e exists is fundamental. It would also appear to be fundamental that e is negatively charged—for that is a fundamental property of a fundamental entity. It is clear, however, that e 's existing, since it is an electron, necessitates its being negatively charged. Thus, the fact that e is negatively charged is not free with respect to e 's existing. This doesn't count against MF, however, since e is *essentially* negatively charged. The fact that e can't fail to be negatively charged does not make its being negatively charged non-fundamental. Compare: that a is maroon necessitates that a 's being maroon grounds its being red. Whereas Bennett and deRosset would locate the source of this necessity in a 's being maroon, I locate it in the essence of grounding. It is of the essence of grounding to take maroon and deliver red. Grounding can't fail to take maroon and give us red. This no more violates MF than the fact the electrons can't fail to be negatively charged does.

3.20.2 Brute Essentialism

A view which is similar to mine is dubbed 'brute essentialism' by Dasgupta (2015). According to this view, A grounds B just in case it lies in the nature of B to be grounded in A .⁵⁸ That is, the essence of the *grounded* fact grounds grounding. Dasgupta notes that the view enjoys many virtues but rejects it because it entails the falsity of physicalism, as he understands it. Why? Because essentialist facts are not physical facts, and every grounding fact must ultimately be grounded in an essentialist fact. Therefore, there are facts not grounded in physical facts.

I have a few remarks about this. First, Dasgupta too thinks that grounding facts are grounded in essentialist facts. He only manages to save a weakened version of physicalism, and at the cost of positing an extra ideological primitive. The physicalism Dasgupta sets out to save is:

(104) **STRONG PHYSICALISM**

All non-physical facts are grounded in physical facts.

⁵⁸If this looks familiar, it's because it is also the condition that Rosen (2015) provides for real definition. See the previous chapter.

The physicalism he actually saves is:

(105) **MODERATE PHYSICALISM**

All non-physical facts are grounded in physical facts or autonomous facts, *and all autonomous facts help underwrite grounding explanations.*

Dasgupta thinks that what results is a non-*ad hoc* explanatory project for physicalism. Given the autonomous facts, which must be placed there ‘by fiat’ anyway, the physical is sufficient to ground all else. This gives explanatory pride of place to the physical facts. Sure, given the autonomous facts, the resulting project for the physical is non-*ad hoc*—that does not mean the posit of autonomy was not *ad hoc* to begin with. Essentialist facts can underwrite grounding explanations whether they be autonomous or ungrounded. Absent the Siderian problem, I don’t think there’s a convincing reason to posit autonomous facts.

Second, why think the strong kind of physicalism Dasgupta wants to save is actually worth saving? Dasgupta would reply that perhaps it isn’t, but that this shouldn’t be decided by theoretical considerations about grounding. The motivation is the same kind of ecumenicalism that motivated Wilson in Chapter 2 (which she neglects to mention in this context). I doubted ecumenicalism back in Chapter 2 and I’ll cast doubt on it again. Not all philosophical views are created equal. Not all philosophical theories deserve to be taken seriously. And since a philosophical framework will rule out views just by having content, it is unreasonable to demand that our framework be consistent with every conceivable philosophical position—or even every plausible one. But that is no matter, because, as Wilson (forthcoming) points out, physicalists are typically concerned with such working hypotheses as ‘the mental is ultimately explainable in terms of physical’. When the physicalist says that ‘all facts are physical’, what they usually mean is that nothing is irreducibly mental or biological or whatever. To interpret the physicalist as maintaining that *absolutely every* fact is grounded in the physical is unwarranted, and the claim is implausible on the face of it—at least for the philosopher who takes metaphysical claims seriously. Find me a physical ground for the laws of logic and maybe

I'll reconsider. The philosopher who claims that logical facts have physical grounds most definitely bears the burden of proof.

So why am I not a brute essentialist, given that I reject Dasgupta's reasons for rejecting it? Because it locates the grounds of grounding facts in the essence of the *grounded*. Since I reject the autonomy of essence, however, this requires that I take the essence of the grounded to be fundamental, and it just doesn't sit well to take the essence of a non-fundamental fact to be fundamental. If it doesn't outright violate the letter of Purity, it at least violates its spirit. My position does not suffer this drawback. I do not require the essences of grounded facts to be fundamental, since I take the essence of *grounding* to ground the grounding facts. To illustrate, suppose that *A* grounds *B*. This is grounded in a general connection between type-*A* facts and type-*B* facts which is itself grounded in the essence of grounding. Now, it may be replied that this masks a tacit commitment to the fundamentality of *types* of non-fundamental fact, since they are 'written into' the essence of grounding. That strikes me as true in a sense, but also unobjectionable. I think of it like this: the grounding relation contains the 'blueprints' for generating *B*s from *A*s (much like the successor function contains the blueprints for generating a number's successor). The blueprints are fundamental, sure—in the sense that they are contained in the essence of a fundamental relation. If this entails that *types* of fact are fundamental, that is a bullet I'm happy to bite. It is clear, however, that the view requires no *instances* of these types to be fundamental. Furthermore, this has desirable results regarding counterfactual grounding claims. Suppose it is a fact that, though there are no type-*A* facts, if it had been the case that *A* it would have been the case that *A* grounds *B*. On my view, this has a natural ground. The essence of grounding grounds general connections whether or not they are instantiated, since they are just blueprints written into grounding itself. On Dasgupta's view, this work will have to be done by the autonomous essences of unactualised (uninstantiated) fact types. Fair enough. But the only reason for positing those autonomous essences (so far as I can see) is to account for these kinds of counterfactual grounding claims. Thus, again, Dasgupta's view appears more *as hoc* than mine.

3.20.3 Grounding Reconsidered

The resulting picture of grounding may be surprising. It *reifies* grounding in a particularly strong way.⁵⁹ Grounding is imbued with a rich essence, covering everything from structure to connective rules covering all kinds of fact. The grounding relation thus ends up doing quite a bit more work than perhaps we thought.

That is a fair criticism, but I do not think it is knockdown. My claim is that *something* needs to do this work, and it is natural to have grounding do it. Similar criticisms can be levelled at causation. Causal laws are often invoked to explain the holding of causal facts. Similarly, instead of seeing grounding as encoded with general grounding principles, we might invoke external, but fundamental, metaphysical laws, in the vein of Wilsch (2015). I'm not sure how much the weight choice really carries if, ultimately, the same work is done in either case. I prefer my formulation simply because it avoids the posit of a further kind of fact—the fundamental metaphysical law. That is not because I deny there are such facts, but it seems natural to me to ground metaphysical laws in the way the grounding relation behaves. If it is a law that necessarily, if *a* is maroon, then *a* is red, then it seems to me that that is *because* necessarily, that *a* is maroon grounds that *a* is red. Allowing grounding to have a rich essence—which is by no means a trivial posit, I concede—gives us metaphysical laws ‘for free’.

Others accept that such work needs doing but don't posit anything which can do it. Here I count the ‘bootstrapping’ accounts of Bennett and deRosset. It is claimed that the fact that *a* is maroon is sufficient, on its own, to *generate* *a*'s being red. Our criticism of this was that it gave rise to implausible explanations, but metaphysically, we just don't have the machinery to generate the grounded—unless we stipulate that every single fact has the means to generate what it grounds ‘built in’. But then this view morphs into a less plausible version of my own, except whereas I locate this generative

⁵⁹This is a complaint of the grounding literature recently advanced by Dasgupta (2017). He thinks current grounding theorists have a significantly more inflated sense of ‘ground’ than was initially intended by Fine (2001), and that a significantly deflated notion of ground is still theoretically useful. Unfortunately the paper was published too recently for me to fully consider in this thesis.

power in the grounding relation, Bennett and deRosset locate it in *every* fact. This view is metaphysically acceptable to me, but it is significantly more inflationary than the view Bennett and deRosset intended.

What I do not think is acceptable is to deny that the generative work needs doing. This entire thesis, in a sense, has argued that such work needs doing. Dasgupta's autonomous essences do the same work, but the posit of autonomous facts is supposed somehow to be ontologically innocent because they are 'placed there by fiat' (2015, p. 583) anyway. My account accepts the ontological cost in the way I think most natural.

3.21 Explaining Grounding Facts

There's one more loose end we need to tie up. We need to show that the Grounding Essentialism (GE) account offers satisfying explanations of grounding facts. We rejected the Bennett-deRosset account because it is just implausible that *a*'s being maroon grounds its being red because it is maroon. Dasgupta fared better with his account. He took the essence of the grounded fact to ground grounding. Thus, disjunctions are grounded in their true disjunctions because it's just in the nature of disjunctions that they are grounded in this way. The explanation is natural and satisfying. My approach seems to fare much worse in this regard. Since I take grounding facts to be grounded, ultimately, in the nature of grounding, it would appear that the ultimate explanation of every grounding fact can be summed up as 'that's just how grounding works!' That would not appear to be an acceptable explanation.

In response I am going to argue that, contra appearances, the kinds of explanations my approach offers are just as informative as those available on Dasgupta's account. To start, let's compare exactly how we would go about explaining a range of grounding facts on each approach.

(106) a. p grounds $p \vee q$

Why? Because

b. It is in the nature of *disjunction* that disjunctions are grounded in their true

disjuncts. (Dasgupta)

- c. It is in the nature of *grounding* that disjunctions are grounded in their true disjuncts. (GE)

- (107) a. That I promised to φ grounds that I have an obligation to φ .

Why? Because

- b. It is in the nature of obligation that promises ground obligations. (Dasgupta)
- c. It is in the nature of grounding that promises ground obligations. (GE)

- (108) a. That *a* is maroon grounds that *a* is red.

Why? Because

- b. It is in the nature of determinable colours that they are grounded in their determinates. (Dasgupta)
- c. It is in the nature of grounding that determinate colours ground determinable colours. (GE)

I chose these examples because, intuitively, they favour different kinds of explanation. Dasgupta's view offers the best explanation of disjunction-grounding facts. The nature of grounding appears to be irrelevant. What matters is the nature of disjunction. It is because of how disjunction works, not of how grounding works, that true disjuncts ground disjunctions.

On the other hand Dasgupta's view does not offer satisfying explanations of obligation-grounding facts. It is because of the nature of *promises* that promises ground obligations. The notion of obligation appears to be essential to the notion of a promise but not conversely. Neither theory seems to capture this example well.

Lastly, it remains quite obscure as to how determinates ground their determinables. I'm not convinced either that it is the essence of the determinate, or the essence of the determinable, which grounds determinate-determinable relations. In such cases we can do no better than to say: 'that's just how grounding works'.

With regards to disjunction, Dasgupta's explanation is preferable not because it is

more informative, but because it seems more likely to be true. In each case we have located the ground in an essence, but without saying precisely which aspect of that essence gives rise to the grounding fact. Each explanation conveys, more or less, the same amount of information, yet each is informationally deficient. The question is, then, could we expand the GE-style explanations in such a way as to render them more plausible. In principle, it is my position that, for each grounding fact, a full ground resides in the essence of grounding. Yet I concede it won't always be possible in practice to find one. Thus, my aim is merely to argue that it is plausible such explanations exist. To that end, let us consider the case of disjunction more explicitly.

p grounds $p \vee q$ because it is essential to grounding that a true disjunct ϕ grounds a disjunction $\phi \vee \psi$. But recall that grounding encodes, as a blueprint, the natures of non-fundamental fact *types*. It needs those very blueprints in order to function in the first place. Thus, the nature of (a kind of generalised) disjunction is encoded in grounding. This will include facts concerning, for instance, the semantics of disjunction, and its governing inference rules. These are the very same facts to which Dasgupta appeals in explaining grounding facts for disjunction. So it turns out, we can, in a roundabout way, offer the very same explanations. In the same way we can account for promises grounding obligations—albeit by appealing to the generalised nature of the ground, rather than the grounded. And we have a principled reason to suppose that there is a full and satisfying explanation of determinate-determinable relations, even though we are ignorant of it.

CHAPTER 4

Why I am not a Humean

4.1 Introduction

In this chapter I want to apply the notion of ground to a divisive and vexed metaphysical debate—the debate over laws of nature. The debate takes a familiar course. On the one side, the Humean says we can make sense of laws without countenancing any kind of ‘necessary connection’, ‘cosmic glue’, or otherwise ‘unhumean whatnots’. On the other, the non-Humean says that the Humean’s laws can’t leverage the metaphysical machinery to do the job they’re supposed to do: they can’t explain; they’re not confirmable; they can’t uphold an accident/law distinction; they can’t support counterfactuals; and they can’t support physical necessity. The Humean shouts down their opponent with accusations of question begging. Stalemate.

This is frustrating for the non-Humean. For her, there is something *deeply* wrong with Humeanism. It’s not just that she thinks it is wrong; it’s that it belies a deep incoherence. If only she could make the Humean *see* it! But it seems she cannot find a way of articulating her worries to which the Humean will not cry foul.

The recent advent of grounding has changed this. For grounding allows the non-Humean to articulate—in a particularly precise and illuminating way—exactly what her misgivings are. Thus, her complaints are not so easily dismissed as question-begging.

This is a welcome step towards breaking the stalemate. However, as will become clear, while the non-Humean's new articulation of her criticism isn't strictly question-begging, it does rely on assumptions the Humean is not obliged to accept.

My criticism of Humeanism is different. It will hardly come as a surprise that the typical Humean will reject grounding. It is exactly the kind of 'necessary connection' she explicitly eschews. However, while the Humean eschews heavyweight metaphysical relations, she nevertheless attempts to carry out heavyweight metaphysical work. Such is the inherent tension in Humean accounts of law. Their account of laws is explicitly metaphysically 'thin', and yet they try to put laws to serious metaphysical (and epistemological) work. My target is the Humean who eschews grounding, and yet seeks to do its work with no comparable machinery. This Humean attempts to have her cake and eat it. My criticism of such accounts is that they exhibit explanatory or 'grounding' gaps. There is an unbridgeable grounding gap between a Humean ontology and lawhood—if the world is Humean, there is nothing which deserves to be called a 'law'. When the Humean attempts to close such gaps—usually by changing our understanding of some operative notion—another gap crops up elsewhere. This is what I take to be central anti-Humean complaint. Previous non-Humeans have certainly hinted at this core complaint, but I don't think it has hitherto been clearly articulated.

There are Humeans who deny there is any such heavy-duty metaphysical work to be done. They are not my concern. This kind of Humean denies grounding because she denies that there is any work for grounding to do. The view seems perfectly coherent to me, but I am unsure why anyone would want to hold it. The view has severe and wide-reaching implications, particularly regarding what we think we know about the world. If you're happy to bite those bullets, we have little common ground, and discussion wouldn't be very fruitful. But I suspect that most Humeans deny that their view really has these consequences. Again, it is my purpose to show that these Humeans have a deeply incoherent view.

4.2 Humeanism

According to the official story, Hume was (in)famously skeptical of what he called ‘necessary connexions’. Whether that story is correct is neither here nor there. In contemporary usage ‘Humean’ describes a collection of views—or better, an attitude—characterised by a general distrust of a generalised notion of ‘necessary connection’. This notion of ‘necessary connection’ is slippery. In fact, I know no necessary condition for it. It is not merely a relation which implies a corresponding necessary truth. For instance, since Anscombe (1971) it has been widely doubted that a causal relation implies anything like a corresponding necessary causal law. Nevertheless, causation (as a robustly metaphysical relation) continues to be held up as exactly such a necessary connection. Such necessary connections are more like determination relations. They *make* the world the way it is, or *ensure* it is a certain way. They are the relations which ‘hold the world together’—without doing so necessarily! The term ‘necessary connection’ is a misleading hangover from Hume, who took the orthodox view of causation to imply such necessary truths. Nor is it *sufficient* for a necessary connection that it imply a corresponding necessary truth. Relations of logical necessity or analyticity are acceptable to the Humean. It is necessary that $p \rightarrow p$ or that all bachelors are unmarried. Such necessities are fine because they follow from logical laws or semantic facts, not because they imply any worldly necessity. We can largely bypass these issues, however. If aRb implies some truth of the form $\Box(Fa \rightarrow Gb)$ and $Fa \rightarrow Gb$ is not merely a logical or analytic truth, then R is a necessary connection in our sense. Deterministic lawful connections, according to the non-Humean, imply such truths, so we will restrict our attention to them.

Distrust of necessary connections may be local—a Humean may think we need to countenance necessary connections in some instances, but not in others. Someone who denies grounding, but admits causation, would be such a Humean. Or one may be Humean in a global sense, eschewing all kinds of necessary connection. David Lewis was this kind of Humean. He dubbed his view ‘Humean Supervenience’ and characterised it

thus:

It is the doctrine that all there is to the world is a vast mosaic of local matters of particular fact, just one little thing and then another. (Lewis 1986b, p. ix)

[It is] the thesis that the whole truth about a world like ours supervenes on the spatiotemporal distribution of local qualities. (Lewis 1994, p. 473)

Weatherson (2016) factors Humeanism into two theses. The first (relatively uncontroversial) thesis is that truth supervenes on being:

(109) **TRUTH SUPERVENES**

Every truth supervenes on how the world is.

The second thesis, which is our point of contention, is that there are only local matters of particular fact or local qualities. What this means is that:

(110) **MOSAIC**

There are only (perhaps point-sized) individuals, their *intrinsic*, *categorical* properties, and the spatiotemporal relations between them.

For Lewis, the world *is* the mosaic—in the sense that there is nothing more to how the world is than how the mosaic is. Two worlds exactly alike in their mosaics are exactly alike *full stop*. The non-Humean denies this. For her, there is more to the world than the mosaic. There is the glue binding its tiles together—the necessitating unHumean whatnots. The non-Humean thinks that though two worlds are exactly alike in their mosaics, they may yet differ. They may make true different truths. But the non-Humean does not deny that truth supervenes on being. She just thinks there is more to being than the Humean has dreamt of.

Why does the non-Humean hold such a view? Because she sees truths for which she cannot find a ground in the mosaic. Notably, she claims she is unable to find grounds for laws of nature in the mosaic. Typically, the Humean responds that she has the wrong conception of laws, or at any rate, the Humean is not obliged to accept her conception of laws (cf. Beebe 2000). Perhaps, if laws were as the non-Humean conceives them,

they would not find a suitable ground in the mosaic. But the Humean does not conceive of laws that way, and she can certainly ‘ground’ her laws in the mosaic.

4.3 Two Theories of Law

4.3.1 The Humean View: Regularities and Deductive Systems

The simplest Humean theory of laws is the naïve regularity, or constant conjunction-type, theory: if we look throughout the mosaic, and find that B always follows A , then it is a law that B s follow A s. It is easy enough to see how such a law might be ‘grounded’ in the mosaic. It is just a special case of a generalisation being grounded in its instances. What grounds that all A s are B is that *each* A is B .¹

This theory does not satisfy a key desideratum for a theory of laws, however. A theory of laws should distinguish between laws on the one hand, and generalisations which are merely ‘accidentally’ true on the other. It is probably the case, as the usual example goes, that there are no gold spheres more than a mile in diameter. On the regularity view, then, it counts as a law that all gold spheres are less than a mile in diameter. And yet, it seems as though there is no law forbidding this. On the other hand, it does seem to be a law that there are no uranium spheres this large (critical mass would be achieved long before that). Why is one regularity a law and the other not?

Enter Lewis. On Lewis’s ‘Best-System Account’ (BSA) of laws we are asked to imagine we are given a vast compendium of all the facts describing the mosaic (and therefore the world). Such a compendium is unwieldy. We can cut down its size considerably if we organise it into a deductive system. The challenge is to find the smallest set of propositions (axioms) the deductive closure of which most closely resembles the original compendium. Some axiomatisations are simpler than others. They comprise a smaller number of, or just simpler, axioms. Other axiomatisations are stronger. They imply

¹We ignore any problems about whether ‘totality facts’ are needed in addition to the instances. See Fine (2012a, 2012b).

more truths. And finally, some axiomatisations provide a better ‘fit’. They are more accurate than others. The ‘best system’ is the one which offers the best balance of simplicity, strength, and fit. A proposition is a law if it is an axiom or theorem of this system.² The BSA accounts for the law/accident distinction easily. Only those generalisations which are theorems of the best system count as laws. And in simple cases the BSA reduces to the regularity view. If there are many *As* and they are all *B*, ‘all *As* are *B*’ will probably make it into the best system.

4.3.2 A non-Humean View: Armstrong’s Necessitating Universals

Our concern is not to argue that any particular non-Humean view is right. It is merely to highlight how a non-Humean view satisfies the non-Humean sentiment that there is more to the world than the mosaic. We will thus use Armstrong (1983) as our exemplar. He says:

Suppose it to be a law that *F*s are *G*s. *F*-ness and *G*-ness are taken to be universals. A certain relation, a relation of non-logical or contingent necessitation, holds between *F*-ness and *G*-ness. This state of affairs may be symbolized as ‘*N*(*F*, *G*)’ (p. 85).

The necessitation relation satisfies the non-Humean sentiment. A rough gloss of the distinction is this: whereas the Humean thinks that it is a law that all *F*s are *G* *because* all *F*s are *G*, the non-Humean thinks that all *F*s are *G* *because* it is a law that all *F*s are *G*. The properties *F*-ness and *G*-ness stand in a special, or privileged relation, such that whenever something is *F*, it *must* be *G*. Beebe (2000) calls these views the *non-governing* (merely descriptive) conception of laws, and the *governing* conception of laws, respectively. The idea is that the Humean laws do not govern, are not responsible for, what goes on at a world. They merely describe what goes on at a world. The governing conception is that laws are to be obeyed! They actively constrain what happens at a world.

²Technically, this allows a proposition to count as a law even if it is not strictly true. Suppose there is one *A* which is not *B*, but unfathomably many *As* which are *B*. Then the law ‘all *As* are *B*’ may pay enough in simplicity and strength to offset the loss of fit.

Beebe thinks that most (if not all) challenges to the Humean view fail because their proponents presuppose a governing conception of laws. The counterexamples simply beg the question. For instance, Tooley (1977) asks us to consider a world in which there are 10 fundamental particles, and thus 55 two-particle interactions. However, only 54 of these interactions ever occur. Nevertheless, you'd think, there is a law dictating what happens in the remaining interaction. The committed Humean ought have no problem accepting that there is no law describing the remaining interaction. After all, there's nothing to be described! Tooley's example is question-begging.

It would appear that the fundamental difference between Humean and non-Humean is this: the non-Humean sees work that needs doing—that is, of explaining how laws govern—so posits something to do it. The Humean denies any such work needs doing and so has no need for the extra posit. If that is the case, then the debate about laws has been primarily verbal. We thought we arguing about what would account for lawhood. Instead, we should be arguing about what kind of thing deserves the name of 'law'.

Some Humeans didn't get the memo. Lewis, for instance, still wants to put Humean laws to some heavy-duty epistemic and metaphysical work. He says:

Some familiar complaints seem to me question-begging.... If you're prepared to agree that theorems of the best system are rightly called laws, presumably you'll also want to say that they underlie causal explanations; that they support counterfactuals; that they are not mere coincidences; that they and their consequences are in some good sense necessary; and that they may be confirmed by their instances. (Lewis 1994, pp. 478–9)

It is familiar complaint. Humean laws can't explain their instances, since it is the instances which determine what the laws are. The order of explanation is reversed on the Humean scheme. But this is question-begging, decrees Lewis, since explaining is just what 'laws' do. The appropriate response to this is summed up in that eloquent and witty passage, often quoted by Humeans without irony, from Lewis himself:

[Armstrong] uses 'necessitates' as a name for the lawmaking universal *N*; and who would be surprised to hear that if *F* 'necessitates' *G* and *a* has *F*, then *a* must have *G*? But I say that *N* deserves the name of 'necessitation' only if, somehow, it really can enter into the requisite necessary connections. It can't enter into them

just by bearing a name, any more than one can have mighty biceps just by being called ‘Armstrong’.³ (Lewis 1983, p. 366)

Absolutely right. And a proposition is not confirmable just by being called a ‘law’. The Humean needs to show us *how* their laws are confirmable (and what notion of confirmation they’re working with).

We have some common ground. Humean and non-Humean alike think a theory of laws should satisfy certain desiderata. Ideally, it should show how laws: explain; support counterfactuals; differ from coincidences; underwrite physical necessity; and are confirmable.⁴ We are further agreed that an entity cannot instantiate a property or relation merely by bearing a name. Thus, it is not question-begging to argue that Humean ‘laws’ do not satisfy one or other of these desiderata.

If these desiderata are characteristic of laws, and *if* the Humean cannot satisfy any of them, then it would appear there is no refuge. At this point, the Humean might argue that since the non-Humean has metaphysically heavyweight conceptions of these desiderata, of course she requires some heavy duty machinery to support them; it’s kind of a package deal. But the Humean has correspondingly ‘lightweight’ conceptions of these notions, which her conception of laws is perfectly able to support. For instance, the Humean may adopt a stance on which logical implication is perfectly able to underwrite an explanation.

Here I detect a characteristic difference in attitude between the Humean and her opponent. The non-Humean sees a deeper *why*-question here. *Why* do implications underwrite explanations? *In virtue of what* is an inference explanatory? The Humean simply does not see an explanatory burden. That is, where non-Humeans see grounding gaps—gaps to be bridged, the Humean sees no gap. This seems to me the reading of Lewis which is most plausible. When he says ‘if you’re prepared to agree that theorems of the best system are rightly called laws, presumably you’ll also want to say that they

³There is a parallel here with Wilson (2014)’s critique of grounding. One of her key complaints is that big-G Grounding does not get to be explanatory simply because we stipulate it to be so.

⁴Not all Humeans share all these desiderata. Beebe (2000), for instance, accepts that, metaphysically speaking, there is no distinction between laws and accidentally true generalisations.

underlie causal explanations', what this means is, you probably won't see an 'explanatory gap' between Humean laws and their ability to explain.⁵

This changes the structure of the dialectic once more over. The debate was about what deserved the name of 'law'. Though Humean and non-Humean share a set of desiderata, they differ over the sense of the operative notions in those desiderata. The Humean and opponent agree that laws must 'explain', but they disagree over what explanation is! The challenge now is simply to show that the Humean's conceptions of these notions will not do. There are explanatory gaps everywhere on the Humean view. One way of reading previous counterexamples to Humeanism is as trying to show that such explanatory gaps are unacceptable. Of course, the Humean might continue to reject the existence of the explanatory gaps, but the non-Humean suspects that there are more explanatory gaps than the Humean realises or is willing to admit. Thus, the prospect for converting at least some Humeans remains open.

We will present the Humean with a dilemma. On the one hand, the Humean may adopt lightweight conceptions of explanation, confirmation, and the rest. When these notions are deployed, however, they do not behave as desired. They leave explanatory, or grounding, gaps, rendering the notions mostly useless. On the other, the Humean may adopt heavyweight notions of explanation and confirmation, but then there is a grounding gap between a Humean ontology and these metaphysically robust notions. Either way, the Humean leaves grounding gaps *somewhere*.

4.4 Humeanism and Grounding

It will be convenient to introduce some shorthands. Call any kind of notion an 'H-*notion*', if a Humean would approve of it. Thus, 'H-laws', 'H-confirmation', 'H-explanation' etc. are the Humean versions of law, confirmation, and explanation. We use 'N-laws' for 'necessitating' or non-Humean laws.

⁵I'm not sure whether this was Lewis' intended reading (I'm inclined to doubt it, if anything), but it lends the most plausibility to the passage.

4.4.1 H-Laws can't ground explanation

Barry Loewer (2012, p. 130) rightly notes that a central anti-Humean complaint is that H-laws can't explain. He therefore considers two articulations of an argument that H-laws don't explain. The first, due to Armstrong (1983, p. 40), is that H-laws can't explain their instances since the instances are part of the very thing which is supposed to explain them. The law 'all F s are G ' does not explain why all *observed* F s are G since the law is equivalent to the conjunction 'all observed F s are G and all unobserved F s are G '.⁶ The second is due to Tim Maudlin (2007, p. 72). His point is that, since the mosaic is, for the Humean, ontologically fundamental, it can admit of no further explanation. Laws are just 'generic features' of the mosaic.

Loewer (pp. 130–2) responds that this objection rests on a conflation of metaphysical and scientific explanation. Loewer accepts that, on a view like Lewis's, the mosaic *metaphysically* determines what the laws are, and so explains why certain propositions are laws. But, he says, this kind of explanation is very different from scientific explanation. His take on the distinction is that to metaphysically explain a fact is to show what grounds it, while to scientifically explain a fact or event is to show why it occurred in terms of prior events and laws.⁷ The Humean's claim is that laws *scientifically* explain their instances. This is perfectly compatible with those very same instances *metaphysically* explaining what why that law is law.

Marc Lange (2013) argues that Loewer's argument fails because scientific and causal explanations chain. We first considered his example back in Chapter 2. Here it is again, cast now in terms of explanation:

- (111) That its internal pressure is greater than the external atmospheric pressure
(causally) explains the expansion of the balloon.

⁶Another way of putting the point makes use of a substitutional understanding of quantification: if $d_1, \dots, d_n$ make up our domain, we can write ' $\forall x\phi$ ' as: $\phi(d_1) \wedge \dots \wedge \phi(d_n)$. Thus, an H-law cannot explain its instances for the same reason that a conjunction cannot explain its conjuncts.

⁷Loewer does offer some further considerations in favour of the distinction; that metaphysical explanation synchronic (which we have already shown to be false); that scientific explanation can be probabilistic; and that although scientific explanations often cite metaphysical facts and vice versa, we do not confuse the two kinds of explanation. I don't find any of these reasons particularly compelling.

- (112) That the internal pressure is greater than the external pressure is (metaphysically) explained by the forces exerted by the gas molecules on the balloon's interior.

From which it follows, it seems, that the forces on the balloon's interior explain its expansion. At the very least, the example lends some plausibility to the claim that metaphysical and scientific explanations chain.

Suppose it is a law that all *As* are *B*. Reconstructing the anti-Humean argument à la Lange, we have:

- (113) That this *A* is *B* helps metaphysically explain why all *As* are *B*.
 (114) That all *As* are *B* helps scientifically explain why this *A* is *B*.
 (115) So, by chaining, that this *A* is *B* helps explain why this *A* is *B*.

Thus, the Armstrongian argument is revived.

I've made no bones that I am sympathetic to this chaining principle. However, I think Lange's argument hints at, but does not fully capture, the anti-Humean complaint. For one, it's not a chaining principle that we really need. The Humean is free to maintain some kind of explanatory holism on which these kinds of explanatory circles are perfectly acceptable. Better, we could establish an *asymmetry* principle: that a fact can't scientifically explain what it is metaphysically explained by. But nor does this really get to the heart of the matter. Both kinds of argument are reductions. In each case the argument is: suppose H-laws are explanatory; then we get circular or self-explanations. However, the Humean must accept both the chaining principle *and* asymmetry for this argument to be dialectically successful.

What the non-Humean (this one anyway) really thinks is that H-laws just don't have what it takes to explain. There would certainly be unwelcome consequences if H-laws explained, but what we want to show is that H-laws are just not of the right metaphysical character to be able to explain. The issue is not that metaphysical explanations chain with scientific explanations to give us explanatory circles. The issue is that '*A* explains *B*'

lacks a suitable Humean ground in the first place—or so I am going to argue. This both more accurately portrays the anti-Humean sentiment, and provides a stronger attack on Humeanism—since it does not rely on controversial assumptions about explanation the Humean may easily reject.

Laws and generalisations

H-laws are metaphysically ‘thin’. There is no difference—metaphysically speaking—between an H-law and an accidentally true generalisation. There is no difference *at all* on the naïve regularity view. On the BSA, if there were a metaphysical difference, it would be, at best, an extrinsic one. It would be because, by happenstance, it earns its keep in the best system.

Non-lawful generalisations—mere accidents—do not explain. Why is this gold sphere less than a mile in diameter? Because *all* gold spheres are. That’s no explanation. The ability to explain is thought to be a property characteristic of laws. What grounds a law’s ability to explain? *In virtue of what* do laws explain? We sketched a theory of explanation in Chapter 3. Explanations track dependence relations. It is natural to conclude, therefore, that laws derive their ability to explain from their underwriting or tracking causal (and other dependence) relations. We’re not going to fall back on that—the point is, N-laws can explain, since they provide a suitable ground for explanations.

The Humean will reply that her H-laws also underwrite causal relations. Fine. But the Humean’s causal relations are not dependence relations. That would be to invoke unHumean whatnots. Humean causal relations are merely descriptive of regularities. Humean causation is (something like) constant conjunction. Again, the question arises as to why H-laws, but not accidental generalisations, underwrite causal relations.⁸ Either one bites the bullet, and says that both do, whence the law/accident distinction collapses. Or else one attempts to ground causation somehow.

⁸H-laws *can* underwrite causation and counterfactuals, but only rather trivial versions of these notions. Suppose it is an H-law that all *As* are *B*. What makes it true that if *x* had been *A*, it would have been *B*? Lewis would say that the relevantly similar worlds are the ones in which the H-law holds. But who would be surprised to hear that an *A* would be *B* in those worlds in which all *As* are *B*?

Lewis would say that only those generalisations in the best system can underwrite causation. But again, we ask what the relevant *metaphysical* difference is. What *metaphysical* function does the best system play? The mosaic does not care about being organised into a deductive system. The mosaic is unwieldy *for us*, not in itself.

Perhaps the problem is that I'm seeing a grounding gap where the Humean sees none. I see a gap between her laws and her explanations which she does not. In which case, I'm not sure how to proceed. That *does* seem like a difference in attitude. On the other hand, perhaps it will be replied that of course there is no *metaphysical* difference between laws and accidents—that is what the Humean has been trying to tell us all along (Beebe 2000). What the Humean denies is that we need this metaphysically weighty conception of explanation that the non-Humean seems to have. If explanation must track metaphysically weighty dependence relations, then of course the Humean will reject it. But there is a lighter conception of explanation, a purely epistemic sense of explanation, on which explanations 'organise' our knowledge. Thus, laws explain because they organise the mosaic for us. Call such explanation 'H-explanation'.

4.4.2 H-explanation is not good enough

We have argued that there is a grounding gap between a Humean ontology and a weighty conception of explanation. We will now argue that there is a grounding gap between H-explanation and other notions to which we want to put it to work. Specifically, I will argue that H-explanation can't even play a rather modest epistemic role unless H-laws are confirmable. But H-laws are not confirmable. So H-explanation can't even do this modest job.

Consider three mosaics. Let each tile represent a fact or event. There are three kinds: white, black and grey. And let each column represent the world at a time. Call the first mosaic the 'Unkind World'.⁹ This mosaic has no discernible uniformity. There are no useful generalisations to be made about this structure; the facts just hang together

⁹The label is an allusion to an oft-repeated remark by Lewis: that if the world is kind to us, then we will be able to make many law-like generalisations about it.

randomly.

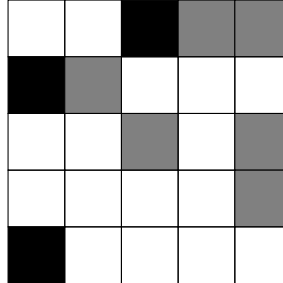


Figure 4.1: The Unkind World

Call the second mosaic the the ‘Humean World’. This world exhibits some uniformity. We can make some generalisations about it. For instance, every black tile precedes a grey tile. No laws actively govern this world, however. There are no ‘necessitation’ relations or other unHumean whatnots.

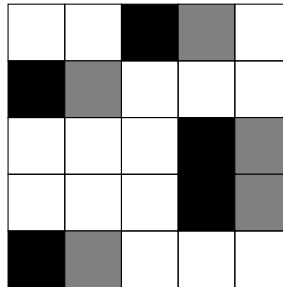


Figure 4.2: The Humean World

Finally, we have the non-Humean World. This world’s mosaic is identical to the Humean world’s. However, the laws in the Humean world are given ‘after the fact’, as it were; they merely describe the world. The non-Humean world is actively governed by the law ‘black precedes grey’ ($b \Rightarrow g$).

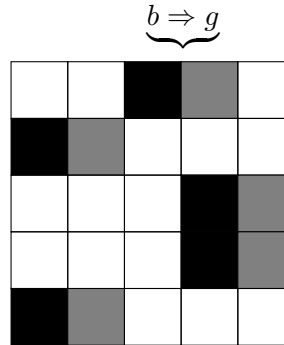


Figure 4.3: The non-Humean World

As the non-Humean sees things, the Humean World is remarkable. Though no laws actively constrain it, it behaves as though it is indeed ‘governed’ by laws. The world shares its beginning with the Unkind World, yet the two take very different histories. But neither history is more likely than the other. It is, frankly, miraculous that the Humean world exhibits as much uniformity as it does. There is nothing miraculous about the uniformity in the non-Humean world. Such uniformity is *forced* upon it.

Predictably, we are accused of question begging. H-laws are all the Humean needs to underwrite her version of physical necessity. Only those worlds which share the same laws are sufficiently similar to the Humean world to be considered when assessing physical necessity. I’ve already said I find this sense of physical necessity rather trivial, but fine, let’s grant it. The trouble now is that we have no way of telling whether we are in a Humean world, or an unkind world. Thus, we don’t know what the physically possible futures are.

The problem is that H-laws supervene on the *entire* history of a world, including its future. But we can’t know the future. Consider the following partial history up to time t :

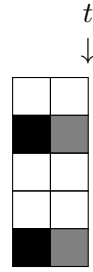


Figure 4.4: A partial history

Based on the available evidence at t , we might conclude it is a law that black precedes grey. But we have no way of telling if our world is kind or not. For all we know, the world has been kind up till now, but tomorrow the laws we thought held will cease to describe the world. To put the point somewhat provocatively, Humeanism (as the non-Humean sees it) entails that tomorrow gravity might cease to function, we'll spin off the Earth, and be launched into outer space.¹⁰ (Dismissed as question-begging, obviously.)

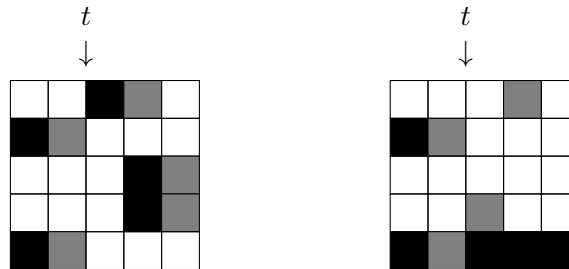


Figure 4.5: Left: a kind history.

Right: an unkind history.

Since the histories of these worlds are identical up to t , whatever inferences are warranted at t are warranted in both worlds. An internalist might say: since the available

¹⁰Lewis (1994) considers a similar situation in the case of probability. In simple cases, the BSA account of chance reduces to Humeanism's probabilistic cousin, simple frequentism. Suppose the frequency of A s which are B is $1/2$ (both observed and overall). Thus, the probability that an A is B is $1/2$. It is consistent with this probability that all future A s are B . After all, there's a non-zero chance of it. But this future is impossible, since it entails that the probability would be different to what it actually is! Lewis calls these 'undermining' cases.

So suppose it is a law that $b \Rightarrow g$. It is possible for there to be a b which is not g , since no necessitating whatnots prevent it. But it is impossible, since, if it came to pass, the laws would have been different from what they actually are!

evidence at t is the same *for us*, whatever inferences we can draw in the one world we can draw in the other. But how can an inference which can go *so* badly wrong possibly be warranted? No matter, you might think, Humeanism and externalist epistemologies are natural bedfellows. What warrants the inference that $b \Rightarrow g$ is what the world is like, not what we know about it.¹¹

Not only is Humeanism now tied to a highly non-trivial epistemology, it is tied to a pretty implausible one at that. Indeed, what lends externalism plausibility in the first place is that it relies on the assumption that the world is uniform. Knowledge is not lucky. We arrive at knowledge through reliable methods. And when warrant is defeated, it is because we have just been unlucky. Truth alone is not sufficient for warrant. (If it were, there would be no Gettier cases.) But inductive inference is not reliable in a Humean world. It is not reliable because there is nothing ensuring that inductive inference is generally truth-tropic. It is not reliable because there are far more unkind than kind worlds. Thus, all knowledge would be lucky in the Humean world.

To put the point in more familiar epistemic terms, if the world is Humean, inductive inference never results in *safe* knowledge, but it appears that knowledge must be safe. Williamson (2000, Ch. 5.3) explains safety like this. Imagine two golf balls, one resting on a tee, the other at the bottom of a hole. Both balls are in equilibrium. But the latter is in a more stable equilibrium. A strong gust of wind could push a ball off a tee. Not so with the ball in hole. That ball is 'safe'. We are safe in knowing that p if it is not the case that p could easily have been false. Say that a method of obtaining knowledge is reliable *in a case* α iff the method leads to truth in every case similar to α . Now inductive inference may be reliable—in a world. What makes it reliable is that the world is generally uniform. But the knowledge thereby gained is never safe—it could have easily turned out false. It could have easily turned out false because there is a world very similar to ours in which there is a b not followed by a g . Now, the Humean will reply that we have not used the right measure of similarity. The *relevantly* similar

¹¹This is precisely the kind of argument on which van Cleve (1984) relies in arguing that induction justifies induction (and consequently, confirmation).

worlds are the ones which share the very same laws. But now the Humean is begging the question. She must assume that H-laws carry enough metaphysical weight to enter into considerations of objective similarity between worlds. Accidental generalisations do not enjoy this privilege, I take it. But there is no metaphysical difference between accidents and H-laws!

It does not help, either, to advert to Bayesian methods. In order to raise the probability that $b \Rightarrow g$ there must be a finite number of bs . If there are 10 balls in a bag, and we draw nine red ones, that raises the probability that all the balls in the bag are red. But plausibly the number of bs is potentially infinite, if not actually. If the bag contained infinitely many balls, drawing any number of reds would not raise the probability that *all* are red. And even if we knew there were a finite number of bs , Bayesian inference wouldn't give us all we need. Unless we have an independent reason to believe that the tenth ball is red, observing nine reds does not alter the probability that the tenth is red. We might infer that the best explanation for our having drawn nine reds is that someone intentionally filled the bag entirely with red balls. But that would be an 'unHumean bag'. What we know about the bag can only be given by the bag itself—agents with intentions are meddling unHumean whatnots. Likewise, observing a b preceding a g would raise the probability that *all* bs precede gs , but it would not alter the probability the *next* b precedes a g . But the latter is surely the more modest inference!

We have uncovered another grounding gap: that L is an H-law does not ground that L is confirmable (even in a relatively weak Bayesian sense). This spells trouble even for the weak (purely epistemic) sense of Humean explanation. If an H-law is to be knowable, it had better (at the very least) be confirmable. If it can't be known, how can it play the epistemic role of 'organising' our knowledge? Perhaps we take laws on faith. But that doesn't give us knowledge of a law. In that case the best job of 'organising' it could do is a conditional one: on the assumption that L, p . It is an assumption which is never discharged. On a non-Humean view, by contrast, not only is a law confirmable, it is *knowable*. (Which is to be welcomed, since there are certainly laws we know.) What makes inductive inference reliable is not that all bs happen to precede g —it's that there

is a law *enforcing* it. We thus don't need to rely on a questionable inductive vindication of induction (à la Cleve 1984). We can rely on an inference to the best explanation. It is a no miracles argument. It would be miraculous if all *bs* just happened to precede *gs*. There are no miracles. Therefore, the best explanation for this is that there is a law ensuring that all *bs* precede *gs*.

Perhaps the committed Humean will stay true to her roots and deny that confirmation is possible. Again, she is not my target. (I simply shake my head in disbelief that she denies the obvious.) My target is the Humean who thinks confirmation is possible. My argument is that there is simply no ground for confirmation on a Humean ontology. There is no explanation why H-laws should be confirmable.

I think similar arguments can be made regarding all the familiar desiderata for laws. A Humean ontology just has no ground, no explanation, for them. To sum up, our argument has been:

- (116) H-laws cannot ground a robust form of explanation.
- (117) H-laws can ground a weak form of explanation only if they are confirmable.
- (118) That H-laws are confirmable is not grounded.
- (119) Therefore, H-laws can't explain.

I have offered no original arguments against Humeanism (they can all be found in Armstrong 1983), only reinterpreted them as complaints of grounding gaps. The question now, then, is how to deal with grounding gaps.

4.5 Grounding Gaps and Methodology

The non-Humean does not ask much. She asks only that if you agree laws have interesting features, you have a theory which explains those interesting features—a theory which shows what grounds them. Instead the Humean (as the non-Humean sees things) gives us the runaround: first we are told that laws have these features just by being called laws; then we are told that we have the wrong conception of laws, and that H-laws can

perfectly well explain and do other things in a ‘Humean’ sense. When it is pointed out H-laws can’t do this either, we are usually accused of question begging. Such is the incoherence of Humeanism: it attempts to explain the interesting features of laws but explicitly eschews any metaphysical posits which would explain them. And when this is pointed out, they either claim not to understand the objection or cry question begging.

Compare this to another familiar debate: the debate between A- and B-theorists about time. Both A-theorists and B-theorists agree on the desiderata for a theory of time. (Though they may disagree about their relative importance.) For instance, both agree that we need to account for the appearance of tense. And what’s more, both theories *do* account for tense. On the A-theory, time is inherently tensed, and the B-theory can be supplemented with an account of indexicality to account for tense. Debates about time do not proceed with one side accusing the other of not having an explanatory theory. Rather, the debates typically proceed first by assessing the relative plausibility of the accounts without regards to their explanatory virtues. Are they internally coherent? How many desiderata do they fulfil? How well do they comport with current physics? That’s not to say that explanatory virtues aren’t discussed. We can discuss whether the A-series or the B-series gives the *better* explanation of change, for instance. But such disputes centre on explanatory virtues such as elegance and simplicity, not whether there is any explanation at all. It is usually obvious and accepted by both sides when a theory is unable to explain some phenomenon.

On the other hand, sometimes it is acknowledged a theory is unable to explain some phenomenon, but in such cases we are offered an argument as to why that phenomenon cannot exist. The free will debate proceeds in such a fashion. The libertarian does not complain to the compatibilist that her theory does not explain what she thinks it explains. The compatibilist knows she has no explanation of libertarian free will. Her theory does not attempt to explain such free will. That’s not her point. Rather, on pain of deterministic considerations, it is argued that freedom to act as willed is the best we can do. The compatibilist then offers an explanation of this kind of free will. That is not the shape of the debate about laws of nature—there the goalposts are forever shifting.

Nor is the debate akin to the theism/atheism debate, with the Humean in the role of atheist. There the theist might complain that the atheist can offer no ‘ultimate ground’ for the existence of the world. The atheist may agree. The atheist may even agree that the theist *can* offer an ultimate ground for the world. But the atheist will say that the theist has met one explanatory burden by introducing another—unless she can show why it is that God contains in Herself the ground of Her own being (or does not need one). And the answer had better not be ‘because She’s God!’ Moreover, the atheist can make any number of responses to the theist: that they do not share the same explanatory goals; that although the theist offers a ground for the world, the explanation has no independent plausibility; that the whole project is misguided. That is not the shape of the debate about laws. The Humean and non-Humean have a mutually agreed set of desiderata. What they do not agree on is what explains what.

The point is, philosophers agree in most circumstances when explanation is achieved. They have arguments about what the ‘best’ explanations are, but they do not typically disagree about whether we have explanation at all. That is a peculiarity of the debate about laws.¹² If we can persuade the Humean that their view leaves explanatory gaps, all well and good. But the non-Humean has been trying that for *decades*. Few Humeans have been converted. That leaves us in uncertain methodological territory. How does one go about convincing their opponent of an explanatory gap?

We want to approach the problem charitably. The uncharitable approach dismisses the Humean’s stubbornness as insincere. It’s not that she doesn’t see the grounding gaps, it’s just that she refuses to admit it. (I often have to resist the temptation of this way of thinking). But that would be to accuse many fine philosophers of intellectual dishonesty. So let us assume that the Humean really does not see any explanatory gaps.

As far as I can tell, there are three reasons for disagreement about grounding gaps. First, pragmatically speaking, explanations are audience-relative. Whether *A* explains *B* successfully *for me* depends on the state of my knowledge. Recall Salmon (1984)’s

¹²At least, it is the only debate with which I have some acquaintance to exhibit such a peculiarity. But I’d be surprised if it were the only such debate.

recounting of the friendly physicist. For the physicist, a perfectly cogent explanation of why the balloon moved forwards is that the plane accelerated. But that explanation leaves a big gap for the child. He does not have the requisite knowledge of fluid dynamics to be able to bridge that gap. In principle, however, the gap is perfectly bridge-able—we just have to teach the kid some physics. I find it incredible that the non-Humean is in a similar state of ignorance. For that would entail that the Humean has a deeper knowledge of the explanatory connection between H-laws and explanation. If the Humean did possess such knowledge, surely she would have been able to communicate it to the non-Humean in all these years.

Second, the Humean might see an obvious and immediate explanatory connection between being an H-law and being explanatory—in the same way that the explanatory connection between a conjunction and its conjuncts is obvious and immediate—that the non-Humean does not. This chapter has focused on such disagreements. What we have found, however, is that they usually amount to verbal disputes—due to differences in the way that each party uses ‘explains’ and ‘law’. But suppose we are using the terms consistently. It would be uncharitable to refuse the Humean the obvious and immediate explanatory connection. But we are left scratching our heads as to how the disagreement could arise in the first place. Why does one philosopher see an obvious explanation where the other sees nothing at all? Is there some radical incommensurability of conceptual schemes at play? I’m inclined to doubt this possibility, but I concede I have no convincing argument against it. If it is accepted, however, it may turn out after all that the deadlock is indeed unbreakable.

Third, the Humean may see no explanatory gap because the fact to be explained is fundamental or brute. It simply *can’t* admit of an explanation. Perhaps it is of the (ungrounded) essence of an H-law to be explanatory. However the story goes, we can respect this as a dialectical possibility for the Humean. But we needn’t accept it as a *plausible* possibility. With other ungrounded facts we are usually confident that they *couldn’t possibly* admit of explanation. The non-Humean’s very position is that the explanatoriness of laws *can* be explained. Moreover, no Humean, as far as I know, has

ever claimed that the explanatoriness of laws is fundamental or brute. Thus, this does not seem the correct diagnosis of the stalemate.

So much for charity. My uncharitable view is that the stalemate arises because the Humean and her opponent have very different starting points. The Humean is guided by the principles of Humean Supervenience: that all truth supervenes on the mosaic and that there are no necessary connections. These are the Humean's hinge propositions, if you like. She will bend and twist everything else to fit around them. Her task is to give a picture of the world as complete and coherent as possible within the confines of Humean Supervenience. The reason I suspect this is because of something Lewis says at the end of 'Humean Supervenience Debugged'. He says:

A feature of Reality deserves the name of chance to the extent that it occupies the definitive role of chance... Because of undermining, nothing perfectly occupies the role, so nothing perfectly deserves the name. But near enough is good enough. If nature is kind to us... [t]hey will thereby occupy the chance-role well enough to deserve the name. To deny that they are really chances would be just silly. (1994, p. 489)

Lewis is talking about chance but his point applies equally well to laws. Perhaps Humeans realise that their view doesn't fulfil *all* the desiderata for a theory of laws. But they fulfil enough to deserve the name. *That* point is well taken. But it does not permit the Humean to claim that their theory explains things which it clearly does not. For the non-Humean there are explanatory burdens which are non-negotiable. A theory of laws must explain how laws get to be explanatory and how they are confirmable. They will thus disagree that the Humean has got 'near enough'.

Perhaps the Humean will counter, as Lewis does, that the non-Humean's laws do not meet their own desiderata. Necessitation relations don't explain just because we call them necessitation relations. Thus, if we can't explain explanatoriness even with these extra unHumean posits, we might as well do without them. That point is also well taken. Perhaps Armstrong's view *is* unexplanatory. What Armstrong does do, however, is recognise the explanatory burden. If we can't meet the burden *à la* Armstrong, we will take it upon ourselves to meet it elsehow. And this burden must be borne, for

the Humean must deny what is painfully obvious to the rest of us: that it is perfectly rational not to go round sticking your hand in fires.

CHAPTER 5

Conclusion

I set out to defend the posit of grounding, and to argue that building a theory of it is a worthwhile philosophical aim. My goal was not—directly—to build my own theory of ground. Rather, it was to address some foundational challenges, so that grounding theorists could continue the positive work of elucidating grounding unharassed by dubious criticisms. It is difficult, however, to say anything substantive without ruling out certain views about grounding. And, in fact, I have said a fair few substantive things about grounding. The space of possible grounding theories has thus narrowed as the thesis has progressed. Ecumenicalism has been a recurring theme in this thesis. My doubts about it are well known by now. There is something rather paradoxical about pursuing ecumenicalism. On the one hand, we want our claims to be as interesting and contentful as possible. On the other, the stronger our claims are, the more views they rule out, and hence, the less ecumenical they are. Let us end on a thematic note, then, and review the commitments I’ve made regarding grounding. As it turns out, I’ve committed myself to a fairly detailed picture of grounding.

Chapter 2 aimed to show that the posit of grounding was at least *prima facie* justified. My response to the skeptic was actually fairly ecumenical. That was largely a byproduct of my wanting to take the dialectical high ground. I wanted to show that the skeptic’s criticisms could be met while making relatively few assumptions about

grounding. For instance, I made no assumptions about the relation of grounding, or on the separatism/unionism dispute. What I did argue is that (philosophical) grounding claims derive a large part of their content from the operative background theory, and that consequently, grounding claims are only explanatory in the context of theory. I argued, moreover, that grounding is intimately bound up with a relational notion of fundamentality. Such a notion of fundamentality is closest to our pretheoretic notion, and is more useful than a notion of absolute fundamentality.

Not only did I show that grounding claims were informative, I showed that they were necessary. We can express things with the notion of grounding which just aren't expressible given weaker notions of dependence. While I argued that a relational understanding of fundamentality is preferable to an absolute notion, I did not establish that we need *only* the relational notion. Perhaps we need both, as Fine (2001) seems to think. Or perhaps what Fine calls the 'Real' is to be understood somehow. Nor did I establish, definitively, that questions of relative fundamentality are inseparable from questions of ground. Those questions require further investigation.

My aim in Chapter 3 was to show that the sense in which grounding is explanatory could be given a plausible interpretation—one that comports with a leading theory of explanation; and that illuminates how grounding is central to philosophical theorising. This was important since the existence of non-causal explanations is a major motivation for the posit of grounding. My issue with the operator view and unionism was largely that they obscured these issues. The operator view precluded our making any commitments regarding the ontology of grounding, and thus how it related to other ontologies. And unionism offered no accompanying account of the sense in which grounding is *distinctly* explanatory. To put the explanatoriness of grounding on a secure footing, then, it was necessary that I made some commitments on these issues. I argued that grounding is a relation which itself partially grounds an epistemic notion of explanation. I argued, moreover, that grounding and causation are unified by their being species of a general notion of determination. Causal and metaphysical explanation are unified insofar as the relations which ground them are unified. And regarding the nature of philosophy, I

argued that it largely proceeds by making essence claims and deriving grounding claims from them. Such derivations rely on generic grounding principles, the discovery of which is the task of the metaphysician. Thus, most of philosophy turns out to be a kind of applied metaphysics.

There are some issues that need to be addressed still. First, the unionist appeared to have in mind a distinctly ontic sense of explanation. I was unable to reconstruct such a notion, but I'm very curious as to what, exactly, the unionist has in mind, so I encourage the unionist to develop a more detailed account of this kind of explanation. Second, I argued that grounding is a relation, but I did not establish what the relata are. More argument is needed to establish whether the relata are facts, propositions, or entities of arbitrary category. If the relata turn out to be something fact-like, we also need to explore cognate non-fact-relating relations, such as ontological dependence. Third, though I claimed that grounding and causation are species of determination, I did not address the nature of this relation itself. Is it some kind of abstraction over its species? A determinable with grounding and causation as determinates? Are there other species of determination? What is it about determination relations which makes them apt to explain? There's a lot of mileage in these questions. Lastly, I addressed a certain kind of philosophical theory in this chapter—those aimed at real definition—and claimed that they are simply sets of essence claims. It would be nice to have a deeper exploration of the nature of philosophical theories. Presumably, they are not all essence claims. Some may be grounding claims, some normative claims, or combinations thereof. A better understanding of the philosophical theory will give us a better understanding of how grounding claims fit into them.

The aim of Chapter 4 was to show that the notion of grounding is internally coherent—for Sider's dilemma apparently shows that it is not. While the problem is well known and many solutions exist, none struck me as particularly satisfactory. Like Dasgupta, I argued that grounding relations are grounded in essences—but unlike Dasgupta, I did not assume that essences were *groundless*. I argued there was a sense in which grounding is fundamental—the grounding relation exists fundamentally. And grounding has an

essence—grounding principles, and thus, grounding facts, are grounded in essentialist facts about grounding. This is a rather strong view on how grounding works. Grounding is more like a function, encoded with principles as to what it generates, given some input.

A key advantage of my view over its rivals was that it offered an explanation of why there are some grounding facts we are unable to explain. To explain a grounding fact we need to derive it via explanatory premises from some facts about the essence of grounding. But the essence of grounding is not wholly known to us! Those grounding facts we are unable to explain are grounded, or so I claim, in unknown facts about the essence of grounding. This required that I tease apart the notions of primitivity, fundamentality, and analysis. But we barely scratched the surface. Their interrelationships—with each other, and with grounding and essence—are far richer, I suspect, than my brief survey was able to capture. For instance, would a list of possible grounds (acting as a sufficient condition), plus an account of essence (acting as necessary conditions) suffice for analysis?

Lastly, my aim in Chapter 5 was to show that grounding is a *useful* notion. While grounding may offer the conceptual tools for describing what it is we're doing when we do philosophy, can we deploy the notion consciously to help with our first-order philosophical theorising? Well, yes—albeit indirectly. I argued that common complaints about Humeanism are best interpreted as complaints of grounding gaps—that a Humean ontology just can't explain what we want it to explain. This interpretation clarifies the structure of the dialectic in a way that favours the non-Humean. The Humean is forced to revise her conceptions of related notions. But the Humean revision of explanation, say, turns out to be largely useless. To recapture the useful notions we must countenance 'necessary connections'.

It would be interesting to see if other philosophical debates can be similarly reconstructed as debates about grounding gaps. And in general, it would be nice to see some more applications of grounding theory. While debates about the nature of grounding itself are all very interesting, we should bear in mind, as we learnt back in Chapter 2,

that this must ultimately be in service of some first-order philosophical goal.

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