Ground grounded[*]

Metaphysics has always needed a "level-connector". One doesn't get far in metaphysics without some sort of distinction between fundamental and nonfundamental facts, or between more and less fundamental facts. And given such a distinction, one will want to say that nonfundamental, or less fundamental, facts "rest" in some way on fundamental, or more fundamental, facts. Higher levels of reality must somehow be connected to lower levels.

We've flirted with various ways to connect the levels: meaning, apriori entailment, supervenience. But consider the connection between the high-level fact that New York City is a city and the underlying physical reality—some fact that involves the global quantum state, suppose. This connection is clearly not a matter of meaning in any ordinary sense; language *per se* knows nothing of quantum mechanics. Nor is it apriori.[1] Supervenience is a step in the right direction since it's a metaphysical (rather than epistemic or semantic) account of the connection between levels, but it too is inadequate. It provides no useful account of the connection for noncontingent subject matters: mathematical truths supervene on any facts whatsoever, but do not "rest" on just any facts. Supervenience isn't an asymmetric relation, whereas the level-connecting relation is. Finally, supervenience may in this case be metaphysically epiphenomenal: the conditional "if the quantum-mechanical facts are such-and-such then NYC is a city" might be necessarily true *because* of that conditional's status as a level-connector; and if so, its necessary truth cannot explain the connection between NYC's cityhood and the quantum-mechanical facts.

So there's a niche for a metaphysical but nonmodal conception of the connection between levels. That niche has been filled by ground. Friends of ground have made the above criticisms of semantic, epistemic, and modal conceptions of level-connection, and have proposed that we accept a notion of ground that is metaphysical in nature but not defined as necessitation or supervenience. We are encouraged to speak in good conscience of facts grounding one another (holding "in virtue of" one another, "making true" one another, etc.) even if we cannot define ground in other terms.[2]

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[1]David Chalmers (2012) notwithstanding. See Schaffer (2017*a*) for a defense of this.

[2]See Fine (2001, 2012); Rosen (2010); Schaffer (2009).

The grounding revolution of the past decade has certainly been a socio-logical success (just look at the journals). I also think it's been an intellectual success in many ways.[3] But there is an awkward dilemma at its foundation.

Suppose some quantum-mechanical fact, Q, grounds the fact, N, that New York City is a city. What is the grounding status of this grounding fact, the fact that Q grounds N? Is it itself grounded or not?

The second horn of this dilemma—that the grounding fact is ungrounded—appears to be unacceptable. For it implies that one of the rock-bottom facts, namely, the fact that Q grounds the fact that NYC is a city, involves the concept of being a city. Surely the ultimate story of the universe can be told without talking about cityhood at all.[4]

This argument can be generalized. Let C be any concept whose presence we're reluctant to allow in an ungrounded fact.[5] Then facts that specify the grounds of C-involving facts must themselves be grounded. Let us write "$A \rightarrow B$" to mean that A (fully) grounds B. (I blur use and mention where convenient, and intend full grounding unless otherwise specified.) If $A(C)$ is a C-involving fact and fact X grounds $A(C)$, the grounding fact $X \rightarrow A(C)$ is itself a C-involving fact, since it contains C in its "consequent". Thus $X \rightarrow A(C)$ cannot be ungrounded. In my preferred terms, the argument appeals to a principle of "Purity": no ungrounded fact can involve a "nonfundamental concept". Thus grounding facts that involve nonfundamental concepts (like being a city) must themselves be grounded.[6]

The argument from Purity doesn't quite rule out all ungrounded grounding

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[3]I do have some concerns. 1. Enthusiasm for ground sometimes leads to its application in places where it doesn't belong (Sider, 2020). 2. Ground's "conditional" nature encourages positing too little at the fundamental level (Sider, 2013b, pp. 741–6). 3. A linguistic variant on ground is more appropriate for accommodating nonfactual discourse (Sider, 2011, 125–7).

[4]Bennett (2011, p. 27, 2017, pp. 190–2) makes a second argument against this horn that will appeal to many: ungrounded building facts would violate a modal principle of recombination.

[5]Fans of Fine (2001) might say instead "…in an ungrounded fact that holds in reality", and make corresponding adjustments to what follows.

[6]See Sider (2011, sections 7.2, 7.3, 8.2.1). There I used the term "structural" instead of "fundamental concept", and spoke of metaphysical semantics rather than ground. Note that 'fundamental concept' cannot just mean 'concept that can appear in ungrounded facts', since that would trivialize the principle of Purity. For me, the notion of a fundamental concept is undefined. (Sider, 2011, sections 7.5, 7.13; chapter 2). But note: the argument here does not really require a general notion of a fundamental concept, or the general principle of Purity, since the argument needn't be generalized: most of this paper could be recast using one-off principles banning any ungrounded facts that involve, say, the concept of being a city, or the concept of an economy.

facts, since some grounding facts might be "pure" in the sense of involving only fundamental concepts. Let A be any fact that is pure in this sense. Some ground X of A might also be pure. Further, one might hold that ground itself is a fundamental concept. Given all these things, the fact $X \rightarrow A$ would involve only fundamental concepts, in which case Purity would allow it to be ungrounded. For example, where E is the fact that something has charge and M is the fact that something has mass, one might hold that $E \rightarrow (E \lor M)$ involves only fundamental concepts and is ungrounded. Still, the argument from Purity prohibits any "impure" grounding facts from being ungrounded. This includes all level-connecting grounding facts, assuming that facts at higher levels involve nonfundamental concepts. Thus for all such grounding facts, the second horn of the dilemma—that the grounding fact is ungrounded—is unavailable.

The first horn of the dilemma is that the fact $Q \rightarrow N$ is grounded. This is the horn that I think we should embrace. But, one might object, isn't ground meant to be "primitive"? Friends of ground do say such things. But what they usually mean is that 'ground' cannot be *defined* in more familiar terms,[7] and all friends of ground agree that grounding does not require definability. Just as facts about cities can have quantum-mechanical grounds even if 'city' cannot be defined (in any ordinary sense of 'define') in quantum-mechanical terms, so facts about ground can be grounded even if 'ground' cannot be defined.

Another concern has been put forward about the first horn: Karen Bennett's (2011) regress. Return to our fact $A(C)$, which involves a concept C that cannot occur in an ungrounded fact. There must then be an infinite series of grounding facts: some X_1 must ground $A(C)$, some X_2 must ground $X_1 \rightarrow A(C)$, some X_3 must ground $X_2 \rightarrow \big(X_1 \rightarrow A(C)\big)$, and so forth. For at each stage, the increasingly complex grounding fact $X_n \rightarrow \ldots \big(X_2 \rightarrow \big(X_1 \rightarrow A(C)\big)\big)$ always contains C and must therefore be grounded in some X_{n+1}, continuing the regress.

This is indeed a regress in the sense that there does indeed exist an infinite series of grounding facts. But the regress is not vicious; there is nothing problematic about the series. In particular—as Bennett (2017, p. 197) now agrees—the existence of the series does not imply that grounding fails to be well-founded, in the sense of there being infinite descending chains of ground.[8]

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[7] Or that we know of no such definition, or that speaking of ground is acceptable even if we possess no such definition, etc. See, for example, Rosen (2010, p. 113); Schaffer (2009, p. 364); see also McDaniel (2017, pp. 224–5) on this point.

[8] Rabin and Rabern (2016) also make this point. They then go on to provide much-needed

An infinite descending chain of ground would be a series of grounding claims of the following form:

$$Y_1 \twoheadrightarrow Y$$
$$Y_2 \twoheadrightarrow Y_1$$
$$Y_3 \twoheadrightarrow Y_2$$
$$\vdots$$

(Y would be grounded in Y_1, which would be grounded in Y_2, which would be grounded in Y_3, and so on.) In Bennett's regress we have instead:

$$X_1 \twoheadrightarrow A(C)$$
$$X_2 \twoheadrightarrow \big(X_1 \twoheadrightarrow A(C)\big)$$
$$X_3 \twoheadrightarrow \Big(X_2 \twoheadrightarrow \big(X_1 \twoheadrightarrow A(C)\big)\Big)$$
$$\vdots$$

The first series is "chained": the "antecedent" (left-hand-side) of each member of the series is the same fact as the "consequent" (right-hand-side) of the next member of the series. The second series is not chained. The antecedent X_1 of the first member, for example, is not the same fact as the consequent $X_1 \twoheadrightarrow A(C)$ of the second member.[9]

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clarification of the notion of grounding being "well-founded" (as does Dixon (2016)). They argue that lacking infinite descending chains is an overly strong formulation of the intuitive constraint of well-foundedness, but that is not a concern here since I am arguing that not even this constraint is violated.

[9]Consider the Bennett regress for partial ground ("$\dashrightarrow$"): for some $X_1, X_2, \ldots,$

$$X_1 \dashrightarrow A(C)$$
$$X_2 \dashrightarrow \big(X_1 \dashrightarrow A(C)\big)$$
$$X_3 \dashrightarrow \Big(X_2 \dashrightarrow \big(X_1 \dashrightarrow A(C)\big)\Big)$$
$$X_4 \dashrightarrow \bigg(X_3 \dashrightarrow \Big(X_2 \dashrightarrow \big(X_1 \dashrightarrow A(C)\big)\Big)\bigg)$$
$$\vdots$$

Suppose we accepted the following principle: whenever A is a partial ground of B, the fact that A partially grounds B is also a partial ground of B. There *would* then result an infinite chain

So the regress does not imply that there are infinite descending chains of ground. Might the regress be vicious in some other sense? Bennett (2017, section 7.3.3) tentatively suggests two reasons for thinking it might be. First, she says that the regress is problematic in a way that's analogous to the way in which an infinite descent of ground would be (allegedly) problematic:[10]

> For one thing, there is something bothersome about the fact that there is no satisfying end to the line of questioning that produces the above list. I take it that something like this concern motivates those who insist that building (or at least grounding) must be well-founded.

But I don't agree that this is the motivating concern. The mere fact that there's a systematic way of generating infinitely many grounding questions which all have answers isn't problematic at all. I can ask "what grounds the fact that there is at least one number?", "what grounds the fact that there are at least two numbers?", and so on without end, expecting an answer in each case, without anything being amiss. What strikes many as problematic about infinite descending chains of ground is something very specific: if Y_1 is grounded in Y_2, Y_2 is grounded in Y_3, and so on, then this is regarded as undermining the claim that Y_1 (or any later Y_i, for that matter) is grounded at all: as Schaffer (2010, p. 62) puts it, "Being would be infinitely deferred, never achieved". Whatever the merits of this thought, it's specific to infinite descending chains of grounding, and does not speak against the sort of infinite series of grounding claims involved in Bennett's regress.

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of partial ground, running down the right-hand-side of the above series. As applied to the second claim in the series, the principle tells us that $\left(X_2 \dashrightarrow \left(X_1 \dashrightarrow A(C)\right)\right) \dashrightarrow \left(X_1 \dashrightarrow A(C)\right)$. Thus the consequent of the third member of the series partially grounds the consequent of the second member. Similarly, applying the principle to the third member of the series yields $\left(X_3 \dashrightarrow \left(X_2 \dashrightarrow \left(X_1 \dashrightarrow A(C)\right)\right)\right) \dashrightarrow \left(X_2 \dashrightarrow \left(X_1 \dashrightarrow A(C)\right)\right)$, and so the consequent of the fourth member of the series partially grounds the consequent of the third member of the series; and so on. But, in the spirit of Lewis Carroll (1895), we should reject the principle. For it implies, as Bolzano (1837, section 199) noted, that whenever A partially grounds B, the following facts also partially ground B: $A \dashrightarrow B, (A \dashrightarrow B) \dashrightarrow B, \left((A \dashrightarrow B) \dashrightarrow B\right) \dashrightarrow B, \dots$. Moreover it seems based on the thought that "A cannot, on its own, fully ground B; it is only the combination of A and $A \blacktriangleright B$ that fully grounds B", whose first half implies, if the variables A and B are universally quantified and if A encompasses pluralities, that no fact has a full ground; also, the first half, thus understood, contradicts the second half.

[10]p. 197. Building is the central concept of Bennett's book, which is distinct from (though related to) grounding.

Bennett's second suggestion is that the regress is "ontologically profligate", because it apparently leads to an infinity of grounding facts (namely, to $X_1 \rightarrow A(C)$, $X_2 \rightarrow \left(X_1 \rightarrow A(C)\right)$, $X_3 \rightarrow \left(X_2 \rightarrow \left(X_1 \rightarrow A(C)\right)\right)$,..., and grounds of those facts $(X_2, X_3 \dots))$. But the infinity of grounding facts seems unavoidable, given the principle of Purity. The infinity of grounds of those facts isn't unavoidable; it can be avoided by adopting Bennett's own view (to be discussed below), which is that a single fact, the fact X_1, grounds each of the infinitely many grounding facts. (That is, X_1 grounds each of the following: $X_1 \rightarrow A(C), X_1 \rightarrow \left(X_1 \rightarrow A(C)\right), \dots$.) But that doesn't on its own make her view any less profligate. For as will become apparent, the kinds of facts $X_2, X_3 \dots$ that I think ground the grounding facts $(X_1 \rightarrow A(C)$, $X_2 \rightarrow \left(X_1 \rightarrow A(C)\right)$, $X_3 \rightarrow \left(X_2 \rightarrow \left(X_1 \rightarrow A(C)\right)\right)$,...) are facts that Bennett (and everyone else) already accepts. We disagree over whether these facts ground grounding facts, but not over whether these facts exist, so the disagreement does not mark a difference in ontological profligacy.

Setting aside the regress, a final concern about the first horn—about the idea that grounding facts have grounds—is that it's hard to see what those grounds might be. Two proposals have been offered recently, one by Bennett (2011) and by Louis deRosset (2013), the other by Shamik Dasgupta (2014b). But in my view neither is correct.

According to both Bennett and deRosset, any grounding fact $A \rightarrow B$ is grounded simply by A. But the quantum-mechanical fact Q, for example, contains nothing relevant to the relation of ground, and therefore does not seem like a metaphysical basis, all on its own, for the grounding fact that Q grounds the fact that NYC is a city. The grounding fact $Q \rightarrow N$ is a relational fact, and relational facts normally are grounded by something that connects the relata in question (or else something that connects the grounds for the existence of the relata, if those relata do not exist fundamentally). The ground of the relational fact that Harry met Sally must include some connection between Harry and Sally (or, perhaps, some connection between the grounds of Harry's existing and the grounds of Sally's existing). So one would expect $Q \rightarrow N$ to have a ground that connects the facts Q and N (or one that connects grounds of Q and N). Further: grounding is meant to be a kind of metaphysical explanation, or perhaps a quasi-causal fact backing metaphysical explanation. Thus the facts that ground grounding facts ought to be analogous to the facts that ground explanatory or causal facts. The nature of the grounds of causal and explanatory

facts are disputed, but everyone can agree that the ground of the fact that c causes e, for example, won't just encompass c, but will rather extend to e and the connection between c and e.[11] [12]

It might be objected that a special feature of grounding undermines these arguments. According to Bennett, grounding is "superinternal". "Everything is settled by the base, by the first relatum(a)", she says; "the intrinsic nature of… [the first relatum(a)] guarantees not only that the relation holds, but also that the other relatum(a) exists and has the intrinsic nature it does" (Bennett, 2011, pp. 32–3). Now, Q does "settle" and "guarantee" in a *modal* sense that Q grounds N, but it is a ground-theoretic sense that is relevant here. And in this sense, Bennett's claims don't seem right, for the reasons given above: while the quantum mechanical fact Q *is* a metaphysical basis, all on its own, for New York City's being a city, it is not a metaphysical basis all on its own for its being a metaphysical basis for New York City's being a city, since it contains nothing relevant to metaphysical basing. The issue is admittedly difficult to adjudicate, however, since the preceding sentence comes close to begging the question. But perhaps we can make progress by considering different conceptions of the nature of the grounding relation. On a primitivist conception, according to which the grounding relation is a metaphysically fundamental relation, grounding facts $A \twoheadrightarrow B$ would presumably be ungrounded (perhaps violating Purity, depending on how the view is developed), rather than being grounded in A as Bennett and deRosset say. (How could Q—a fact solely about quantum mechanics—*ground* the fact that Q bears this metaphysically fundamental relation of grounding to something?) On a "Humean" conception, according to which grounding is a matter of "patterns" in particular matters of fact, grounding facts $A \twoheadrightarrow B$ would surely be grounded in broad patterns of particular matters of fact, and not just in A, just as on a Humean conception of the causal

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[11]Dasgupta (2014*b*, pp. 572–3) makes a similar objection. He also makes the further objection that $P \twoheadrightarrow (P \lor Q)$ and $P \twoheadrightarrow \sim\sim P$ would, according to Bennett and deRosset, have the same ground, whereas "the grounds are surely different and involve something about disjunction in the first case and negation in the second" (Dasgupta, 2014*b*, p. 573). I agree, though I suspect the underlying thought is the same as the original objection.

[12]It might seem that a similar objection could be made to Litland (2017), who defends a view similar to that of Bennett and deRosset, namely that nonfactive grounding claims are zero-grounded (in Fine's (2012) sense). But Litland adds that although grounding claims all have the same (zero) ground, different grounding claims are grounded in different *ways*, and he goes on to explore the idea of ways of grounds further in subsequent work. This seems to be a fruitful idea, but our concerns about what grounds the facts of grounding would seem to reappear as concerns about what grounds the ways of grounding.

relation, the fact that c causes e would not be grounded solely in c but rather in broader patterns (say, the fact that all events relevantly like c are succeeded by events that are relevantly like e). Now, neither of these conceptions may appeal. But there are less extreme conceptions in the neighborhood of the Humean one, which regard grounding as patterns in a broader sense, which include modal and other "patterns" to be discussed below. And on any such view, the grounds of $A \rightarrow B$ will not just be A, but will instead involve these broader patterns. Thus on any conception of the nature of grounding that I can think of—a metaphysically basic relation, a Humean relation, or a relation amounting to patterns in a broader-than-Humean-sense—the Bennett/deRosset view is incorrect.

According to Dasgupta (2014b), the grounding fact $A \rightarrow B$ is grounded in the essences of the constituents of B (together with the truth of A). The fact that Q grounds NYC's being a city, for example, is grounded in some fact about the essence of cityhood (together with NYC's actually being a city), perhaps this fact:

(E) It's essential to cityhood that if Q then NYC is a city

It is indeed natural to take the essence of cityhood to specify which sorts of facts are sufficient for a thing's being a city. But as Dasgupta notes, this reintroduces our dilemma, now applied to facts about essence. (Indeed, this dilemma arises regardless of whether such facts ground grounding facts.) For we may now ask whether facts like (E) are grounded. On the one hand, since (E) involves cityhood, Purity implies that it must be grounded. But on the other hand, it's hard to see what might ground a fact like (E).

In response to this dilemma, Dasgupta makes his most distinctive claim. (E), he says, is ungrounded. This violates the principle of Purity as I've stated it here. But according to Dasgupta, (E) and other statements of essence are "autonomous" facts, meaning that they are "not apt for being grounded".[13] And it's not problematic, Dasgupta says, for an *autonomous* ungrounded fact to involve a nonfundamental concept like cityhood. Purity ought to be understood as allowing this.

But shouldn't we reject the existence of *any* ungrounded facts involving cityhood? If a fact is ungrounded then it must be included in any telling of the complete story of the world. So even if (E) is not apt for being grounded in some sense, if it involves cityhood then it remains the case that any telling of

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[13]A variant of Dasgupta's view would say that nonfactive grounding claims are autonomous.

the complete story of the world must bring in cityhood; and that remains hard to stomach. To descend into metaphor: when God was creating the world, she must have decreed the autonomous ungrounded truths, since nothing is true other than God's decrees and what they ground; but surely God's decrees when creating the world didn't need to involve cityhood at all.

In explaining the status of autonomy, Dasgupta gives two analogies. In one he compares autonomous truths to definitions in an axiomatic system. Definitions, Dasgupta says, are not apt for being proven from the axioms. This status differs, he says, from the status of simply not being provable; a definition is unlike, say, the axiom of choice relative to the other axioms of standard set theory, from which it cannot be proved. Rather, the question of whether a definition is provable is somehow illegitimate. The second analogy involves causal explanation. Some facts have causal explanations, such as the fact that I am typing right now. Other facts, perhaps, lack causal explanations; perhaps there is no causal explanation of why the universe began as it did. But even if this fact about the initial state of the universe lacks a causal explanation, it still *makes sense* to ask what causally explains the universe's initial state; it's just that the answer is: *nothing*. The situation is quite different, Dasgupta claims, with mathematical truths, say; the question of their causal explanation "simply doesn't arise".

What these examples illustrate, it seems to me, is just that certain relations between sentences or facts are explicitly and intentionally limited in scope. A definition isn't the sort of thing that can be proven from axioms because the definition is a statement in the metalanguage ("$\ulcorner \alpha \subseteq \beta \urcorner$ abbreviates $\ulcorner \forall z(z \in \alpha \rightarrow z \in \beta) \urcorner$") whereas theorems are stipulated to be sentences in the object language.[14] Provability from axioms is explicitly limited in scope to sentences in a certain specified language. Similarly, suppose Dasgupta is right that the question of what causally explains a mathematical truth "simply doesn't arise". (It's not in fact clear that he is right about this; the example of definitions is stronger, I think.) Then this would be due to causal explanation being intentionally restricted in scope to events in time; our causal explanatory ambitions would be understood as excluding the realm of the mathematical.

It's a little misleading to say that questions of provability and causal expla-

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[14]One might instead take the definition to be an act of stipulation. Since acts of stipulations aren't sentences of the object language, the definition could not be a theorem. Or, one might take the definition to be "$\forall x \forall y \big(x \subseteq y \leftrightarrow \forall z(z \in x \rightarrow z \in y)\big)$". This is an abbreviation for "$\forall x \forall y \big(\forall z(z \in x \rightarrow z \in y) \leftrightarrow \forall z(z \in x \rightarrow z \in y)\big)$", which *is* a theorem (since it's a logical truth).

nation "don't arise" for definitions and mathematical truths, since in each case the questions have answers. Definitions are *not* theorems because they're not formulas in the object language; mathematical truths are *not* causally explainable because only events in time have causes. What's true is that the limitation in scope of the concepts of provability and causal explanation *immediately* yield negative answers to the questions, without the need for further examination of the case. Compare the question of whether a rock is witty: since wit is (in some sense) restricted to sentient things, we know that a rock is not witty without consulting the details of the rock's situation. Still, the question of whether the rock is witty does have a straightforward answer: no.

Now, does metaphysical explanation have a similar "limitation of scope"? Surely not; surely there are no antecedently imposed limitations on what sorts of facts we can query for metaphysical explanation. And so, since ground is, or is closely connected to, metaphysical explanation, ground also lacks the restriction in scope. No one would say that a mathematical fact, for example, is outside the scope of metaphysical explanation; if there are indeed mathematical facts, then we may ask what their obtaining consists in. Similarly, if it is indeed a fact that murder is wrong, then we can ask what constitutes that fact, what grounds it. So, similarly, if it's a fact that it's of the essence of cityhood that if Q then NYC is a city, we may surely ask what if anything accounts for this fact. Metaphysical explanation is disanalogous to causal explanation and provability at precisely the crucial point, because of the expansive ambitions of the project of metaphysical explanation. Perhaps those ambitions are somehow doomed, but at any rate no restriction of scope is "built into" ground in the way that a restriction to sentences of the object language is built into theoremhood. Perhaps there is some deeper sense of "restriction of scope", but no such deeper sense seems to be illustrated by the examples of theoremhood or causal explanation.

Jonathan Schaffer (2017*a*, section 4.3) has offered a response to the concern that is structurally analogous to Dasgupta's. According to Schaffer, a metaphysical explanation has three parts: the derivative fact to be explained, the fact doing the explaining, which grounds the derivative fact, and a *metaphysical bridge principle* linking the two. And like Dasgupta's autonomous facts, Schaffer's bridge principles (some of them, anyway) are said to lack grounds despite involving nonfundamental concepts. As with Dasgupta's autonomous facts, I object that no ungrounded fact ought to contain nonfundamental concepts. At the very least, we need an argument for the existence of this third status posited by Schaffer and Dasgupta, a status of fact partly obeying the rules of ungrounded facts, and partly obeying the rules of grounded facts. Perhaps

the argument is the lack of an alternative, but as I will now show, there is an alternative.

The way forward is to recognize that the question of what grounds a grounding claim $A \rightarrow B$ needn't have a simple answer, an answer formulated as a simple function of A and B. The only simple answers with any plausibility would seem to be those we've considered and rejected: Bennett and deRosset's answer "A", and Dasgupta's answer "A, together with the nature of B". But why assume the answer must be simple? High-level facts in general depend on low-level facts in complex ways; why should grounding facts be any different? When asked what grounds a high-level fact such as the fact that New York City is a city, friends of grounding normally gesture at the *kind* of fact that does the grounding—a fact about the global quantum state, perhaps, or about the parts of New York City—without giving any specific account of which particular fact that is.[15] Similarly, I suggest, it is appropriate to provide an account of the kinds of facts that play a role in the grounding of grounding facts, without saying exactly what those facts are, or exactly how they combine to form the ground. Grounding facts may be grounded in complex ways about which we know little.

Compare an analogous attitude towards causation:

> The concept of causation is central to our understanding of certain sciences as well as to ordinary thought. It's fine to employ it in theorizing about those domains, even if we don't possess a reductive analysis. Saying this does not imply that causation is metaphysically basic. On the contrary, the causal facts are ultimately grounded in the non-causal facts, perhaps in laws of nature, or counterfactuals, or modal facts, or some other facts. The question of exactly how they are so grounded is a difficult one, but we needn't have an answer to this question in order to use the concept of causation in good conscience.

To be sure, one *might* attempt to give a reductive analysis of causation. Indeed, there is a long tradition of attempting to do so. But one of the central wellsprings of the grounding revolution has been skepticism of our ability to produce reductive analyses of concepts of philosophical interest, and rejection of the necessity of doing so. Revolutionaries[16] have rejected the idea that all facts must

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[15] See Sider (2011, section 7.6) for a discussion of this issue.
[16] I take this martial terminology from Kovacs (2017).

either be fundamental or else reducible to fundamental facts via philosophical analyses; instead, they think, nonfundamental facts may be grounded in complex and inscrutable ways. This attitude should be taken toward ground itself. To be sure, one *might* try to give an analysis of ground, similar in status to a covering-law or counterfactual analysis of causation, or try to supply some simple formula for grounding the facts of grounding. But the true revolutionary will see these projects as optional. The facts of grounding are in no more need of an analysis or simple grounding formula than are the facts about cities or causation.

To be sure, even without an analysis it's sometimes clear that a certain kind of fact simply can't be grounded. It's clear, for instance, that in a naturalistic world, there are no facts that could ground the existence of God. But the case of ground isn't like that, since we can identify the kinds of facts that can help ground the grounding facts:

 i) patterns in what actually happens

 ii) modal facts,

 iii) facts about the form or constituents of the grounding fact in question

 iv) metalinguistic facts

 v) facts about fundamentality,

 vi) certain "pure" grounding facts

The list i)–vi) isn't meant to be exhaustive: perhaps other kinds of facts can help too.[17] Nor do I mean to commit to each: perhaps some members of the list play no role at all. Opponents of a Humean conception of grounding would oppose a role for facts of type i); I myself would oppose a role for facts of type vi). Here I remain neutral about such issues. Nor am I saying that any of these facts can fully ground any grounding facts by themselves; full grounds may need to be composed of facts of multiple kinds. Nor am I going to supply a formula for constructing full grounds from facts of these kinds (just as we cannot supply such a formula for facts about cities). The point is just to satisfy ourselves that, unlike in the case of God in a naturalistic world, there exist resources for grounding the grounding facts—and moreover, resources that are consistent with Purity.

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[17]For instance Wilson's (2014) "little-g" grounding relations.

Let a be some table, and consider the fact that a's being a table grounds its being either a table or a chair:

(1) $Ta \rightarrow (Ta \lor Ca)$

For the remainder of the paper we'll investigate in detail the categories of fact i)–vi), which might be involved in a ground of (1).[18] As we'll see, in each case the facts in question can be ultimately grounded in a way that's consistent with Purity.

General facts (1) might be grounded in part by general facts, such as the fact that all tables are either tables or chairs:

(2) $\forall x \big(Tx \rightarrow (Tx \lor Cx)\big)$

According to some, grounding facts just are facts about explanations, and one way to explain is to subsume under patterns, which are general facts. According to others (such as Schaffer (2016)), grounding facts are more like causal facts; but Humeans anyway think of causation as being grounded by patterns.

I am not saying that general facts are the sole elements of full grounds of grounding facts, only that some full grounds may involve general facts in combination with other facts of kinds to be considered below. Still, some friends of grounding may doubt that general facts play *any* role. For myself, I prefer a "Humean" approach to necessary connections across the board: to laws of nature (Lewis, 1973, pp. 73–4), to physical chance (Lewis, 1994), to metaphysical necessity (Sider, 2011, chapter 12), to logical truth (Sider, 2011, section 10.3), and so on; allowing general facts to play a role in grounding the facts of grounding is just more of the same. But others can rely instead on the other potential grounds for grounding facts to be discussed below.

(2) involves nonfundamental concepts, so it's worth pausing to think about what might ground it. (But if (2) cannot be grounded consistently with Purity, the friend of grounding has a problem bigger than finding grounds for grounding facts.) (2) is universally quantified, so we need to ask what grounds such facts in general. Perhaps, as Fine (2012, section 1.7) says, they're grounded in the plurality of their instances plus a "totality fact" insuring that there are no additional entities beyond those in the instances.[19] In that case (2) will have a ground that looks like this:

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[18] I actually have in mind nonfactive grounds of (1) and thus am ignoring Ta.
[19] But see Sider (2020), section 2.5.2.

(3) $Ta_1 \to (Ta_1 \vee Ca_1), Ta_2 \to (Ta_2 \vee Ca_2), \dots, \text{Tot}(a_1, a_2 \dots)$

Moreover, each instance $Ta_i \to (Ta_i \vee Ca_i)$ is a material conditional, which, let us assume, is ground-theoretically equivalent to:

(4) $\sim Ta_i \vee (Ta_i \vee Ca_i)$

Now, consider cases where the second disjunct is true. Then, since disjunctions are grounded in their true disjuncts, (4) would be grounded by:

(5) $Ta_i \vee Ca_i$

Side point: one such case is the case where $a_i = a$; thus (5) here is $Ta \vee Ca$. And since partial ground is transitive, we have that $Ta \vee Ca$ partially grounds (1). But this doesn't mean that $Ta \vee Ca$ partially grounds itself; it means that $Ta \vee Ca$ partially grounds the fact that $Ta \vee Ca$ is grounded by Ta. And that's unproblematic. (This is particularly clear if the fact that Ta grounds $Ta \vee Ca$ is an explanatory fact consisting of subsumption under a pattern; the pattern in question will in part be constituted by the facts subsumed.)

Returning to (5): it will be grounded in whichever of its disjuncts is true. And that disjunct will in turn be grounded in some complex physical (or whatever) fact about a_i—whatever makes it a table or chair as the case may be. Thus we have drilled down to the fundamental without violating Purity.

Now, in cases where the first disjunct of (4)—i.e., $\sim Ta_i$—is true, there is a question of what grounds it, which raises the general question of what grounds negations. But assuming this can be answered (we'll discuss it further in a minute), and assuming the totality fact in (3) doesn't raise any problems with Purity, we have seen that in the case of (2) anyway, "pure" grounds—i.e., grounds not involving any nonfundamental concepts—for (1) can be reached. Moreover, the output of this drill-down procedure leading to pure grounds is sensitive to the fact that it is $Ta \vee Ca$, as opposed to some other fact, that is being grounded in (1). This is in contrast to Bennett and deRosset's proposal, according to which variation in B does not result in variation in the ground of $A \to B$.[20]

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[20] To be sure, some elements cited in the preceding paragraphs are not unique to the right-hand-side of (1). Some partial grounds of (1) will, as a result, also partially ground other grounding claims. For instance, one partial ground of (1) might be a pure ground of Ta_{17} (since such a fact grounds Ta_{17}, which grounds $Ta_{17} \vee Ca_{17}$, which grounds $\sim Ta_{17} \vee (Ta_{17} \vee Ca_{17})$, which partially grounds (2), which (I say) partially grounds (1)); but this same fact would also partially ground any other fact of the form $Ta \to (Ta \vee Fa)$. Nevertheless, appropriate sensitivity to the consequent of (1) is present in the totality of partial grounds of (1).

(2) isn't the only general fact that might be part of (1)'s ground. In addition to all tables being tables-or-chairs, the fact that not all tables-or-chairs are tables might also be relevant (recall the asymmetry of ground), as might be the way in which (2) fits into larger patterns. (The latter is in the spirit of the best-system theory of laws (Lewis, 1994).) I'm not in a position to say exactly which facts are relevant, or how they're relevant. It would certainly be nice to do so, and indeed, to give a definition or analysis of ground. But as I've been saying, we needn't produce a definition to convince ourselves that there are grounds for grounding facts (consistent with Purity).

Modal facts   Another potential source of grounds of (1) is modal claims.[21] For instance, (1) might be partially grounded in (6):[22]

(6) $\Box\forall x\big(Tx \to (Tx \lor Cx)\big)$

Again, as with the general facts mentioned above (and all the kinds of facts to be discussed), the proposal is not that such modal facts are full grounds of grounding facts, but rather that they are (or may be) partial grounds: that there are complex combinations of modal and other facts of the kinds i)–vi) that constitute full grounds of grounding facts.

(6), though, involves the nonfundamental concepts of being a table and being a chair; how to continue the drill-down procedure to pure grounds so that those are eliminated?

For a modal reductionist this is unproblematic: (6) will be grounded in nonmodal facts, and the drill-down procedure can proceed as with any other sort of fact.

Modal antireductionists will deny that (6) is grounded in nonmodal facts. But that does not commit them to the Purity-violating claim that (6) is ungrounded. They can instead hold that (6) is grounded in modal facts which do not involve nonfundamental concepts like being a table or being a chair.

To get a handle on how impure modal facts might be grounded in pure ones, consider first a simpler case. It would be natural for a modal antireductionist to regard the impure modal fact $\Diamond\exists x\,Tx$ as being grounded in $\Diamond\exists x\,T_i x$, where T_i is any "realizer" of being a table—any specific microphysical property that would ground a given thing's being a table.

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[21]This might be in tension with the suggestion made at the beginning of the paper that some grounding facts ground the corresponding modal statement, depending on which modal claims are said to partially ground the facts of grounding.

[22]Or in $\Box\big(Ta \to (Ta \lor Ca)\big)$.

The situation with (6) is more complicated. Before broaching it, let's return to the question of what grounds a negative fact, such as the fact $\sim T b$ that a certain thing b is *not* a table. One answer might be that the ground is a fact of the form $\sim \tau(b)$, where τ is a "metaphysical definition" of 'table'. (The proposed ground isn't $\sim \tau(b)$-and-τ-is-a-metaphysical-definition-of-'table', but rather just $\sim \tau(b)$.) Like a ground, a metaphysical definition of 'table' gives an underlying account of being a table, but unlike a ground, a metaphysical definition must be both necessary and sufficient for being a table. For the sake of definiteness,[23] let's suppose that τ is the disjunction of all possible realizers of the property of being a table; thus a ground of the fact that b is not a table might be that b is neither T_1 nor T_2 nor….

(Side point: friends of ground often provide, as a ground for a positive claim, a sufficient but not necessary condition for the claim. They say, for instance, that Ta is grounded in just one of its "realizers", $T_1 a$, and don't insist that the ground must be something like $T_1 a \lor T_2 a \lor \ldots$, which includes all the realizers, and thus is perhaps necessary as well as sufficient for Ta.[24] Indeed, the ability to provide "small" underliers of high-level facts might be regarded as a great advantage of the ground-theoretic framework over accounts of levels in which underliers must be both necessary and sufficient.[25] But in the case of negative claims, this kind of strategy won't work. Thus the apparent advantage is in fact illusory.)

It may be replied that the negative claim $\sim T b$ can be grounded in some positive feature of b that rules out its being a table. But what might that positive feature be? Not the fact that b is a chair (say); a chair could also be a table. Not a complete intrinsic description of b: such a description needn't necessitate b's failing to be a table since being a table is a relational matter (how a thing is used, for instance, can affect whether it's a table). A complete intrinsic and extrinsic positive description of b would necessitate its not being a table, but it contains too much information to be a ground of that fact. It contains irrelevant information about the exact physical state in the center of Alpha Centauri, for instance, and the ground of a fact must not contain anything irrelevant to that fact.[26]

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[23]Actually I think a more likely view is that τ is a functional definition of 'table'.

[24]This is enabled by the fact that ground is "conditional", not "biconditional" (see note 3).

[25]See, for instance, my exchange with Schaffer (Schaffer, 2013; Sider, 2013*a*) on the virtues of ground and metaphysical semantics in light of multiple realization.

[26]Compare Dasgupta's (2014*a*) argument against grounding Obama's existence in a description of an overly large region of space.

Back to the ground of (6). One potential ground for it is like the ground for $\sim Tb$ considered above: simply replace 'table' and 'chair' in (6) with their metaphysical definitions:[27]

(7) $\quad \Box \forall x \big((T_1 x \lor T_2 x \lor \cdots) \to ((T_1 x \lor T_2(x) \lor \cdots) \lor (C_1 x \lor C_2 x \lor \cdots)) \big)$

Note that Purity allows this to be ungrounded (provided the logical concepts involved—including necessity—are fundamental concepts).

Let me address some objections. The first says that (7) can't be a full ground of (6) because a full ground of (6) would need to include something that connects the disjunction of the T_is to T, i.e., to being a *table*. But if that's a good objection, it would also refute paradigmatic claims of grounding, such as the claim that $T_1 a$ grounds Ta. If in the case of the simple, positive claim that a is a table, the ground is just the realizer, $T_1 a$, and nothing connecting the realizer to tablehood is needed, why should such a thing be needed in more complex claims involving tablehood?

The second objection is that the approach suggested above to negations, and applied again when (7) was said to ground (6), would imply violations of the irreflexivity of ground. For example, the result of replacing each predicate in (7) with its metaphysical definition would seem to be (7) itself, assuming that fundamental predicates are their own metaphysical definitions. One might quarrel with this assumption; some of the directedness of ground might emerge from a corresponding directedness in the notion of a metaphysical definition. But more importantly, I didn't mean to suggest the general principle that A grounds B whenever A results from B by replacing expressions with their

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[27]There are other plausible candidate grounds of (6) in the neighborhood:

(7a) $\quad \Box \forall x \Big(\big(T_1 x \to (T_1 x \lor (C_1 x \lor C_2 x \lor \cdots)) \big) \land \big(T_2 x \to (T_2 x \lor (C_1 x \lor C_2 x \lor \cdots)) \big) \land \cdots \Big)$

(7b) $\quad \Box \forall x \Big((T_1 x \to (T_1 x \lor C_1 x)) \ \land \ (T_1 x \to (T_1 x \lor C_2 x)) \ \land \ \cdots \ \land \ (T_2 x \to (T_2 x \lor C_1 x)) \ \land$
$\qquad (T_2 x \to (T_2 x \lor C_2 x)) \land \cdots \Big)$

In (7), it is only the entire disjunction of the realizers of 'a is a table' that is said to suffice for something (namely, the disjunction of the disjunction of realizers of 'a is a table' with the disjunction of realizers for 'a is a chair'). Whereas in (7a) and (7b), each individual realizer of 'a is a table' is said to be sufficient for something—for the disjunction of itself with the disjunction of all realizers of 'a is a chair', in the case of (7a), and for the disjunction of itself with, in turn, each realizer of 'a is a chair' in (7b).

metaphysical definitions. I meant to be proceeding more piecemeal, to be saying that this looks plausible in certain cases while leaving open how far it generalizes. Remember our guiding thought: ground is a complex, high-level matter, and there need be no simple rules governing how it is grounded.

The third objection is that the suggested approach would have implausible results in other cases. The approach apparently implies that

(T) $\quad \Box \forall x \big(Tx \longleftrightarrow (T_1 x \lor T_2 x \lor \cdots) \big)$

is grounded in

(T') $\quad \Box \forall x \big((T_1 x \lor T_2 x \lor \cdots) \longleftrightarrow (T_1 x \lor T_2 x \lor \cdots) \big)$

For (T') results from (T) by replacing 'Tx' with its metaphysical definition '$T_1 x \lor T_2 x \lor \cdots$'. But how can (T') be a ground of (T)? (T') is a logical truth, whereas (T) seems to concern the "substantive" matter of what the necessary and sufficient conditions for being a table are. (Grounding orthodoxy says that nonlogical truths can ground logical truths; P grounds $P \lor {\sim}P$, for instance. It is the converse that is at issue here, the grounding of a nonlogical truth by a logical truth.)

I could reply again that I'm not committed to the general principle mentioned above. But in the present case I think the principle may well deliver the right result; the appearance of oddness dissolves upon closer inspection. Whether a sentence is a logical truth is sensitive to patterns of recurrence amongst its constituent expressions: $a = a$ is a logical truth whereas $a = b$ is not. If one extends the notion of logical truth to structured propositions (or facts), the analogous point is then that whether a proposition or fact is a logical truth is sensitive to patterns of recurrence of its constituent entities, properties, and relations. But now: passing from a grounding to a grounded fact can change what the constituents of the fact are, and hence change the patterns of recurrence. In the fact (T), the constituent property on the left-hand side of the biconditional is the property of being a table, whereas the property on the right-hand side is the disjunction of the realizers of being a table. Since these properties are distinct (let us suppose[28]) there is no recurrence, and the fact is not a logical truth. But when we pass from (T) to its ground (T'), the property of being a table is replaced by the disjunction of its realizers; that property now recurs in (T'); (T') is a logical truth.

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[28]One might say that they are not distinct, on the grounds that metaphysical analysis is identity (compare Dorr (2016)). But further room is available to maneuver; see for instance Fine (2012, section 1.9) and Rosen (2010, section 10).

Perhaps the appearance of oddness persists: (T′) is knowable apriori, whereas for all we know apriori, (T) could be false. But it's not an apriori matter what a given fact's grounds are; it's not apriori that (T)'s ground is (T′). So it is unsurprising that the apriori (T′) could ground the aposteriori (T).

Logical form   (1) might also be partly grounded in facts about its "logical form", facts such as (8):

(8) The antecedent of $Ta \rightarrow (Ta \lor Ca)$ is a disjunct of its consequent

Continuing to drill down: what grounds (8)? And how, generally, are facts about the logical forms of facts or propositions grounded? Assuming a structured conception of facts (perhaps presupposed by talk of facts as having logical forms), the question reduces to that of how facts about the constituency-structure of complexes are grounded. On one view, the existence and features of an entity with parts (in a broad sense of 'part') are grounded solely in the existence of those parts. Thus (8) would be grounded in the mere existence of the parts of $Ta \rightarrow (Ta \lor Ca)$: the entity a and the properties T and C (plus the "syntactic" relations of antecedent, constituency, and disjunct, plus some logical concepts). On another view, facts about the holding of fundamental constituency relations or operations would also be required.

Either way, to drill further down we need a ground of the existence of the properties T and C—of being a table and being a chair. How this proceeds depends on the ontology of properties.

On a "deflationary" approach, the existence of the former property, for example, might be said to be grounded in the fact that there exist tables.[29] And from the existence of tables, subsequent drilling down in line with Purity is unproblematic. Another approach is nondeflationary but reductive. For example, David Lewis (1986, section 1.5) identifies properties with sets. Subsequent drilling down will then depend on what one thinks the grounds of facts about sets are (recall what was said a moment ago about the grounds of the existence of things with parts).

Yet another approach is nonreductive. Now, a nonreductivist conception of properties might seem to conflict with Purity, since it might seem committed to there being no ground for the fact that there exists a property of being a table. But the situation here is parallel to that of (6) for a modal antireductionist. The nonreductivist about properties could claim that the existence of the property

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[29]I have in mind Schiffer's (2003) approach.

of being a table is grounded in the ungrounded existence of the property of *being a T_1 or a T_2 or a T_3 or ...*, which is compatible with Purity.

Mereology, etc.   The appeal to logical form is a special case of a more general idea: that the grounds of a grounding fact $A \rightarrow B$ might include internal relationships between the facts A and B. Relations of logical form are one sort of internal relationship; another is relations of parthood or constituency. For example, those who think that Socrates's existence grounds the existence of his singleton set might hold that this grounding fact is partly or fully grounded in the fact that Socrates is a member of his singleton set.

Exactly which internal relationships? We needn't say. I continue to insist on the appropriateness of specifying the kinds of facts that can ground grounding facts without supplying a formula that is applicable in all cases.[30]

Metalinguistic facts   Logical form was available to help ground (1) because (1) is a case of "logical grounding", and holds at least partly by virtue of its logical form: all disjunctions are grounded by their true disjuncts. Other cases, for instance those connecting levels, have nothing to do with logical form. For instance, in the grounding fact $T_1 a \rightarrow Ta$ (a is a table in virtue of possessing the realizing property T_1), there is no logical connection between $T_1 a$ and Ta. Similarly for $Q \rightarrow N$.

Extensional and modal facts (as well as, perhaps, nonlogical internal relations between antecedent and consequent, though this seems less likely), are of course still available to help ground levels-connecting grounding facts. But there is another sort of fact that may well also be relevant. Perhaps part of what ties T_1 to T, part of what makes T_1 a sufficient condition for T, are metalinguistic facts about how the word 'table' is used, about the environment surrounding our usage of 'table', about the history of our usage of that term, and so on. Various philosophers have put forward various ideas about the sources of meaning and reference, the facts that attach our words to bits of the world, and any of these facts might be regarded as partly grounding levels-connecting facts about

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[30]Kovacs (2018) defends a "lightweight" conception of ontological dependence (a close cousin of ground) in which mereological relations play a central role. Also meshing with the spirit of the present paper is Kovacs's insistence that a lightweight account need not give necessary and sufficient conditions for ontological dependence. (His defense of the propriety of this stance is different from mine.)

ground.[31] [32]

It's straightforward to continue drilling down from metalinguistic facts to pure grounds; such facts don't present any particular conflict with Purity.

Some will reject the idea that *words* are involved in any way in the grounds of $T_1a \rightarrow Ta$. Facts about the grounding of tablehood, they will say, concern only the nonlinguistic part of the world, and could have held if different or even no languages had existed.

Now, I don't think this objection is clearly right, since I don't think it's so obvious that grounding is entirely independent of language. Also, metalinguistic partial grounds of facts about the grounding of table-facts wouldn't imply the existence of metalinguistic partial grounds of the table-facts themselves.

In any case, it doesn't matter much whether the objection is right. For suppose it is. Then we must clearly separate the operation of meaning-determination from the operation of ground: the meaning-determining facts play only the role of content-selection, associating contents with words; ground is a relation on the contents thus selected, a relation that is blind to the manner of selection, concerning only non-metalinguistic features of the contents. Fine; but then, some of the work we might have thought was to be accomplished by ground must instead be accomplished by metalinguistic facts.

For instance, suppose the metalinguistic facts associate the disjunctive fact $T_1a \vee T_2a \vee \dots$ with the sentence 'Ta'. On the view we are considering, the grounding fact $T_1a \rightarrow Ta$ is just a case of logical grounding: the fact Ta just *is* the disjunctive fact $T_1a \vee T_2a \vee \dots$, which is grounded in its disjunct T_1a.[33] The non-metalinguistic nature of the grounding fact $T_1a \rightarrow Ta$ has thus been secured. But there still remains a question of the connection between the disjunction $T_1a \vee T_2a \vee \dots$ and Ta. That question can no longer be understood as a question about facts since as facts these are identical. But the question obviously still remains, however we conceptualize it—perhaps as a question

[31] See Fodor (1987); Lewis (1984); Millikan (1989), and myriad other works.

[32] This idea could take different forms. Metalinguistic facts might be said to directly ground $T_1a \rightarrow Ta$, the idea being that there is a direct realization relation between T_1 and T that is partly metalinguistic in nature. Alternatively, it might be said that T_1 realizes, in an entirely nonmetalinguistic sense, a certain functional property F, so that $T_1a \rightarrow Fa$ is grounded by facts having nothing to do with language; but nevertheless, metalinguistic facts help ground $Fa \rightarrow Ta$, the idea being that they attach F to 'table' and hence to tablehood. $T_1a \rightarrow Fa$ and $Fa \rightarrow Ta$ would then ground $T_1a \rightarrow Ta$ (the latter would be a case of mediate ground in Fine's (2012) sense).

[33] Here I assume that ground is a relation between facts, which is in harmony with the view under discussion.

about sentences or about concepts. Moreover, the remaining question is clearly akin to other questions that we answer with ground. Even though we can no longer say that a's being a table is grounded in a's either being a T_1 or a T_2 or …, it's still entirely natural to say that a is a table *because a* is either a T_1 or a T_2 or …. And the propriety of saying this will be due to metalinguistic facts. We don't properly understand the way the levels are connected, given the above setup, unless we bring in the fact that 'Ta' expresses the disjunctive fact $T_1a \vee T_2a \vee \dots$.[34]

Fundamentality   It is central to the conception of ground that it is a *directed* relation. (The perceived failure of modal notions to account for this directionality is a large part of the argument for positing ground.) Indeed, most friends of ground assume that grounding is an asymmetric relation, that if A grounds B then B *cannot* ground A; but even the dissenters (such as Elizabeth Barnes (2018) and Carrie Jenkins (2011)) agree that in a great many central cases in which A grounds B, B does not also ground A.

(1) is a case of asymmetric grounding: Ta grounds $Ta \vee Ca$, but $Ta \vee Ca$ does not ground Ta. And if we look back at the resources for grounding that have been discussed so far, we can see a basis for this asymmetry. For instance, it isn't true that all tables-or-chairs are tables, nor is this necessarily true. Now, in other cases these bases for asymmetry won't be present: $Ta \vee Ta$ does not ground Ta despite the fact that it *is* true, and necessarily true, that everything that is a table-or-table is a table. But other of our resources apply asymmetrically in this case. For example, we considered above that (1) might be partly grounded in facts about its logical form, for instance that its antecedent (left-hand-side) is a disjunct of its consequent (right-hand-side). In the false grounding claim $(Ta \vee Ta) \rightarrow Ta$, the antecedent is *not* a disjunct of its consequent, so that potential partial ground of the false grounding claim is absent. Thus there is a basis for much asymmetry in the list of kinds of partial grounds of grounding statements that we have considered so far.

By "basis for asymmetry" I do not mean grounds of negations of grounding claims, like $\sim\!\big((Ta \vee Ta) \rightarrow Ta\big)$. As we saw, the grounding of negative claims is in general a tricky business. Moreover, we earlier considered the idea of a negation $\sim\!A$ being grounded in $\sim\!M(A)$, where $M(A)$ is a metaphysical analysis of A; but providing such a ground for a claim of the form $\sim\!(A \rightarrow B)$ would require providing a metaphysical analysis of ground, which I have said I cannot

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[34]The issues raised by Jenkins (2011) and Wilson (2014, section V.ii) are related.

provide. I mean something more modest: that there are asymmetries in the kinds of facts available for grounding the facts of grounding, in virtue of which those facts will in general ground a grounding claim without grounding its "converse".

More fully. My overall goal in this section is to list various kinds of facts that can together, in some combination, constitute full grounds of facts about grounding. I have not specified what that combination is. That is, I have not specified a *ground-grounding function*, a function yielding, for any propositions A and B, the set of possible full grounds for A's grounding B—that is, the set of propositions P, constructed from propositions of the listed kinds i)–vi), such that if P were true, then $P \rightarrow (A \rightarrow B)$.[35] I grant that there must be a ground-grounding function G, but I have insisted that it need not be simple, and that a friend of grounding need not be able to specify it. So, in these terms: when I say there is a "basis for asymmetry" in the list of kinds of facts I have been supplying, I simply mean that there are sufficiently many asymmetries in these facts so that, for a great many pairs of propositions A and B (perhaps all) for which $G(A,B)$ contains at least one true proposition—that is, in a great many cases in which A in fact grounds B—$G(B,A)$ does not contain any true propositions, so there is no (factive) full ground for B's grounding A, and so B in fact does not ground A. The kinds of facts that I have been specifying, which ground grounding facts $A \rightarrow B$ when combined in the way that the correct ground-grounding function G specifies, do not (typically) combine, again in the way G specifies, so as to ground its "converse" $B \rightarrow A$. The claim that G has this feature is similar in status to the claim that G's values are composed of facts of kinds i)–vi): it is a plausible though unspecific guess about the way in which grounding facts are grounded, akin to plausible but unspecific guesses about the way in which complex macro-truths about cites are grounded.

All this about directionality has been a preamble for the following: although we have a basis for much of the directionality of grounding in place already, there is a further kind of fact available to help ground the facts about grounding, and which can also help to account for directionality: facts about fundamentality, and in particular, facts about which concepts are fundamental.

It's quite natural to think that some of the directionality of ground derives from the presence of facts about concept-fundamentality in the grounds of grounding facts. Now, given grounding orthodoxy, many—indeed, most—cases of ground do not involve fundamental concepts or fundamental facts, for

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[35]These propositions would be nonfactive full grounds of A's grounding B.

according to that orthodoxy, propositions stated in terms of any chosen concepts ground and are grounded. (For instance, for any true A and any B, A grounds $A \vee B$ and also grounds $A \wedge A$.) Nevertheless, facts about concept-fundamentality—in concert with the other kinds of facts we are investigating here—can play a role in grounding even facts involving nonfundamental concepts, by helping to identify one end in the entire grounding hierarchy as the most fundamental one.

By 'fundamental concept' (both here and in the principle of Purity) I intend *absolute* fundamentality. This is important in the present context because facts about what concepts are absolutely fundamental are Purity-friendly. Suppose C is a fundamental concept—that is, an absolutely fundamental concept. Then the involvement of C in the fact that:

> C is a fundamental concept

is no obstacle, so far as Purity is concerned, to that fact's being ungrounded. (The only other obstacle would be if the concept of a fundamental concept were itself not a fundamental concept.[36]) The situation is different with relative fundamentality, for in the fact:

> C_1 is a more fundamental concept than C_2

the concept C_2 is not a fundamental concept (not an absolutely fundamental concept, that is), which, given Purity, requires this fact to have a ground.

Pure grounding facts   The friend of ground might even claim that the ultimate grounds of (1) include certain grounding facts. This would be consistent with Purity if those grounding facts involved only fundamental concepts. It might be held, for instance, that (1) is partially grounded in:

(9) $(T_1 a \vee T_2 a \cdots) \rightarrow ((T_1 a \vee T_2 a \cdots) \vee (C_1 a \vee C_2 a \cdots))$

This would require, however, claiming that ground itself is a fundamental concept. It would involve regarding grounding as a sort of super-added force, if only a force restricted to "pure" facts involving only fundamental concepts.[37]

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[36]In Sider (2011, 7.13) I argue that the concept of a fundamental concept *is* a fundamental concept. There are subtle issues about what concepts the claim involves; see Sider (2011, section 6.3). For a similar view to that of this section, see Wilson (2014, section IV.i.), who argues that a certain sort of fundamentality is primitive, and that this helps to fix the direction of metaphysical priority.

[37]Similarly, a believer in fundamental laws of metaphysics like Schaffer (2017*b*, section 4.2) could, consistently with Purity, invoke fundamental laws of metaphysics that involve only

Some grounding theorists may favor this position. But the most convincing argument for the indispensibility of ground is that ground is needed as a levels-connector. It is this function of ground, for instance, that lets us give suitable statements of sweeping metaphysical theses like moral naturalism.[38] And this aspect of ground's role does not call for a metaphysically fundamental concept of ground.[39] Further, given Purity, the vast majority of grounding facts require grounds, even if grounding is claimed to be a fundamental concept. So the position doesn't buy us much extra "oomph". The added oomph would be restricted to austere cases, such as the grounding of "pure" disjunctions in their disjuncts, the grounding of the existence of $\{a\}$ in the existence of a, and so forth. My own tastes call for reducing this trickle of oomph to patterns, in some Humean fashion. But to each her own.

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fundamental concepts, such as, perhaps, a second-order law to the effect that for all P, Q, if P then $P \lor Q$.

[38] See Rosen (2010, section 2), for example.

[39] See my Sider (2020, chapter 1) for further discussion, including a defense of this aspect of ground against Wilson's (2014) assault.

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