Ergo AN OPEN ACCESS JOURNAL OF PHILOSOPHY

Janus-Faced Grounding

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A common view in the metaphysics of ground is that all grounding facts are grounded. This generates an infinite regress of ever more grounding of grounding facts, but most grounding theorists take the regress to be harmless. However, in this paper, I argue that the regress is in fact vicious, therefore some grounding facts are ungrounded. Since the regress appears to fall out of two plausible principles of fundamentality, I offer a new interpretation of them that allows for ungrounded grounding facts.

Metaphysical **grounding** is the generation of the less fundamental from the more fundamental. In this way, grounding is *Janus-faced*, looking partly to the fundamental, partly to the non-fundamental. Most theorists of ground hold that grounding is thereby non-fundamental, and so must itself be grounded. Yet, if grounding is always grounded, then every grounding fact generates an infinite regress of the grounding of grounding facts, where each grounding fact needs to be grounded in turn. These theorists claim that the regress isn't vicious, since what's grounded can still ground out in the fundamental and, anyway, the regress is forced upon us by the nature of grounding.

I argue that this line of thinking is wrong. An infinite path of dependent grounding facts depending on yet more dependent grounding facts is in fact vicious. Therefore, some grounding facts are ungrounded. Because the regress seems to fall out of two plausible principles of fundamentality, they require reexamination. Broadly speaking, the first principle is that the fundamental cannot contain the non-fundamental, and the second is that the fundamental generates everything else. I argue for new interpretations of these principles that avoids regress, thereby allowing for a new view of how grounds are linked to what they ground.

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https://doi.org/10.3998/ergo.4664

1. Grounding Ground

Why do grounding theorists take grounding facts to always be grounded? Because it seems to follow from two principles about fundamentality: **purity** and **completeness** (Sider 2011: ch. 7, sec. 5). Purity holds that fundamental facts don't have anything non-fundamental in them. The idea is that containing the non-fundamental makes a fact go beyond the confines of fundamental reality, but the fundamental is supposed to be *purely* fundamental. Thus, most grounding theorists take purity to be something like the following requirement:

Purity: Ungrounded facts cannot contain any grounded facts.

Completeness holds that the fundamental generates the rest of reality. Once you have the fundamental base, then that determines the rest of reality. Each non-fundamental fact is ultimately generated from fundamental ones:

Completeness: The ungrounded facts generate all the grounded facts.[1]

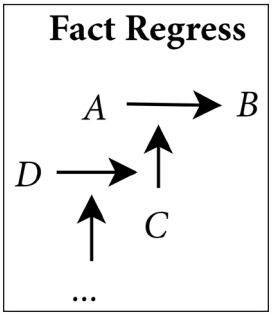
However, while I think both these formulations are correct, I think the proper interpretation of them requires some care. Previewing: completeness bans regresses of grounding, while the proper interpretation of purity avoids them by allowing for ungrounded grounding facts which thereby 'involve' grounded facts—namely, those facts being grounded—but don't 'contain' them in a way that violates purity. This is important because the standard construal of these principles leads to an infinite regress of grounding of grounding facts.

How so? Take any grounding fact, such as that the complex physical fact *P* grounds the fact *H* that Houston is a city. Then, this grounding fact involves the non-fundamental fact *H*, so by the standard construal of purity it's non-fundamental. Hence, by completeness it must be grounded. But this holds for *every* grounding fact. So the fact whereby the original grounding fact is grounded must itself be grounded—and *this* grounding fact must also be grounded, and so on forever. Thus, we have what Karen Bennett (2011: 30–31) calls the **fact regress**.

Let '⟶' stand for the grounding relation, and for the sake of exposition let it be a relation between facts—though for ease of exposition when I speak informally I often talk of entities besides facts entering into grounding. To avoid

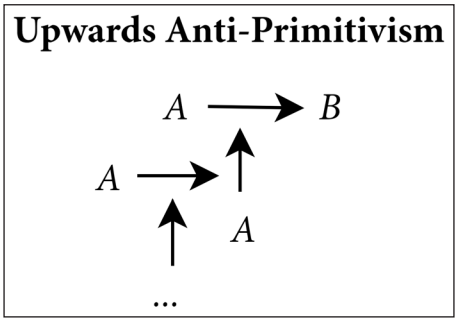
1. For arguments against completeness, see Ross Cameron (2008) and Ricki Bliss (2013). A weaker formulation of completeness that would suffice for my arguments would be that every grounded fact is at some point grounded where there are no longer non-fundamental facts as grounds, so, for example, it would allow for *zero grounding* such that grounded facts sometimes ground out in no grounds.

Greek, let italicized uppercase letters pick out collections of facts, including the singular collection of just one fact. Then, where arrows going into arrows indicate the grounding of a grounding fact, the regress in diagram form is:



As I discuss in the remainder of this section, the major accounts of what grounds the grounding facts posit a regress with this sort of shape. Thus, while each faces its own particular problems, my objection to all of them is simply that they posit the fact regress. I argue, contrary to popular opinion, that the regress is vicious. To put it simply: the regress is not a harmless 'upward' regress of the generation of new facts from prior ones, but, rather, a harmful 'downward' regress where each earlier fact always depends on yet another one. But, before getting to that, let me talk through the extant accounts.

According to one prominent approach, grounding facts are grounded in the original grounds (Bennett 2011; 2017: ch. 7; deRosset 2013). When *A* grounds *B*, then *A* grounds that *A grounds B*, and *A* grounds that *A grounds that A grounds B*, and so on forever. So,

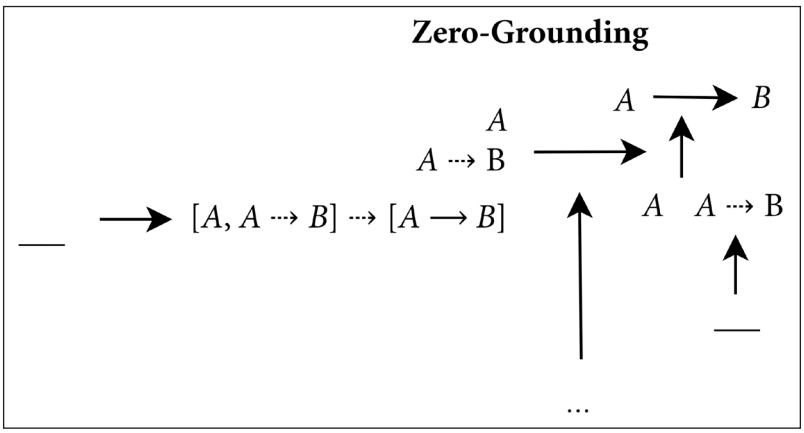


The problem, then, is that this view produces the fact regress, since each grounding fact must be grounded in the original grounds.

The second approach makes crucial use of a distinction between **factive** and **non-factive** grounding (Fine 2012). Roughly put, *A non-factively* grounds *B* if and only if given *A* then *A* generates *B*. *A factively* grounds *B* just in case *A* non-factively grounds *B* and *A* obtains. The idea is that non-factive grounding is a rela-

tion between two facts such that one is enough to generate the other, whether or not the first actually obtains and hence whether or not the first actually generates the second. The counterfactual gloss 'if A *were* to obtain, then *B would* obtain' is just a gloss. I take non-factive grounding to be a primitive notion that entails counterfactual claims. And I take non-factive grounding to be the core notion of grounding by which we can understand factive grounding.

So with non-factive grounding in our toolkit, consider the approach that holds that grounding facts are *zero-grounded*—grounded but not in any grounds. As Jon Litland (2017) formulates it, every grounded fact is factively grounded in its grounds in addition to a non-factive grounding fact holding that those grounds ground the grounded. These non-factive grounding facts are then zero-grounded. Let '⟶' indicate factive grounding, and let '⇢' indicate non-factive grounding. Moreover, let '__' indicate that there are no grounds—and not, to be clear, the presence of a negative fact about the absence grounds. Then, Litland's view is that:



Each grounding fact is grounded. Either it's factively grounded in a non-factive grounding fact and some grounds or it's a non-factive grounding fact that's factively zero-grounded without any grounds. Thus, this view faces the same problem as the first. It produces the fact regress, since each grounding fact must in turn be grounded—even if some are grounded without any grounds.

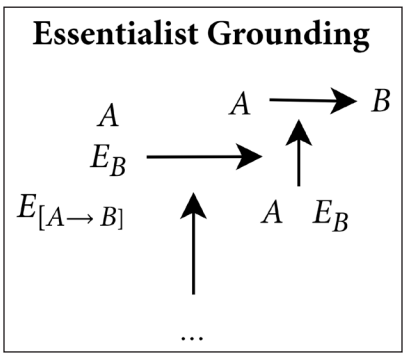
A third approach appeals to the essence of what's grounded such that it's essential to constituents in the grounded fact that they are grounded in certain grounds (Rosen 2010; Fine 2012; Dasgupta 2014; Kment 2014). Take the grounding fact that Houston is a city is grounded in physical fact *P*. It would have as a ground something like:

Essence of cities: It's essential to *being a city* that if *P*, then $P \longrightarrow H$.

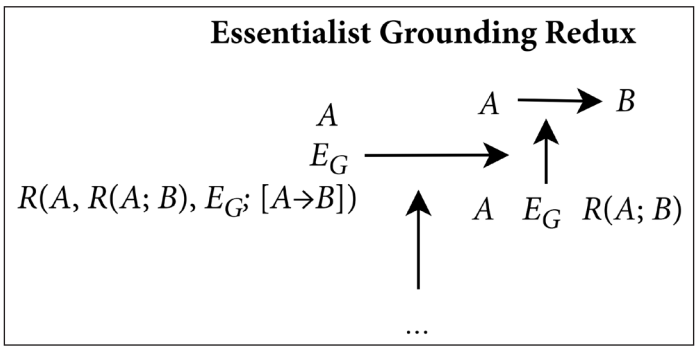
Call this essential fact 'E_N'. The view, then, is that this essential fact along with the physical fact ground that the physical fact grounds that Houston is a city: E_N, $P \longrightarrow [P \longrightarrow N]$. More generally, the view is that for any grounding fact $A \longrightarrow B$ there is some essence fact E_B such that E_B, $A \longrightarrow [A \longrightarrow B]$. So essence facts ground grounding facts, but these grounding facts would still need to be grounded. Therefore, there would also have to be essences of grounding facts, along the lines of:

> **Essence of grounding facts**: It is essential to $A \longrightarrow B$ that if E_B and A, then E_B, $A \longrightarrow [A \longrightarrow B]$.

And this would produce the following pattern:

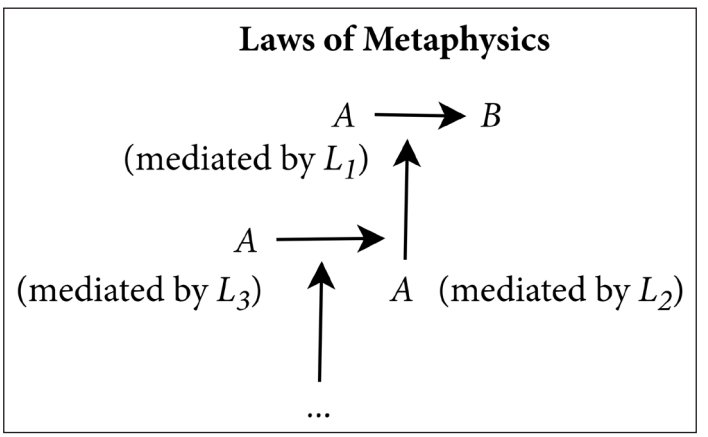


It's open to a proponent of this view to hold that these essentialist facts are different at various steps or, in fact, the same throughout. So, perhaps, they could say that there is an essence of the grounding relation E_G that recurs at each step, in combination with some fact about a general relation between grounds and grounded $R(X; Y)$ (Rosen personal communication):



This would minimize the number of distinct essence facts posited. But on any way of spelling out the proposal the view still generates the fact regress. Grounding facts are grounded in essence facts where this grounding must be grounded in yet another essence fact and so on forever.

A fourth view holds that there are fundamental **metaphysical laws** that link the ground to the grounded (Wilsch 2015a; 2015b; Glazier 2016; Schaffer 2017).[2] One way to take this view is not that laws ground the grounding facts, but rather that laws serve as distinct principle-y sort of grounds in contrast to input-y sorts of grounds. So let '*L*' be the law that $A \longrightarrow B$. Then on this understanding of the view it's not that *L* grounds $A \longrightarrow B$, but rather that *L* a serves as a principle-y ground of *B* while *A* serves as an input-y sort of ground. But this interpretation doesn't give an answer as to what grounds the grounding facts, so let me set it aside and focus on an interpretation according to which metaphysical laws are what ground the grounding facts. Jonathan Schaffer's (2017) view is that laws of metaphysics *mediate* grounding facts in a manner akin to how laws of nature mediate causation, so laws of metaphysics aren't grounds just as laws of nature aren't causes. They facilitate grounding without being *grounds* of grounding facts. What are the grounds of grounding facts? Schaffer (personal communication) is inclined to take the original grounds to serve as grounds of the grounding fact. Hence, his view generates the fact regress:



I leave it open whether $L_1 = L_2$ and $L_2 = L_3$ and so on. The important point is that, as with the other proposals, this account leads to the fact regress.

2. Joaquim Giannotti (2022) has explored a view according to which the laws are non-fundamental in being grounded in regularities among grounding facts. But if laws are taken to help ground the grounding facts, then this violates the non-circularity of ground, since laws would then ground the regularities that ground them.

A final proposal is that there is no unified account of how all grounding facts are grounded (Sider 2020). Different kinds of grounding facts are grounded in different ways, though each is ultimately grounded in a fundamental fact. While there is no unified story to tell for all grounding facts that abides by purity, there is a story for each grounding fact that does. However, even though there is a hodgepodge of different kinds of grounds for different kinds of grounding facts, it's still the case that each grounding fact needs to be grounded, so the fact regress remains.

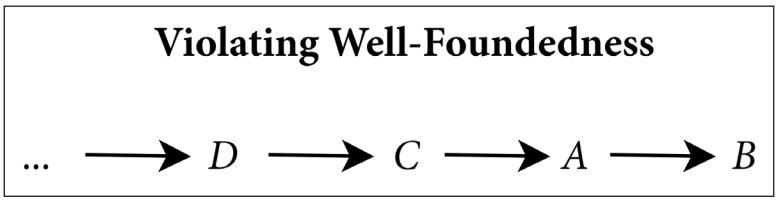
Therefore, all of the prominent proposals for what grounds the grounding facts generate the fact regress.

2. Viciousness of the Regress

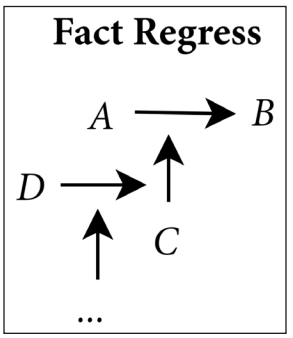
So is there something bad about the fact regress? The standard take among grounding theorists is that the regress isn't vicious, just a surprising discovery (Bennett 2017: 196–98; Sider 2020: 749–51). The main reason they give is that the regress doesn't violate the well-foundedness of ground (Rabin & Rabern 2016), which is that:

> **Well-foundedness**: Every fact is either ungrounded or ultimately grounded in an ungrounded fact.

Well-foundedness entails completeness, and on the assumption that every fact is either grounded or ungrounded they amount to the same principle. This is because well-foundedness bans infinite chains of grounding such that . . . $D \longrightarrow C \longrightarrow A \longrightarrow B$ so that all grounding chains terminate in an ungrounded fact. To violate well-foundedness would require that there is a chain of grounding of grounds that never terminates:



This infinite 'descent' of grounds violates well-foundedness and thereby completeness, so is bad in that respect. But the fact regress doesn't violate well-foundedness, since a new fact is grounded each time:



This is compatible with completeness: just let *C* and *D* and so on either be fundamental or grounded in the fundamental.

However, I claim that the fact regress is still vicious. A violation of well-foundedness of ground means that there is a chain of metaphysical 'why' questions that never comes to an end. "Why does this happen? Because of $that_1$. Well, why does $that_1$ happen? Because of $that_2$ . . ." Given well-foundedness, at some point we must reach a "Just because $that_n$*'s* how it is". But, given the fact regress, even if each chain of 'why' questions comes to an end then there is still no end to each *line of questioning*. "Why does this happen? Because of $that_1$. Well, why does $that_1$ make it happen? Because of $that_a$. Well, why does $that_a$ make $that_1$ make it happen? Because of . . ." For any explanation both *explainers* and *explanations* must come to an end. But grounding is the worldly relation that backs metaphysical explanation (Schaffer 2016). Well-foundedness corresponds to the constraint that for any explanation the chain of *explained explainers* must come to an end. It cannot be that each explainer must itself be explained in turn. But it's not just *explainers* that must come to end, *explanations* must come to an end as well. Thus, the fact regress should be rejected, since grounding is the worldly relation backing explanation and so the fact regress leads to an unending path of *explained explanations*. If the fact regress were the case, then for any given bit of non-fundamental reality, the fundamental would never be done doing what's required to generate it. Each step of generation would require yet another generation.

Consider, by analogy, the nomic progression of nature over time. Take a world with an initial state S_1 and fundamental physical laws *L*. Then, S_1 evolves to the next state S_2, where this is mediated by *L*. But say that mediation via a law of nature requires a meta-law to mediate the mediation, so that S_1 evolving to S_2 via *L* requires a meta-law L_L such that S_1 evolves to S_2 via *L via* L_L. But, then, if mediation via a law always required another law, then mediation by the meta-law L_L would itself require mediation by a meta-meta-law, and so on

forever. This is vicious.[3] And it's vicious because at no point does *L* actually end up mediating S_1 evolving to S_2, so at no point is there enough in the world for S_2 to come about. I hold that grounding is no different. Any grounding fact must eventually terminate in an ungrounded grounding fact.

All that was impressionistic and analogical, so let me offer a sharper and more direct argument. The basic idea is that a grounding fact depends not just on its grounds but also on the grounds of its grounding fact—and, in general, on the grounds of any grounding fact in the path of the grounding of grounding facts that it initiates. Given this sort of dependence of the grounded on those various grounding facts, then the fact regress is bad for the same reason that violations of well-foundedness are bad: they are both problematic infinite descents of dependence. With the fact regress, the generation of what's grounded by its grounds would never ultimately be put in place, since it would always require a further ground of a grounding fact.

To build up to why I think grounded facts depend on the various grounding facts that underwrite their being grounded, it will be useful to have the notion of a **stepwise path**:

> **Stepwise Path**: For any grounding fact *F*, let a **stepwise path** be a sequence of facts G_1, G_2, . . . that aren't grounding facts such that G_1 grounds *F*, G_2 grounds that G_1 *grounds F*, . . ., and where an **empty** stepwise path consists in *F* being ungrounded.[4]

Setting aside overdetermination here and throughout, I claim that a grounded element depends not just on its grounds but on any ground G_n featuring in its stepwise path. We can thus distinguish between **grounding dependence** and **connection dependence**. *Grounding dependence* is dependence on grounds. *Connection dependence* is dependence on the grounds of the grounding facts in the stepwise path.

Why is connection dependence a genuine form of dependence? Suppose the following is the case: *A grounds B*, where *C* grounds that *A grounds B*. Then, *B* doesn't only depend on *A*. Instead, it also depends on *C*, because *A* only generates *B* given *C*. If there were no *C* to put *A grounds B* in place, then even if there were *A* there would be no *B*, since *A* wouldn't generate *B* because it wouldn't

3. If causation is genuine explanatory relation, then it falls to the same requirement, so there cannot be an infinite regress of causing of causation, contra David Kovacs (2022). But if causation is instead just a loose abstraction from the more joint-carving nomic facts involving fundamental laws, then it may not fall under the same requirement. Hence, I focus on evolution via the fundamental laws of nature.

4. If there are more than countably many groundings of grounding facts we would need to generalize the notion of a stepwise path, but the gist would remain the same.

be the case that *A grounds B*. For example, if a collection of particles ground the composite whole of those particles only via a composition operation grounding this grounding fact, then if, perhaps counterpossibly, there were no composition operation then those particles would not ground that whole, because there would be no composition. Or if a set is only grounded from some elements given a set-building operation, then if, perhaps counterpossibly, there were no set-building operation then those elements would not generate a set because there would be no set formation. For a more contentious example, if a particular sculptor's statue-directed intention grounds that this particular shaped clay grounds that particular statue, then if there were no such artistic intention, then a duplicate of the clay would not ground a statue. Even if *C* = *A*, it would still be the case that *B* depends on various *instances* of *A* playing different grounding roles. *B* would depend not just on the instance of *A* that appears in *A grounds B*. But also on the second occurrence of *A* that appears in *A grounds that A grounds B*. In this case, *A* needs to do work twice, first in grounding that it grounds *B* and then in grounding *B*.

Similar reasoning applies at each step in the stepwise path. If *D* grounds that *C grounds A grounds B*, then if there were no *D*, then even if there were *C* and *A*, then there would be no *B* because *C* would not generate that *A grounds B*, and so *A* would not generate *B*.[5] And so on for each ground in the stepwise grounding path. Thus, connection dependence is a genuine form of dependence. *B* needs *C* in order to come about, and it also needs *D* in order to come about, and so on down the stepwise path. So *B* metaphysically requires each ground in its stepwise grounding path.

Moreover, assume for the moment that there is no fact-regress, so there is a terminating point of the stepwise path: *X* grounds that . . . *D grounds that C grounds A grounds B*. Then, *X* obtaining helps determines that *B* obtains, since *X* initiates a chain of grounding facts all the way up the stepwise path until reaching *A grounds B*, which, if each ground within the chain obtains, ensures that *B* comes about. Thus, *X* along with all the other grounds in the stepwise path metaphysically suffice for *B*, and so initiating a chain of stepwise grounding—initiating a chain of connection dependence—is a type of metaphysical determination. And setting aside overdetermination, dependence is the converse of determination, so connection dependence is a genuine form of dependence.[6]

But this means that the fact regress is bad for the same reason that a violation of well-foundedness is bad. Violating well-foundedness is vicious, because there might then be no stopping point—no point from which what's grounded

5. For discussion of the link between grounding and counterfactuals, see Alastair Wilson (2018) and Jonathan Schaffer (2016)—though they are focused on grounds of the grounded and not grounds of the grounding facts.

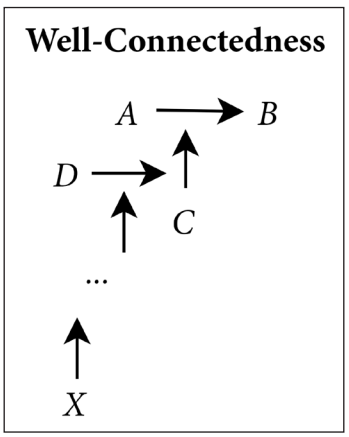
6. I thank an anonymous reviewer for pushing me to say more here.

is able to be ultimately generated from its grounds. Without well-foundedness it could be that each ground would need to be grounded in turn. Yet given the fact regress there can also be no stopping point—no point from which what's grounded is ultimately able to be generated from its grounds. Each grounding fact underwriting this generation needs to be underwritten in turn. As Jonathan Schaffer says in the context of defending well-foundedness, if grounding did not terminate in an ungrounded ground, then "being would be infinitely deferred, never achieved" (2010: 62). But given connection dependence, then the same can be said for an infinite stepwise path of ever more grounding of grounding facts. Even if ground were well-founded, if the grounding of grounding facts had no end, then 'being would be infinitely deferred, never achieved', since there would be no point at which it's ultimately settled that the grounded is generated. It would always need a further ground of a grounding fact. Therefore, if one thinks that violating the well-foundedness of ground is vicious, then one should also think that the fact regress is vicious—given that the grounded depends not just on its grounds but also on the grounds of its grounding facts, and, more generally, on the grounds in its entire stepwise path of grounding facts.

Therefore, I uphold what can be called **well-connectedness**:

> **Well-connectedness:** Every path of grounding of grounding facts terminates in an ungrounded grounding fact: each grounding fact has some stepwise path to an ungrounded grounding fact.

This blocks the fact regress from arising, because there are no never-ending paths of grounding of grounding facts:



At one limit, this allows that the path consists just of a single ungrounded grounding fact. At the other, this allows that there are an infinity of ground-

ing of grounding facts such that the infinite series terminates in an ungrounded grounding fact. By contrast, the fact regress never ends.

To be clear, there's nothing *incoherent* about the fact regress or violations of well-connectedness in general. Just like there is nothing *incoherent* about violations of well-foundedness in general and for ground. When it comes to well-foundedness, the issue with violations has to do with the supposition that reality has a bottom layer, which is presumably not a logical truth. Likewise, violating well-connectedness does not fall afoul of any purely logical constraint, but, rather, a metaphysical one.[7]

Let's return to the core motivation behind completeness, which is the thought that the fundamental entirely accounts for the non-fundamental. There are two ways to cash this out. One way is as a necessity claim, and the other is as a sufficiency claim. The necessity claim is that the non-fundamental *requires* the fundamental. As Ted Sider puts it:

> The fundamental must in some sense be responsible for everything. . . . It would be a nonstarter to say that the fundamental consists solely of one electron: thus conceived the fundamental could not account for the vast complexity of the world we experience. (2011: 105)

This understanding imposes the requirement that each grounded fact must ground out in an ungrounded fact. The fact-regress abides by this constraint, since it still allows that there is no ungrounded non-fundamental fact.

But there is a flip-side to completeness, which is that the fundamental is *enough* for the non-fundamental. Jonathan Schaffer hints at such a conception when he says, "the basic entities must be complete, in the sense of providing a blueprint for reality" (2010: 39). And Karen Bennett states that "the set of the *xx*s is (or the *xx*s plurally are, or a non-set-like *x* is) complete at a world *w* just in case its members build (. . .) everything else at *w*" (2017: 109). Likewise, L. A. Paul says that "the fundamental structure concerns . . . the constituents from which everything else is constructed" (2012: 221). Elizabeth Barnes appeals to "the familiar theological metaphor: the fundamental entities are all and only those entities which God needs to create in order to make the world how it is" (2012: 876). And Carrie Jenkins claims that to call something fundamental is to say that it is "that by appeal to which all the rest can be explained" (2013: 212). Likewise, Jessica Wilson states that "it follows from some entities' being fundamental at a world that these entities, individually or together, provide a ground . . . for all the other goings-on at [that] world" (2014: 561).[8] While I don't claim that these

7. I thank two anonymous reviewers for pushing me to say more here.
8. For discussion, see Bennett (2017: 107–8).

metaphysicians explicitly had in mind the sufficiency claim, I do think it is part of the intuitive conception of completeness: the fundamental is all that's needed for the non-fundamental. The fundamental, unto itself, generates all of the non-fundamental. As I'll put it, for any bit of non-fundamental reality there must be some portion of fundamental reality that is *sufficient unto itself* to produce that bit of non-fundamental reality.

But here's the rub. If it were the case that grounding facts always needed to be grounded, then the fundamental would not be sufficient unto itself for the non-fundamental. Recall that connection dependence is a genuine form of dependence. Say that *C* grounds that *A grounds B*. Setting aside overdetermination, this means that without *C* even if *A* obtains then *B* does not obtain. So *B* depends on *C*. Without *C* there's no *B*. So, then, when a grounding fact needs to be grounded then the ground is not sufficient unto itself to produce the grounded. This is because it requires a further ground to ground that whole grounding fact in order to produce what's grounded. So if *A grounds B* is non-fundamental, then *A* is not sufficient unto itself to produce *B*—even if *A* itself is fundamental. But, then, if grounding were always grounded, then *B* would depend on each ground in the stepwise path: it would depend on *D* when *D* grounds that *C grounds that A grounds B*, and so on. So if the fact regress held, then, there would be no part of the fundamental that's *enough* for a given bit of the non-fundamental. Pick any collection of fundamental facts you'd like. They are never enough to deliver *B*, because they always require a *further fact* of a grounding of a grounding fact. Thus, none of these facts are sufficient unto themselves for *B*, since *B* always connection depends on a further fact.

What about overdetermination? Does this undermine the claim that the non-fundamental needs to depend on a given portion of fundamental reality? There are two senses of overdetermination. It could be that *B* is fully grounded in two or more distinct collections of grounds. In this case, if the fact regress held then each of these different grounding facts—*A grounds B* and *A' grounds B*—would still require a further grounding fact ad infinitum. My above complaint would still apply, because, again, there is no part of the fundamental that is sufficient unto itself for *B*. Another sense of overdetermination is that it could be that *A grounds B* is itself fully grounded in two or more distinct collections of grounds. If so, then given the fact regress it's still the case that *B* depends on there being *some* grounding of *some* grounding fact by which its grounded—*A grounds B* requires some fact *G* such that *G* grounds *A grounds B*, even if there turn out to be multiple of them. But, then, there still is no collection of fundamental facts that is unto itself sufficient for *B*, since each fact about the grounding of *A grounds B* must be grounded in turn. And so on down the regress. Thus, even if there is overdetermination of *B* via distinct paths of stepwise grounding, there still needs to be some part of fundamental reality that is sufficient unto itself for gen-

erating *B*. Even if there are *multiple* parts of fundamental reality sufficient for *B*, there still needs to be *at least one*. But the fact regress precludes even this, because anything that produces *B* is not sufficient unto itself, since either its grounding *B* or its grounding the grounding of *B* would itself need to be grounded in turn.

What about the infinite series of facts? Could it be that the entire incomplete infinity of grounding facts: $A \longrightarrow B$, $C \longrightarrow [A \longrightarrow B]$, $D \longrightarrow [C \longrightarrow [A \longrightarrow B]]$, . . . is sufficient unto itself for B? No. Call this infinite collection of facts *I*. If *I* were sufficient unto itself for *B*, then either *I* would ground *B* or *B* would connection depend on *I*. But *B* isn't grounded in *I*. It's grounded in *A*. And *B* doesn't connection depend on *I*. If it did, then *I* would at some point have to be the *X* in $X \longrightarrow [\ldots D \longrightarrow [C \longrightarrow [A \longrightarrow B]] \ldots]$. But, then, given the fact regress, this fact would in turn be grounded and so would actually be part of *I* and not *I* itself. So, then, *B* can't connection depend on *I* as a whole. Therefore, even if in some sense *I* were a well-defined part of fundamental reality, *B* wouldn't depend on it in the relevant way.[9]

Indeed, I'm open to a completed infinity of grounding facts: $A \longrightarrow B$, $C \longrightarrow [A \longrightarrow B]$, $D \longrightarrow [C \longrightarrow [A \longrightarrow B]]$, . . . , $X \longrightarrow [\ldots D \longrightarrow [C \longrightarrow [A \longrightarrow B]] \ldots]$, where each ground is fundamental and the chain terminates in $X \longrightarrow [\ldots D \longrightarrow [C \longrightarrow [A \longrightarrow B]] \ldots]$. Here there is a collection of fundamental facts that's sufficient unto itself for *B*, namely *X*, . . . *D*, *C*, *A* and $X \dashrightarrow [\ldots D \dashrightarrow [C \dashrightarrow [A \dashrightarrow B]] \ldots]$.[10] Even if *X*, . . . *D*, *C*, *A* is a collection of infinitely many fundamental facts and $X \dashrightarrow [\ldots D \dashrightarrow [C \dashrightarrow [A \dashrightarrow B]] \ldots]$ is an infinitely complex fundamental fact in mentioning an infinity of grounding facts, the two together still form a collection of fundamental facts that is sufficient unto itself to produce *B*. There is some 'place' in the fundamental, so to speak, that by itself generates *B*. The fact regress, however, would preclude there being such facts.

Therefore, I think the sufficiency part of completeness includes the requirement that for any non-fundamental fact there is a collection of fundamental facts such that the non-fundamental fact is grounded in some of those fundamental facts and either that grounding fact is fundamental or some of the facts in that collection initiate a chain of grounding of grounding facts leading to the non-fundamental fact. Roughly put, there must be some 'complete' part of fundamental reality that is sufficient unto itself for each bit of non-fundamental reality. The fact regress falls afoul of this understanding of com-

9. Not that there is anything wrong with incomplete infinities and grounding in general. The grounding of conjunction leads to an incomplete infinity: $A \longrightarrow A \wedge A$, $A \wedge A \longrightarrow (A \wedge A) \wedge (A \wedge A)$, ... But say there is a general grounding principle for conjunctions '$\Longrightarrow_{\wedge}$', then *A* and this principle are unto themselves sufficient for all of it.

10. The reason I included '. . . *D*, *C*, *A*' is that I'm inclined to think grounds of grounding facts needn't include the grounds within those grounding facts. To my mind, the ground of the fact that the shaped clay grounds the statue is the artist's intention, not the artist's intention plus the shaped clay. I discuss this more later in the paper.

pleteness since it generates an incomplete infinity of grounding of grounding facts. So I hold that the fact regress is vicious. Not as a logical matter, but as a metaphysical one.

Against this claim, Karen Bennett (2017: 198; 2011: 34; see also deRosset 2013: 262) holds that the fact regress is harmless, at least when it comes to her view that the grounds ground the grounding facts. Bennett appeals to an analogy with the **truth regress**: a fact *P* makes '*P*' true, and *P* also makes ''*P*' is true' true, and so on. Here, there are an infinity of true propositions that are all ultimately made true by *P*, so there is nothing vicious about this infinite generation. This is an 'upward' generation of an infinite number of facts, where each new fact is generated by the prior fact. Yet, this is analogous not to the fact regress but to a regress involving a well-founded but infinite chain of grounding. So if you take conjunctions to be grounded in their conjuncts, then it's akin to the conjunction regress that *P* grounds $P \wedge P$, and $P \wedge P$ grounds $(P \wedge P) \wedge P$, and so on forever. This regress certainly isn't vicious, since it's an 'upward' creation of an infinity of facts from a single base.

But the fact regress is more analogous to what we can call the **truthmaking regress**: '*P*' is made true by *P*, but that's only because ''*P*' is made true by *P*' is made true by *P*, but that's only because '''*P*' is made true by *P*' is made true by *P*' is made true by *P*, and so on forever. The crucial aspect is that each occurrence of truthmaking only does its truthmaking work by being a further truth that is itself in need of truthmaking. It's not a harmless 'upward' regress of each *new* fact being generated by *earlier* facts, but rather a regress of *earlier* facts needing to be generated by *new* facts. Unlike the truth regress, the truthmaking regress is vicious. While there is an extra-representational fact *P* that makes true all the relevant propositions, there is no ultimate truthmaking of these propositions from *P*, since these are understood just as more truths in need of truthmaking. So there is no point at which truth ultimately becomes tethered to non-representational reality. Vicious!

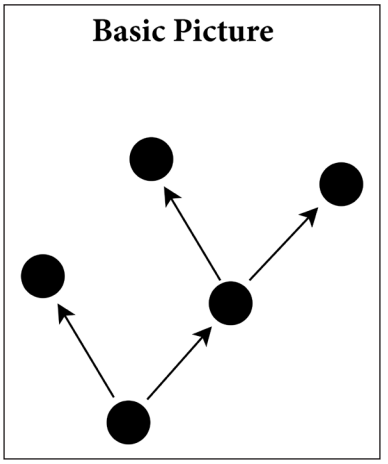
Therefore, it's worth exploring whether there's a way to reject the fact regress by holding that some grounding facts aren't grounded such that each grounded fact has a path of grounding of grounding facts that terminates in an ungrounded grounding fact. However, the problem with rejecting the fact regress is that purity and completeness are each overwhelmingly plausible, and together they seem to entail the regress. What to do? Simple. . .ish. Satisfy purity and completeness in a way that doesn't require that all grounding facts must be grounded. In the rest of the paper, I show the way. I offer a new interpretation of purity that allows for some grounding facts to be ungrounded, where completeness and this form of purity don't entail the fact regress. I then develop a

novel account of what underwrites the grounding facts. Even if you deny—as you shouldn't—that the fact regress is vicious, this more parsimonious picture is attractive in itself and thus worth developing.

3. Purity Revisited

Grounding is a relation of **relative fundamentality**. When *A* grounds *B*, then *A* is *more* fundamental than *B*, and *B* is *less* fundamental than *A*. We can use this notion of relative fundamentality to define notions of absolute fundamentality and non-fundamentality: *A* is absolutely fundamental if and only if it's not grounded, and *B* is absolutely non-fundamental if and only if it's grounded.

The basic thought is that grounding determines the hierarchical structure of reality, so that there are grounding paths from the fundamental to each grounded fact. Grounding is what determines being 'lower' or 'higher' in the hierarchy, and what's absolutely fundamental is what's lowest and what's non-fundamental is what's not. In picture think, reality has a tree-like structure, where there are basic and derivative **nodes** such that grounding forms **links** between them.



The bottom nodes are fundamental and ungrounded, while the higher nodes are non-fundamental and grounded.

The pull of the fact regress stems from the combination of purity and completeness. As formulated, they apply to both links and nodes:

Purity: Ungrounded facts cannot contain any grounded facts.

Completeness: The ungrounded facts generate all the grounded facts.

Together they seem to ban fundamental grounding facts, because grounding facts apparently have grounded constituents and so by purity would seem to not be fundamental and thus by completeness would have to be grounded. My contention is that the proper understanding of purity allows for fundamental grounding facts. The crux is offering the relevant construal of 'contain'.

Let's return to the purpose of purity. As Sider characterizes the principle:

> . . . *fundamental truths involve only fundamental notions*. When God was creating the world, she was not required to think in terms of nonfundamental notions like city, smile, or candy. (2011: 106)

> Suppose someone claimed that even though cityhood is a nonfundamental notion, in order to tell the complete story of the world there is no way to avoid bringing in the notion of a city—certain facts involving cityhood are rock-bottom. This is the sort of view that purity says we should reject. (2011: 107)

Here's his motivation for it:

> My argument has been simply that the fundamental story of the world ought not to mention cityhood at all . . . "When God created the world, she did not need to use 'city'." (2011: 109)

While Sider himself uses purity to argue against fundamental grounding facts, since they 'mention' grounded elements of reality, I think the proper understanding of purity allows for a fundamental fact to *mention* non-fundamental facts so long as it doesn't *contain* them. Let me explain.

Recall the distinction between *factive* and *non-factive* grounding: *A* non-factively grounds *B* when it's the case that *were A* to come about then it would generate *B*, which allows for *A* to non-factively ground *B* even when neither is the case.[11] Were Congress to pass legislation making wearing red ascots illegal, then this would ground its being illegal to wear red ascots. But Congress has not, and probably never will, pass such legislation. So it's a fact that Congress passing legislation making wearing red ascots illegal non-factively grounds that wearing them is illegal. But neither of these facts that the grounding fact mentions obtain. But the same applies to non-factive grounding facts that happen to mention facts that do obtain. The United States Congress did in fact pass a law imposing a debt ceiling, which grounds that there is in fact a debt ceiling. But these facts are not *contained* in the non-factive grounding fact that Congress passing a law creating

11. I thank an anonymous reviewer for suggesting that I develop this response further.

a debt ceiling non-factively grounds that there is a debt ceiling. Because that grounding fact was around prior to the passage of the law, and could still obtain even if the law was never actually passed.

Thus, in a legitimate sense the fact *A non-factively grounds B* doesn't 'contain' either *A* or *B*, since it can obtain without either of them obtaining. While it 'mentions' those facts in some way, it doesn't have them as constituents in a more literal sense. But this more literal sense is what's needed to raise trouble for fundamental grounding facts on the basis of purity, because being mentioned doesn't mean you're actually there. So a fundamental fact can mention a non-fundamental fact, without that non-fundamental fact being part of it—indeed, without it obtaining at all! Thus, if fundamental grounding facts 'mention' the non-fundamental without 'containing' them, then these fundamental facts are still pure of the non-fundamental. There are no non-fundamental facts running around in the fundamental realm. Therefore, non-factive fundamental grounding facts are compatible with purity properly understood. And, as I said earlier, I hold that non-factive grounding is the core notion of grounding. Factive grounding just is the combination of non-factive grounding plus the obtaining of the grounds.

If grounding and purity are understood in this way, then purity and completeness don't entail the fact regress since they allow that grounding facts can be ungrounded. Grounding facts mention ungrounded grounding facts, but they don't contain them and so don't fall afoul of purity. Hence, purity and completeness are compatible with well-connectedness:

> **Well-connectedness:** Every path of grounding of grounding facts terminates in an ungrounded grounding fact: each grounding fact has some stepwise path to an ungrounded grounding fact.

But, as I mentioned above, well-connectedness blocks the fact regress. Take a fact. It's either ungrounded or grounded. If it's grounded, then there is a grounding fact about this. Either this grounding fact is already ungrounded, or by well-connectedness the chain of grounding of grounding facts it initiates terminates in an ungrounded grounding fact. Yet, by the new interpretation of purity, there is no problem with a grounding fact being ungrounded.

Is there some independent motivation for interpreting purity to be consistent with fundamental grounding facts? Yes, in that there is independent motivation for taking non-factive grounding to be the core notion of grounding (Fine 2012). And, Yes, in that there is independent motivation for taking some grounding facts to be fundamental. As Nick Jones (2012) expresses it:

> Reality's fundamental facts include a specification of how the more fundamental generates the derivative. The method of generation is written

> deep into the foundation of things. And how could it be otherwise? Since all reality arises from the fundamentals, those fundamentals must somehow encode how the derivatives arise. Merely specifying the fundamentals without the method of generation won't suffice: the fundamental particles know nothing of cities and societies. . . . So the method of generation itself must be fundamental, an additional feature of fundamental reality that specifies how the derivatives come to be. (1–2)

My interpretation of purity corresponds to a natural picture of the hierarchical structure of reality. The original understanding of purity—which precludes the fundamental from specifying how the non-fundamental is created—is mistaken precisely in precluding the fundamental from containing the blueprint for how the rest of reality is generated.

As I said, an attractive picture of reality is that it has a tree structure, where the world bottoms out in nodes that have links going out but none coming in and where each node with a link coming in has a path to a bottom-level node. This conception doesn't require that each link itself be linked by further links. That would be to treat every link as a node. And, in fact, this conception *requires* that some links not have any links going into them, because the basic links in the tree aren't nodes. So the motivation for the new interpretation of purity is that we want a conception of relative fundamentality that captures the structure of this basic picture. The original interpretation of purity is too strong in requiring links going into every link. The new interpretation of purity is just right in allowing for the linking of some links to be basic.

The distinction between nodes and links runs deep in much metaphysical thinking. Shamik Dasgupta (2014: 563) appeals to the metaphor of reality as a building with multiple floors, where grounding is the scaffolding between the floors. Boris Kment (2014: 5) and Jonathan Schaffer (2016; 2017: 305) appeal to an analogy with causation, where causes are distinct from the causal laws the mediate their causing the effect and, likewise, grounds are distinct from what mediates their grounding the grounded. Tobias Wilsch (20150a; 2015b) and Martin Glazier (2016) offer a further analogy with the nomological account of explanation, where *explainers* explain the *explained* via an *explanatory connection* similarly to how grounds ground the grounded only given a grounding connection.

The distinction is important because it suggests that purity should be interpretated in a way that allows for basic links. By their nature, links—grounding facts—are Janus-faced in that they face both the more and the less fundamental by forging a connection between them. But the links do not fall *within* the nodes they connect. They lie between them. Hence, they do not bring non-fundamental nodes inside of fundamental reality. The best interpretation of purity is that it

involves the requirement that the lowest-level of reality be separated from the levels it helps produce, and so it should be seen as part of a more general requirement that the levels of reality be cleanly separated. But ungrounded grounding facts abide by this understanding of purity. Indeed, grounding facts are precisely what separates the levels of reality, where levels are understood as forming a partial order. A grounding link between two nodes ensures a clean separation between different hierarchical aspects of reality, because it separates the two nodes it connects while being separate from both. As for *ungrounded* grounding facts, these are links without any links coming into them. Thus, all by themselves, ungrounded links serve to separate the aspects of reality in their vicinity. Taking purity to be part of the principle that reality's levels are cleanly separated, there is no need to preclude grounding facts from sometimes being fundamental. Therefore, I hold that grounding is well-connected in that each grounded fact must have a path of grounding of grounding facts that ends in an ungrounded grounding fact.

Taking there to be ungrounded grounding facts doesn't violate completeness and purity, once they are properly understood. But are there other difficulties?

It's a common thesis that what's fundamental is freely modally recombinable (Schaffer 2010). Thus, if grounding is fundamental, then there's a world that retains all the *rest* of the fundamental facts but where there is no grounding and so no derivative facts at all (Bennett 2011: 27; 2017: 214–24). There could be fundamental particles and spacetime arranged just as in the actual world yet lacking any tables or cats or people. So even setting aside purity and completeness, there might seem to be a problem with taking grounding to sometimes be ungrounded.

There are a few avenues of response. First, I could simply take flatworlds to be metaphysically possible, though I'm wary of taking this route. Second, I could hold that they are conceptually possible, even if not metaphysically possible—so free-modal recombination does not apply to metaphysically necessary fundamental grounding relations but only to fundamental non-grounding facts.[12] Third, I could more generally deny that what's fundamental is always freely recombinable. I'm inclined to take this last route, because it's hard to see the justification for the free modal recombination of the fundamental, aside from a contentious suspicion of necessary connections (Wang 2016). Moreover, there are a plethora of apparent counterexamples. Say that spacetime and quarks are both fundamental. The having of the property of *being a quark* by some object modally requires the having of *being a spacetime point* by some object. Quarks cannot be around without spacetime to be around in. So the fact that there exists some quark is not freely recombinable with the fact that there exists some space-

12. Compare Jonathan Schaffer's distinction between fundamental grounds and metaphysically necessary laws of metaphysics, where only the former are metaphysically freely recombinable (2017).

time point. Or take two fundamental facts with a shared fundamental constituent (Wang 2016: 403). Say that it's fundamental that Sparky is an electron, and say that it's also fundamental that Sparky exists. These fundamental facts aren't freely recombinable. Sparky can't be an electron without existing. Finally, consider necessary fundamental facts. Say that mathematical facts are necessary, and that some of them are fundamental. Then they are not freely recombinable with each other. Nor is any other fundamental fact freely recombinable with any fundamental and necessary mathematical fact. Therefore, we should reject the free modal recombinability of the fundamental, so that fundamental grounding facts sometimes have necessary connections to fundamental grounds.

Does this leave grounding a hodgepodge of brute grounding facts? Aside from the illicit motivation stemming from the fact regress, metaphysical principles are motivated by the need to capture *patterns* in grounding facts (Dasgupta 2014: 569–70; 2019; Schaffer 2017: 307; Glazier 2016: 23; Wilsch 2015a: 3297; 2015b: 5). There aren't just one-off grounding facts of the form *Pa grounds Qb,* but there are universal generalizations like *Px grounds Qy* for all individuals x and y.[13] Allowing for fundamental grounding facts might seem to remove the ability to account for such patterns.

However, in response, I claim that the proponent of fundamental grounding facts can appeal to metaphysical principles to capture such patterns. To start, I don't hold that *all* grounding is ungrounded.[14] It's plausible to me that akin to special science laws there are **special laws of metaphysics** in the sense of grounded links between grounds and grounded. For example, take the fact that a building is over six-stories tall grounds its being illegal, where this grounding itself depends on the law in the jurisdiction that buildings can't be more than five-stories. Or take the fact that Congress passed a bill that declares murder is illegal, where this grounding itself depends on our socially accepting that Congress has legal authority. These grounding facts aren't ungrounded, since they are put in place by further facts, such as those about how we set up our political institutions.[15]

13. Actually, I'm fine with *some* metaphysical principles mediating highly specific grounding facts—these would be some of the special laws of metaphysics discussed below. But many metaphysical principles are more generic.

14. Contrary to Nick Jones (2012).

15. For the first example, see Gideon Rosen (2017: 285–86). For the second, see Brian Epstein (2015: ch. 6). Though neither claim, as I do, that the fact about the collective agreement would *ground* the grounding fact. Rosen's motivation for this interpretation is that grounds are usually thought to necessitate what they ground (Rosen 2010: 118). Against this, I think it's more natural to hold that the law is what links the ground to the grounded. More generally, making the links further grounds seems to remove the linky-ness of the links. While I thus deny the standard construal of necessitation, I hold the nearby principle that the grounds in combination with all the grounds in the stepwise path necessitate the grounded.

For ungrounded grounding facts, I hold that we can capture patterns by reworking the law-based approach. A simple amendment would just hold that laws mediate grounding, where not all grounding facts are grounded so that it could be that $A \longrightarrow B$ is mediated by L without $A \longrightarrow B$ being grounded. However, I think a more parsimonious view can do without 'mediation' entirely. The basic idea is that various laws of metaphysics just are various grounding relations, where we understand laws to be generative relations between facts. Perhaps there are fundamental laws corresponding to the operation of building sets from members, or composing objects from other objects, or making conjunctive facts from other facts. Let '$\Longrightarrow$' stand for such a law, then there might be a set-building law $\Longrightarrow_{\{\ldots\}}$, a composition law $\Longrightarrow_{C}$, and a conjunction formation law $\Longrightarrow_{\wedge}$. So *A non-factively grounds B* just is the fact that there is some law such that $A \Longrightarrow B$. And *A factively grounds B* just in case *A* and there is some law such that $A \Longrightarrow B$.[16] So what I've been calling an 'ungrounded grounded fact' would actually be an ungrounded instance of a law of metaphysics. Special laws of metaphysics would then be laws whose application is grounded via other laws of metaphysics.

On what we can call the **grounding as laws** approach, there are ungrounded laws of metaphysics in that their operation on grounds to generate the grounded is not itself grounded. Nevertheless, they are compatible with well-connectedness as well as both completeness and purity once properly understood. They are ungrounded grounding facts, but this is fine on the new interpretation of purity. And their being ungrounded doesn't violate the well-connectedness of grounding, since by being ungrounded they terminate their own chain of grounding. In addition, they include ungrounded links serving to connect basic to derivative nodes in the connected tree of reality, so completeness is satisfied. Grounded grounding facts come in the form of special laws of metaphysics, whose operation is grounded via other laws until ultimately reaching an ungrounded application of a basic law. Therefore, reality is both pure and complete, yet not all grounding facts are grounded.

Acknowledgments

For their progressive help on progressive versions of this paper, I thank Karen Bennett, Jonathan Schaffer, and Ted Sider. I would also like to thank Nick Jones, Alex Roberts, and Ezra Rubenstein for feedback. And let us not forget the two anonymous reviewers for this journal who offered insightful comments.

16. So when *X* factively grounds the grounding fact *A* grounds *B*, then it first and foremost grounds that *A* non-factively grounds *B*.

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