this conversation" is true in a strong and non-pragmatic sense. And what is this if not a moral judgment? Furthermore, one cannot but wonder whether his methodological proposal for fostering progress presupposes an overly rationalist view of the phenomenon, underestimating the importance of volitional obstacles, rather than cognitive ones, that it must overcome. After all, many people in many circumstances know what would be morally right to do, but this is often insufficient to motivate them to do it. How can the ideal conversation (or some institutional embodiment of it) address this problem? Kitcher, as I have said, leaves these and other questions unanswered.

Nevertheless, for the clarity and the degree of detail with which it is articulated, his contribution remains a highly recommended read for anyone interested in the theme of moral progress.

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McKenzie, Kerry, *Fundamentality and Grounding*.
Cambridge: Cambridge University Press, 2022, pp. 74.

Fundamentality and Grounding is an academic publication that stands out in the landscape of contemporary metaphysics. Its general intent is to assess some of the central issues that arise around the widely debated notion of "grounding", according to a naturalistic methodological viewpoint proper to the metaphysics of science. Such methodology aims at understanding what is possible to "import" from science to "update" or "inform" metaphysics and how to implement this task. Specifically, three issues are considered:

- What are the relationships between the notions of fundamentality and grounding?
- Is the notion of grounding used in the various philosophical discussions ambiguous? In other words, are there substantially different types of grounding?
- Should we exclude the possibility of infinite regress in the order of grounding?

McKenzie is clear from the outset in stating that the concepts of fundamentality and grounding are intimately linked. As it shall be clear, she regards "grounding" as a "level connecting explanation" (8) among facts or entities belonging to different metaphysical categories. Grounding bears interesting relationships to the notion of ontological priority, which is undoubtedly the most common way of thinking about fundamentality: *x* is fundamental if there is no *y* ontologically prioritized over *x*. The interest in grounding is motivated by its close connection with the concept of fundamentality, so conceived. The reason for this interest, McKenzie explains, arises from the fact that fundamentality plays a key role in the way metaphysics is often understood, namely, as the study of the fundamental.

In what follows, I critically review Chapters 2, 3, and 4 of *Fundamentality and Grounding*, the stated purpose of which is to naturalize the metaphysics of grounding, grounding being a relation often relegated to a priori metaphysical analysis

only. By naturalization, in this case, McKenzie means the reevaluation of some important features commonly attributed to the notion of grounding in light of what science, in the present case, physics, says. Two positions characterize McKenzie's philosophical stance. They emerge clearly in the third and fourth chapters:

- grounding is not a single relation, but various relations of grounding must be recognized;
- in science, infinite explanatory regressions, often deemed vicious by metaphysics, are permitted. Consequently, grounding relations, closely tied to the concept of metaphysical explanation, can be involved in such regressions without concern (as metaphysics must heed the insights from science.).

The second chapter is aimed at identifying how grounding should be understood. This task is particularly challenging due to the high complexity and multitude of positions expressed regarding this notion. Philosophers have tried to make sense of the following ideas:

- the world possesses a gradually *stratified* structure;
- such stratification obtains in virtue of the *explanatory determination* of one level over another;
- there exists a fundamental, i.e., ontologically prioritized level, which *explanatory determines* the others.

Capturing the specifics of such a determination required the introduction of a new notion, that of grounding, and the reasons behind this necessity are the following:

- causation is not the relationship of determination sought. Indeed, the concept of causation connects different temporal moments, while the notion of explanatory determination must be capable of establishing a hierarchy between levels (e.g., Schaffer 2012)[1];
- modal notions are inadequate to capture explanatory notions, such as that of explanatory determination (e.g., Sider 2020)[2];
- the notion of determination has quite different characteristics from those of ontological dependence, not the least of which is that it entertains a different relation to the notion of priority: to say that *x* depends, at least in part, ontologically on *y* implies that y has priority over *x*. If *x* depends on *y*, however, the existence of *x* also implies in a metaphysically necessary way that of *y*. From a standpoint of determination, therefore, *x* is prioritized over *y*.

The notion of grounding often appeals to the notion of *metaphysical explanation*. Remarkably, the "grounding school" divides into two main families, the unionist and the separatist. Unionists claim that the grounding relation coincides exactly with the metaphysical explanation, while separatists do not. The separatists claim that grounding relations are what *justify* or what *underly* explanations. There appears to be a good reason to avoid treating the notion of metaphysical explanation according to a single notion. In fact, a unifying approach runs the risk of slipping into unclear theoretical involutions. Among them, for example, one can find such questions as "what is the grounding of the notion of grounding?" According to

[1] Schaffer, J. 2012, "Grounding, Transitivity, and Contrastivity", in F. Correia and B. Schnieder (ed.), *Metaphysical Grounding: Understanding the Structure of Reality*, Cambridge University Press, 122-138.
[2] Sider, T. 2020, "Ground Grounded", *Philosophical* Studies, 177 (3), 747-767.

Wilson (2014)[3] and Koslicki (2015),[4] these envelopments of the notion of grounding have been dictated by an abuse of the a priori metaphysics approach, which seems to self-generate problems for itself, to the detriment of their relevance. The author's view looks favorably on the vision of a separatist grounding approach and argues that there are theoretical resources in elementary physics that push for such an approach, which she sets out to defend in the book.

In the third chapter McKenzie specifies how grounding can be understood as a *connector of levels*. After all, the author argues, there are two ways of connecting levels (and I believe this constitutes this book's major contribution to the existing literature on grounding). The first way connects levels belonging to the same category, which can be, for example, the category of physical objects, physical properties, physical laws, and so on. The second way, on the other hand, is to understand grounding as a connector between transcategorical levels, that is, as a connector of different categories. For McKenzie, the distinction between these two kinds of "connection between levels" is well founded in that it refers to two different kinds of metaphysical explanations. Levels that are connected by remaining within the same category are called "levels of nature" by McKenzie. In contrast, levels of the second kind, that is, levels between different categories, are called "levels of metaphysics".

As an example, within the category of "objects", it is possible to recognize the level of ordinary objects and the level of subatomic objects such as protons or electrons. Following McKenzie's analysis, these two levels are levels of science. The distinction between these two levels within the same category is attributed, according to McKenzie, to the recognition of a priority status of subatomic entities over ordinary ones. Such recognition pertains to the science. The category of "objects" is just one of the categories that one can introduce. Alongside it, it is possible to admit the existence of the categories of properties or even physical laws. Now, these different categories represent the various levels of metaphysics, and the priority relations among them belong to metaphysics and are obtained through the grounding relations between the different categories.

The distinction McKenzie outlines thus raises the following question: what relationship exists between the levels of science and the levels of metaphysics? Given the different relationships in each hierarchy, these questions have no obvious answers. Nonetheless, if one thing becomes clear from McKenzie's analysis, it is that to speak of "stratified" metaphysics acquires a specific meaning, since, as it turns out, one is faced with two different hierarchies, on the one hand that of the levels of nature and on the other that of the levels of metaphysics. By appealing to the Humean mosaic, McKenzie contends it is not possible to examine the levels of nature based on those of metaphysics and vice versa. The moral to be drawn from this, according to McKenzie, is that there are two notions of fundamentality, and thus priority, that are not inter-reducible. One is faced with a pluralist thesis about priority that favors a very specific insight: the levels of nature and those of metaphysics establish two different dimensions of priority. The hierarchical direction of the levels of nature is thus essentially different from the hierarchical direction of the levels of metaphysics. This "multi-dimensionality" aspect has, in the

[3] Wilson, J.M. 2014, "No Work for a Theory of Grounding", *Inquiry: An Interdisciplinary Journal of Philosophy*, 57 (5-6), 535-579.
[4] Koslicki, K. 2015, "The Coarse-Grainedness of Grounding", *Oxford Studies in Metaphysics*, 9, 306-344.

author's view, been seldom the subject of philosophical debate and, indeed, often overlooked. Indeed, a considerable number of philosophers have often argued that the levels of metaphysics go deeper than the levels of physics as "metaphysics 'takes things a level deeper' than physics" (33). However, such a comparison implies a certain degree of commensurability between the two types of levels, which McKenzie excludes on the strength of her analysis. Ultimately, through the plurality of priority relations, one must recognize a plurality of relations of metaphysical explanation. Since grounding and metaphysical explanation are closely related (and often even identified), McKenzie's argument thus far reveals direct implications for the supposed "unity" of grounding.

In chapter four, McKenzie addresses the following question: is the grounding relationship well-founded? That is, must every grounding sequence (or chain) end at some point, a thesis known as foundationalism? If so the existence of every non-foundational entity is grounded in a set of foundational entities. McKenzie believes that discussing the foundationalism of grounding is important, if only to understand whether the definition of metaphysics as the study of the fundamental is, for all intents and purposes, acceptable. How should we characterize metaphysics in case a fundamental level doesn't exist? McKenzie argues that foundationalism is a thesis assumed almost at the axiomatic level, or at the level of metaphysical law, supported often more by mere intuition than by actual philosophical justification. McKenzie asks the following questions:

- what are the criteria for determining that a regression to infinity is vicious?
- do regressions to infinity of a sequence of grounding relations satisfy such criteria?
- does satisfying such criteria mean incurring some kind of metaphysical contradiction?

There are two theses that McKenzie proposes about the last questions:

1. first, there is no reason to think that an infinite sequence of grounding relations must necessarily be vicious;
2. second, it is argued that a form of "viciousness" is present in every regress to infinity known by means of scientific methods.

To justify thesis 1, McKenzie argues that regressions to infinity are not necessarily vicious for grounding. For them to be so, "what explains" (*explanans*) and "what is explained" (*explanandum*) must share the same "form" at each stage of the regress. For McKenzie, the viciousness of an infinite regress emerges as a "function of the explanatory interests" (54) we have along with the degree of abstraction of the *explanandum*. Since the degree of detail in science is highly refined and its aspirations are less abstract, there is no *a priori* reason to argue that infinite regressions don't arise in science. To justify thesis 2, McKenzie argues that even though there is not necessarily form invariance for the metaphysical explanations proposed by science, those involved in infinite chains nevertheless exhibit such uniformity. This is sufficient to label them as vicious. A case-study offered by a physical theory proves that infinite regressions exist in science, but this doesn't imply any form of contradiction. The theory in question is the "S-matrix", popular in the 1960s in high-energy physics. The aspect of interest here is that this theory posits a gunky world, that is, a world in which each object has a proper part. In fact, the S-matrix theory accepts the existence of hadrons and also claims that

each hadron in turn contains hadrons of each type, including additional specimens of its own type. The example offered by the S-matrix theory is illustrative, therefore, of the fact that science presents infinite regressions in which each successive step of the regression is characterized by the same form as the previous step, thus making the regression itself *homogeneous* in form. The case study examined here, McKenzie argues, is only a special case of a phenomenon that occurs within scientific theories: infinite regressions are always vicious. The reason for this derives from the fact that the form scientific explanations take is inevitably constrained by the basic postulates of the relevant theory, containing a certain number of predicates. In the case of infinite explanatory regression, therefore, the general framework and its stock of predicates remain the same even though the structure of determination never ends. Therefore, McKenzie argues, the resulting regressions are flawed in some substantive sense. Ultimately, McKenzie asserts that her analysis points in a very specific direction: foundationalism is false and should be consequently abandoned.

In the last instance, I would like to focus on McKenzie's analysis on foundationalism. Certainly, there are those, such as Schaffer (2010),[5] who have argued that *every grounding chain terminates*. However, this characterization of foundationalism, which McKenzie assumes, doesn't consider the theoretical developments that have taken place in recent years to make foundationalism more precise. There are those who, like Dixon (2016)[6] or Rabin and Rabern (2016),[7] have proposed to characterize foundationalism in terms of maximal grounding chains by requiring that "every maximal grounding chain terminates" (Pearson 2022: 1544),[8] whereby maximality of a grounding chain requires that there is no entity that is not a member of the chain and that partially grounds every member of the chain. But there are also those, such as Pearson 2022, who have proposed to capture the idea of foundationalism by appealing to the notion of inclusive grounding chain: "an inclusive grounding chain is a chain of grounding such that it is not the case that each member of the chain is grounded by a fact or facts that are not members of the chain" (Pearson 2022: 1542). Pearson redefines foundationalism so that "every grounded entity is a member of at least one inclusive full grounding chain and that every inclusive full grounding chain terminates" (Pearson 2022, 1546). It wouldn't be surprising if some of the objections in the naturalistic vein proposed by McKenzie could be resolved by adjusting the adopted definition of foundationalism, which has not been thoroughly investigated and remains formulated only in its most basic definition. If you aim to demonstrate that foundationalism is to be discarded, you must first show that every effort has been made to salvage it, and yet, despite these efforts, the sciences are indicating a wholly different direction. Consequently, the last word has not yet been said about grounding foundationalism, which I believe still enjoys a good reputation amongst philosophers.

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[5] Schaffer, J. 2010, "Monism the Priority of the Whole", *Philosophical Review*, 119, 31-76.
[6] Dixon, S. 2016, "What is the Well-Foundedness of Grounding?", *Mind*, 125, 439-468.
[7] Rabin, G., & Rabern, B. 2016, "Well Founding Grounding Grounding", *Journal of Philosophical Logic*, 45, 349-375.
[8] Pearson, O. 2022, "Grounding, Well-Foundedness, and Terminating Chains", *Philosophia*, 51 (3), 1539-1554.