Einstein's theories of relativity. Janiak gives several reasons for stopping this volume with Kant, 'just before' these exciting developments. One reason is that these developments are intimately connected with the early twentieth century rise of analytic philosophy, and the literature on analytic, twentieth century theories of space is already vast. Understandably, Janiak prefers to contribute to the more modest bodies of literature on earlier theories of space. Another reason is that, as it stands, all the figures covered in the volume agree on some basic ideas, including that geometry is Euclidean, and space and time are separate things. Once these ideas shift, Janiak claims that an 'intellectual boundary' is reached, and the volume aims to stop just before that point (pp. 6–8).

Although I see the sense of this, I argue the volume stops about a hundred years too early. Kant's *Critique of Pure Reason* came out in 1781. János Bolyai and Nikolai Lobachevsky developed non-Euclidean geometries in the 1820s, but their ideas were not widely recognised in mathematics until the 1860s, and many more decades passed before they filtered widely into philosophy. Einstein's special theory of relativity was published later still, in 1905. I would have appreciated a final chapter exploring space in mid (or even late) nineteenth century philosophy, perhaps looking at later German idealisms or British empiricisms. Like the medieval period, the nineteenth century is also neglected by historians of philosophy – certainly in comparison to the seventeenth. An additional chapter would have helped address that neglect, and still squeaked in just before the volume's self-imposed intellectual boundary.

Holes aside, *Space* advances many fascinating theses, raises intriguing interdisciplinary questions, and is well worth reading. I hope it will lead to further far-reaching studies of philosophic space.

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The Metaphysics of Representation by J. Robert G. Williams (Oxford University Press, 2020). doi: 10.1093/oso/9780198850205.001.0001
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Two striking characteristics of Williams' *The Metaphysics of Representation* are the grand-scale nature of the objective and its conciliatory approach. Our perceptions represent a portion of reality. We

form intentions about what to do in this reality, beliefs and desires that represent reality or how we would like reality to be. We use language to express what we think. The objective of the book is to address the foundational question as to how all these representational facts are possible: What grounds the move from a fundamentally representation-less world to a world where there are representational facts? How can we reduce all the representational to the non-representational? The main thesis defended is that representation is a layered, hierarchical affair. In the first layer are the representational facts concerning intentions and perceptions, which are metaphysically prior to and then able to ground the representational facts in a second layer, those concerning thought, beliefs and desires. Then comes the third layer of the representational facts about language, metaphysically grounded in the facts in the other two layers. The book starts midway, with a discussion of the representational facts in the second layer (chapters 1 to 5). Representational facts concerning beliefs, desires, thoughts and concepts (in particular, logical concepts in chapter 2, concepts used in explanations in chapter 3, and moral concepts in chapter 4) are here reduced to representational facts in the first layer, i.e. those concerning intentions and perception. Chapters 6 to 8 go up in the hierarchy and are devoted to representational facts concerning linguistic representation. Finally, chapters 9 and 10 go all the way down in the hierarchy to ground the first layer of the representational facts, i.e. those concerning perceptions and intentions.

Concerning the first layer of intentions and perceptions, Williams, following Dretske, Millikan and in particular Neander, adopts an account in the teleoinformational tradition. The key notions here are *causation* and *functionality* and your perception of a green sphere on the right is a perception having as content *green sphere on the right* because your sensory system has the function, i.e. the ability to respond, or was selected by evolution for responding, to such a state of affairs, a green sphere on the right. A similar story, Williams thinks, is to be told about intentions and your intention of grasping that green sphere on the right is an intention having as content *right-green-sphere-grasping* because your intentional-motor system has the function to produce such content. Representations in the first layer seem sufficiently similar to those of other animals and when we think about this, teleoinformational accounts might be a convincing option: a frog's perception represents *something small, dark, moving* because the perceptual system has the biological function of being produced by something small, dark, moving, function selected by evolution so that the frog can feed itself with flies.

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But the accounts are often considered in trouble when we try to extend them to other representational facts such as those concerning beliefs and desires: arguably, it does not seem, at first, that we can account for the belief that the God of rational theology is omnipotent in terms of the function of our systems of representation to cause or be caused by the content *that the God of rational theology is omnipotent*. This is where the project shows its conciliatory nature, for concerning the other two layers of representation Williams prefers an account in a very different tradition, i.e. the one of the radical interpretationists Quine, Davidson and in particular Lewis. What makes all the representational facts representations and what is respected in Williams' layered account is their aboutness: all of perception, beliefs and language are about something. But what a subject believes and desires is not established by causes and functions, but rather by the *correct interpretation* of the subject. A subject believes something because according to the correct interpretation of the subject they do. The correct interpretation is taken to be the one that best rationalises the subject's dispositions to act in the light of the courses of experience they may undergo. The relevant notion of *rationality* is for Williams a substantive one. It is not merely a matter of having mental states patterned in the right way, as in the Bayesian tradition, where, for example, rationality is in structural constraints such as consistency of the beliefs, no matter what they are. The contents of the attitudes for Williams matter to rationality and the correct interpretation makes subjects as responsive to their evidence as they can be taken to be and it makes them act as closely as possible as to how they ought or is permissible for them to, given their interests and options.

Finally, concerning the third layer of representational facts about language, Williams stays within the interpretationist tradition, and follows in particular Lewis, so that meanings will come out of the best linguistic interpretation. But of course a new key-notion is needed, as the meaning of words is partially a matter of convention. Williams relies on Lewis' account of *convention* and meanings are grounded in the conventional association consisting, for example, in the regularities that speakers utter 'Grass is green' only if they believe *that grass is green*, that if they hear somebody uttering that sentence they will believe *that grass is green*, and that these regularities count as conventions in the linguistic community. The best linguistic interpretation that will provide meanings for all the language will then be the one that optimizes a trade-off between fitting the various conventional associations and its elegance, to be determined

with reference to the conceptual repertoire of speakers of the community.

The conciliatory aspect of the book is primarily in the claim that teleoinformational accounts and radical interpretation are compatible because they concern different representational facts. But there is more conciliation in the book. For example, one might think that radical interpretation is a rival to any other account of concepts, but Williams aims at showing that some other accounts of some concepts are compatible with radical interpretation, which in fact predicts them. For example, radical interpretation is argued to predict an inferentialist account of logical concepts such as *and*, according to which, roughly, what makes it the case that such concepts denote what they do is the fact that they are associated with certain rules of inference. Similarly, for those concepts that are employed by subjects in explanations, radical interpretation is argued to be able to generate another claim in the Lewisian tradition, according to which the reference of a concept such as *green* is to be the one that respects the objective joints in nature, so that *green* denotes green, not, for example, green-when-observed-or-not-green-when-unobserved.

Conciliatory approaches have undisputable merits, they show that the weaknesses of an account can be overcome with the aid of another way of thinking about the matter and they put different traditions into dialogue. But they are, of course, also risky. A convinced defender of one of the traditions Williams relies on might be dissatisfied by seeing a different account adopted in another layer. In particular, those who endorse teleinformational accounts for their naturalism, i.e. their ability to ground representational facts in entities that feature in natural science, i.e. causation and function, might not like the non-naturalistic turn in radical interpretation in terms of interpretation and rationality. Conversely if, with Williams, one is happy to go non-naturalistic, then teleoinformational accounts might sound unappealing, as their main appeal, arguably, is exactly their naturalism. Williams' main aim, though, is not to convince the reader of the truth of each account, but to show that his way is a possible, consistent and genuinely reductive way to tell a story that needs to be told, i.e. the story about the possibility of representation, something that is surely real, out of a fundamentally representation-free world.

It is in light of that being the main aim of the book that other two of its characteristics are to be understood. First, there are two main approaches to a *metaphysics of representation*. The first is the foundational approach of the kind Williams adopts, where the main question is what grounds representation. Within the second

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approach, instead, one is primarily concerned with questions as to what the nature is of those entities involved in representation. For example, what are concepts? What are contents? What are propositions, the contents of propositional attitudes such as beliefs? Although Williams does reach some results about the nature of these entities, he also explicitly does not take a stance, for example, on what propositions are. While somebody who favours the second kind of approach in metaphysics might ask a metaphysics of representation to provide more details about the nature of the entities involved in representation, it would be wrong to count a lack of stance as a weakness of the book. For Williams's foundational story can in fact be combined with various accounts of concepts, contents and propositions, and this is a strength of a story presented as a possible story about what grounds representation.

Second, teleoinformational accounts and radical interpretation might for some not be intuitive. Many could for example protest that it is not the case that they believe that grass is green because this is the best interpretation we can have of them, but rather that the best interpretation takes them to believe that grass is green because this is what they believe! Is it genuinely the case, moreover, that the correct interpretation of a subject is the one that makes them as responsive as they can be taken to be to their evidence and interests, when so many subjects seem to just act exactly against their interests and evidence? Williams does not attempt at convincing the reader of the basic motivations and core ideas of the approaches he favours for the various layers and does not even attempt at explaining opposing intuitions away. While a reader would maybe benefit from some guidance here, the reason why Williams does not indulge in motivating the main tenets of the accounts is again that his aim is not primarily to convince the reader of their truth, but to show that there is at least one way to found representations in the non-representational. The book then tries to convince the reader by showing that the story told is indeed able to explain and reduce representation, by going deep into the details, leaving no notion as an undiscussed primitive, setting and solving some intriguing puzzles and using vivid analogies at the difficult and crucial points.

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