



All manner of mind

Philip Ball: The book of minds: How to understand ourselves and other beings, from animals to AI to aliens. Chicago: The University of Chicago Press, 2022, 512 pp, \$26 HB

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The Book of Minds is an impressive investigation of the various dimensions of what we call “the mind” with much discussion of what sorts of beings might have minds. The book surveys views of a variety of philosophers and scientists with the breadth of knowledge you would expect of prolific science author Philip Ball.

As a start to answering the question “What is a mind?” a working definition is provided in Chapter 1: “*For an entity to have a mind, there must be something it is like to be that entity*” (9, emphasis in the original). On this account, where there is mind there is the subjective, qualitative character of experience, how it *feels* to the sentient being to experience the world the way it does. Ball sometimes speaks of “mindedness,” which is meant to allow that having a mind is not an all-or-nothing affair, but a matter of degree, with a wide array of distinct mental features and capacities. “The Space of Possible Minds” is the title of Chapter 2, and as Ball mentions, the description appears in the title of a paper by Aaron Sloman. Although it is not always obvious when Ball is agreeing with rather than merely describing the views of the theorists he discusses, it does seem clear that he concurs with Sloman that we should reject the idea that there is one major division between entities with minds and those without and instead expect great diversity within the space of possible minds.

The space of human minds is the focus of Chapter 3. While Ball aims to give a sense of the many things we are mentally, the title being “All The Things You Are,” one might wish for a more structured presentation in this chapter. The reader is shuttled across a dizzying span of topics, including the evolution of minds, how society shapes intelligence, the role of imagination, how the mind constructs reality, the nature and function of mental models, learning in young children, the role of emotions in motivating action, autism and neurodiversity, and the notion of the extended mind.

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The presentation becomes more focused with the lucid discussion of *consciousness* in Chapter 4. The discussion here, as in the rest of the book, is best suited for the novice, yet potentially very informative to many readers. We are introduced to various philosophical positions (e.g., dualism, eliminative materialism, and mysterianism), different varieties of consciousness mentioned in the philosophical and scientific literature (e.g., access consciousness and the brands Damasio calls “core” and “autobiographical”), and prominent models of consciousness, especially global workspace theory and integrated information theory. Other topics discussed in this elegant chapter include the search for the neural basis of consciousness and whether consciousness is adaptive or epiphenomenal.

The question of which animals have minds or some degree of mindedness is the focus of Chapter 5. Ball surveys numerous issues typically covered in the literature on animal minds, including possible evidence in nonhuman animals of a theory of mind, forward thinking, the ability to generalize, communication, emotion, and a sense of self. The range of animals discussed is wide, from bonobos to bowerbirds to bees. Ball nicely summarizes the views of prominent authors and offers highly accessible accounts of some of the relevant research. The issues regarding animal minds are discussed in a cautious fashion, with Ball warning against being too quick to deny mentality to other animals while also reminding us of our natural tendency to anthropomorphize.

Ball is often careful about jumping to conclusions, but not always. In the first chapter, after describing differences between brains and computers, he writes, “my hunch is that no genuine mind will be like today’s computers” (37), and early in Chapter 7, “Machine Minds,” there is the bold claim that “every robot and computer ever built (on this planet) is mindless” (270). Chapter 7 does have its merits. Ball offers an informative history of computer programming and AI along with a useful introduction to machine learning and neural nets. He also insightfully describes differences between what human minds do and what AI machines do. However, it certainly does not follow from his discussion of the differences that all the machines we have built are mindless. Also insufficiently supported is the claim that since we evolved with innate goals and they have been built to perform a task, “meaning exists for us and not for machines” (304). It seems, in addition, that there is some tension between these strong claims and the wise advice elsewhere in the book of allowing items of diverse kinds and with a range of differing abilities into the space of possible minds. Ball himself worries that with his remarks about mindless machines, he “might be merely repeating the bias against animal minds” that he has “so deplored in the earlier chapters” (270). I cannot be sure what Ball would say about more recent work in AI, subsequent to completion of the book. However, he certainly does allow that AI mindedness might occur in the future, and his discussion in Chapter 7, and in the final chapter of the book, inspires speculation on what our future machines might need to have minds.

A different apparent tension, and more diffuse, concerns the working definition that for one to have a mind there must be something it is like to be that individual. Many of the mental attributes discussed in the book are different from the *what it is like* aspect of experience. The component of experience we call “subjective feel” or “qualitative character” is not quite the same thing as intelligence,

imagination, memory, forward thinking, a mental model, or a theory of mind, and it is arguable that each of the latter could possibly occur in the absence of “qualia,” especially since some mental processes occur non-consciously, as Ball acknowledges. That there is a wide variety of mental features is perfectly consistent with the claim that the bearers of any of them must have or be capable of having states with qualitative character. However, given that the presence of qualitative character is not a necessary condition for lots of genuinely mental features, Ball’s working definition is questionable.

Given the multi-disciplinary nature of the book, the discussion shows ample sensitivity to a host of philosophical positions—that is, for the most part. Attention to the philosophical landscape is notably weak in Chapter 9, “Free to Choose.” In discussing reasons determinists might offer for rejecting free will, Ball addresses the view, which he calls “physical determinism,” that “there is an inevitability to all events because they arise only from the physical interactions of fundamental particles” (402). Ball is right to point out the limitations of bottom-up explanations of behavior, and he does so very well. But one can agree that our macroscopic behavior is often not best explained in terms of the activity of our microscopic parts while also accepting the core determinist view that present and future events are inevitable consequences of past events together with the laws of nature. In discussing reasons a determinist might offer against free will, Ball arguably would do better to focus more on this core determinist belief. In addition, he characterizes what he calls “philosophical determinism” as insisting that “because there is no purpose or plan among atoms, there can be none anywhere” (417). The label is unfortunate since philosophers who are determinists can reject the reductionism implied by his characterization, and they can also believe that we sometimes act freely, as Ball recognizes since he himself mentions that “compatibilism is the right position” (399). Also, against the alternative possibilities view of free will, it is claimed that alternative outcomes “are not real, but metaphysical: they can never be observed” (414). Granted, if there are genuine alternatives, it is not clear how we can know when they are available. Yet, alternative courses of action might very well be real, and perhaps also necessary for acting freely, even if they cannot be observed. Despite these and other concerns, the chapter does offer insightful remarks on the *agency* of organisms and various ways in which minds enhance and broaden that agency, e.g., by evaluating, predicting, and making decisions. The discussion also makes clear to those new to the debate how acting freely might be more a matter of minds causally directing behavior than whether actions are determined or undetermined. Also, the final portion of the chapter features a useful discussion of moral responsibility.

The Book of Minds is a highly interdisciplinary work that nicely weaves together ideas from various disciplines that address matters of mind. The book is well-written and accessible, with a clear presentation of the major issues, including the intriguing topic of minds beyond the boundaries of our planet, which is the focus of Chapter 8. The presentation throughout the book is introductory and suited for a general audience. Experts and advanced students of the mind will not gain as much from the discussion; yet specialists in one area are likely to learn a fair amount about relevant research and views in other areas. Overall, the

book provides a fascinating introduction to the many different aspects of mind with intriguing discussion of who might have them.

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