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The Peripheral Mind: Philosophy of Mind and the Peripheral Nervous System. István Aranyosi. Oxford, United Kingdom: Oxford University Press, 2013, 256 pages, $60.00 hardcover.

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Much of the action and excitement in the philosophy of mind over the last couple of decades has been in a movement to look beyond the brain for locating and explaining mental states. This movement consists in a number of different claims. We have heard, for instance, that the mind extends into artifacts, and that the mind is brought forth or enacted or constituted by the active living body. In his recent book, *The Peripheral Mind*, István Aranyosi defends a neglected middle ground in the debate, a middle ground between the brain and the external world. Aranyosi urges that we take seriously the peripheral nervous system in our investigation into the mind. More specifically, the main thesis of his book is the peripheral mind hypothesis, which is that "Conscious mental states typically involved in sensory processes are partly constituted by subprocesses occurring at the level of the [peripheral nervous system]" (p. 22).

I find the book overall to be thought-provoking, especially as it brings a fresh perspective on a number of issues in contemporary philosophy of mind, including semantic externalism and some issues in neuroethics. One attraction of the book is Aranyosi's ecumenical methodology; he draws from cultural anthropology, detailed neurophysiology, illusions of embodiment, continental phenomenology, thought experiments (Stinky Earth is my favorite of these), and even his own personal experiences, which are directly relevant. Due to the scope of the book, I must leave out quite a bit in my discussion. My focus will be on its main thesis, which is original and potentially relevant in a wide range of issues, as Aranyosi indicates. The central argument for the main thesis can be found in the seventh chapter of the book. As I explain below, I find the argument lacking.

Before looking at the argument for the peripheral mind hypothesis, I should locate the claim within the existing literature. Probably the most important objection to the various theses advocating extra-cranial extension of the mind is the objection that its proponents fail to appreciate the distinction between causation and constitution (Adams and Aizawa, 2008; Block, 2005; Prinz, 2006). The objection is that proponents of extension identify important causal contributions to mental states and then fallaciously

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conclude that these causal contributions actually constitute those mental states. Aranyosi is aware of the distinction, and the objection. Given this state of affairs, it is crucial for his defense of the peripheral mind hypothesis to make a clear case for the constitutive claim, a case why the peripheral nervous system makes a constitutive, rather than a "merely" causal, contribution to conscious mental states.

The main basis for the constitutive claim is a number of empirical results having to do with illusions of embodiment. Aranyosi begins with Aristotle's illusion: cross the index and middle fingers, then touch the tips of both crossed fingers simultaneously with a pencil. (Hold the pencil perpendicular to your crossed fingers, and place the pencil in the "V" created by your crossed fingertips.) Many people experience being touched by two objects, despite the visual percept (and veridical belief) that they are being touched by one object. Aranyosi then moves on to describe a number of other illusions involving proprioception and touch, including a variation on the rubber hand illusion and his own variation on Aristotle's illusion. One key experimental finding for Aranyosi's argument is that the tactile illusions can be lost for subjects who spend a long time with crossed fingers (Benedetti, 1991). He reaches the plausible conclusion that the tactile properties of our fingertips depend on the history of the ways in which they have been stimulated by objects (p. 134).

With these empirical results in place, Aranyosi goes on to apply a counterfactual causal analysis of the illusory experience in order to justify the constitutive claim. He suggests that the "one causal contributor" to the illusory experience is the absence of a particular kind of stimulation history (p. 135). Counterfactually: if the stimulation history had been different, there would have been no illusory experience. Aranyosi concludes that, since the actual stimulation of the fingers "is a contributor to my paradoxical experience," then ". . . we should understand these [peripheral nervous system] processes as constitutive contributors to the experience" (p. 135).

Now I will offer some critical remarks, beginning with the argument just sketched. The main problem that I find with this argument is that it depends on a dubious background assumption. The implicit assumption is that a counterfactual analysis reveals the "only one causal contributor" to an event (ibid.). This assumption is questionable because it is plausible that many events have multiple causes that can be revealed using a counterfactual analysis. In this case, I suggest, the actual stimulation of the peripheral nerves is a good candidate for another causal contribution to the experience. It is wrong to suppose, as Aranyosi seems to do, that all events have one single cause and that all other contributing factors are constitutive. Instead, one could plausibly maintain that the other contributing factors are background causes. Another relevant point here is that counterfactual causal analyses have been used as ways to model commonsense judgments about causation. In this case, the counterfactual analysis is used to reach a decidedly non-commonsense judgment about the cause of an event. Thus Aranyosi's argument may raise a problem for counterfactual analyses of causation rather than support a conclusion about the peripheral nervous system.

Part of the difficulty here might lie in the fact that the causal/constitutive distinction is a poor fit for theorizing in empirical science. Following Ross and Ladyman (2010), the root problem in the debate is that the causal/constitutive distinction belongs to analytic metaphysics (or, less charitably, to folk physics), but it is being applied to a theoretical dispute in the empirical sciences of the mind. According to Ross and Ladyman, since the distinction has no place in the mature sciences such as physics and chemistry, it should find no place in the sciences of the mind. Instead of making the constitutive claim, then, one could instead argue that our best scientific models of the mind are

those that include, in this case, the peripheral nervous system. I suspect that elements of Aranyosi's book could be adapted to this claim, though I will not pursue the issue.

Apart from the relevance of constitutive claims for the sciences of the mind, I'd like to raise two further worries about the peripheral mind hypothesis. The first worry is that Aranyosi excludes dreams from his hypothesis, because "the connection between sensory states in dreams and the [peripheral nervous system] is much less tight in actual fact" (p. 22). Since dreams have already been raised in the debate over whether the conscious mind is partly constituted by extra-cranial processes (Block, 2005; Noë, 2004: chapter 7), I was somewhat surprised to see their casual dismissal here. More to the point, if we can have a phenomenal state in a dream, without the constitutive (or even causal) role of the peripheral nervous system, then we have strong prima facie reasons for thinking that the peripheral nervous system is not constitutive of particular phenomenal states. It would seem that such a conclusion would be in tension with the peripheral mind hypothesis.

A second worry is that Aranyosi does not address evidence for the plasticity of the body schema. There is experimental evidence that tool use can change the receptive field properties of the cortical neurons that play a role in body representation (see Maravita and Iriki, 2004 for a review of the literature). This evidence suggests that our body representations are mostly determined by the central nervous system, and that the peripheral nervous system may not play a significant role. For instance, assume that my body representation can become extended when I am using a rake, such that the tip of the rake is represented as the tip of my limb. Also assume, in accordance with the experimental findings, that this extension is due to the plasticity of neuronal activity in the central nervous system. In such a case, it is not clear to me that the properties of the peripheral nervous system are of any explanatory interest — it is not as if the peripheral nervous system itself extends into the rake. Perhaps the peripheral nervous system will be important for an explanation of the plasticity of body representation, but the onus is on proponents of the peripheral mind hypothesis to make that case.

Overall, *The Peripheral Mind* has the virtues of originality and scope. But the trade-off for scope is slow and careful argumentation, as I indicated using the example of the main argument of the book.

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