

Joseph Rouse. *Articulating the World: Conceptual Understanding and the Scientific Image.* University of Chicago Press 2015. 416 pp. \$105.00 USD (Hardcover ISBN 9780226293677); \$35.00 USD (Paperback ISBN 9780226293844).

Can science make sense of, comprehend, or understand itself? The various sciences, such as chemistry, biology, geology, astronomy, and psychology aim to understand various aspects of the universe. They seek and provide evidence and justification for claims of objective correctness about those aspects. For all their achievements, they seem to share a conception of the universe that makes it very hard if not impossible to understand the notions of evidence, justification, and objective correctness. For those notions at least seem to be normative, concerning what *ought* to be or *may* not be the case, and the sciences do not seem to recognize any such properties in the universe. Thus, it can seem that science, writ large, cannot understand itself. At best, the sciences can understand everything about the universe except for the sciences themselves.

In his new book, *Articulating the World*, Joseph Rouse continues his project of clarifying this profound challenge and developing a compelling response to it. He seeks a ‘naturalistic self-understanding’ (3). Because Rouse covers such a wide range of topics and authors, it is difficult to grasp his whole story. Still, at each stage Rouse is clear about what he is up to, providing helpful summaries and glances ahead. Each chapter requires and rewards careful re-reading.

Given that Rouse is guided by something like the question ‘Can science understand itself?’ after an introductory, synoptic chapter, he divides his project into two parts. The first address the question: ‘What is understanding?’ The second addresses the question ‘What is science?’

In Part I, Rouse argues that understanding is discursive niche construction. Put roughly, understanding is the creation of a distinctive sort of environment. In chapter 2, Rouse discusses conceptual understanding or, equivalently for him, intentionality. He argues that intentionality is, first and foremost a normative status. Performances display intentionality so long as they can be ‘appropriately assessed according to rational norms’ (45). He adds that

Intentionality ... requires reflexive self-directed comportments that would constitute a standard to which they are accountable and the ability to self-correct according to that standard... [O]penness to self-correction cannot be limited to interaction with actual entities but must also encompass a modal “space” of possibilities and impossibilities. Intentionality cannot just involve a pattern of response to actual surroundings but must somehow constitute a more comprehensive pattern in which the actual response pattern is situated. (66)

This makes intentionality very demanding. Rouse holds that intentionality cannot be understood merely in terms of the goal-directedness of living things. For Rouse, the main problem here is that genuine intentionality requires two norms, not just one. There is a norm for *how* a system takes a thing to be (the content of the intentional state), as well as a norm for *which* thing is taken to be that way (the target of the intentional state).

In chapter 3, Rouse aims to show how conceptual understanding could have evolved, focusing on the evolution of language. This is central to giving a naturalistically respectable account of conceptual understanding. Rouse explains niche construction theory, using it as the framework for his account. According to that theory, an organism’s niche is not just ‘the environmental factors acting on’ that organism, but ‘the sum of selection pressures’ acting on it, and these include the patterned activities that the very organism engages in (114). Building on the work of Derek Bickerton, Rouse speculates that protolinguistic abilities emerged ‘in response to the need to recruit

larger bands of hominids quickly to act together at distinct locations' (119). Patterns of call and response then become part of the organism's niche—a further selective pressure and a ratchet for more sophisticated abilities.

In chapter 4, Rouse develops further the contentions of the preceding chapter. He holds that nonhuman organisms that might seem to have genuine intentionality in fact do not. He discusses vervet monkeys' alarm calls. He says: 'The vervets' cries are directed responses *to* impending predation that might be avoided by timely responses, but they do not involve any understanding, classification, or even representation *of* anything *as* an animal, a predator, a danger, or an indication to flee in a specific way' (143). For this, they need something more: 'tracking vocal expression in relation to their conversational and expressive contexts... and tracking these larger patterns of "intralinguistic" expression in the context of broader perceptual and practical responsiveness to circumstances' (156). This is necessary for expressions or performances to have contents and targets, which in turn is necessary for genuine intentionality.

In chapter 5, Rouse aims to clarify objectivity, especially what it is for performances to be accountable to objects themselves. Early in the chapter he makes a fascinating suggestion that he attempts to make good on across the rest of the book: 'The Sellarsian space of reasons *is* our continually reconstructed biological niche' (175). For Wilfrid Sellars, 'the space of reasons' is our elaborate practices of justifying and seeking justification for what one says and thinks. Rouse is proposing that this is the distinctively human niche, one which, in accordance with niche construction theory, we are continually shaping. Rouse holds that unlike the behavior of other organisms, '[h]uman behavior is directed not merely toward the goal *that* its life pattern continues but also toward *what* that life pattern will be' (189). This, Rouse thinks, is the key to understanding intentionality. For it makes possible two distinct norms that will allow a distinction between the content and the target of intentional states. It was not clear to me exactly how this is to be achieved, so this is a place that theorists of intentionality should attend to with care.

In Part II, Rouse aims to show how science fits into his account of conceptual understanding (201). Beginning with chapter 6 Rouse contends that we should not think of science as primarily aiming to represent the world, but instead as intervening in and changing the world. He regards the 'world-transforming character of scientific inquiry as a straightforward commonplace' (216). This allows him to directly fit science within his conception of conceptual understanding. Since conceptual understanding is, for Rouse, discursive niche construction, and science is a type of conceptual understanding, it is then a type of niche construction. What type of niche construction is it? In Rouse's words, it 'involves coordinated shifts that create new material phenomena, new patterns of talk and skillful performance, the opening of new domains of inquiry and understanding, and transformations in what is at issue and at stake in how we live our lives and understand ourselves. The sciences thereby transform the world we live in and our place and possibilities within it. In doing so, they articulate the world as conceptually intelligible' (217). In this regard, Rouse stresses the practical, manipulative, and creative character of scientific practices. In chapter 7, he explains that 'the sciences allow the world to show itself... by making new things happen... [S]cientific understanding articulates the world itself, rearranging it in ways that allow new conceptual possibilities to emerge' (33).

In the next chapter, Rouse contends that scientific understanding has a distinctively modal character—concerning what is possible and impossible—and focuses on clarifying the place of laws in scientific practices. Following Marc Lange, Rouse holds that laws express inferential norms (255). Roughly, in taking a claim to be a law for a domain of entities, a scientist treats that claim as one that will be vindicated by the best experimental work on that domain. Following John Haugeland, Rouse

also holds that ‘a set of laws “constitute” a domain of entities by holding them to defeasible standards’ (265). Fairly evaluating Rouse requires special attention to the technical sense of ‘constitute’ on which he relies.

In chapter 9, Rouse offers his take on the ‘the scientific image,’ the ‘idealized composite of what the sciences achieve’ (287). Rouse contends that the sciences continually reconfigure the space of reasons, so the scientific image should not be thought of as simply a position within that space. In chapter 10, Rouse extends this line of thinking in order to clarify how scientific practices are alive to ‘what is at issue and at stake’ (34) in those practices, but also in the larger niche of all human life of which they are a part. Rouse nicely summarizes his way of thinking in the final sentence of the chapter: ‘The sciences continually reconfigure our involvement in the world as an open-ended field of conceptual possibilities, fraught with productive tensions, focused upon shifting issues, and oriented toward working out and reconfiguring how those possibilities make a difference to our lives and the world we inhabit’ (341).

As I hope you can tell, *Articulating the World* fairly bristles with provocative and intricately interconnected claims about the profound question of whether and how we can achieve a ‘naturalistic self-understanding.’ It deserves the attention of scholars interested in that question, but also scholars of intentionality and of scientific practice. Rouse offers us an interesting synthesis of two celebrated ideas, one from Aristotle, the other from Marx. Aristotle held that philosophy aims at understanding the world. Marx held that philosophers ought to aim at changing the world. Rouse holds that we understand the world by changing it.

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