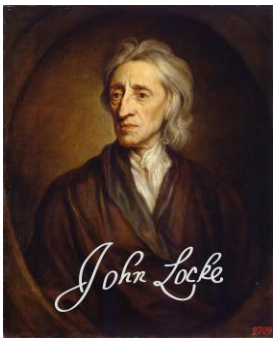

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Review of *Locke's Image of the World* by Michael Jacovides

NATHAN ROCKWOOD (BRIGHAM YOUNG UNIVERSITY)

Abstract:
A book review of Michael Jacovides's recent book, *Locke's Image of the World* (Oxford, UK: Oxford University Press, 2017).

Keywords: history of science, epistemology, corpuscularianism, John Locke, Robert Boyle, Isaac Newton

Jacovides, Michael. *Locke's Image of the World*. Oxford, UK: Oxford University Press, 2017. 231 pp. $70 (hbk). ISBN 9780198789864.

Reviewed by NATHAN ROCKWOOD

The overarching theme of *Locke's Image of the World*, by Michael Jacovides, is that Locke's belief in the best science of his day shapes his philosophy in important ways. Jacovides contends that "by understanding the scientific background to Locke's thoughts, we can better understand his work" (1), including both his positions and his arguments for those positions. To a lesser extent, Jacovides's book also treats Locke as a case study in thinking about how much scientific theory *should* influence philosophy. While much of the science Locke relies on is incomplete or problematic, and so leads him into errors, Jacovides is sympathetic to Locke's approach of using the best scientific theories to help develop and justify his philosophical positions.

There are three main sources of scientific theory that influence Locke. First, he was trained as a medical doctor and engaged in medical experiments. Second, he was a close associate of Robert Boyle who, along with René Descartes, convince Locke that corpuscularianism is the best scientific theory. Even then, however, Locke recognizes shortcomings of this theory. Finally, he later befriends Isaac Newton and becomes convinced that Newton's physics is, in some respects, incompatible with corpuscularianism. Jacovides shows how each of these scientific theories influence Locke's thinking on a variety of topics. The result is an impressive account of the history of science at a critical point in its development through the lens of one of the great philosophers of that time.

Jacovides contends (chap. 2) that Locke's study of medicine made him skeptical that we can know the underlying causes of things. By 1664, Locke was engaged in research on respiration (5) and in the mid-1660s he posits the existence of "ferments" (a kind of matter) as an explanation of disease (6ff). Jacovides takes these scientific enterprises to be philosophically significant because they present alternatives to the reductive explanations of corpuscularianism that Locke would favor later in his career. In the late 1660s, Locke then meets Sydenham who advocates for treatments that have been empirically shown to be effective but for which we lack an underlying explanation as to *why* they work (9). At this point, according to Jacovides (10–11, 14), Locke becomes much more skeptical about our ability to know the underlying causes of natural phenomena. This skepticism becomes one of the hallmarks of Locke's epistemology (13).

Another way in which Locke's medical research influences his philosophy is the discovery of the retinal image. Jacovides describes (chap. 7) how Locke became aware of the retinal image, a two-dimensional image on the back of the retina. Locke seems to think that, since the retinal image is two-dimensional, visual perception is of a two-dimensional array; only through experience do we come to associate certain patterns of color shading with three-dimensional shapes. According to Jacovides, this explains why, in his discussion of the Molyneux problem, Locke asserts that, when a globe is placed in front of a formerly blind person who just gained sight, the person would see a flat circle rather than a three-dimensional sphere (*Essay*, II.xiii.6). The trouble for Locke, Jacovides notes, is that visual perception is *not* generally experienced as a two-dimensional array. Jacovides suggests that Locke's scientific theory leads him to make the (probably sincere) claim that he perceives the world as two-dimensional. In this way, Locke's scientific

theory shapes his account of visual perception. Scientific theory influencing how Locke perceives the world is a recurring theme in the book.

Throughout the discussion of the medical science informing Locke's *Essay*, Jacovides skillfully describes both the scholastic background and, for Locke, the recent developments in medical science. The scholarship is always careful and interesting, though, in my view, the philosophical insight to be gained varies. Jacovides's account of the retinal image, for example, strikes me as persuasive and of great insight into explaining Locke's otherwise puzzling thesis that visual perception is experienced as two-dimensional. It is much less clear to me that Locke's medical research in the 1660s had the same level of impact. Jacovides presents Locke's research as engaging in "alternative traditions" to corpuscularianism (5), yet, as he later concedes, "Though Locke's speculations during the 1660s use non-corpuscularian concepts in a way that we don't find in his later work, they don't mark a sharp break with Boyle's work and thought [i.e., corpuscularianism]" (8–9). Similarly, Jacovides points to Locke's association with Sydenham, and the latter's approach to looking for effective treatments while confessing ignorance about the underlying causes, as pushing Locke toward skepticism about our ability to know underlying causes. But notice that, again, this is compatible with Locke's contemporaneous commitment to corpuscularianism, and indeed such skepticism follows from corpuscularianism, since we cannot observe the tiny particles that explain natural phenomena.

Most of the literature on Locke's philosophy of science, including the bulk of Jacovides's book, focuses on how corpuscularianism influences Locke's philosophy. According to corpuscularianism, observable objects are composed of imperceptibly small particles, and the size, shape, and motion of these particles explain the observable properties and behaviors of macroscopic objects (4–5). It is well known that Locke was influenced by corpuscularianism, and Jacovides's book adds new insight to this topic.

Jacovides asserts that the "connection [between science and Locke's philosophy] is most explicit in the chapter on primary and secondary qualities" (2). After describing a corpuscularian theory of perception, Locke says, "From whence I think it is easy to draw this observation," namely, that the ideas of primary qualities resemble properties in actual objects whereas the ideas of secondary qualities do not (*Essay*, II.viii.15). Here is a clear example of Locke using his favored scientific theory to make an inference about metaphysics and, as Jacovides goes on to explain, leads Locke to substantially revise the standard theory of mental representation.

Jacovides takes Locke to accept the standard Aristotelian theory of mental representation for primary qualities but not for secondary qualities. Primary qualities are the properties that are fundamental and inseparable from material objects. This much is not controversial, but Jacovides's interpretation of Locke's account of primary qualities differs substantially from many other interpretations in two respects. First, he argues (chap. 5) that primary qualities are determin*able* properties such as *having some shape (or other)* and *having some size (or other)*, rather than a determin*ate* shape and size, such as *being circular* or *being one inch in diameter*, on the grounds that the latter are not inseparable from material objects. Second, and more radically, he argues (chap. 8) that our ideas of primary qualities resemble in virtue of, literally, having the same kind of property. For example, my idea of the statue of liberty is taller than it is wide, and hence my idea is literally extended and literally has a shape (165). The Aristotelian position, as Jacovides describes it, is that ideas represent by resembling the thing represented.

Jacovides suggests that Locke accepts this as the right account of representation with respect to primary qualities.

But, famously, Locke denies that our ideas of secondary qualities resemble properties in objects and so, for these properties, he is in need of an alternative theory of representation. Here Locke turns to causation. Summing up the position he argues for in chapters 8 and 9, Jacovides says, Locke's account of secondary qualities "describes how our secondary quality predicates work" (181); namely, "an object satisfies the predicate 'is white' if and only if the object has a power to produce the idea of whiteness" (182). *Whatever* regularly causes us to have an idea of whiteness counts as white. This move allows Locke to say that "snow is white" is true, for example, while avoiding a commitment to the thesis that ideas of secondary qualities resemble properties in objects. There is no mind-independent property of snow that resembles our idea of white. Yet, snow is white in the sense that if we look at snow, we have the sensation of whiteness, and Locke's semantics and theory of representation captures this fact. Jacovides takes Locke's account of secondary qualities as a shining example of successful philosophy. Locke provides a "persuasive and influential solution" to the problem of harmonizing modern science and ordinary judgments concerning these properties (185, 204).

In perhaps the most interesting narrative of the book (chap. 3), Jacovides argues that what is conceivable, and as a result what is considered possible, is largely context-dependent on Locke's favored scientific theory. As a good corpuscularian, Locke takes action-at-a-distance to be inconceivable. According to Locke's empiricism, all ideas come from sensation or reflection, and if we do not get an idea of something from either of these sources then that thing is literally inconceivable (26; *Essay*, II.xxiii.29). We can observe objects acting by impulse, so Locke rightly takes the impulse of tiny particles to be a conceivable cause of observable phenomena. More surprisingly, he takes action by impulse to be the *only* conceivable kind of (body-body) causation. So, for example, the Aristotelian metaphysical explanations that appeal to "forms" and "sensible species" are not just *false* but positively *inconceivable* (34; *Essay*, III.x.14). They are inconceivable since, even if there were such things, we are unable to directly observe them through sensation. Any talk of such entities is thereby rendered meaningless on his theory of language. According to Jacovides, Locke constructs his theory of ideas, at least partly, *so that* it would rule out these Aristotelian metaphysical explanations as meaningless (40, 114). It is Locke's prior commitment to corpuscularianism, then, that leads Locke to conclude alternatives to corpuscularianism are inconceivable.

But the story of inconceivability does not stop there. Under the influence of Boyle and corpuscularianism, Locke takes action-at-a-distance to be what Jacovides calls "strongly inconceivable" in that it conflicts with what we (supposedly) know with certainty is true. However, Locke later, under the influence of Newton and universal gravity, takes action-at-a-distance to merely be what Jacovides calls "psychologically inconceivable" in that we lack the ideas of *how* action-at-a-distance could occur. Once he adopts this latter position, the possibility of God "super-adding" gravitation to matter is opened up, even though it is inconceivable to us how he does so (see *The Works of John Locke*, 10 vols., [London, 1823], 4:467–68). In this way, Jacovides convincingly argues that what Locke takes to be conceivable and inconceivable depends, at least in large part, on the scientific theory he adopts (34). Jacovides does not disparage Locke for this; instead, he suggests, "If we can base a framework of conceivability and intelligibility on our best-justified scientific theories, we will do as well as we can in tracking the true boundaries of possibility" (203).

Another interesting theme in the book is that Locke takes the fundamental laws of nature to explain natural phenomena even though we lack a natural explanation for *how* those laws work. As just mentioned, Locke thinks we literally have no idea *how* gravitation works, yet he still appeals to the law of gravitation as a fundamental principle that explains other natural phenomena (*Works*, 3:282). Similarly, earlier in his career, Locke appeals to action by impulse to be the fundamental principle of nature, yet he even at that time also thinks that we literally have no idea *how* motion transfers from one object to another (chap. 4). This theme reappears (chap. 6) in relation to the mind-body problem. Locke insists that the properties of matter alone cannot explain how we are able to think and perceive (*Essay*, IV.x.10). However, as Jacovides points out, Locke still appeals to anatomy and the motion of particles in order to explain our sensations (127; see *Essay*, II.viii.12–13). So, Locke thinks that we can make progress in explaining natural phenomena even when the fundamental laws are themselves inexplicable. In each of these cases, according to Jacovides's interpretation, God arbitrarily determines the fundamental laws of nature, though we cannot conceive of *how* he does so (47; see *Essay* IV.iii.28–29). Locke nonetheless considers these laws explanatory because, though the laws depend on God's will, the laws are systematic and God's intervention is limited (126). The best a scientific theory can do, then, is offer "intermediate explanations" of natural phenomena. On Locke's view, even with the best scientific theory, we are left with only an incomplete and obscure idea of how the world works.

Jacovides, unfortunately, has relatively little to say about Newton's influence on Locke's philosophy. The last two topics canvased, conceivability and intermediate explanations, represent most of what Jacovides has to say about Newton's influence on Locke. He does argue, though, that it is by Locke's influence that Newton adopts Rule 3 for making inductive inferences (89-91).

Another omission is any sustained discussion of Locke's view on the method of doing science. In this respect, more discussion of Newton's influence may have been especially appropriate. Peter Anstey (among others) has argued that Locke starts out as a proponent of a Baconian natural history method, but then the success of Newton's physics leads Locke to shift his view about how science should be done to what Anstey calls "a mathematical method" (Peter Anstey, *John Locke and Natural Philosophy*, [Oxford, U.K.: Oxford University Press, 2011]). It is somewhat disappointing, then, that Jacovides does not address this topic at any length.

With that said, *Locke's Image of the World* is an impressive feat of scholarship. The exposition of late scholastic science and the then developing science, along with how these scientific theories influence Locke, is meticulous, clear, and engaging. Jacovides succeeds in his goal to show how the science of Locke's day influences his philosophy. And, because developments of science are advancing so rapidly during the time in which Locke was writing, Jacovides is right to think that Locke represents an especially useful case study for thinking about the extent to which philosophers should be influenced by current science. As a result, the book will be of interest not only to Locke's interpreters but also to those engaged in intellectual history, the history of science, and philosophy of science more generally.

Brigham Young University