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LOCKE'S ANSWER TO MOLYNEUX'S THOUGHT EXPERIMENT

Michael Bruno*
Eric Mandelbaum**

1. Berkeley's Criticism of Locke

Philosophical discussions of Molyneux's problem within contemporary philosophy of mind tend to characterize the problem as primarily concerned with the role innately known principles, amodal spatial concepts, and rational cognitive faculties play in our perceptual lives.[1] Indeed, for broadly similar reasons, rationalists have generally advocated an affirmative answer, while empiricists have generally advocated a negative one, to the question Molyneux posed after presenting his famous thought experiment. This historical characterization of the dialectic, however, somewhat obscures the role Molyneux's problem has played in spawning debates within the empiricist tradition. Fortunately, the differences between various empiricist accounts have been widely recognized and discussed among historians of philosophy working on the topic.[2] The focus of the present essay is to develop an interpretation of John Locke's views on Molyneux's problem that best coheres with his other views on human understanding as well as with the predominant scientific opinion about the nature of perception during the period in which he lived.

Upon reading *Essai Philosophique concernant L'Entendement*, an abstract of the first edition of *An Essay concerning Human Understanding*,[3] Irish politician and scientist William Molyneux wrote to John Locke on July 7, 1688, and presented him with the following question. Would a congenitally blind man who had learned to distinguish tactually between a cube and a sphere and who had just been cured of his blindness be able to distinguish between the cube and the sphere upon a visual presentation of them?[4] Locke never responded to Molyneux's original letter. A few years later, after the two had become acquaintances, Molyneux once again posed the question to Locke in a letter dated March 2, 1692:

> Suppose a Man born blind, and now adult, and taught by his touch to distinguish between a Cube, and a Sphere of the same metal, and nighly of the same bigness, so as to tell, when he felt one and t'other; which is the Cube, which the Sphere. Suppose then the Cube and Sphere placed on a Table, and the Blind Man to be made to see. Qaere, Whether by his sight, before he touch'd them, he could now distinguish, and tell, which is the Globe, which the Cube? I answer, not. For, though he has obtained the experience of how a globe, how a cube affects his touch, yet he has not yet obtained the experience, that what affects his touch so or so, must affect his sight so or so; or that a protuberant angle in the cube, that pressed his hand unequally, shall appear to his eye as it does in the cube. (II.ix.viii, 146)

This time Locke responded by including a brief discussion of Molyneux's problem in subsequent versions of the *Essay*. Locke quoted the portion of the letter above in section viii ("Ideas of Sensation Often Changed by the Judgment") of chapter ix ("Of Perception") of book II ("Of Ideas") of the *Essay* and endorsed Molyneux's negative answer.

Locke's negative answer and endorsement of Molyneux's justification for that answer raise an important interpretive difficulty. According to Molyneux's justification, the reason the formerly blind person cannot tell which object is the sphere and which the cube is that the connections between our ideas of figure acquired through different sense modalities must be learned through experience. Nevertheless, while this justification fits generally with the empiricist view that knowledge is grounded in experience and that the vehicles of all mental activity are sensory in nature, it seems incompatible with view that one perceives the same ideas through different senses. Yet, Locke was firmly committed to the doctrine that there are such "common sensibles."[5] As he claims in the chapter "Of Simple Ideas of Divers Senses," "The ideas we get by more than one sense are, of space or extension, figure, rest, and motion. For these make perceivable impressions, both on the eyes and touch; and we can receive and convey into our minds the ideas of the extension, figure, motion, and rest of bodies, both by seeing and feeling" (II.v, 127).[6] Given that ideas of figure are directly perceived through both sight and touch, it is not clear what would stand in the way of the newly cured blind man's being able to recognize the figures he now sees as the same as figures he had previously felt. On precisely these grounds, George Berkeley objected to Locke's treatment of Molyneux's problem:

> Now, if a square surface perceived by touch be of the same sort with a square surface perceived by sight; it is certain the blind man here mentioned might know a square surface, as soon as he saw it. . . . We must therefore allow, either that visible extension and figures are specifically distinct from tangible extension and figures, or else,

> that the solution of this problem, given by those two thoughtful and ingenious men, is wrong.[7]

Such reasoning led Berkeley to reject the doctrine of common sensibles and instead maintain that each sense modality has its own proprietary stock of ideas. While ideas of light and color are directly visually perceived, ideas of figure are specific to touch. Hence, in accord with Molyneux's original justification, the newly cured blind man would still need to learn the connections between patterns of light, color, and figures before he could identify the sphere and the cube as such.[8]

The difficulty in understanding why Locke embraced Molyneux's justification for a negative answer becomes especially pronounced in light of the fact that he thought that properties such as figure are primary qualities and that our ideas of primary qualities exactly resemble those qualities themselves.[9] Given this, along with the plausible supposition that exact resemblance is a transitive relation, it follows that a person's tactile and visual ideas of figure exactly resemble each other. Thus, given Locke's views about primary qualities and common sensibles, it seems that he should have said that the blind person would be able to call up and deploy the tactually acquired idea when first visually presented with the sphere and the cube and thereby be able to tell which is which.

2. Locke's Placement of Molyneux's Thought Experiment

Locke included a discussion of Molyneux's thought experiment in II.ix. viii of the second through the fourth edition of the *Essay*. Up to this point in book II, Locke has discussed the origin of ideas generally, the nature of simple ideas, and the metaphysics of primary and secondary qualities. Simple ideas enter the mind through the different senses of taste, touch, sight, sound, and smell. These ideas cannot be separated into more basic components and are received passively by the mind. As Locke put it, "These simple ideas, when offered to the mind, the understanding can no more refuse to have, nor alter when they are imprinted, nor blot them out and make new ones itself, than a mirror can refuse, alter, or obliterate the images or ideas which the objects set before it do therein produce" (II.i.xxv, 188). Simple ideas can represent either primary qualities or secondary qualities. Primary qualities—for example, figure, shape, bulk, number, and motion—are properties that inhere in objects themselves.[10] Secondary qualities, on the other hand—for example, tastes, colors, and smells—are dispositions or powers to produce ideas in subjects; they do not inhere as such in the objects themselves but are, in a sense, mind-dependent properties. The secondary qualities of an object depend on that object's primary qualities, its categorical base, as well as the nature of the environment and the perceiver. Whereas

ideas of primary qualities always exactly resemble the qualities they represent, ideas of secondary qualities never do.

Chapter ix, "Of Perception," begins Locke's explicit treatment of the mind's operations and the ideas of reflection whose object is those operations. After this, he discusses complex ideas in general, the complex ideas one has of modes, substances, and relations and the nature of abstraction. The fact that Locke does not discuss abstraction until after discussing Molyneux's problem seems to block a fairly straightforward explanation of his verdict. Locke may have claimed that the newly cured blind person's ideas of spheres and cubes were not sufficiently general or abstract before visual-tactile learning. This would be consistent with Molyneux's justification, but also importantly different from Berkeley, who denied the existence of abstract ideas. However, as Martha Brandt-Bolton points out, "[N]o principle of Locke's philosophy precludes the possibility that a blind man should have formed an idea of a globe sufficiently abstract to represent a globe were he to see one."[11] So, if abstraction was part of Locke's explanation for why he answers Molyneux's question the way he does, he would have needed to make this case explicitly, which he never does.

For present purposes, it will be important to focus on chapter ix, the chapter in which Locke discusses the nature of perception itself. There Locke turns to the importance of the interaction between perception and judgment. He claims, "The ideas we receive by sensation, are often, in grown People alter'd by the Judgment, without our taking notice of it" (II.ix.viii, 145). As an example of this phenomenon, Locke discusses our visual perception of a globe. When one looks at a globe, he claims, the visual idea one receives is of a flat and unevenly shaded circle. As he puts it, "When we set before our eyes a round globe of any uniform colour, v.g. gold, alabaster, or jet, it is certain that the idea thereby imprinted on our mind is of a flat circle, variously shadowed, with several degrees of light and brightness coming to our eyes" (ibid.). However, because people are accustomed to perceiving convex surfaces in this way, "[t]he Judgment presently, by an habitual custom, alters the Appearances into their Causes: So that from that, which truly is variety of shadow or color, collecting the Figure, it makes it pass for a mark of Figure, and frames to it self the perception of a convex Figure and an uniform color" (ibid., 145–46). One can tell from experience with two-dimensional paintings that such an alteration occurs. It is at just this point that Locke starts to discuss Molyneux's problem. Accordingly, it makes sense, given its textual placement, that Locke's answer to the problem deals with issues concerning the interaction between perception and judgment, particularly as it concerns the perception of depths.[12]

Locke endorses both Molyneux's answer to the problem, which he acknowledges is counterintuitive, and Molyneux's justification for that answer. Afterward, Locke states his purpose for including the thought experiment: "This I have set down, and leave with my reader, as an occasion for him to consider how much he may be beholden to experience, improvement, and acquired notions, where he thinks he had not the least use of, or help from them" (II.ix.viii, 146). In other words, the purpose of presenting Molyneux's thought experiment is to provide a demonstration of just how subtle and unimposing the ways in which judgments involving ideas antecedently acquired through experience can be in altering our perceptions. While people may ordinarily think that they directly see three-dimensional shapes, this is only because perception-altering judgments, once habitual, are rarely noticed.

Locke goes on to emphasize that judgment mostly affects visual perception because it is the most basic and comprehensive of human senses. People receive ideas of both secondary qualities, such as color, and ideas of primary qualities, such as figure and motion, through visual perception. This creates a conditioned response that makes people especially prone to mix sensation and judgment in visual perception.[13] Once one has become habituated to forming quick and immediate judgments on the basis of sensation, the fact that one is making such a judgment ceases to be transparent. It is this link between habitual judgments and perception that will help illuminate the consistency of Locke's response to the Molyneux problem.

3. The Role of Active and Passive Perception in the Molyneux Problem

Prior to the issue of whether the person in Molyneux's thought experiment could visually distinguish the cube and the sphere is the question of whether that person could see the cube and sphere as three-dimensional figures. Laura Berchielli has argued that Locke thought that people can directly see three-dimensional figures without making any judgments.[14] This interpretation is suggested by the fact that Locke thought our ideas of primary qualities, such as figures, exactly resemble those figures.[15]

The reason, Berchielli suggests, Locke thought the person in Molyneux's thought experiment would not be able to recognize the figures is because that man would fail to recognize that his old tactile ideas and his new visual ideas co-refer. Just as someone can think about Hesperus or think about Phosphorus without knowing that their thoughts are both about Venus, tactile ideas and visual ideas can refer to the same figure without the subject thereby being in an epistemic position to recognize this. Berchielli posits that, although the identification could not be

immediately made, it would be possible for the blind man to make the identification after some time had passed. To understand Berchielli's thoughts on how the blind man may come to make such identifications, drawing a distinction between passive and active mental processes will prove illuminating. Perceiving an idea counts as *active* when it requires either perception-altering judgments or relative movement between the perceiver and stimulus. A perceptual process counts as increasingly active to the extent that it requires perception-altering judgments or complex movements generated by the perceiver, for example, when it requires subtle tactile grasping or coordinated eye and head movement in order to perceive different kinds of ideas.[16]

Berchielli interprets Locke as holding that the newly cured blind person would, after actively looking for some period of time, be able to identify the sphere and the cube as such. In a key passage, she claims,

> In my model, the material impressions of sight in Locke are not (instantaneous) retinal images, but rather a succession of images. One is struck by the modernity of this conception of visual stimulus and the content of the visual idea. Sight and touch appear then to fit into the same general model, one in which perception needs time and movement to get a clear and distinct idea of form. ("Color, Space, and Figure in Locke," 58)

Berchielli's basic idea is that relative movement between lights and colors, which are represented on the retina and which aggregatively form the visual given, allow the visual system to extract three-dimensional shape information noninferentially. However, when the blind man's sight is restored, Locke was assuming that neither the man nor the objects are moving. Because there is no movement, the blind man would not have the proper visual input available to perceive three-dimensional figures directly.

Berchielli's interpretation does not require that the movement be generated by the perceiver; rather, the movement necessary to perceive three-dimensional objects directly as such can be generated by movement of the objects out in the world. Moreover, her account does not require that judgment is necessary in order to perceive three-dimensional figures visually.[17] Thus, Berchielli's account is a passive account of perception. This passive account manages to preserve much of what is important in the empiricist notion that there is a passively received epistemic foundation.[18] Her interpretation should clearly be commended for ingenuity on this point. In regard to Molyneux's thought experiment, her specific interpretation has it that the newly cured blind man would only fail to be able to tell the difference between the sphere and the cube *at first*, that is, before he had a chance to perceive the figures moving.

However, Berchielli's interpretation is tendentious and unstable. Ralph Schumacher has raised a number of significant problems with it.[19] His most damaging criticism is that the interpretation requires ignoring the wording of Molyneux's question, which includes the explicit qualification, "whether by his sight, before he touch'd them" (II.ix.,viii, 146). Berchielli's account makes no reference at all to touch; for her, the Molyneux question can be understood solely through Locke's views on vision. Additionally, Schumacher objects that Berchielli's interpretation fails to make sense of why Locke endorsed Molyneux's justification for a negative answer to the question. That justification, recall, is in terms of the newly cured blind person's having yet to learn experientially the necessary visual-tactile associations (ibid.). But on Berchielli's interpretation, since simply looking around would be sufficient for the person to be able to distinguish the figures, lacking the right visual-tactile associations is not part of the explanation.

In order to avoid the pitfalls of following Berchielli, one might suppose that Locke thought that vision was more active than she supposes. Locke clearly thought perception was at least sometimes active, for the section in which he lays out his views about the passivity of perception is entitled "In the Reception of Simple Ideas, the Understanding Is for the Most Part Passive" (II.i.xxv, 118). This opens up the possibility that Locke thought perception could be both passive and sometimes active. The proposal suggested here is that some modalities tend to be more active (for example, vision) and some tend to be more passive (for example, touch). So, while ideas of two-dimensional figures could be seen as common sensibles, passively received by both sight and touch, passively received ideas of three-dimensional figures could be seen as proprietary to touch. On this interpretation, visually perceiving three-dimensional figures counts as active not because doing so relies on relative movement but because it requires perception-altering judgments. Ideas of three-dimensional figures would, thus, be a mongrel category; those received by touch would be passively received, whereas those received by sight would be actively received. This interpretation would allow Locke a consistent answer to the Molyneux question. The newly cured blind man cannot see the sphere or the cube because he has not learned how to make the sort of perception-altering judgments people with normal vision frequently do, namely, judgments that deploy tactually acquired ideas of three-dimensional figures.

To bolster this interpretation, recall that when a normally sighted person gazes at a convex surface, "the idea thereby imprinted in our Mind, is of a flat circle variously shadow'd" (II.ix.viii, 145). This suggests that only the idea of a two-dimensional figure is passively received through vision. As Locke says, it is only by an immediate and unnoticed act of

judgment that one transforms the visual experience of a two-dimensional shape into an idea of a three-dimensional surface or figure. His analogy to painting further suggests that two-dimensional figures alone are passively received through vision.[20] Finally, it is worth noting that it was widely accepted among optical scientists working during Locke's time that the geometrical properties of retinal images had this implication concerning character of the visual given.[21]

On the interpretation offered here, Locke is in no way committed to claiming that the ideas of figures provided directly by visual experience are three-dimensional. However, he is quite likely committed to this in the case of touch. After all, unlike vision in which the scene that is projected onto the eyes at a moment never has more than two spatial dimensions, people frequently tactually encounter three dimensions at a moment, for example, when they hold a cube or a sphere in their hands. Locke also grants that once one has the ideas of lines, curve, angles, etc., one can form new ideas of figures through acts of judgment. Such judgments would allow one to obtain a geometric understanding of three-dimensional figures, regardless of whether one ever directly felt such objects. None of this undermines Locke's stated justification for his verdict to Molyneux's problem. The ability to understand the geometrical nature of three-dimensional figures and form new complex ideas of them is not itself sufficient for the newly cured person to make the appropriate perception-altering judgments utilizing tactually acquired ideas of figures and cubes. That ability arises only from habitually visually experiencing three-dimensional objects that are also engaged tactually.

In order to round off the defense of this interpretation, one last interpretive option must be considered and dispensed with. In her essay, "The Real Molyneux Problem and the Basis of Locke's Answer," Martha Brandt-Bolton has also interpreted Locke as positing that the newly cured blind person could not see three-dimensional shapes as three-dimensional shapes without the aid of perception-altering judgments. However, her interpretation of Locke has it that Locke held a view of perception that is far too active for his empiricist sensibilities. She also maintains that Locke "claimed entirely without restriction that we see figures by judging color and shading" and that "when he considered Molyneux's question, he assumed that bodily shapes are not immediately given to sight" (82–83).[22] To support this assertion, she calls attention to the fact that Locke claims that form "is truly a variety of shadow or color, collecting the figure" and that the "proper object" of sight is "light and colours" (II.ix.viii, 145). However, as argued above, it should be clear that Locke did indeed think that people directly see two-dimensional figures. Furthermore, as Berchielli points out, Brandt-Bolton's interpre-

tation requires that Locke was being metaphorical when he described perceiving a convex surface as leaving an idea of "flat circle" (ibid). More troubling, if Brandt-Bolton is right, then Locke's empiricist epistemology would be in peril. Her view would saddle Locke with an overly active view of perception, antithetical to his empiricist epistemology. If one always needed to make a judgment in order to perceive a figure and if judgments are made up of ideas, then one would need ideas to perceive any figures, which implies that one would need innate ideas to see figures in the first instance.

In sum, the interpretation defended here takes an intermediate position on the extent to which simple ideas are perceived actively. *Pace* the hyperactive position of Brandt-Bolton, given Locke's inclusion of "figure" both as a common sensible and as a simple idea, it is likely that he thought the newly cured blind person could see two-dimensional geometrical figures without the aid of judgment. *Pace* Berchielli, given Locke's views on perception-altering judgments and depth perception, it is unlikely that the newly cured blind person could see three-dimensional geometrical figures without the aid of judgment. The interpretation defended here allows that three-dimensional geometric figures must be actively visually perceived because the perception requires some perception-altering judgments. Although one can passively perceive three-dimensional objects through touch, one could not transfer the tactile idea of (for example) "cube" to the visual because the visual idea of cube requires active judgments. These judgments would require some prior cross-modal experience and training. One would have to have a habitual connection between touching the three-dimensional object and seeing the three-dimensional object before one could make the correct perception-altering judgments.

4. Consciousness and the Molyneux Problem

One may object that the interpretation defended here is ruled out on the grounds that it requires that Locke thought that there were unconscious mental states. This would be problematic because many interpret Locke as holding the view that the mind is necessarily conscious.[23] For example, in their essay "Locke on Consciousness," Angela Coventry and Uriah Kriegel claim, "Locke says explicitly that mental states are necessarily conscious in numerous passages. . . . [I]t was deemed a conceptual truth that all mental states are conscious in the sense that one is conscious of them, or is aware of being in them." Their claim seems to be suggested strongly by passages like the following: "Whilst it thinks and perceives, it is capable certainly of those of delight or trouble, as well as any other perceptions; and it must necessarily be conscious of its own perceptions" (II.i.xii, 108).

It seems, then, that any interpretation that claims that unnoticed and habitual perception-altering judgments play an essential role in Locke's justification for a negative answer to Molyneux's question must be squared with his views on consciousness. Although a case can be made that Locke did indeed countenance unconscious judgments, the present account can sidestep the question of Locke's views on consciousness.[24] For the present interpretation, all that is necessary is that sometimes one does not realize that one is making perception-altering judgments. Locke could allow that, though perception-altering judgments are conscious, they are also ephemeral and immediately forgotten after becoming conscious. What the perception-altering-judgment interpretation needs is not that Locke allows for unconscious states; rather it requires acknowledging that certain judgments are rarely noticed or attended to. Nothing Locke says rules out the possibility that he thought perception-altering judgments were conscious but usually unnoticed.[25]

5. The Ambiguous Nature of Molyneux's Question

What has probably become clear from the above discussion is that Molyneux's question is underdescribed as posed. Before it can be answered, more constraints need to be added. Is the question supposed to be about whether the formerly blind man can make the identification immediately after opening his eyes? Is it about whether he can make it after looking at the objects for some short but significant amount of time? Is the man allowed to move his eyes and head once sight is returned? Is he able to get up and walk around the objects? If he is stationary, can the objects move around, or must they also be stationary? Answers to these questions may change how Locke would have answered Molyneux's specific question. Since Molyneux's original intent is unclear, this essay cannot necessarily answer his question once and for all. Nevertheless, the cross-modal learning account defended here helps one see how Locke would have responded to different variants of Molyneux's problem.

The suggested interpretation can be used to determine what Locke's answers to other variants of the Molyneux problem would have been. One variant, originally due to Denis Diderot, is a different dimensional variant of the problem.[26] Diderot asks the reader to consider whether a newly cured blind person, who had previously learned to distinguish circles from squares, would be able tell the difference upon a visual presentation of them. Another variant involves the story's being told in reverse, that is, as starting with a sighted person who could tell the difference between a sphere and a cube visually but could not feel things through touch.[27] In both variant cases, Locke would have answered affirmatively had Molyneux presented him with those cases, even if it was specified that the formerly blind man and the objects

were stationary. In regard to the first case, the newly sighted person would be able to distinguish the circle from the square because the intermodal connections would not need to be learned through habituation; rather, the man would just open his eyes and be able to see reflexively the two-dimensional figures as two-dimensional figures.[28] In the other case, since the man with the new sense of touch could directly and passively perceive the simple ideas of the sphere and the cube, or any other three-dimensional shape, it follows that he would be able to recognize them upon first touch.

6. Conclusion

Molyneux's thought experiment was widely discussed among the intellectual class throughout the eighteenth and nineteenth centuries, in part because it was discovered that certain forms of blindness could be cured. Thus, it came to be regarded as an empirical issue capable of experimental resolution. Contemporary cognitive science has identified a number of different strands of evidence relevant to its resolution. On the one hand, there is ample evidence that blind subjects whose blindness is cured in adulthood, through cataract surgery, for example, are unable at first to recognize cubes and spheres visually.[29] However, these experiments have not involved congenitally blind subjects, that is, subjects completely blind from birth. In fact, due to the way their brains develop differently, it is unlikely that congenitally blind subjects can be made to see altogether.[30] On the other hand, evidence from developmental psychology suggests that neonates are capable of cross-modal transfer without learning. For instance, a series of studies ran by Arlette Streri and colleagues have shown that infants, sixteen to one hundred hours old, can identify three-dimensional objects by sight after previously only handling the objects.[31] The infants had one of the two objects placed in their hand until they habituated to the object (infants "habituate" to a stimulus once they have become bored with the object). Immediately after habituation, infants had both the object they handled and the novel object shown to them visually. Infants significantly and reliably looked longer at the novel object, regardless of which object they received during the tactile-habituation phase. This experimental paradigm is based upon the well-tested assumption that infants will look longer at novel objects than at familiar ones. Thus, it seems that neonates are able to recognize by sight the three-dimensional objects they had previously only experienced by touch, without prior visual-tactile learning. While this case is not precisely analogous to the Molyneux case, both because of neural plasticity and because the infants are not actually blind prior to being visually presented with the three-dimensional objects for the first time, it does raise a significant worry for any thoroughgoing empiri-

cism. That said, Locke could not have anticipated these results. Given what he did know and what he thought about the mind more generally, his views were indeed coherent and internally consistent.[32]

* *Lewis & Clark College*
** *University of North Carolina–Chapel Hill*

NOTES

1. For discussions of Molyneux's problem within the philosophy of mind that characterize the historical dialectic in the way suggested, see John Campbell, "Molyneux's Question," *Philosophical Issues: Perception* 7 (1996): 301–18; Shaun Gallagher, *How the Body Shapes the Mind* (Oxford: Oxford University Press, 2005), 153–72; Gareth Evans, "Molyneux's Question," reprinted in *Vision and Mind*, ed. A. Noë and E. Thompson (Cambridge, MA: MIT Press, 2002), 319–49; and Janet Levin, "Molyneux's Question and the Individuation of Perceptual Concepts," *Philosophical Studies* 39 (2008): 1–28.

2. For a particularly succinct statement to this effect, see Désirée Park, "Locke and Berkeley on Molyneux's Problem," *Journal of the History of Ideas* 30 (1969): 253–60, who claims, "their historical agreement about the question is fundamentally misleading, for on no account would either Locke or Berkeley have accepted the premises that led to the conclusion of the other" (253).

3. All references to Locke's *An Essay concerning Human Understanding* are from the P. H. Nidditch edition (Oxford: Clarendon Press, 1975) and will be cited in text by book, chapter, section, and page.

4. In Molyneux's words,

> A Man, being born blind, and having a Globe and a Cube, nigh of the same bignes, Committed into his Hands, and being taught or Told, which is Called the Globe, and which the Cube, so as easily to distinguish them by his Touch or Feeling; Then both being taken from Him, and Laid on a Table, Let us Suppose his Sight Restored to Him; Whether he Could, by his Sight, and before he touch them, know which is the Globe and which the Cube? Or Whether he Could know by his Sight, before he stretch'd out his Hand, whether he Could not Reach them, tho they were Removed 20 or 1000 feet from Him?

"Letter to John Locke, 7 July, 1688," in *The Correspondence of John Locke*, ed. E. S. de Beer (Oxford: Clarendon Press, 1978), vol. 3, no. 1064. Note that the second question, which was omitted from Molyneux's letter to Locke on March 2, 1692, raises issues about recognizing depths and distances rather than recognizing three-dimensional figures as such. The fact that Molyneux posed both questions initially and later omitted the second one suggests that he thought these issues were closely related.

5. The doctrine of common sensible can be traced back to Aristotle (in *De Anima*, trans. Hugh Lawson-Tancred [New York: Penguin Classics, 1987], 9–24, 418, and 425) who thought that there can be no special dedicated sense organs for the common sensibles, e.g., movement, magnitude, and number.

6. Note that the title of the chapter indicates that Locke considers the types of ideas enumerated here to be simple ideas. To modern ears, the title in the table of contents of the *Essay*, "Of Simple Ideas by More Than One Sense," makes this point more clearly. Some interpret this to Locke's being incautious, arguing that ideas like "figure" are actually not simple ideas but are complex ideas and simple modes. The idea is that any ideas that are brought to consciousness are necessarily complex, simple ideas all being unconscious. However, it is quite tendentious to suppose that Locke countenanced unconscious states (see Angela Coventry and Uriah Kriegel, "Locke on Consciousness," *History of Philosophy Quarterly* 25 [2008]: 221–42). Thus, this paper will not suppose that Locke made a mistake here and will assume that ideas like figure are simple, in order to avoid a somewhat anachronistic view that Locke thought there were unconscious mental states. In section 4 of this paper, the question of unconscious ideas will be dealt with in greater depth.

7. George Berkeley, *An Essay toward a New Theory of Vision*, in *The Works of George Berkeley, Bishop of Cloyne*, ed. A. A. Luce and T. E. Jessop (1732; London: Nelson, 1948–57), sect. 133.

8. A natural objection to Berkeley on this point is that shape information is immediately available to a subject given the image projected onto his or her retina. In response, Berkeley pointed out that, while seductive, it is a mistake to think that we have direct access to the retinal image. This can be demonstrated by the fact that we do not see the world upside down, despite the fact that the retinal image is inverted. In diagnosing the source of the illusion that we see retinal images, Berkeley claims, "What greatly contributes to make us mistake in this matter is that when we think of the pictures in the fund of the eye, we imagine ourselves on the fund of another's eye, or another looking on the fund of our own eye, and beholding the pictures painted thereon" (ibid., sect. 116). For detailed discussion of Berkeley's views on retinal images, see Colin M. Turbayne, "Berkeley and Molyneux on Retinal Images," *Journal of the History of Ideas* 16, no. 3 (1955): 339–55.

9. II.xxxii. xiv, 388–89. Locke's resemblance thesis is difficult to analyze, for it appears to lead to troubling consequences, e.g., pertaining to the nature of nonveridical perception. This essay follows Michael Jacovides, "Locke's Resemblance Theses," *Philosophical Review* 108, no. 4 (1999): 461–96, in assuming that Locke holds a simple resemblance thesis.

10. The question of what counts as a simple idea is vexed and cannot be adequately answered here. Instead, the argument that follows presupposes that Locke considers shape to be a simple idea. Motivation for this presupposition comes from the quote reproduced above (II.v), where Locke mentions shape while discussing simple ideas, and from II.xi.vii, 158, where Locke writes, "For, though they [brutes] take in, and retain together, several combinations of

simple ideas, as possibly the shape, smell, and voice of his master make up the complex idea a dog has of him, or rather are so many distinct marks whereby he knows him." This interpretation of shape as a simple idea has nonnegligible interpretive consequences. For example, it puts pressure on one's take on the relation between primary qualities and macro-objects. If primary qualities are properties of corpuscles, then people would have to infer shape (as opposed to see it directly) and so shape would not count as a simple idea. Thus, if one takes shape to be a simple idea, then one also takes primary qualities to be properties of macro-objects This consequence coheres well with a straightforward phenomenological interpretation of the exact resemblance thesis like Hume's (thanks to Jeffrey Tlumak and Alan Nelson for discussion on these points).

11. Martha Brandt-Bolton, "The Real Molyneux Problem and the Basis of Locke's Answer," in *Locke's Philosophy: Content and Context*, ed. G. A. Rogers (Oxford: Oxford University Press, 1994), 82–83.

12. Recall that this is also suggested by the second question posed in Molyneux's original letter; see note 4.

13. II.ix.ix, 146.

14. Laura Berchielli, "Color, Space, and Figure in Locke: An Interpretation of the Molyneux Problem," *Journal of the History of Philosophy* 40 (2002): 47–65; and Park, ibid. For instance, Berchielli claims, "I believe Locke considers it possible for sight to receive ideas of three dimensional shapes without having recourse to judgment" (53).

15. II.i.xxv, 118, cited above.

16. For a contemporary theory of visual perception that emphasizes the active role of saccadic eye movement in realizing various kinds of visual states, see Kevin O'Regan and Alva Noë, "A Sensorimotor Approach to Vision and Visual Consciousness," *Behavioral and Brain Sciences* 24, no. 5 (2001): 939–73. O'Regan and Noë appeal to research by Paul Bach-y-Rita, "Tactile Vision Substitution: Past and Future," *International Journal of Neuroscience* 19 (1983): 29–36. Tactile-vision substitution systems are devices designed to help the blind make use of visual information. A camera is hooked up to a pad that tactilely stimulates the subject in ways isomorphic to incoming visual information. Some subjects claim to have visual experiences and are able to perform tasks requiring the use of visual information, but this only happens when they are able to hold the camera themselves. Michael Morgan, *Molyneux's Question* (Cambridge: Cambridge University Press, 1977), discusses the bearing early research with these devices has on the correct answer to Molyneux's question.

17. Berchielli writes,

> The attention necessary to move from confused ideas of the different parts of a landscape or of a clock to clear ideas of them is not the same thing as a judgement. There are then two sorts of ideas of sensation: first, the clear ideas resulting from attentive observation and consideration by the subject, and second, confused ideas resulting from hasty observation of the object at hand.

> There is no difference in the immediacy of these two sorts of simple idea: both are simple ideas of sensation. ("Color, Space, and Figure in Locke," 57)

18. The intuition here is that empiricists are reluctant to think of perception as an active process because doing so implies that perception requires antecedently possessing some ideas. If ideas are necessary for perception, then there would have to be innate ideas for any perception (or learning, for that matter) to occur. Thinking of perception as a passive process that generates an epistemic foundation, however, does not require innate ideas.

19. Ralph Schumacher, "What are the Direct Objects of Sight? Locke on the Molyneux Question," *Locke Studies* 3 (2003): 41–61, esp. 57–58n26.

20. II.ix.viii, 145–46. This accords with what Berchielli calls the "standard interpretation," namely, that "in Locke, only the sense of touch can receive ideas of three-dimensional figures, whereas sight always receives two" ("Color, Space, and Figure in Locke," 48).

21. See Michael Ayers, *Locke, Volume I: Epistemology* (London: Routledge, 1991), and Gary Hatfield, *The Natural and the Normative: Theories of Spatial Perception from Kant to Helmholtz* (Cambridge, MA: MIT Press, 1990), for detailed historical documentation on this point.

22. Evans, "Molyneux's Question, 345n5, also advocates this interpretation.

23. The tension between Locke's views on Molyneux's problem and consciousness was first noticed and used as an objection to Locke in 1746 by Étienne Bonnot de Condillac, *Essai sur l'origine des connaissances humaines* (Paris: Alive, 1998). The expression "the mind is necessarily conscious" is not meant to imply that Locke thought that the mind was always thinking. He could allow that the essence of the mind was not necessarily to think and still hold that the mind is necessarily conscious of its workings. He could either hold that the mind is conscious of whatever is happening in it (i.e., whatever states it is in when it is in some particular state) or he could hold an antirepresentational view of consciousness, where one can be conscious without being conscious of any particular thing. For contemporary discussion of some the issues at play here, see, e.g., Fred Dretske, "Conscious Experience," *Mind* 102 (1993): 263–83.

24. Berchielli also considers this objection and concludes that (*pace* Coventry and Kriegel) Locke indeed can countenance unconscious mental states ("Color, Space, and Figure in Locke," 64). She reads Locke as a pragmatist of sorts and makes her argument based on "the criterion of usefulness" (65). However, her arguments are unconvincing. The posited criterion at most amounts to the thought that, if something is not useful to have in the mind, then the mind will not contain that thing, whereas what she needs is a principle that states that, if something is useful to have in the mind (like unconscious states), then the mind will have it. Regardless, there is scant evidence that Locke held either reading of the criterion of usefulness.

25. The present interpretation allows Locke to countenance an odd form of subliminal perception. Although Locke probably did not think that there are

unconscious mental states as such, his view does allow him to have states that are immediately forgotten. If Locke was willing to allow for easily forgettable conscious inferences, there is no reason for him to bar a form of subliminal perception, though subliminal perception of an odd sort. This form of subliminal perception could be understood as perception that is only momentarily conscious and then forgotten. This is a substantively different take on subliminal perception than the contemporary understanding of the phenomenon as informational uptake without a phenomenological component (thanks to Jeffrey Tlumak for bringing this issue to our attention).

26. Denis Diderot, *Lettre sur les Aveugles* (translated in Morgan, *Molyneux's Question, 108*).

27. The authors are unaware of this variant case being considered anywhere else in the literature.

28. The claim that, while Locke answered negatively to the three-dimensional version of Molyneux's problem, he would have answered affirmatively to the two-dimensional version has also been briefly suggested by John Mackie in *Problems from Locke* (Oxford: Oxford University Press, 1976), 30–31. In part, the present essay can be seen as an expanded defense of a similar interpretation of Locke on Molyneux's problem in light of the subsequent exegetical debate.

29. For influential summaries and discussion of these experiments, see Donald Hebb, *The Organization of Behavior* (New York: Wiley, 1949); Marius von Senden, *Space and Sight*, trans. P. Heath (London: Methuen, 1960); and Morgan, *Molyneux's Question*.

30. This leads Marjolein Degenaar (in *Molyneux's Problem: Three Centuries of Discussion on the Perception of Forms*, trans. M. J. Collins [Dordrecht: Kluwer, 1996]), to claim "we have not answered Molyneux's question—and, indeed, we think that it cannot be answered because congenitally blind people cannot be made to see once their critical period is passed" (132).

31. For an early influential study, see Arlette Streri and Elizabeth Spelke, "Haptic Perception of Objects in Infancy," *Cognitive Psychology* 20 (1988): 1–23. For a more recent study using a cylinder and a prism, see Arlette Streri and Edouard Gentaz, "Cross-modal Recognition of Shape from Hand to Eyes in Human Newborns," *Somatosensory and Motor Research* 20, no. 1 (2003): 13–18.

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