

Locke and the Visual Array

1 Introduction

A.D. Smith opens his excellent paper, “Space and Sight,” by remarking,

One of the most notable features of both philosophy and psychology throughout the eighteenth and nineteenth centuries is the almost universal denial that we are immediately aware through sight of objects arrayed in three-dimensional space. This was not merely a denial of Direct Realism, but a denial that truly visual objects are *even phenomenally* presented in depth (481).

Times have changed. As Smith writes, “It is hard to think of a more radical reversal in thinking than the one that separates such an outlook from that which prevails today; for this erstwhile orthodoxy is hardly given even serious consideration in our own times, at least among philosophers” (482). How could this doctrine come and go? How can there be fashion in phenomenology?¹

Let me answer the question indirectly, by considering Locke’s reasons for advancing the doctrine. According to him, “When we set before our Eyes a round Globe, of any uniform colour, *v.g.* Gold, Alabaster, or Jet, ‘tis certain, that the *Idea* thereby imprinted in our Mind, is of a flat Circle variously shadow’d, with several degrees of Light and Brightness coming to our Eyes” (2.9.8).² Adults have acquired ideas of three-dimensional shapes

¹ I presented this material to the Oxford Seminar in Early Modern Philosophy, and I’m grateful to the audience for its criticisms and to Paul Lodge for his hospitality. I also presented this paper to Wayne State’s philosophy department, and I thank that audience as well. I had useful discussions on the subject with Jan Cover. I’m grateful to Antonia LoLordo for helpful comments and for not telling me that the paper is crazy. I thank Dan Kelly for helping me track down duck-rabbit references. I thank Eric Schwitzgebel for gracious and illuminating correspondence, and I also thank my anonymous reviewers for their comments.

² References with three Arabic numerals separated by periods are to Book, Chapter, and Section of Locke’s *Essay Concerning Human Understanding*, edited by Peter H. Nidditch (Oxford: Clarendon Press, 1975). References to Locke with two Arabic numerals are to volume and page of *The Works of John Locke*, 10 vols. (London: Thomas Tegg, 1823). References to Descartes are first to volume and page of the Adam and Tannery edition of *Oeuvres de Descartes*, 11 vols (Paris: Vrin, 1973) and then to volume and page of Cottingham, Stoothoff, and Murdoch’s edition of *The Philosophical Writings of Descartes*, 3 vols. (Cambridge: Cambridge University Press, 1984-91). References to *The Search After Truth* are first to volume and page of Jean-Christophe Bardout’s

(presumably by touch) and, in the sighted, these ideas of three-dimensional shapes have become psychologically associated with two-dimensional visual arrays.³ Thus, when a person receives the idea of a variously colored flat circle, her faculty of judgment quickly forms ideas of three-dimensional globes,

having by use been accustomed to perceive, what kind of appearance convex Bodies are wont to make in us; what alterations are made in the reflections of Light, by the difference of the sensible Figures of Bodies, the Judgment presently, by an habitual custom, alters the Appearances into their Causes.

So judgment takes

that which is truly a variety of shadow or colour, 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 Colour; when the *Idea* we received from thence, is only a Plain variously colour'd, as is evident in Painting.

In this paper, I will examine three considerations that led Locke to believe we see a variously colored circle when we look at a homogeneously colored globe. The first is from the anatomy of the eye, the second from realistic paintings, and the third from the phenomenology of the particular case itself. None of these considerations is really an argument. I'll defend the legitimacy of a limited version of the last consideration and then use that defense to solve the puzzle that I opened with. In the story that I will tell, thinking about anatomy and painting in certain ways caused Locke to have the introspective experience that he had.

edition of *De la Recherche de la Vérité*, 3 vols (Paris: Vrin, 2006) and then to page number in Thomas M. Lennon and Paul J. Olscamp's edition and translation (Cambridge: Cambridge University Press, 1997). References to the *Republic* are with Stephanus numbers. I've modified most of the translations.

³ Here I adopt the standard reading of the passage as advanced by Menno Lievers (407-10) and others. Recent papers by Martha Bolton (1994) and Laura Berchielli (2002) have offered alternatives to the standard reading. I criticize these alternative readings in my forthcoming 'Locke on Perception.'

2 From the Anatomy of the Eye

2.1 Perceiving the Retinal Image

One of Malebranche's arguments against the scholastic view that sensible species pass from extended objects to our soul runs as follows: "one can see from the same place or the same point a very large number of objects in the sky and on the earth; thus, the species of all these bodies would have to be reducible to a point. But they are impenetrable, since they are extended, therefore . . . etc." (B 1.440 LO 220-21). The sensible species of distant bodies are themselves extended, so they can't all fit onto the unextended soul. In his *Examination of P. Malebranche's Opinion of Seeing all Things in God*, Locke doesn't defend what he calls "the learned gibberish of the schools" (9.215), but he does discuss Malebranche's objections to scholasticism insofar as they apply to Locke's own view.

Locke first treats Malebranche's objection as a point about optics and replies with Kepler's discovery that the lens of each eye focuses an image on the retina behind it:

as to what is said, that from one point we can see a great number of objects, that is no objection against the species, or visible appearances of bodies, being brought into the eye by the rays of light; for the bottom of the eye or retina, which, in regard of these rays, is the place of vision, is far from being a point (9.216).

Appearances of bodies are produced on the retina by rays of light, and the retina is extended. This reply only deals with "P. M.'s objections against so much of material causes as my hypothesis is concerned in" (9.217). Locke doesn't have any account of the leap from retinal imagery to consciousness. The best he can do is say that this lacuna makes his theory no worse than Malebranche's: "when by this means an image is made on the retina, how we see it, I conceive no more than when I am told we see it in God" (ibid.). As he does in the *Essay*, he emphasizes in the 'Examination' that the mechanism by which neural motions "produce ideas in our minds" works "in a manner to me incomprehensible (ibid.).

Locke's implication that we see our retinal images needs analysis. It's not one that would have occurred to anyone before Kepler or one that follows from Kepler's discovery. Locke repeats the claim with an explanatory analogy: "we may be said to see the picture in the retina, as, when it is pricked, we are truly said to feel the pain in our finger" (9.218). But the simile also needs analysis. According to Locke, all pains, including pains both "of Body or Mind, as they are commonly distinguished" are really "only different Constitutions of the Mind" (2.20.2). The difference between corporeal pains and mental pains lies entirely in their casual antecedents; that is, in whether they were "occasioned by disorder in the Body" or "by thoughts of the Mind" (ibid.). So here's a way of understanding the upshot of Locke's analogy: visual ideas belong to the retina because retinal images cause them.

It's hard to believe that this is all that there is to Locke's analogy between perceiving pain in a finger and perceiving our retinal imagery. After all, the thrust of a sword might cause the idea of pain in us, but he isn't tempted to say that the pain is in the sword (2.8.13). A salient feature of a pain in the finger is that we feel it in the finger. We might imagine its seeming to someone as if the visual array were at the back of his eyes. I'd be surprised if anyone could manage to perceive the visual array upside-down, backwards, and segmented in two, in alignment with his retinal images.

Contrast Locke's simile with Malebranche's assertion "that we would judge or sense colors at the bottom of our eyes just as we judge that heat is in our hands, if we were given our senses in order to discover the truth" (*B* 1.203 *LO* 57). According to Malebranche, if the function of our senses were to reveal the world as it is, then colors would seem to us as if they were on our retinas. For Malebranche, it goes without saying that they don't seem to be there.

2.2 *The Psycho-physical Law for Sight*

Let me suggest that the point of Locke's comparison between feeling pain in a finger and seeing the retinal image is this: the ideas in the visual array immediately and directly correspond to the state of our retinal images, just as corporeal pains immediately and directly correspond to a bodily injury. He believes that the connections between body and mind are straightforward and each patch of each retinal image produce a corresponding patch in the visual array.

At *Essay* 4.2.11, Locke attempts to explain why we don't have sciences based on simple ideas and their modes beyond those of number and extension, even though his theory of knowledge suggests that we should. The problem, he decides, is that we don't have proper measures of the degrees of our simple ideas, because

those other simple *Ideas*, being appearances or sensations, produced in us, by the Size, Figure, Number, and Motion of minute Corpuscles singly insensible, their different degrees also depend upon the variation of some, or all of those Causes; which since it cannot be observed in us in Particles of Matter, whereof each is too subtile to be perceived, it is impossible for us to have any exact Measures of the different degrees of these simple *Ideas*.

If we could measure the corpuscularian sources of our sensations, then we could proceed with a science of sensation. So, Locke hypothesizes,

supposing the Sensation or *Idea* we name *Whiteness*, be produced in us by a certain number of Globules, which having a verticity about their own Centres, strike upon the *Retina* of the Eye, with a certain degree of Rotation, as well as progressive Swifttness; it will hence easily follow, that the more the superficial parts of any Body are so ordered, as to reflect the greater number of Globules of light, and to give them that proper Rotation, which is fit to produce this Sensation of White in us, the more White will that Body appear, that, from an equal space sends to the *Retina* the greater number of such Corpuscles, with that peculiar sort of Motion.

Locke assumes that, if the idea of white is produced by corpuscles with a certain spin, then the more such corpuscles strike the retina, the whiter the body will look. On this

assumption, if we could measure the number of light corpuscles of a color type that strike the retina, then we could exactly measure the degrees of our simple ideas of color.⁴

In putting forward his hypothetical account of color, Locke not only borrows Descartes's theory of light according to which white light is composed of particles with a certain spin,⁵ but he also adopts a retinal version of the *Sixth Meditation* principle that "each one of the motions that occurs in the part of the brain that immediately affects the mind brings nothing to the mind except for some single sensation" (AT 7.87 CSM 2.60). Descartes calls the sensations produced in this one-to-one manner (among which he includes colors) the second grade of sensation. Final judgments about position and length come later and constitute what he calls the third grade of sensation (AT 7.436-38 CSM 2.294-95, see Hatfield and Epstein, 375-79).

This Cartesian principle of one sensation for one motion helps explain what Geneviève Brykman refers to as Locke's "pulvérisation du donné" (517). According to Locke, our senses don't immediately present us with a polished coherent picture of the world. Instead, "though the Qualities that affect our Senses, are, in the things themselves, so united and blended, that there is no separation, no distance between them; yet 'tis plain, the *Ideas* they produce in the Mind, enter by the Senses simple and unmixed" (2.2.1). The initial collection of ideas of colors are arrayed two-dimensionally. These ideas need to be processed for us to judge that we are surrounded by three-dimensional objects. Locke's account is just like Descartes's, except that for Descartes the third grade of sensation results

⁴ Locke's assumption that apparent brightness is entirely and proportionately determined by the number of light corpuscles that strike the retina turned out to be wrong. As a matter of fact, more photons strike the retina from a lump of coal in daylight than from a piece of paper in the shade, but the coal still looks darker than the paper (Hardin 83).

⁵ In his *Elements of Natural Philosophy*, Locke offers a more accurate, Newtonian, account of white light.

from both reason and habit, whereas for Locke, the final judgment results merely “by an habitual custom” (2.9.8).⁶

Malebranche thinks that we see the sides of a cube as squares (B 1.441 LO 221). Locke thinks that this is a simple mistake, a mistake that reading the *Essay* would have averted (9.218). According to him, apparent figures are determined by the shapes cast on the retina: “we see the figures and magnitudes of things rather in the bottom of our eyes than in God: the idea we have of them and their grandeur being still proportioned to the bigness of the area, on the bottom of our eyes” (9.217-18). As H.E. Matthews observes, this passage implies that Locke believes that there is a systematic mapping from the retina to our visual ideas: “The most natural way to read this is to take the ‘idea’ to be the mental counterpart of the retinal image, since it is proportioned to it” (18).

In favor of Malebranche’s opinion, when we take a close, accurate view of a cube, the sides look like squares, since they are squares. In favor of Locke’s opinion, the different sides of the cube take up different proportions of the visual field. We may feel the inclination to split the difference. There’s one way of looking a cube so that its sides seem to be squares and another way so that its sides seem to be irregular quadrilaterals. At the end of the paper, I’ll defend this irenic inclination

It’s a defect in Locke’s account of depth perception that he doesn’t mention binocular vision. He does mention that our ordinary inability to notice the blind spot is partly due to our having two eyes (9.216). Perhaps in characterizing Locke’s view we should say that he thinks that a certain motion striking the retina in a healthy eye is sufficient, but not necessary for having a visual sensation. So if a corpuscle strikes *either* a portion of the

⁶ According to Locke, opinions produced by custom ought to be called a kind of madness, because of their “opposition to reason” (2.33.4, see also 2.33.5).

left retina with a certain motion *or* the corresponding portion of the right retina, then a color idea of a certain type will be produced in the corresponding part of the visual field. The correspondence that God sets up would have to be an inversion from left to right and from up to down in order to reorient the inversion of the retina images. This two-dimensional array of ideas would then, on Locke's account, be transformed by principles of association into ideas of three-dimensional objects.

Locke's belief in a relatively simple mapping from retina to idea comes out in his discussion of a more obvious anatomical feature of the eye, the eyelid. After he asserts that we transform ideas of circles into ideas of spheres, he's concerned to reply to the objection that we don't notice any such transformation of the ideas of sight (2.9.10). This is a pointed problem for him, since he believes a soul "must necessarily be conscious of its own Perceptions" (2.1.12). Locke's reply is that the association of perceptions occurs very quickly, and that habitual, rapid actions "often escape our observation" (2.9.10).⁷ By way of example, he asks, "How frequently do we, in a day, cover our Eyes with our Eye-lids, without perceiving that we are at all in the dark?" (ibid.) From the frequency of blinking, and of unnoticed verbal tics, Locke concludes "'tis not so strange, that the Mind should often change the *Idea* of its Sensation, into that of its Judgment, and make one serve only to excite the other, without our taking notice of it" (ibid.). His illustrative rhetorical question shows that he believes that we are in the dark every time we blink and that these moments of darkness pass too quickly and habitually to be noticed. Thus, Locke assumes a relatively uncomplicated connection between retinal illumination and ideas of sight: when no light strikes the retina, our phenomenal world goes dark.

⁷ In this and the previous quotation, I've omitted italics.

2.3 Possible Replies to Alternatives

Locke's view is coherent, but it's hardly the only picture compatible with the optical facts. Smith describes "a possibility that today suggests itself to us quite naturally: that pre-conscious processes can extract three-dimensional information from what is given to the eye, and can issue, as their *first* conscious upshot, in phenomenally three-dimensional visual experience" (A.D. Smith 492).

Let me sketch out two variants of this possibility. According to the first, which we might call 'biological three-dimensionalism', the brain mechanically takes the two retinal images along with mechanical signs of all the other available perceptual clues and forms a physical perceptual model from which an idea of the three-dimensional objects of sight arises in some mysterious manner.

On the second account, which might be called 'theistic three-dimensionalism,' our sense organs produce corporeal traces in our brain, and God produces ideas of three-dimensional objects in accordance with those traces. This is Malebranche's considered view as presented in the Seventeenth *Elucidation*, published after Locke's death. "By this general law," Malebranche writes, "God gives us precisely the perceptions of objects that we would give ourselves," if we had exact knowledge of our cerebral states, optics, and geometry, and if we were able to make accurate, instantaneous inferences from these (B 3.305 LO 733-34).⁸

Biological and theistic three-dimensionalism are compatible, of course. For some seventeenth-century theists the difference would just be a matter of emphasis. Does God or the brain carry out the most important part of the calculation taking us from retinal images to three-dimensional perception?

⁸ For good discussions see N. Smith 1905 and Bréhier 1938

Against biological three-dimensionalism, Locke would probably deny that mere matter could transform two-dimensional imagery into three-dimensional imagery. Consider his argument that bird songs show that birds store ideas in memory:

For it seems to me impossible, that they should endeavour to conform their Voices to Notes (as 'tis plain they do) of which they had no *Ideas*. For though I should grant Sound may mechanically cause a certain motion of the animal Spirits, in the Brains of those Birds, whilst the Tune is actually playing; and that motion may be continued on to the Muscles of the Wings, and so the Bird mechanically be driven away by certain noises, because this may tend to the Birds Preservation: yet that can never be supposed a Reason, why it should cause mechanically, either whilst the Tune was playing, much less after it has ceased, such a motion in the Organs of the Bird's Voice, as should conform it to the Notes of a foreign Sound (2.10.10).

To put the point anachronistically and unfairly, Locke's argument is that birds must have ideas of memory, because no mere mechanical process could produce the playback of a tape recorder. His willingness to present this argument shows that he has a low opinion of the processing power of mere matter, and he would not have been sympathetic to a view according to which the transformation of the retinal imagery into a corporeal representation of a three-dimensional world occurs mechanically.

Locke would certainly not argue that Malebranche's theistic three-dimensionalism goes beyond the power of God. But Locke's general tendency is to explain phenomena naturally as far as possible, and then to appeal to God only when the possibility of any natural explanation has been exhausted. In *The Reasonableness of Christianity*, he writes,

though it be easy to omnipotent power to do all things by an immediate over-ruling will, and so to make any instruments work, even contrary to their nature, in subserviency to his ends; yet his wisdom is not usually at the expense of miracles, (if I may so say) but only in cases that require them, for the evidencing of some revelation or mission to be from him (7.84-85)

With respect to the theory of perception, this theological attitude helps explain Locke's preference for Descartes's psycho-physical law by which one motion produces one sensation over a Malebranchean system according to which God does most of our cognitive

processing for us. Locke's relatively simple mapping from retinal imagery to our first visual ideas, followed by a natural process that works in accordance with principles of habit and association, gives God less to do in a way that fits with Locke's general physio-theological principles. Of course, all such considerations are at best suggestive and don't come close to proving that the first ideas we receive from sight are two dimensional.

3 From Realistic Paintings

3.1 *Confusion in Galleries*

Locke wrote most of the *Essay* while in exile in Holland at the tail end of the golden age of Dutch painting. He tells us that the idea we receive from viewing a globe, "is only a Plain variously colour'd, as is evident in Painting" (2.9.8). The last clause is often misread as 'evident *from* Painting,'⁹ which isn't what Locke says or means. He isn't offering an argument from painting to phenomenology. Rather, he's offering a phenomenological description, a description of how the globe seems. 'Evident' means *visible* here. What's visible when we look at a globe is like what's visible in a realistic painting of a globe.

Though *Essay* 2.9.8 doesn't contain an argument from painting, we could reconstruct one from some of Locke's remarks in "Of the Conduct of the Understanding." He wants to warn his readers of the cognitive dangers of associated ideas. Before we can be fully prepared "against this evil," Locke warns,

he that would cure it when habit has established it, must nicely observe the very quick and almost imperceptible motions of the mind in its habitual actions. What I have said in another place about the change of the ideas of sense into those of judgment, may be proof of this (3.277-78).

⁹ E.g. by A.D. Smith (487) and Bolton (1994: 80n20)

Locke refers back to his account of vision in order to defend his position that the association of ideas is ubiquitous and barely noticeable.

In reiterating his point, he writes,

let any one not skilled in painting be told, when he sees bottles, and tobacco-pipes, and other things so painted as they are in some places shown, that he does not see protuberances, and you will not convince him but by the touch: he will not believe that, by an instantaneous legerdemain of his own thoughts, one idea is substituted for another (3.278).

Some people, Locke tells us, need to touch certain paintings in order to be convinced that they're flat. He supposes that his description of gallery visitors supports his account that we move by unthinking custom from two-dimensional ideas of sight to ideas of three-dimensional objects. In both situations, "one idea is substituted for another" because of their "customary connexion" (ibid.). If the example supports that part of Locke's psychological theory, then it might support his doctrine that we see a two-dimensional array.

I don't think that Locke's example can justify his theories. Presumably, he's thinking that the initial idea of protuberance can't be acquired through sight, since, after all, the painting is flat. But since we eventually see the portrayed objects as three dimensional, what must be happening is the activation of a habitual association.

Of course, Locke's opponents who believe vision presents us with three-dimensional objects can give an account of the deception that is at least as plausible as his. They can just say that the mysterious process that takes us from the retinal images to consciousness gives ideas of three-dimensional objects when we look at fruit and also when we look at paintings of fruit. There's no paradox in saying that a flat object appears to have depth. Smith observes, "to say of a painting that it is *trompe l'oeil* is to say that it *looks* three-dimensional" (A.D. Smith 487). That's the phenomenon to be explained and, as Smith argues, nothing

about that phenomenon demands that we postulate a preceding consciousness of the painting as flat.

Realistic painting shows we can see a two-dimensional object as three-dimensional. Locke asserts is that we see three-dimensional objects as two-dimensional. The first proposition doesn't justify the second.

Locke doesn't deny that three-dimensional objects eventually produce ideas of three-dimensional objects, but he asserts that they produce these ideas through the intermediary of a two-dimensional array of ideas. The disagreement between Locke and his foes is not over whether a painting might be judged to have depth, but rather over whether the first ideas produced by sight are two-dimensional.

The details of the case tell against Locke, I think. He doesn't have in mind any old painting of breakfast, but rather a *trompe l'oeil* painting that can make us hesitate in our judgments about whether we're looking at something real or something painted on. Locke's claim that those not skilled in painting can't be verbally convinced that they aren't seeing bulges must be hyperbole. The chances mixing up paintings with statues or of seriously confusing paintings with what they depict is quite low. As Nelson Goodman writes,

the probability seldom rises noticeably above zero for even the most guileful *trompe-l'oeil* painting seen under ordinary gallery conditions. For seeing a picture as a picture precludes mistaking it for anything else; and the appropriate conditions of observation (e.g., framed, against a uniform background, etc.) are calculated to defeat deception (34-35).

Still, the first moment of sight may be a another matter. As Hanneke Grootenboer's writes, "Trompe l'oeils display objects so realistically painted that the distinction between reality and representation is beyond our perception—at least for a split second" (4). For present purposes, that's the important moment. When we look at a *trompe l'oeil*, the depicted object seems to be real and have depth in the first instance, and only later can we see the painting

as flat. This is the opposite of what Locke's theory predicts. Insofar as *trompe l'oeils* provide us with a crucial experiment to decide between his theory and his rivals', it seems to undermine his own view.

3.2 *Leonardo's Advice*

Locke tells us that sight presents us with ideas like those visible in painting. We've been considering paintings from the consumer's point of view. Perhaps it would be more helpful to look at them from the painter's point of view. At *Essay* 2.8.6, Locke offers an argument that "one may truly be said to see Darkness. For supposing a hole perfectly dark, from whence no light is reflected, 'tis certain . . . it may be Painted." The principle behind the argument is that whatever can be painted can be seen. It seems to follow from that principle that we can see the two-dimensional array before us. After all, we can paint it.

Elizabeth Anscombe quotes the *Essay's* discussion of globes and circles and suggests that Locke's variety of shadow and color

is what you'd get if, adopting the suggestion of Leonardo,¹⁰ you held up a glass pane vertically before you when you were looking straight ahead and supposed to be painted on it with utter accuracy *exactly* the colour behind it, as seen, in every part of it. The result represents what is thought of as the minimal, uninterpreted visual impression, which is the basis of all else (1981b 43).

Such a painting would "with a high degree of approximation" (Pirenne 170) replicate the distribution of light on the retina. Since retina imagery is the raw material from which vision is constructed, we should expect subjective similarities between looking at a painting that corresponds to this supposition and looking at the scene through an unpainted window.

¹⁰ "Perspective is nothing else than the seeing of an object behind a sheet of glass, smooth and quite transparent, on the surface of which all the things may be marked that are behind this glass" (Leonardo 992)

Of course, there are differences between an array of ideas and a painted windowpane. As Anscombe writes, “the pane would in turn be only an ordinary object of perception: it does duty for something else; it merely carries what *has to be understood as a picture of* a purely visual object” (1981b 43). There’s an old joke about Einstein’s explanation of radio. Imagine a giant cat with its head in New York and its tail in Los Angeles. You pull the tail in New York and the head meows in Los Angeles. Radio is just like that, only without the cat. The visual array is just like a painted pane of glass, only without the paint and without the glass.

Paintings, like retinas, don’t provide us with conclusive reasons to believe in a two-dimensional visual array. At most, they can help explain why someone expects to see a two-dimensional visual array. Leonardo’s sheet of glass would be irrelevant to Locke’s assertions if it didn’t correspond to something available to introspection. We could, Anscombe suggests (1981a 15-16), imagine someone (perhaps created by a Malebranchean God) who could see things as three-dimensional objects but who could not describe the scene as an array of colors and shadows. That is, the person would be able to see a brown dog on a purple mat, but wouldn’t be able to see what was before her as a plane of color patches.

We could even imagine someone producing realistic paintings by instinct and inspiration without being able to see color patches or Leonardo’s pane. After the painting is done, however, it’s hard to imagine someone having anything like our color vision and not being able to see the patches of paint. And anyone who can follow Leonardo’s advice would be able to see what’s before him as an array of color patches.

4 Justification by Introspection

As a matter of fact, many people who can't paint can see what is before them as a two-dimensional array. At least I can, and Locke could as well. He introduces the proposition that globes present us with an idea of a flat circle with the phrase "'tis certain," which is as close as he comes to directly offering a reason for it. It seems to me that Locke takes the existence of a two-dimensional visual array to be immediately obvious. Perhaps this is actually enough to justify a limited version of his thesis. We have first person authority on the question of what ideas we have. If Locke honestly reports that, on at least one occasion, vision presented him with the idea of a two-dimensional array, then there's no sense in denying his report.

Let me bring out two features of Lockean ideas in a way that makes it plausible that he was, indeed, sometimes presented with the idea of a variously colored flat circle when he looked at a uniformly colored globe. First, for Locke, an idea "is the immediate object of Perception, Thought, or Understanding" (2.8.8). We may extract the meaning of this definition from considering Locke's analysis of Malebranche's assertion that "when we perceive any sensible thing, there is in our perception sentiment and pure idea" (9.232). In reply, Locke writes,

If by 'sentiment,' which is the word he uses in French, he means the act of sensation, or the operation of the soul in perceiving; and by 'pure idea,' the immediate object of that perception, which is the definition of ideas he gives us here in the first chapter; there is some foundation for [the distinction between sentiment and idea] (9.232-33).

Locke goes on to argue that, given such a definition of ideas and the doctrine that we perceive all ideas in God, Malebranche would be committed to the result that color and scent are in God: "taken thus, I cannot see how it can be avoided, but that we must be said to smell a rose in God, as well as to see a rose in God; and the scent of the rose that we

smell, as well as the colour and figure of the rose that we see, must be in God” (9.233). The argument only makes sense if by ‘the immediate object of perception,’ Locke means what we smell, see, or perceive in some other way.

Malebranche’s definition of ‘idea’ in 3.2.1 of *The Search after Truth* is like Locke’s definition of idea in *Essay* 2.8.8. The distinction between the activity of the substratum of perception and the immediate object of perception is a good one, and I wish that Locke had heeded it more carefully throughout his work. In any case, I want to pick up the clue: what he means by the immediate object of perception, thought, or understanding is what we perceive, think, and understand (Chappell 27-35).

The second point to make about Lockean ideas is that they are as they seem (Bolton §4). Descartes had implicitly distinguished between two senses of sensing: “I see light, hear noise, feel heat. These are false, since I sleep. But I certainly seem to see, to hear, to feel, to be warm. This can’t be false; this is properly what in me is called ‘sensing’ (*sentire*)” (AT 7.29 CSM 2.19). Descartes’s implicit distinction between the improper and proper senses of *sentire*, corresponds to Anscombe’s (1981a) distinction between the material and intentional objects of sensation: the material object is the sensed external object (if anything), while the intentional object is what we seem to sense. Lockean ideas are like Descartes’s objects of sensing in the proper sense and like Anscombe’s intentional objects. They are as they seem to be. “For let any *Idea* be as it will,” Locke writes, “it can be no other but such as the Mind perceives it to be” (2.29.5). The ink on a page, he argues, makes the same idea as a perfectly dark hole (2.8.6). The relevant similarity is between what we seem to see when we look at ink spots and holes and not between ink spots and holes as they are in themselves.

Here is my defense of Locke: in many circumstances, it’s possible for a person to see what’s before her as a two-dimensional array of color patches. Once we realize that, which

we see is up to us. James Gibson asks us to consider “the railroad tracks extending to the horizon. They are ‘seen’ in one sense of that term to converge; they are ‘seen’ in another sense of that term *not* to converge. . . . By adopting the appropriate attitude, one can have either kind of visual experience” (149, see also Gombrich 327-29).¹¹ No doubt the world appeared to Locke as two-dimensional on occasion, and his autobiographical reports to that effect have first-person authority.

This is only a limited defense of Locke. I don’t think that he has shown that ideas of a two-dimensional array are always present or that they are temporally or epistemically prior to our perceptions of three-dimensional objects. Rather, I follow Gibson in thinking, “the resulting pictorial impression is not the *basis* of ordinary perception. . . . So far from being the basis, it is a kind of *alternative* to ordinary perception” (151).

According to E.H. Gombrich, “the total ambiguity of one-eyed static vision is logically compatible with the claims of geometrical perspective but incompatible with the idea that we ‘really’ see the world flat or curved” (393). His expression ‘total ambiguity’ surely goes too far. I once saw a rabbit through my front window, and I tried without success to see it as a duck. In some circumstances and for some people, it is close to impossible to see the world as an array of color patches. Only foolish and difficult concentration would allow someone to see two-dimensional arrays while walking down a busy sidewalk or when a pitched ball is nearing fast.

The invention of the stereoscope was important to the development of 19th century psychology mostly, as Nicholas Wade and Hiroshi Ono have argued (1985), because it

¹¹ J.L. Austin argued against thinking that the word ‘perceive’ is ambiguous (Austin 84-102; here I’m indebted to an anonymous reviewer of a companion paper). Anscombe (1981a 17) reports that Austin “remarked casually that there were perhaps two senses of ‘object of sight.’” I am with Austin on the semantic issues, but Gibson is right to point out that we can see railroad tracks as parallel and we can, if we choose, see them as converging at the vanishing point.

allowed for the manipulation of some of the empirical variables that produce depth perception, but partly, I think, because it's difficult to look into a stereoscope and see a two-dimensional array. That's the difficulty motivating Russell's quick rejection of the doctrine that we see a two dimensional array: "Berkeley's theory of vision, according to which everything looks flat, is proved false by the stereoscope" (51).

Even so, Gombrich and Gibson are right to think that we may, in most situations, see what is before us either as a two-dimensional array or as bodies in space. Wittgenstein maintains that a person needs to be aware of two alternatives in order to sensibly use the words 'seeing as' in a first person avowal. By way of example, he asserts that someone looking at a knife and fork wouldn't be able to meaningfully use the expressions "I see that now as knife and fork" or "that's now a fork for me" (195). I think that the ambiguity of vision extends to cutlery. With a little bit of exposure to epistemology or art theory, just about anyone can see what he sees to the left of the plate as either a fork or as a two-dimensional array of color patches.

I don't want to overemphasize the symmetry between the two ways of seeing. I agree with the modern consensus that untutored sight sees three-dimensional objects and depth. Dogs and cats see cats and dogs; they don't see color patches. Our ability to see color patches is a product of civilization—paintings, optics, and epistemology. I'm sure that in day-to-day vision, Locke's eyes presented him with three-dimensional objects. Only when he sat down to do epistemology did he see what was before him as an array of color patches.

Considerations from painting and the anatomy of the eye prodded Locke to think that vision presents us with a two-dimensional array and that this array is the basis of our further visual judgments. Because Locke believed that sensations come to us separately and in accordance with a simple psycho-physical rule, he was inclined to believe that our first

visual ideas correspond pretty directly to our two-dimensional retinal images. Because some of us can produce realistic paintings by painting color patches in the visual array, Locke inferred that we can come to have thoughts of depth after being presented with a two-dimensional array. But these considerations would have been inert if he couldn't see what he saw as a two-dimensional array of colors and shadows. Since he could, they were not.

Most epistemologists can see what is in front of them as an array of color patches. There's no reason to deny that Locke had that capacity as well. The alternative is to say that he didn't. Some argue that his assertion in *Essay* 2.9.8 that sight presents us with the idea of a circle variously shadowed when we look at homogeneously colored spheres is simply a mistake. Eric Schwitzgebel suggests that we can't see things as two-dimensional arrays, and suspects that

our inclination to regard the apparent shape of the coin as an ellipse and the farther lightposts as smaller—our inclination to attribute to visual appearances or visual experience what I'll henceforth call *projective distortions*—is due to *over-analogizing* visual experience to flat media such as paintings or snapshots" (2006 593).

The evidence that he gives for this thesis is the following conjecture: "Theorists writing in contexts where vision isn't typically analogized to two-dimensional, projective media will be *substantially less likely* to attribute projective distortions to visual experience than those analogizing vision to painting or photography" (ibid.). That is to say, in cultures where people compare appearances to paintings, they're more likely to say that pennies look ellipses.

By way of supportive examples, Schwitzgebel denies that either Plato or Aristotle "ever attributes projective distortions to visual appearances, though they do discuss various puzzles about perception" (2007: 594). I don't think this is right in the case of Plato, who argues in the *Republic* that paintings imitate appearances rather than the things which appear

(597e-598b), who compares the images of natural objects to shadows and reflections (509e-510a), and who has the prisoners in the allegory of the cave stare at shadows cast by statues on a wall (515a-c). Schwitzgebel would not, I take it, be rattled by these texts. For him, the fact that Plato and Locke both claim that appearances present us with something like what is evident in painting is evidence that they *didn't* see anything like that, since it's evidence that they were in the grip of a false analogy.

There's something fishy about this form of reasoning. Normally, if many people say that x is like y, it's evidence that x is like y, not that it isn't.

Let us examine Schwitzgebel's denial that he can see what's before him as a two-dimensional array: "For what it's worth, as I stare at the penny now, I'm inclined to say it looks just plain circular, in a three-dimensional space—not elliptical at all, in any sense or by any effort I can muster. I can't manage any Gestalt switch; I discern no elliptical 'apparent shape'" (2006 590). We might try to prod Schwitzgebel towards being able to see two-dimensionally. We might ask him to carry out Leonardo's thought experiment, or ask whether he can discern multiple apparent colors in a concave homogeneously colored object. But if all that fails, we have no reason to doubt his sincerity, any more than we have reason to doubt the sincerity of people who say they can't see the numbers in an Ishihara test for color blindness.

If the philosophical community can trust Schwitzgebel's ability to describe how things appear to him, then it ought to extend the same courtesy towards Locke (and to *me*). The principle of charity can be misused, and I do think that Locke is mistaken when it comes to ordinary unreflective sphere viewing. Still, when a great philosopher carefully and contemplatively describes what he finds inside his own mind, we should not dismiss it in a hurry. Philosophers of mind attempt to combine psychology, common sense, and logic. The

most important application of logic in this context is to reveal the logical form of psychological statements, that is to say, to elucidate the valid inferences that follow from psychological statements with a certain structure. As a matter of logical form, we would like to evaluate claims about intentional objects by the way their subjects take these objects to seem.

Schwitzgebel wants to show that introspection is unreliable, and his argument that people are mistaken when they claim that coins look elliptical is part of that larger project. I'm happy to grant him that we may be mistaken about our temperaments, our emotions, and our motivations, but I would like to hang on to first-person authority about contemporary appearances. Schwitzgebel and I are both struck by variations over time in reports of how things appear, but I take them to show the malleability and suggestibility of phenomenology, and he takes them to show that people can't be trusted about this sort of thing.

In the course of criticizing the reliability of introspection by appealing to such variations, Schwitzgebel criticizes the alternative interpretation that "people are more or less the same *except* when they introspect" (2008 264). This is my view, when it comes to visual appearances (for some kinds of introspection and some values of 'more or less'). Ordinarily, I say, everyone sees things as three-dimensional, but, in the right circumstances, introspection can transform what's seen into a two-dimensional array. Expectation and preconceptions can alter what we discover through introspection without thereby affecting ordinary experience. Let me reply to four objections Schwitzgebel offers against this view.

His first objection is that "the view concedes to the skeptic that we know little about ordinary, unintrospected experience since it hobbles the inference from introspected experience to experience in the normal, unreflective mode" (ibid.). That is, if introspection

is different from unreflective experience, then we can't know what happens in ordinary experience. But it isn't the case that we know about ordinary experiences by inferences from the special experiences we have when we pause and gaze inward. Rather, we know about our own ordinary experiences by undergoing them, and we know about the experiences of others by asking them about them. As I said, I agree with Schwitzgebel that in ordinary cases (*Mary's trying to figure out what she really wants to do with her life, John's wondering whether he's as quick-tempered as people say*) introspection is fallible and useful. The special case under examination in this paper--the careful study of the phenomenology of appearance--isn't the sort of thing that most people do outside of an art class. That we can't extrapolate from such studies to everyday life isn't a bullet to bite but is instead an interesting fact about the psychic world.

Second, Schwitzgebel argues that the view

threatens to make a hash of change in introspective opinion: If someone thinks a previous introspective opinion of hers is mistaken—a fairly common experience among people I interview . . . she must, it seems, generally be *wrong* that it was mistaken. She must, generally, be correct, now, that her experience is one way, and also correct, a few minutes ago, that it was quite another way, without having noticed the intervening change. This seems an awkward coupling of current introspective acumen with profound ignorance of change over time (2008 264-65)

Schwitzgebel's interviewees first report that a broad range of the visual field seems clear to them. He then convinces them that they can't make reliable judgments about shape and size outside a narrow focal area. After being taught this, most of them find that "the center of clarity is tiny, shifting rapidly around a rather indistinct background. My interlocutors—most of them—confess to error in having originally thought otherwise" (2008: 256).

According to Schwitzgebel, it's more plausible to think that his interviewees were previously mistaken when they thought they saw a large swath of the visual field clearly than it is to think that they are now mistaken when they say that they were previously mistaken

If we have to make a choice between the reliability of retrospective judgments about past appearances and the reliability of introspective judgments about contemporary appearances--and we do--I say that we ought to hang on to the introspective judgments about present appearances. Let us distinguish between objective visual clarity and subjective visual clarity. Objective clarity is the ability to make reliable judgments by sight about publicly recognizable features of external objects. Subjective clarity is the way things look when they seem (as a matter of phenomenology) to be seen clearly. A few experiments with playing cards can demonstrate that only a narrow portion of the visual field is objectively clear. If Schwitzgebel's interlocutors are confessing to the error of thinking that they had reliable access to shapes and colors outside a narrow field, that's progress in psychology. If they deny that a broader range ever *seemed* clear to them, then they have, I suspect, conflated subjective clarity with objective clarity. This is a failure of philosophy, not one of introspection.

Schwitzgebel's third objection is that "the view renders foolish whatever uncertainty we may sometimes feel when confronted with what might have seemed to be introspectively difficult tasks Why feel uncertain if the judgment one reaches is bound to be right?" (2008). By way of illustration, consider Anscombe's man who, when asked to describe the colors that he sees, replies, 'It's frightfully difficult, it all changes so fast, so many colours shifting all the time, I can't describe it, it doesn't stay long enough' (1981a: 15). Sometimes it's hard to describe what appears. To say that people's judgments of how things appear to them are trustworthy is to say that if a person can say with confidence how things appear, then they do appear that way to that person. It doesn't follow that the antecedent is true; that is, it doesn't follow that the person can readily say how things appear.

Fourth, Schwitzgebel argues that the view

suggests a number of particular—and I might say rather doubtful—empirical commitments (unless consciousness is purely epiphenomenal): major differences in actual visual acuity while introspecting between those reporting broad clarity and those reporting otherwise; major differences in cognition while introspecting between people reporting a phenomenology of thought and those denying it; and so on (265).

That is, if introspection narrows the range of subjectively clear visual field in some people but not in others, then we would predict that the people with the narrower subjectively clear field would also have a narrower objectively clear field. Schwitzgebel doesn't think that that such predictions will be borne out.

I don't see the attraction in the premise that differences in phenomenology must correspond to differences in cognitive capacity. I wouldn't expect that someone who feels a certain buzz while adding numbers to add more or less reliably than someone who doesn't. The usual form of glaucoma occurs slowly, without the victims' recognizing that their vision has gotten worse. Glaucoma patients often don't believe that they have the disease. So, for example, one patient "said that the doctors told him his eyesight was getting worse—and they must know since they went to school, he said with an ironic laugh. But he said, his eyesight is not getting worse, and he demonstrated this fact by reading a few letters from a piece of paper he was carrying" (Kugelmann and Bensinger 321-22). Coming to believe a diagnosis of glaucoma may make the world seem newly cramped, but I don't think it would change a patients' visual acuity.

Set aside my doubts about Schwitzgebel's premise that a difference in phenomenology always corresponds to a difference in ability. Consider the ability to see the world as a two-dimensional array. We would expect the ability to carry out Leonardo's thought experiment to be a useful aid to the painter and to the photographer. In a similar manner, being able to see a chessboard as an assemblage of threats and strong points helps the chess player, and being able to see an image from a super-collider as tracing the paths of

sub-atomic particles helps the physicist. Often, seeing the world in a different way does correspond to a difference in capacity.

5 Our Problem Solved

Let me return to the puzzle I began with. In the eighteenth and early nineteenth century, almost everyone thought that what we see is obviously two-dimensional and in the twentieth century almost everyone thought that what we see is obviously presented with depth. How was that possible? It was possible because it's possible to see what's before us in either way. When we see things in one way, we have first person authority that we are seeing things in that way, so a person's view's about the immediate object of sight will seem not only right, but obviously right. Since one way of seeing drives out the other, at least for the moment, philosophers and psychologists might think that alternatives are obviously wrong.

The fact that the blind spot was discovered late in the history of civilization, the fact that we don't notice our own blinking, the fact that glaucoma patients are slow to admit that they are losing peripheral vision, and the fact that a broad range of the visual field is subjectively clear though only a narrow region is objectively clear all illustrate the *modus operandi* of the human visual system: it receives fragmentary neural stimuli and presents continuous and detailed appearances without revealing the gaps in input. Sometimes, when the input is ambiguous in the right way, the visual system may present one of two incompatible appearances. In some of these cases, the subject may be able to move from one of these appearances to the other through an act of will. In other cases, other cues may determine what the subject sees.

Aspect perception is susceptible to contextual prodding. If we expect a duck we're more likely to see a duck. Children are more likely to see duck-rabbits as rabbits on Easter

Sunday (Brugger and Brugger, 1993). If you see a duck-rabbit in a sequence of unambiguous ducks, it will look like a duck (Long and Toppino 2004 757-58). Since aspect perception is subject to societal pressure, it is subject to fads and fashions. Psychologists and philosophers in the eighteenth century were taught by Locke and others that vision presents them with a two-dimensional visual array, and they saw what they expected to see.

So what we think we see depends on what we expect to see, and, when it comes to our ideas, what we think we see is what we actually see. Locke's historical, plain method turns out to be partly a matter of description and partly a matter of invention. The fat fingers of introspection aren't supple enough to pick up unmodified perceptions.

Bibliography

- Anscombe, G.E.M. 1981a. "The Intentionality of Sensation: A Grammatical Feature," in *Metaphysics and the Philosophy of Mind*, vol. 2 of *Collected Philosophical Papers*, Minneapolis: University of Minnesota Press.
- 1981b. "Substance," in *Metaphysics and the Philosophy of Mind*, vol. 2 of *Collected Philosophical Papers*, Minneapolis: University of Minnesota Press.
- Austin, J.L. 1962. *Sense and Sensibilia*, edited by G.J. Warnock, Oxford: Oxford University Press.
- Berchielli, Laura 2002. "Color, Space, and Figure in Locke: An Interpretation of the Molyneux Problem," *Journal of the History of Philosophy*, **40**: 47-65.
- Bolton, Martha Brandt. 1992. "The Epistemological Status of Ideas: Locke Compared to Arnauld," *History of Philosophy Quarterly* **9**: 409-24.
- 1994. "The Real Molyneux Problem and the Basis of Locke's Answer," in G.A.J. Rogers (ed.). *Locke's Philosophy: Content and Context*. Oxford: Clarendon Press.

- Bréhier, Émile 1938. “Les ‘jugements naturels’ chez Malebranche,” *Revue philosophique de la France et de l'étranger* **125**: 142-50.
- Brykman, Geneviève 1991. “Sensible communs et sens commun chez Locke et Berkeley,” *Revue de métaphysique et de morale* **96**: 515-29.
- Chappell, Vere. 1994. “Locke’s Theory of Ideas,” in *The Cambridge Companion to Locke*, edited by Vere Chappell. Cambridge: Cambridge University Press.
- Gibson, James J. 1952. “The Visual Field and the Visual World: A Reply to Professor Boring,” *Psychological Review* **59**: 149-51.
- Gombrich, E.H. 1961. *Art and Illusion: A Study in the Psychology of Pictorial Representation*, second edition. Princeton: Princeton University Press.
- Goodman, Nelson 1976. *Languages of Art: An Approach to the Theory of Symbols*, second edition. Indianapolis: Hackett Publishing.
- Grootenboer, Hanneke 2005. *The Rhetoric of Perspective: Realism and Illusionism in Seventeenth-Century Dutch Still-Life Painting*. Chicago: University of Chicago Press.
- Hardin, C.L. 1988. *Color for Philosophers*. Indianapolis: Hackett Publishing.
- Hatfield, Gary C. and William Epstein 1979. “The Sensory Core and the Medieval Foundations of Early Modern Perceptual Theory,” *Isis* **70**: 363-84.
- Kugelman, Robert and Richard E. Bensinger 1983. “Metaphors of Glaucoma,” *Culture, Medicine, and Psychiatry* **7**: 313-28.
- Leonardo da Vinci 1954. *The Notebooks of Leonardo da Vinci*, edited and introduced by Edward MacCurdy. New York: George Braziller.
- Lievers, Menno 1992. “The Molyneux Problem,” *Journal of the History of Philosophy*, 30, 399-416.

- Long, Gerald M. and Thomas C. Toppino 2004. "Enduring Interest in Perceptual Ambiguity: Alternating Views of Reversible Figures," *Psychological Bulletin* **130**: 748-68.
- Matthews, H.E. 1971. "Locke, Malebranche, and the Representative Theory," *Locke Newsletter* **2**: 12-21.
- Pirenne, M.H. 1952. "The Scientific Basis of Leonardo da Vinci's Theory of Perspective," *The British Journal for the Philosophy of Science* **10**: 169-85.
- Russell, Bertrand 1948. *Human Knowledge: Its Scope and Limits*. New York: Simon and Schuster.
- Schwitzgebel, Eric 2007. "Do Things Look Flat?," *Philosophy and Phenomenological Research* **77**: 589-99.
- 2008. "The Unreliability of Naive Introspection," *The Philosophical Review* **117**: 245-73.
- Smith, A.D. 2000. "Space and Sight," *Mind* **109**: 481-518.
- Smith, Norman 1905. "Malebranche's Theory of the Perception of Distance and Magnitude," *British Journal of Psychology* **1**: 191-204.
- Wade, Nicholas and Hiroshi Ono 1985. "The Stereoscopic Views of Wheatstone and Brewster," *Psychological Research* **47**: 125-33.
- Wittgenstein, Ludwig 1958. *Philosophical Investigations*, third edition, translated by G.E.M. Anscombe. New York: Macmillan.